ESCAMBIA COUNTY DEPARTMENT OF PUBLIC SAFETY
2019 Medical Protocols

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May 2019 Version 1.0

Effective date: June 1 2019

Medical Director:_____
Rayme Edler M.D.

ACKNOWLEDGEMENT

This protocol set could not have been accomplished without the help and support from Dr. Edler's mentor and previous medical director, Dr. Kim Landry. Dr. Landry, a long-time member of the local Fire and EMS community has once again aided our community with deployment of this protocol set. Dr. Landry has been gracious to provide his guidance and insight in this endeavor. Dr. Edler would like to extend her thanks to the many Escambia EMTs and Paramedics who have provided their insight to this project.

This Edition of Protocols has been reviewed and approved by Dr. Edler. This Edition, as well as the future Edition will vary only slightly in format but retain all the needed information. Future Editions will focus on simplicity of use. Contained in this volume are protocols and procedures that are not currently permitted in Escambia County. If the item has a ~~strikeout~~, it is not an approved procedure or protocol for Escambia County Medical Providers currently.

Dr. Edler continues to develop and produce a protocol set specifically designed for the needs of Escambia County. The consumer needs to understand that the formation and development of protocols takes hundreds of man hours with the assistance from groups of physicians comprised of EMS regions. This undertaking is monumental during normal, ordinary situations. Due to this enormous scope of creating a protocol set that contains up to date medical practice that is accordance with standard of care, we will be using this version until the Escambia County Common Protocol Set Version 1.0 is released

Figure 1Dr. Kim Landry

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Additional Drip Charts:

Amiodarone IV Drip Chart 450 mg
Amiodarone IV Drip Chart 900 mg
Diltiazem Drip 125 mg
Dobutamine 1000 mg
Dobutamine 500 mg
Dopamine 800 mg
Epinephrine IV 2mg
Esmolol 2.5 gm
Heparin 25,000 units (units per hour)
Heparin 25, 000 units (units/kg/hr)
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Aromatic Hydrocarbons (Benzene, Toluene, Xylene)	**Guide 2- Blue**
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Ethylene Glycol	**Guide 6- Pink**

Ethyl Isocyanate	**Guide 1- Yellow**
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Hydrogen Cyanide	**Guide 5- Red**
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Methylene Dilsocyanate (MDI)	**Guide 1- Yellow**
Mustard (Sulfur Mustard)	**Guide 1- Yellow**
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1.1 General Issues for Paramedics and EMTs

1.1.1 Intent and Use of these protocols:

Purpose: To define who is allowed to use the ECDPS protocols and identify any restrictions.

Policy:

1. The following medical protocols are to be used by ECDPS Medical Personnel including, EMTs, EMT-I (if recognized by the state), AEMT (if recognized by the state), Paramedics, and Flight Nurses, who hold a valid and current license or certificate from the state EMS office or the National Registry EMT office.
2. The purpose of these protocols is to serve as guidelines for evaluating and treating patients in the out-of-hospital (pre-hospital or interfacility transfer) setting. It is not possible to address every possible variation of disease or traumatic injury, but these protocols and procedures will apply to the vast majority of patients we encounter. If and when a situation is encountered that is not clearly covered by a protocol or procedures, contact medical control (ED MD, Sending MD, Receiving MD, EMS Medical Director) for clarification or assistance. Any orders provided must be within the scope of practice of the individual calling for the advice/assistance.
3. All ECDPS Medical personnel should become very familiar with the protocols and the reason for their use.
4. These protocols are copyrighted and are the intellectual property of Dr. Kim Landry. Dr. Kim Landry has authorized Escambia County EMS to utilize the protocol set with the stipulation that any modification or adjustment be limited to the two persons he selected.

4a. Do not perform any step or steps in any standing order or protocol (particularly the procedure protocols) if you have not been trained to do so.

5. These standing orders and protocols are to be followed only while on duty with and working for Escambia County Dept. Public Safety
6. Protocols are divided into the following three parts:
    a. **Basic Level care: Actions authorized for the EMT or Paramedic that are supportive in nature. EMT (BLS), EMT and paramedic (BLS and ALS) actions are specified within each of these protocols.**
    b. **ALS Level 1: Actions authorized only for the paramedic prior to physician contact. EMT can start IVs and may be allowed limited pharmacologic authorization. EMTs who successfully completed an IV course and signed off by a field training officer or supervisor, can start and monitor an unmedicated IV (in some states).**
    c. **ALS Level 2: Actions authorized only for the paramedic that require a physician consult.**
7. Some patients may require treatment not specified herein. The treatment protocols should not be construed as prohibiting such flexibility. The paramedic must use his/her judgment in administering treatment in the following manner:
    a. The paramedic may determine that no specific treatment is needed; or
    b. The paramedic may consult medical direction before initiating any specific treatment; or
    c. The paramedic may follow the appropriate treatment protocol and then consult medical direction.

d. The paramedic may contact medical direction at any time he/she deems necessary.

8. When the paramedic/EMT is unable to contact other forms of medical direction, he/she may contact the receiving hospital for consultation with the emergency department physician. It is recommended that the paramedic/EMT make contact with the physician for consultation on complicated patients whenever possible. When the paramedic is unable to make contact with a physician for medical direction, the paramedic may administer BLS treatment according to his/her judgment. In this instance, the paramedic may administer ALS treatment only as authorized in the treatment protocols.
9. Many of the protocols will include additional medications not routinely carried on the units. In addition, some of the procedures suggested are beyond the scope of EMTs and paramedics. You are to perform only those procedures within the scope of your training and use those medications available to you. The additional medications and advanced procedures are to cover other critical care specialist who may on occasion accompany a patient on transfers and who have been provided the additional medications and equipment by the transferring facility.
10. Transport destination determination may include hospital and freestanding emergency departments
11. The name of the physician authorizing ALS Level 2 orders must be documented in the patient care report (PCR). Physicians authorized to approve ALS Level 2 orders include the following individuals:
    1. EMS provider's medical director via Dispatch(a).
    2. Receiving hospital emergency department physician (a).
    3. Physician present in his/her own office (b).
    4. Online medical control physician (a).
    5. Bystander physician personally known to the paramedic (c).
    6. Bystander physician who presents a valid M.D. or D.O. (c).
    7. Poison information center (d).

    Note:

    (a)) Contact for ALS Level 2 orders by the EMS provider's medical director, online medical control physician, or emergency department physician should be initiated in the following order:
        1. Cell Phone contact via Escambia County PSAP **850.471.6300**
        2. Telephone contact via Escambia County PSAP **850.471.6300**
        3. Relay of information via dispatch.

    (b) Only verbal or written orders that are signed by the physician that are given directly to the paramedic by a physician in his/her office are acceptable.

    (c)) A bystander physician, as described above, must accept full responsibility for patient care and accompany the patient in the ambulance to the hospital to give Level 2 orders.

    (d) The Poison Information Center is authorized to direct all medical care (Supportive Care, ALS Level 1, and ALS Level 2) for the toxicology and hazardous material exposure patient. **The Poison Information Center must be contacted via telephone at 800-222-1222**

1.1.2 Definitions:

1. **Advanced (Critical Care) Paramedic** - Person currently registered as an EMT-Paramedic by the Department of Health who has completed an approved Critical Care Transport course such as the CCEMT-P course (or equivalent) and who has been approved by the medical director to function at this advanced level of care.
2. **ALS call/run**: Patient's condition may require advanced pre-hospital care and ALS interventions such as IV therapy, cardiac monitoring, and drug administration, advanced airway management (oxygen beyond nasal cannula or simple face mask). Paramedic or critical care nurse will provide care. EMT-basics may assist as needed.
3. **AMA (Against Medical Advice)**: A competent patient (see definition of patient below) who was informed to the best of an EMT, Paramedic or Medical Control MD's ability, the risk/benefit of refusing vs not refusing transport to a hospital, including evaluation and treatment from a physician, for an injury or illness. The patient has the capacity to refuse and is willing to accept the risk of further deterioration of their condition which could lead to permanent disability and/or death. See AMA / REFUSAL (Capacity to refuse)
4. **BLS call/run**: Patient's condition requires basic monitoring of vital signs, oxygen by nasal cannula or simple face-mask, suctioning of oral cavity, simple splinting and immobilization. Care can be provided by an EMT-basic. See EMT-B protocol below
5. **Capacity**-- refers to the intact ability to respond to a particular situation with appropriate appreciation and to act in one's own self-interest. A person may lack capacity for a number of different reasons: memory impairment (e.g. Alzheimer's Disease), inability to read or understand language (e.g. stroke), loss of brain functions related to judgment and planning and initiative (e.g. frontal lobe disorders), hopelessness and loss of self-worth (e.g. depression), altered mental status related to mind altering substances (e.g. alcohol, drugs, carbon monoxide). A person with otherwise intact mental faculties may have capacity compromised by "undue influence."
6. **Competency** (or competence) --refers to the determination that a person retains the capacity for a specific action. Competency **is a legal determination** that addresses societal interest in restricting a person's right to make decisions or do acts because of incapacity. The fundamental issue is whether the person can be held accountable for the consequences of his or her decisions and actions.
7. **Critical Care Transport call/run**: Patient's condition fits the criteria of a critical care patient as per Critical Care Protocol 1.3.10 which entails the services of critical care trained paramedics or nurses when available. When critical care trained paramedic or nurse is not available, the medical director may direct, guide, and/or monitor via telemedical services or radio communications with an ALS paramedic or nurse, the care of a patient during transport. This type of transport may also require additional manpower to manage patient during transit.
8. **Critical Care Transport/Flight Nurse**: Registered nurse with 2 years critical care experience and current in ACLS, and PALS (or equivalent). Must be approved by medical director. Flight nurses should have basic knowledge of flight physiology.
9. **AEMT (or EMTA)** – An EMT who has received training above the level of an EMT-B. "Advanced Emergency Medical Technician (AEMT)" means a person who has successfully completed the Advanced Emergency Medical Technician training course,

has qualified by examinations to perform pre-hospital emergency patient care, and provides basic and limited advanced emergency medical care, under medical direction, pre-hospital and during transportation for critical, emergent, and non-emergent patients who access the emergency medical system

10. **EMT-B** - Person currently registered as an EMT-Basic by the Department of Health and/or the National Registry for EMTs (NREMT).
11. **EMT-I** - Person currently registered as an EMT-Intermediate by the Department of Health and/or the National Registry for EMTs (NREMT). Some areas are phasing out EMT-I and only recognizing Advanced EMTs (or AEMT)
12. **EMT-P** - Person currently registered as an EMT-Paramedic by the Department of Health and/or the National Registry for EMTs (NREMT). Paramedics with ECDPS, must keep current with BCLS, ACLS and encouraged to be current in ITLS and PALS (or equivalent) standards and certification.
13. **Flight Physician**: A board certified physician (in emergency medicine or other specialty depending on patient's need) approved by the medical director to accompany a patient and serve as a consultant to the medical crew during transfer from one facility to another. Physician should have some knowledge of basic flight physiology. Physician is available for advice and/or assists the medical crew as needed in managing the patient. Physician may be called upon to perform advanced procedures such as endotracheal intubation, chest needling, etc.
14. **Guardian**: Individual appointed by the court to make decisions for a patient/person deemed incompetent. Sometimes is referred to as a "Conservator of the patient (Note: conservator of the estate can only handle financial matters and not patient healthcare decisions).The request for treatment or no treatment (transport or no transport) should be honored regardless if patient agrees. See A patient with a Living Will, Power of Attorney, Guardianship protocol for further description.
15. **Healthcare Surrogate**: see power of attorney below
16. **On-line medical control** - Medical direction of pre-hospital ALS activities by direct radio, telephonic, or telemedical communications with an on-line medical control physician. This could be an ED physician, the sending MD, the receiving MD, or the EMS Medical Director (or his/hers designee).
17. **Patient**: A person will be considered a patient if: 1) a request (via first party caller) for medical assistance is made by an individual (or guardian/parent) for a perceived illness or injury. 2) Person who denies or declines medical assistance but with obvious signs and symptoms of an illness or injury (i.e. very minor MVA but reporting a little soreness in neck. Person claiming, they are fine but sweating profusely and clutching their chest) 3) Person who denies/declines medical assistance, denies injury or illness, but the circumstances or mechanism suggest possibility or potential for a medical condition or injury (i.e. MVA with major damage but patient has no complaints or obvious signs of injury. Patient with no complaints after being pulled from a burning

building but had risk of high CO exposure).
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18. **Power of Attorney/Healthcare Surrogate**: An individual chosen by patient (to make decisions on behalf of the patient when the patient later becomes incompetent or incapacitated. Request of a POA or Healthcare surrogate only apply when patient him/herself is incapacitated at the time of the request. See; A patient with a Living Will, Power of Attorney, Guardianship protocol for further.
19. **Protocols** - Guidelines for pre-hospital patient care. Orders not requiring medical control for approval prior to initiating are "standing orders" and may be undertaken before contacting on-line medical control.
20. **Respiratory Therapist**: Certified/Registered Respiratory Therapist knowledgeable in treating patients with severe respiratory conditions that may be on a ventilator. Respiratory therapist will on occasion accompany paramedics and/or flight nurses in caring for patients on ventilators.
21. **Standing orders** - Advanced life support interventions, which may be undertaken before contacting on line medical control.

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Quality Assurance/Quality Review: ***Clinical Quality Assurance and Quality Improvement***

Purpose:

To develop and implement a patient care quality assurance system to assess the medical performance of paramedics and EMTs. To stay in compliance with Florida State Regulations for Emergency Medical Services per Chapter 64J-1.004(4b). As public safety personnel we are the patient's advocate. Delivering high quality prehospital emergency care to individuals living in and visiting Escambia County is our number one mission. Our sense of purpose will be reflected solely in our time sensitive, medically sound, respectful and compassionate delivery of prehospital care.

Scope:

All Escambia County (EC) Public Safety EMTs and Paramedics shall adhere to this procedure. All Supervisors and/or Command Staff are tasked with ensuring employees are in compliance with this procedure. All EC Public Safety Emergency Medical personnel are allowed to practice their scope of medicine at their EMT or Paramedic level of training; but do so only under the license of a medical physician. EC Public Safety personnel will provide prehospital care according to the EC Public Safety Emergency Medical Protocols and Clinical Policies and Procedures as written by the Medical Director. When a patient or clinical situation does not fit into an established EC Public Safety Emergency Medical Protocol or Clinical Policies and Procedures, the EMT/Paramedic on scene shall treat the patient in accordance with the routine Adult/Pediatric Assessment or Trauma Care protocols in the best interest of the patient. Medical Control may be contacted for further instructions. Deviations from protocol, when clinically indicated, shall be documented in the patient care report.
If you have questions about your scope of practice as an EMT or Paramedic or do not understand any of the EC EMS Protocols, then contact the Office of the Medical Director for direction in further training and support. Public Safety will facilitate a continuing education environment so that you may be proficient in your skills and a leader in Emergency Medicine.

Policy:

QA reviews shall be initiated based on any one or more of the following:

1. Complaints from:
    a. Patients; Family Members; EMS/Fire/LifeFlight Administration; Crew Members; Hospital Personnel; Bystanders with direct knowledge of alleged concern.
    b. Case Reviews
    c. Routine electronic patient care report evaluations or index case reviews
2. Key performance or clinical benchmarking indicator tracking (e.g. EtCO2, airway signatures, protocol compliance)
3. Investigations conducted by EMS/Fire/LifeFlight Administration for violations of policies and procedures.

<u>Reporting:</u>

Clinical reporting shall be sent to the Medical Director via rmedler@myescambia.com and should include:

1.) Item number
2.) Concerns for Reporting Party
3.) Statements from crew, as appropriate

"Near-miss" reporting can be highly valuable for predicting future problems. Near misses should be reported to the Medical Director via rmedler@myescambia.com so that it may be identified and addressed.

Escambia County Public Safety Emergency Services and the Office of the Medical Director encourages the **self-reporting** of any errors and there will be no punitive action(s) taken provided that the error was:

1.) Reported promptly
2.) Was not deliberate
3.) Did not constitute a criminal offense
4.) Was not the result of incompetence or negligence; and
5.) Did not constitute a repetitive pattern

Upon the reporting of an error, an appropriate investigation of the details will be conducted, the goal of which is to learn about the event and not necessarily the provider's individual performance.

Evaluation and Review:

Once a case has been initiated, a Quality Assurance/Quality improvement file will be opened in the employee's name. It will then be the determination of the Clinical Officer, in conjunction with the Medical Director, if the medical protocol violated is deemed a violation. The matter may be closed after case review or directed for review by a Clinical Peer Review Board.

In certain instances, it may be necessary for the Medical Director to restrict the clinical privileges of the provider pending the completion of a full investigation.

The Clinical Peer Review Board may be made up of the following members:

1. Emergency Medicine Medical Director(s)
2. Training Officer / Safety Officer
3. Field Training Officer / EMS Supervisor
4. Specialty Paramedic or EMT as needed
5. Others as appointed by the above members

Findings from the Clinical Officer(s) or the Clinical Peer Review Board shall be forwarded to the Medical Director of Public Safety for final disposition. The Medical Director may exercise one or more of the following actions:

1. No action taken/matter resolved
2. Remediation training
3. Clinical Improvement Plan
4. Suspension of Clinical Privileges

Isolated protocol violations may not necessarily result in disciplinary action and the clinical review process will focus on clinical review and education for the medical provider.

While the focus on the Clinical Peer Review Board is for quality assurance and quality improvement; major or repetitive violations, or failure to adequately progress through the remediation process may be referred to Operations for review and progressive disciplinary action.

It is the intent of clinical review to improve patient care and clinical operations, not to discipline the employee.

Clinical Remediation

Purpose:

To ensure the best quality of patient care. The Public Safety Medical Director shall lead the remediation process. At any time, after clinical review, an EMT or Paramedic employed by Escambia County may enter a clinical remediation program.

Scope:

All Escambia County Public Safety EMT's and Paramedics shall adhere to this procedure. All supervisors and/or command staff are tasked with ensuring employees are in compliance with this procedure.

Policy:

The remediation process shall include a written clinical improvement plan for the review of the employee's clinical deficiencies, noted areas for improvement and expected outcomes or improvements. Remediation may involve:

1. Classroom training
2. Simulation
3. Skills checkoff
4. Remediation shifts with Training Officers and/or the Medical Director

Remediation shifts with a Training Officer shall involve at least two different officers and/or the Medical Director prior to completion of the remediation training.
In an event that the employee is unable to complete the clinical remediation process to a satisfactory degree as documented in the clinical improvement plan, the employee may face suspension of clinical privileges, demotion or termination.
It is the intent of clinical review and clinical remediation to improve patient care and clinical operations, not to discipline the employee.

SELF REPORTING OF CLINICAL / MEDICAL ERROR

Purpose

To ensure continuous quality improvement, it is important to allow our errors to drive our improvement without an unnecessary focus on punishment for simple errors. Using this approach, we can learn from our mistakes, make the necessary changes to prevent their recurrence, and progress forward into a stronger service with an emphasis on patient safety.

Application

Errors happen in any field, but repeating the same errors makes the problem more serious. Hiding those errors compounds their effects. Examples include medication/dosage errors, unexpected complications or patient care concerns.

Members are encouraged to self-report any errors and there will be no punitive action(s) taken provided that the error was:

1. Reported promptly
2. Was not deliberate
3. Did not constitute a criminal offense
4. Was not the result of incompetence or negligence; and
5. Did not constitute a repetitive pattern

Upon the reporting of an error: investigation into the event to gather details of the occurrence and not focus on the individual medic's performance.

Most errors are linked to a breakdown in systems, not individuals. These system errors require teamwork to prevent future ones by:

- Reporting suspected or actual errors/incidents
- Identifying processes that led to the event
- Creating and implementing corrective action plans.

The end goal is to learn about the mistake for the benefit of the medical system. These results will drive future training, needed remediation, protocol changes and changes to the Clinical Policies and Procedures if needed.

In the event that a known error is uncovered without any attempt at self-reporting on the medic/EMT's part, then the usual disciplinary action will commence as deemed by EMS administration.

Disciplinary action is strictly reserved for:

- Willful disregard
- Wrongful intent, and
- Purposeful noncompliance with reporting procedures.

	Escambia County Department of Public Safety	
	Subject: Securing Controlled Medications	**Policy Number:**
	Created by: Rayme M. Edler M.D., Medical Director	**Issue Date:** SEE MGT
	Approved by: Russell Nail, Chief of EMS and Fire	**Effective Date:** SEE MGT
	Amended by:	**Amended Date:**

1.1.3 CONTROLLED SUBSTANCE USAGE/DOCUMENTATION

Purpose:

To establish a clearly defined procedure for the safe and secure handling, administration, documentation and restocking of controlled medications. This policy shall encompass controlled narcotic medications such as Lorazepam (Ativan), Midazolam (Versed), Morphine (Morphine Sulfate), and Sublimaze (Fentanyl) as well as controlled non-narcotic medications for Rapid Sequence Intubation (RSI) such as Ketamine (Ketalar), Etomidate (Amidate), Succinylcholine (Anectine), and Rocuronium (Zemuron).

Scope:

All Escambia County (EC) Public Safety EMTs and Paramedics shall adhere to this policy. All Supervisors and/or Management are tasked with ensuring employees are in compliance with this policy.

Policy:

I. Obtaining, Logging and Securing Controlled Medications:

A. Post 10:

Upon arrival for duty, the crew shall:

Obtain ambulance keys, with 2 (two) controlled medication locker keys attached, from the on-duty logistics clerk.

Each crew member will attach a key to their person via the carabiner. This key Shall remain on the crew member at all times

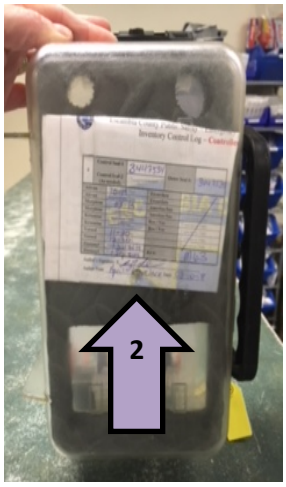
The paramedic will present his/her county issued ID to the on-duty logistics clerk, for scanning, and will receive the controlled medication kit.

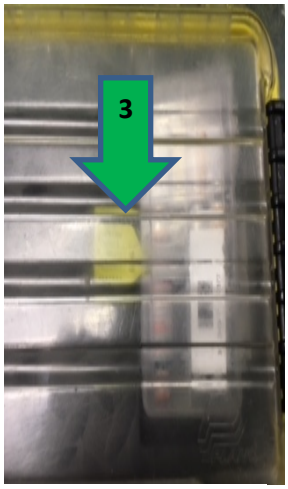
Upon receipt of the controlled medication kit, the paramedic will

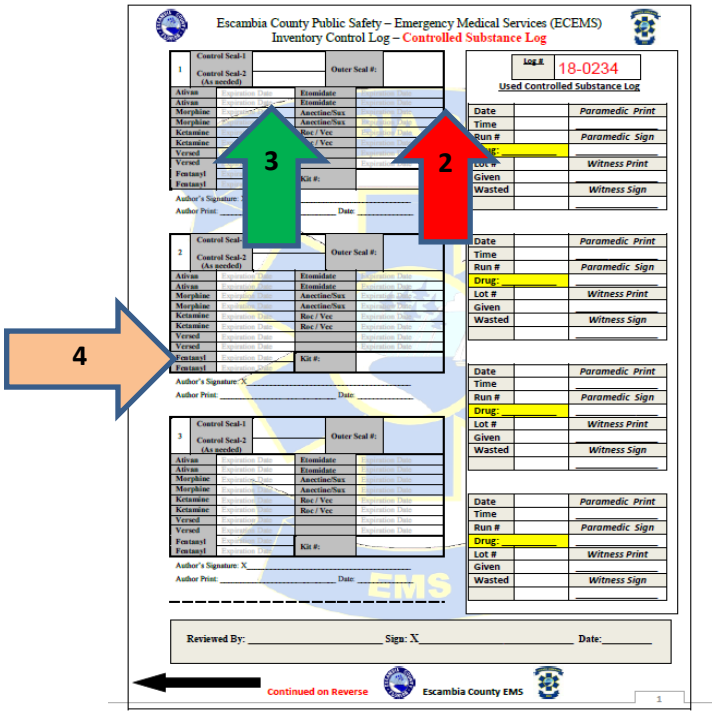
1. Locate outer yellow seal, ensure that it is intact.

2. Locate the Controlled Substance Inventory Control Log on the underside of the controlled medication kit. Verify that the number on the yellow seal matches the number documented on the Controlled Substance Inventory Control Log.

3. Locate the yellow control seal, which is located inside the controlled medication kit and seals the narcotic box. Verify that the number on the yellow seal matches the number documented on the Controlled Substance Inventory Control Log.







4. Verify quantity of medication and expiration dates of the medications to the dates recorded on the Controlled Substance Inventory Control Log.

Approved quantity of medications for **standard drug kits**:

1 vial - Morphine (Morphine Sulfate) 10mg - (10mg/ml vial)
1 vial - Lorazepam (Ativan) 2mg – (2mg/ml vial)
2 vial - Midazolam (Versed) 5mg – (5mg/ml vial)
2 vials - Fentanyl (Sublimaze) 200mcg – (100mcg/ml vial)
1 vial – Ketamine (Ketalar) 500mg – (500mg/5ml vial)

5. Secure the controlled medication kit in the on-board refrigerator and lock the lockbox using each crew members key.

B. Post 50:

Upon arrival for duty, the crew shall obtain ambulance keys from the lockbox located in the office.

The paramedic will open the file cabinet via combination lock (contact on-duty Shift Supervisor for the code)

Retrieve the refrigerator key from the top drawer of the file cabinet, unlock the refrigerator, collect the controlled medication kit for the assigned shift and:

1. Locate outer yellow seal, ensure that it is intact.

2. Locate the Controlled Substance Inventory Control Log on the underside of the controlled medication kit. Verify that the number on the yellow seal matches the number documented on the Controlled Substance Inventory Control Log.

3. Locate the yellow control seal, which is located inside the controlled medication kit and seals the narcotic box. Verify that the number on the yellow seal matches the number documented on the Controlled Substance Inventory Control Log.

4. Verify quantity of medication and expiration dates of the medications to dates recorded on the Controlled Substance Inventory Control Log.

Approved quantity of medications:

2 vials - Morphine (Morphine Sulfate) 40mg - (10mg/ml vial)
2 vials - Lorazepam (Ativan) 8mg – (2mg/ml vial)
2 vials - Midazolam (Versed) 20mg – (5mg/ml vial)
4 vials - Fentanyl (Sublimaze) 400mcg – (100mcg/ml vial)

If the yellow "outer seal" number on the controlled medication kit and the documented "outer seal" number on the Controlled Substance Inventory Control Log match and all medications are present and have not expired,

1. Contact the on-duty logistics clerk via phone with the following information:

   a. Paramedic name and shift number that is being covered

   b. Yellow outer seal number on the controlled medication kit

2. Secure the controlled medication kit in the on-board refrigerator and lock the lockbox using each crew members key.

C: Walnut Hill:

D. ECFR ALS Staffed Stations:

Shift Change with Fire Medic On-Duty

Upon arrival for duty, the Fire Medic shall:

Obtain the keys to the controlled medication cooler, carabiner with 2 keys attached, from the on-duty Fire Medic.

Retrieve the controlled medication kit from the apparatus cooler.

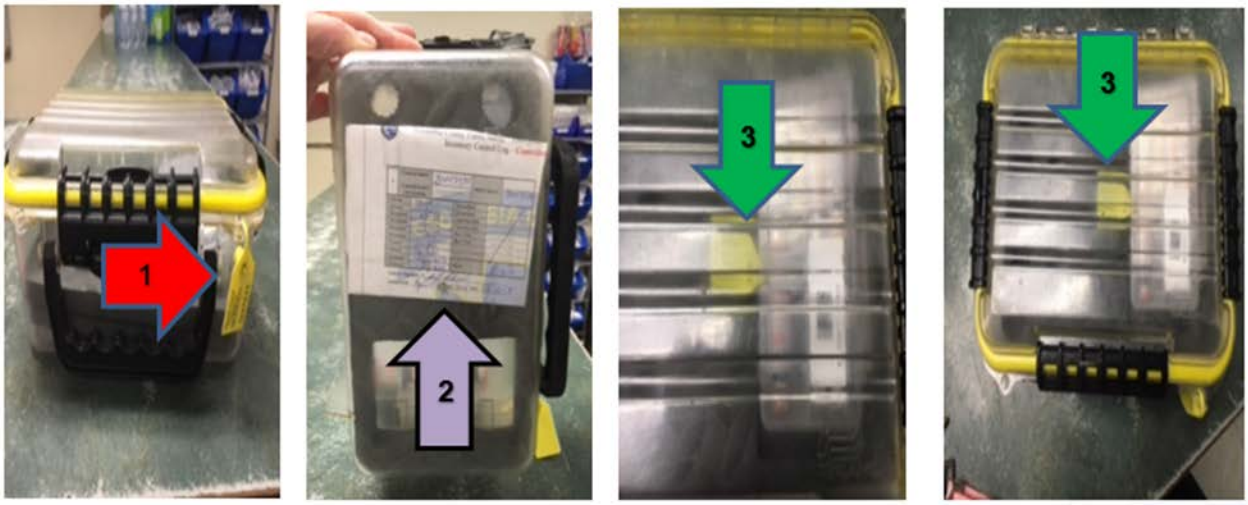
The On-coming Fire Medic and the Off-going Fire Medic will perform a visual inventory of the controlled medication kit using the procedure listed below;

Upon retrieval of the controlled medication kit, the Fire Medic will

1. Locate outer yellow seal, ensure that it is intact.

2. Locate the Controlled Substance Inventory Control Log on the underside of the controlled medication kit. Verify that the number on the yellow seal matches the number documented on the Controlled Substance Inventory Control Log.

3. Locate the yellow control seal, which is located inside the controlled medication kit and seals the narcotic box. Verify that the number on the yellow seal matches the number documented on the Controlled Substance Inventory Control Log.



4. Verify quantity of medication and expiration dates of the medications to the dates recorded on the Controlled Substance Inventory Control Log.

Approved quantity of medications for **standard drug kits**:

1 vial - Morphine (Morphine Sulfate) 10mg - (10mg/ml vial)
1 vial - Lorazepam (Ativan) 2mg – (2mg/ml vial)
2 vials - Fentanyl (Sublimaze) 200mcg – (100mcg/ml vial)
1 vial – Ketamine (Ketalar) 500mg – (500mg/5ml vial)

If the yellow “outer seal” number on the controlled medication kit and the documented “outer seal” number on the Controlled Substance Inventory Control Log match and all medications are present and have not expired,

5. Contact the on-duty EMS Supply Clerk via phone with the following information:

a. Paramedic name and apparatus identifier

b. Yellow outer seal number on the controlled medication kit

6. Secure the controlled medication kit in the on-board cooler and secure the cooler using two locks. The cooler must be secured to the apparatus with a security cable or placed inside a locking compartment.

Immediately report to the on-duty EMS Shift Supervisor and Battalion Chief if either yellow seal is found to be broken, upon initial receipt of the controlled medication kit from the logistics clerk.

D. On duty Shift Commander

Upon arrival for duty, the Shift Supervisor will present his/her county issued ID to the on-duty logistics clerk and will receive the controlled medication kit.

Upon receipt of the controlled medication kit, the paramedic will

1. Locate outer yellow seal, ensure that it is intact.

2. Locate the Controlled Substance Inventory Control Log on the underside of the controlled medication kit. Verify that the number on the yellow seal matches the number documented on the Controlled Substance Inventory Control Log.

3. Locate the yellow control seal, which is located inside the controlled medication kit and seals the narcotic box. Verify that the number on the yellow seal matches the number documented on the Controlled Substance Inventory Control Log.

4. Verify quantity of medication and expiration dates of the medications to dates recorded on the Controlled Substance Inventory Control Log.

Approved quantity of medications:

1 vial - Morphine (Morphine Sulfate) 10mg - (10mg/ml vial)
1 vial - Lorazepam (Ativan) 2mg – (2mg/ml vial)
1 vial - Midazolam (Versed) 5mg – (5mg/ml vial)
2 vials - Fentanyl (Sublimaze) 200mcg – (100mcg/ml vial)
1 vial – Ketamine (Ketalar) 500mg – (500mg/10ml vial)

5. Secure the controlled medication kit in the Yeti cooler in the Supervisor SUV.

Immediately report to the on-duty Shift Supervisor if either yellow seal is found to be broken or if either seal number does not match what is recorded on the drug log, upon initial receipt of the controlled medication kit from the logistics clerk.

II. End of Shift Procedure:

This procedure applies to the on-duty Shift Supervisor and Paramedics

At the end of the shift, the paramedic and EMT will retrieve the controlled medication kit from the onboard refrigerator using both keys.

The paramedic will verify that all seals are intact and will return the controlled medication kit to the on-duty logistics clerk.

III. Documenting Administration of Controlled Medications

All administration of controlled medications will be done in accordance with Escambia County Public Safety patient care protocols.

The attending paramedic shall document administration of controlled medication(s) in the electronic patient care report as well as on the Inventory Control Log.

Documentation should include the following:

1. Date and time of call
2. Call run number
3. Medication administered
4. Lot number of medications
5. Dosage administered
6. Amount wasted
7. Paramedic printed name and signature (on inventory control log)
8. Witness printed name and signature (on inventory control log)

When completing the Inventory Control Log, every attempt should be made to have the nurse or physician who receives the patient, sign as witness. If unable to have them sign, the EMT partner may sign as witness.

IV. Restocking the Controlled Medication Kit

A. Post 10

1. Controlled medications will be restocked at the end of each shift, as needed.

2. Report to the on-duty Shift Supervisor and advise him/her of the need to restock the controlled medication

3. The on-duty Shift Supervisor will:

a. Access the safe using their personal combination code

b. Retrieve the appropriate controlled medication pouch from the safe

c. Retrieve the corresponding key and seal from the key lock box that is located on the wall in the supply room, OR

d. Retrieve the refrigerator key from the safe

e. Retrieve the appropriate controlled medication from the refrigerator

f. Verify all information on the paramedic's Controlled Medication Log has been logged correctly

g. Complete the Master Inventory Supply Log. The receiving paramedic will sign as the witness

h. Receiving paramedic will complete two sections of the Controlled Substance Log:

i. Complete the next available Replacement Log box
ii. Complete the next available master log box to include current inventory of all medications assigned to that controlled medication kit and both yellow seal numbers.

i. The Shift Supervisor will sign as witness on the Replacement Log

j. The Shift Supervisor will return the controlled medication to either the safe or the refrigerator, properly securing all locks, return the key for the controlled medication pouch (if used) to the key lock box and secure with yellow seal (be sure to add the seal # to the Master Inventory Supply Log).

k. The paramedic will return the controlled medication kit to the on-duty logistics clerk at the end of the shift

Supervisor

B. Post 50:

Century crews are supplied with additional medications, as their ability to restock at Post 10 is limited.

The paramedic will notify the on-duty Shift Supervisor when they have administered a controlled medication, and to make arrangements to restock.

The on-duty Shift Supervisor will facilitate restock via:

1. Retrieving the required medication(s) from either the safe or refrigerator and completing the Master Inventory Control Log associated with the medication. The on-duty logistics clerk, or appropriate available personnel will sign as witness.

2. Drive to Post 50 to deliver the requested medication(s) and sign as witness on the Post 50 Controlled Substance Log. OR

3. The on-duty Shift Supervisor will retrieve the required medication(s) from either the safe or refrigerator and complete the Master Inventory Control Log associated with the medication. The logistics clerk or available appropriate personnel will sign as witness

4. The on-duty Shift Supervisor will then place the medication in a transport kit and secure with a yellow seal.

5. The on-duty Shift Supervisor will enlist either the on-duty logistics clerk, or any extra personnel that is on duty at the time, to deliver the controlled medication to Post 50.

6. Upon receipt of the controlled medication at Post 50, the on-duty paramedic will make phone contact with the on-duty Shift Supervisor, to confirm that the transport kit has remained secured with the yellow seal. The paramedic will also verify the seal number with the Shift Supervisor.

7. Once verified, the receiving paramedic will complete the Controlled Substance Log, the deliverer will sign as witness, and return the transport kit to the logistics clerk at Post 10

C. ECFR:

Only the Escambia County Fire Rescue Fire Chief, Battalion Chief(s) or

paramedics are authorized to receive controlled medications for restocking purposes.

The authorized ECFR representative will make contact with the on-duty Shift Supervisor to initiate the restock process

The on-duty Shift Supervisor will facilitate restock via:

1. The on-duty Shift Supervisor will retrieve the required medication(s) from either the safe or refrigerator and complete the Master Inventory Control Log associated with the medication. The authorized ECFR representative will sign as witness

4. The on-duty Shift Supervisor will then place the medication in a transport kit and secure with a yellow seal.

5. The authorized ECFR representative will deliver the controlled medication transport kit to the requesting ECFR paramedic.

6. Upon receipt of the controlled medication, the ECFR paramedic will make phone contact with the on-duty Shift Supervisor, to confirm that the transport kit has remained secured with the yellow seal. The paramedic will also verify the seal number with the Shift Supervisor.

7. Once verified, the receiving paramedic will complete the Controlled Substance Log, the deliverer will sign as witness.
8. The authorized ECFR representative will then return the Medication transport kit to the logistics clerk at Post 10.

V. Receiving and Securing New Stock

The Logistics Manager will receive the shipment of controlled medications and immediately deliver them to the on-duty Shift Supervisor.

The on-duty Shift Supervisor shall:

1. Retrieve the spare controlled medication pouch from either the safe or refrigerator and retrieve the corresponding key and seal from the sealed lock box.

2. Open the locked pouch and verify the information on the Master Inventory Control Log to the amount of medication that is present in the pouch.

3. Complete the Master Inventory Control Log, adding the new amount of medication to the current inventory and obtain witness

signature from available appropriate personnel

4. Add new medications to the medication pouch, seal the key in the key lock box and place locked medication pouch back in either the safe or refrigerator.

In accordance with 64J-1.021, Florida Administrative Code, the amount of each controlled substance authorized to be in on-site storage is determined by the Medical Director.

Any amounts above the limits listed below must be approved, in writing, by The Escambia County Medical Director

Per Escambia County Medical Director, Allowable limits are as follows:

Common Name	Generic Name	Upper Limit Amount	Reorder Amount
Ativan	Lorazepam	120mg	30mg
Etomidate	Amidate	1,600mg	400mg
Fentanyl	Sublimaze	12,500**mcg**	2,000**mcg**
Ketamine	Ketalar	45,000mg	1,000mg
Morphine	Morphine	600mg	100mg
Rocuronium	Zemuron	3,600mg	500mg
Succinylcholine	Anectine	6,000mg	2,000mg
Versed	Midazolam	500mg	100mg

VI. Monthly Drug Inspection

A. Paramedic responsibilities

On the 28th of every month, all paramedics shall conduct an inspection of the assigned Controlled Medication kit as follows:

1. Break both the outer and inner control seals on the kit

2. inspect the integrity of all vials within the kit

3. Inspect the integrity of all tamper resistant seals

4. Check expiration dates

5. Immediately notify the on-duty Shift Supervisor of any Medications that will expire within 30 days

Any medications that do not clear the inspection process shall be replaced as noted in above section IV – Restocking the Controlled Medication Kit

B. Shift Supervisor responsibilities

On the 28th of every month, the designated Shift Supervisor shall conduct an inspection of ALL of the Controlled Medication kits that are not in immediate use.

1. Break both the outer and inner control seals on the kit

2. inspect the integrity of all vials within the kit

3. Inspect the integrity of all tamper resistant seals

4. Check expiration dates

Any medications that do not clear the inspection process shall be replaced as noted in above section IV – Restocking the Controlled Medication Kit.

VII. Mid-shift Change in Crew or Ambulance

In the event of a mid-shift change in paramedic or ambulance, the oncoming paramedic shall obtain the on-board lock box key from the off going paramedic.

The oncoming paramedic shall, along with his/her partner retrieve the Controlled Medication kit from the lock box and refrigerator and thoroughly inspect the kit as noted in above section I – Obtaining, Logging and Securing Controlled Medications

Once inspected, the oncoming paramedic shall make contact with the on-duty logistics clerk informing them of the change in crew member.

In the event of a mid-shift change in ambulance, the paramedic and EMT shall unlock the lock box and the paramedic shall retrieve the Controlled Medication Kit from the refrigerator of the initial ambulance and place it in the refrigerator of the new ambulance. The paramedic and EMT shall secure the Controlled Medication kit in the lock box with their respective keys.

VIII. Rapid Sequence Intubation (RSI) Kits

The Rapid Sequence Intubation (RSI) Kits shall be treated as any other Controlled Medication Kit, as listed in the above sections.

Only RSI credentialed paramedics, with a valid RSI card, may obtain and administer RSI medications.

Approved quantity of medications for **RSI drug kits**:

1 vial – Morphine (Morphine Sulfate) 10mg – (10mg/ml vial)
1 vial – Lorazepam (Ativan) 2mg – (2mg/ml vial)
1 vial – Midazolam (Versed) 5mg – (5mg/ml vial)
2 vials – Fentanyl (Sublimaze) 200mcg – (100mcg/ml vial)

1 vial – Ketamine (Ketalar) 500mg – (500mg/ml vial)
2 vials – Etomidate (Amidate) 80mg – (40mg/20mlvial) **OR**
4 vials – Etomidate (Amidate) 80mg – (20mg/20ml vial)
2 vials – Succinylcholine (Anectine) 200mg – (200mg/20ml)
2 vials – Rocuronium (Zemuron) 200mg – (100mg/10ml)

IX. Replacing Drug Logs

The paramedic shall immediately report to the on-duty Shift Supervisor when all fields of the Controlled Medication Inventory Control log are full.

The on-duty Shift Supervisor shall:

A. Look over the existing Controlled Medication Inventory Control log for accuracy,

B. Sign and date the form, and file it in the completed form binder.

C. Issue new Controlled Medication Inventory Control log from Master Log binder

X. Controlled Medication Log Discrepancies

Any discrepancies on the Controlled Medication Inventory Control Log should be immediately reported to the on-duty Shift Supervisor and,

A. The Paramedic shall complete an Information Report detailing the discrepancy

B. The on-duty Shift Supervisor shall contact the last paramedic that completed the Controlled Medication Inventory Control Log, requesting a detailed Information Report.

C. The on-duty Shift Supervisor shall conduct an investigation of the event and forward findings to the Deputy Chief of Operations and/or the Medical Director for further review.

D. Copies of investigatory reports shall be maintained in the personnel files.

XI. Disciplinary Actions

Disciplinary action shall be imposed on a case by case basis, and may involve both the paramedic and the witness. Disciplinary action will be dependent on the severity of the deviation from this policy, the intent of the employee and any detriment to the patient.

Disciplinary actions are divided into three general categories, however, are not limited to only these categories:

- **Actual Medication involvement**
    - **Administration of an expired controlled medication**
    - **Failure to keep custody of, or properly secure the controlled**
    - **medications Failure to remove the controlled mediations from a vehicle at the end of shift or from a vehicle that has been placed out of service**

    - **First Offense: Automatic written reprimand for the first offense**
    - **Second Offense: Automatic one day suspension for the second offense***
    - **Third Offense: Automatic three-day suspension for a third offense***
    - *** (If within 12-month period of first offense)**

B. Controlled Medication Procedures

(1) Failure to properly inspect the controlled mediations resulting in:

(i) failure to identify expired controlled medications
(ii) failure to identify missing controlled medications
(iii)failure to replace expired controlled medications and/or failure to notify the on-duty Shift Commander
(iv) failure to inform the on-duty Shift Commander that controlled medications will expire prior to the next monthly inspection
(v) failure to have a witness present for wasting controlled medications

First Offense: Notice of Counseling
Second Offense: Notice of Counseling
Third Offense: Written Reprimand *
Fourth Offense: Automatic one day suspension *
(If within 12 month period of the second offense)

C. Inventory Control Logs

1. **Documentation errors**
2. **Failure to legibly complete the logs**
3. **Failure to complete all sections of the logs**
4. **Failure to replace a log**
5. **Loss of a log**
6. **Failure to submit requested information reports**
7. **Failure to have a witness present for wastage**

First Offense: Notice of Counseling
Second Offense: Notice of Counseling
Third Offense: Written Reprimand *
Fourth Offense: Automatic one day suspension *
*** (If within 12 month period of the second offense)**

1.2 General Patient Care Issues

1.2.1 GENERAL GUIDELINES FOR TREATING PATIENTS

Purpose: To explain/review some general guidelines for treating patients that will enhance the care provided.

Policy:

1. The patient history should not be obtained at the expense of treating the patient. Life-threatening problems detected during the primary assessment must be treated first.
2. Cardiac arrest due to trauma may not respond to treatment from medical cardiac arrest protocols. Trauma patients should be transported promptly with CPR (if not going to pronounced in the field), control of external hemorrhage, cervical spine immobilization, and other indicated procedures attempted en route (i.e. IVs). If any doubt about the onset of the cardiac arrest (i.e. before vs. after the trauma), contact the medical control or medical director for guidance.
3. In patients with non-life-threatening emergencies who require IVs, only two attempts at IV insertion should be attempted in the field. Further attempts must be approved by medical control. If lifesaving drugs or IV fluids to treat severe hypotension is needed emergently, place an I/O if unable to obtain peripheral IV access.
4. Patient transport, or other needed treatments, must not be delayed for multiple attempts at endotracheal intubation. A LMA may in fact be quicker to insert and secure an airway.
5. Verbally repeat all orders received prior to their initiation. This is especially true for drug orders given over the phone or radio. On ALL instances when you receive a medication order from a physician, you are to repeat the order to the physician, including the name of the drug as well as the dosage and route ordered. This is to ensure the physician you understood the correct dose of the correct medication.
6. Any patient with a cardiac history, irregular pulse, unstable blood pressure, dyspnea, or chest pain should be placed on a cardiac monitor.
7. If the patient's condition does not seem to fit a protocol or protocols, always contact medical control or medical director.
8. NEVER HESITATE TO CONTACT MEDICAL CONTROL OR MEDICAL DIRECTOR FOR ANY PROBLEM, QUESTION, OR FOR ADDITIONAL INFORMATION.
9. Always show respect to the patient and family. Treat every patient with dignity and modesty.
10. If any jewelry is removed from a patient, please document in the record the disposition of the item(s) i.e. gave to family member, placed in patient's pocket or purse, etc. Have this witnessed by your partner.
11. Care of cardiac dysrhythmias is based on standards established by the American Heart Association committee on emergency cardiac care.
12. In terms of cardiac patients always treat the patient, not the monitor.
13. Protocols for cardiac arrest situations presumes that the condition under discussion continually persists, that the patient remains in cardiac arrest, and that CPR is always performed.

14. Adequate airway, ventilation, oxygenation, chest compressions, and defibrillation are more important than administration of medications and take precedence over initiating an intravenous line or injecting medications.
15. The new biphasic defibrillators are designed to deliver shocks at fewer joules than the monophasic defibrillators. Some of the new biphasic defibrillators are pre-set to deliver current at 120, 150, and 200 joules. Medtronic (Life Pack) Monitors can be dialed up to deliver 200, 300, and 360 joules in accordance with the new 2010 ACLS guidelines.
16. **If patient has unstable vital signs:**
    a. If patient is severely injured, with systolic blood pressure <90 mmhg in adults, or children with capillary refill time >2 seconds:
        - Airway with cervical spine control
        - Breathing
        - Circulation/perfusion with hemorrhage control
        - Disability determination (AVPU, motor, posturing)
        - Exposure
    b. Perform a rapid, abbreviated full-body assessment in order to identify any major injuries.
    c. If extrication required, perform quickly with spinal immobilization.
    d. Transport.
    e. Start 2 IVs (in adults) ~~of lactated Ringer's~~ or NS en route and run wide open up to 2 liters in trauma, 1 liter for medical then contact medical control for further. Recheck vital signs and lung sounds after each 250 cc bolus
    f. Contact medical control en route.
17. **If the patient has stable vital signs**
    a. If the patient's systolic pressure is initially and continuously stable, without significant signs or symptoms of shock, more time may be taken for field assessment:
        - Airway with cervical spine control.
        - Breathing.
        - Circulation/perfusion with hemorrhage control.
        - Disability determination (AVPU, motor, posturing).
        - Exposure.
    b. Administer oxygen to maintain Pulse Ox > 94%.
    c. Attach cardiac monitor and pulse oximeter.
    d. Perform a rapid, full-body assessment in order to identify any major injuries.
    e. If extrication required, perform with spinal motion restriction if indicated.
    f. Start an IV of Normal Saline en route at 150 ml/hour.
    g. Complete splinting and packaging.
    h. If head or spinal injury present, see Head Injury/Spinal Injury Protocol.
    i. If pelvis or femur fractures present, see Extremity Injury Protocols.
    j. If chest trauma present, see Chest Trauma Protocol.
    k. Transport.
    l. Contact medical control for any questions or problems.
18. The following are considered "load and go" situations:
    a. Airway obstruction that cannot be relieved by mechanical methods
    b. Conditions which result in inadequate respirations

c. Large open chest wounds (i.e. sucking chest wounds)
d. Large flail chest
e. Tension pneumothorax
f. Major blunt chest trauma
g. Traumatic cardiac arrest
h. Shock
i. Head injury with unconsciousness, unequal pupils, or deteriorating neurological status.
j. Tender, distended abdomen
k. Bilateral femur fractures
l. Unstable pelvis
m. Development of respiratory difficulty
n. Penetrating wounds to the head, neck, chest or abdomen.
o. Amputations proximal to the wrist or ankle
p. Uncontrolled hemorrhage.

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1.2.2 MULTIPLE PATIENTS / TRAUMAS

Purpose: To briefly explain how to manage a situation involving more than one patient until more help arrives.

Policy:

1. **SITUATIONAL GUIDELINES**
   a. The first paramedic on the scene will become the scene director and others arriving later will follow his or her lead until a formal incident command system (ICS) is in place.
   b. Try to keep ambulance crews and equipment together to minimize confusion when several ambulances are present at the scene.
   c. Notify dispatch of the need for more help when the estimated number of injured can be determined.
   d. Note any hazards (chemical spills, downed power lines, etc.)
   e. Begin rendering emergency care with airway being the first priority, followed by oxygenation, and hemorrhage control. Call trauma alert on patients that meet criteria.
   f. Begin transporting severely injured, but salvageable, patients first. Dead and hopelessly dying patients should not be transported until salvageable patients are removed.
   g. In airplane crashes, be sure to leave a marker noting the position of the patient before removing them from the scene.
   h. If more than 5 patients or more than 3 trauma alerts, start triage system and declare a multiple casualty incident (see MCI Protocol for local service area.)

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1.2.3 SPECIAL CONSIDERATIONS

Purpose: General guidelines for patients who need IV/IO therapy and/or endotracheal intubation.

Policy

1. **IV Therapy** (see IV procedure protocols for actual procedure)
    a. All trauma patients should receive at least one, and preferably two, IV's of normal saline via large bore (14 or 16 gauge) catheters. Trauma patients with a systolic blood pressure <90 mmHg should receive wide-open fluids until the systolic blood pressure is >90 mmHg. If after 2 liters the systolic blood pressure is < 90 mmHg, notify medical control. Trauma patients with a systolic blood pressure >90 mmHg should receive fluids at a "to keep open (TKO)" rate or as directed in the applicable protocol. Trauma alert is to be called on all patients who meet the regions trauma alert criteria. Patients with closed head injury should maintain systolic BP of 110-120 mm/hg per ITLS recommendations.
    b. Intraosseous infusion may be performed (see IO procedure protocols) on pediatric and adult patients with the EZ-IO or the BIG I/O intraosseous needles when life saving drugs or IV fluids is needed in critical situations and a peripheral IV was unavailable. It is not necessary to place an I/O "just in case", as unlike a peripheral vein, the bone will always be there even when the patient is in shock. **Only place the I/O when fluids and/or drugs are actually going to be administered**.
    c. Only paramedics, who have obtained the required education in intraosseous needle placement and whom the system medical director has approved may place intraosseous needles.
    d. EMTs can start non medicated IVs once they have completed an approved IV course, have been observed by a paramedic starting 10 – 12 IVs and authorized by the medical director to do so.
    e. All pediatric peripheral IVs should be started with a minidrip administration set.
    f. All initial IV attempts are to be peripheral.
        i. The external jugular vein is considered a peripheral vein. DO NOT PLACE BILATERAL EXTERNAL JUGULARS. If an external jugular infiltrates with IV fluid or medication on one side, do not stick the other side.
        ii. Access of indwelling central lines (i.e. Hickman Catheters, Quinton cath) is permitted only in patients where peripheral IV attempts have been unsuccessful and the needs of intended therapy outweigh the risks.
        iii. Only Critical Care Paramedics who are trained in accessing Central Access IV ports (Port-o-cath) may do so when medications and/or IV fluids are needed. Note: these central port catheters require special access needles (Huber). Do not attempt access if you do not have the special needles that are required and/or if you are unfamiliar with this technique.
    g. An IV lock or medication access point may be used in lieu of an IV bag in some patients, when appropriate. However, if no IV fluid or medication is anticipated to be given to the patient pre-hospital, please do not sick patient for an IV routinely. If patient decompensates and immediate intervention is needed and a peripheral IV is not accessible, give fluids and/or medication via an I/O which can be placed at the time it is needed.

h. Dial-a-flows are not to be used in lieu of an IV Pump unless approved by medical director
i. Each IV bag should be labeled with the following data:
    i. Time and date of IV start
    ii. IV cannula size
    iii. Initials of paramedic who started the IV
j. On all interfacility transfers:
    i. If by ground: all medication drips and IV fluids that are ordered to be administered at a specific rate (except KVO) **must** be on an IV pump to regulate the dosage/rate unless approved by the medical director.
    ii. ~~If by fixed wing air: All medication drips and IV fluids are to be on an IV pump~~.
k. For pre-hospital scene calls:
    i. All IV piggyback medications administered via the ground service (with the exception of closely monitored Lidocaine drip initiated during treatment of a cardiac arrest in the field) should be on an IV pump to control the rate. If time permits, place the Lidocaine drip on a pump.
l. After each intravenous medication, give a 20- to 30-ml bolus of intravenous fluid and immediately elevate the extremity. This will enhance delivery of the drug to the central circulation.

2. Endotracheal Intubation (See Endotracheal procedure protocols for more details)

a. Proper endotracheal tube placement must be documented by at least three different methods. These include:
    i. Presence of bilateral breath sounds
    ii. Absence of breath sounds over the epigastrium
    iii. Presence of condensation on the inside of the endotracheal tube
    iv. $ETCO_2$ Waveforme (Mandatory as one of the three)
    v. Use of an endotracheal esophageal detector
    vi. Visualizing the tube passing through the cords
    vii. Continuous normal pulse-ox reading
b. All three verification methods must be documented in the medical record!!
c. Following endotracheal intubation, tube placement should be re-verified every time patient is moved, by noting bilateral breath sounds, noting condensation of ET tube, observing rise and fall of chest wall, **monitoring continuous end-tidal carbon dioxide readings** and monitoring pulse ox.
d. See confirmation/re-confirmation protocol for more details.

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1.2.4 AMA / REFUSAL / DRY RUN CASES:

Purpose: To define who is considered to be a patient and how to go about allowing a patient to decline treatment and/or transportation to the hospital based on being competent and having the capacity to refuse.

Policy:

1. Any patient (See definition of patient below) refusing treatment must be informed of the risk of potential worsening of their condition, which could possibly lead to death or permanent disability. If patient is competent (see below) AND has no signs of being under the influence of an intoxicating substance AND is alert and oriented to person, place and time AND is not a minor AND has the capacity to refuse (see below) AND is not homicidal or suicidal, AND still refuses, he/she must sign a refusal form indicating they understand and are accepting the risk of refusal and cannot hold anyone responsible for any bad outcome as a result of their refusal.
   If there are any questions or concerns about a patient's state of mind (competency, intoxication or altered mental status) that is refusing care or transport, request the help of family or notify law enforcement. **Notify the supervisor or medical director of ALL refusals at the time of the incident**.
2. **Definition of a patient**; an individual will be considered a patient if, once contact with an individual by EMS is made and:
   a. They have an obvious injury or illness
   b. They have a medical or traumatic complaint
   c. They appear in some type of distress, i.e. short of breath, diaphoretic, in obvious pain, etc.
   d. Any individual with an obvious altered mental status
   e. Any individual where the EMT/Paramedic suspects injury due to mechanism of injury
   f. Any individual who, for any reason, requests to be transported to the hospital for evaluation.
   g. A person who denies injury or has no complaint, however, there is a significant mechanism in which it is conceivable that someone could have been injured from such a mechanism, such as a long fall, MVA with significant damage to vehicle, etc.
3. **For the purpose of EMS, a competent patient is defined as:**
   a. At least 18 years old (unless emancipated minor) AND
   b. Alert, responsive, oriented to person, place, time and situation AND
   c. Has no signs of injury or illness which may impair the ability to make an informed decision AND
   d. No signs of being under the influence of an intoxicating/mind altering substance (including carbon monoxide) AND
   e. Not suicidal or homicidal and does not want to hurt themselves AND
   f. Patient must have the capacity to refuse. Patient must demonstrate an understanding of:
      1. Diagnosis, possible diagnosis, or current medical problem; does the patient understand the condition/medical problem for which the specific treatment/transport is being offered?

2. Nature and purpose of treatment; is the person able to explain the nature of the treatment and understand relevant information?
3. Risk and benefits of proposed treatment/transport; is the person aware of the possible outcomes of treatment, alternatives or lack of treatment (and is able to verbalize the potential danger/risk to their health and well-being by refusing transport/care)?
4. Is the person able to make a decision and communicate a choice, and or the expectations realistic?
5. Is the person able to manipulate the information rationally?

4. For **minor patients** who meet criteria of "patient" above, refusal can be granted if:
    a. The patient exhibits no historical or physical findings of potentially life or limb or organ threatening injury or illness.
    b. Patient is not intoxicated, has no alterations in mental status, level of consciousness, or vital signs.
    c. The responsible parent/legal guardian is competent and available in person. It is reasonable for a refusal to be given by phone to two witnesses. If no parent/legal guardian is available in person or by phone, contact medical director or medical control for advice.
    d. Refusal by phone can be obtained from a parent, adult sibling, or legal guardian and must be witnessed by two paramedics or paramedic and EMT.
5. **Emancipated minors** can consent for themselves. Emancipated minor includes:
    a. A self-sufficient minor
    b. A married minor
    c. A minor in the military
6. Notify shift supervisor or medical director of all refusals at the time of the incident. Be prepared to discuss the case and provide pertinent information related to the nature of the call, scene size up, your assessment, including but not limited to: physical exam of involved anatomy, vital signs, applicable test such as EKG, pulse ox, glucose, and temp, etc. Report the reason for the refusal. It may be prudent for the supervisor and/or the medical director or med control MD to speak to the patient to reiterate the importance of transport to the hospital, depending on the situation.
7. Inform patients (family) of the risk of potential worsening of their condition, which could lead to loss of limb, death, or permanent disability
8. Ensure that the following information is provided:
    a. That the release is against medical advice
    b. That it applies to this instance only
    c. Patient should be instructed to request EMS to return (call 911) should they change their mind or their condition worsen.
    d. They should follow up with their primary care MD as soon as possible.
    e. Have appropriate "Refusal of Care" form signed and witnessed.
9. **IF Law enforcement calls EMS to a scene to "check out", "clear", "evaluate", or whatever terminology is used to request an EMS unit to respond to the scene to evaluate a patient**.

    In general, when we are requested by law enforcement, this is because the law enforcement officer has some concern about the individual in question. On occasion, they would like the individual examined to determine if the individual needs to go to

the hospital or can safely be transported to jail. Whatever the case may be, because the law enforcement agency is responsible for the safety of the individual, you will treat this individual as a patient and obtain a refusal if the individual declines an evaluation and/or treatment and/or transport to the hospital. **You MUST document your encounter**. Your documentation should include the reason you were requested. You should then proceed to document as much as possible (see documentation protocol 1.1.3) in as much as the situation and/or the patient allows. If the patient is uncooperative and/or belligerent and/or is threatening, this must be documented as to explain why the report is incomplete.

NOTE: Never document in your run report that "patient is **cleared** to be taken by law enforcement" or "patient is **cleared** to be taken to jail", etc. You cannot do a sufficient exam in the field to "clear" anyone. You should only document what you see, feel, hear, etc. At the time of your examine, if there are no obvious signs and symptoms of an illness or obvious injury, you should document ***"based on the current vital signs and current exam, there is no apparent life threatening illness or injury identified".*** If the law enforcement officer ask you if the patient is "cleared", simply repeat the phase above. If they insist on the patient being "cleared", this will entail a trip to the hospital for evaluation by a physician. The refusal should be discussed with the supervisor on duty at the time of the refusal and if it is high risk, can be discussed with the medical director prior to clearing the scene.

10. **IF a healthcare provider on behalf of a patient under their care request EMS to transport the patient**.

    An individual for whom EMS was summoned by a healthcare provider (who is caring for the individual) will be classified as a patient for the purpose of documentation and as such, **a patient care report shall be generated.** Should the individual have the capacity to refuse and does indeed refuse evaluation and/or treatment and/or transport, the patient care report should be completed to the best of your ability with regards to documenting a chief complaint, past medical history, medications, allergies, vital signs and a physical exam. Remember an EKG, pulse ox, and blood glucose should be included if applicable and allowed. The refusal should be discussed with the supervisor on duty at the time of the refusal and if it is high risk, can be discussed with the medical director prior to clearing the scene. If patient is uncooperative, combative, belligerent, etc., this should be included in the report.

11. **IF a family or witness to a medical or traumatic event who is present when EMS arrives on scene**.
    If a witness (family or other individual) to an event **is present** when EMS arrives on scene, the individual for whom EMS was summoned will be considered a patient and as such, **a patient care report shall be generated**. Should the individual have the

capacity to refuse and does indeed refuse evaluation and/or treatment and/or transport, the patient care report should be completed to the best of your ability with regards to documenting a chief complaint, past medical history, medications, allergies, vital signs and a physical exam. Remember an EKG, pulse ox, and blood glucose should be included if applicable and allowed. The refusal should be discussed with the supervisor on duty at the time of the refusal and if it is high risk, can be discussed with the medical director prior to clearing the scene. If patient is uncooperative, combative, belligerent, etc., this should be included in the report.

12. Cancelled Call:

A Cancelled Call will be defined as any of the following

a. Canceled Prior to Arrival
b. Canceled Upon Arrival (NO PATIENT CONTACT)
c. Handled by Law Enforcement (NO MEDICAL CARE NEEDED)
d. Handled by Fire Department (NO MEDICAL CARE NEEDED)
e. Standby For:_____(NO PATIENT CONTACT)
f. Patient Refuses Care, Third Party Caller but not present on scene when EMS arrives, No Obvious Injuries, (AOx4, and does not meet definition of a patient).

THE DRY RUN SHOULD BE DOCUMENTED IN THE PATIENT CARE FORM AS "CANCELLED" AND/OR "SERVICES NOT NEEDED, NO PATIENT". A DRY RUN IS NOT TO BE USED FOR ANY PATIENT THAT HAS RECEIVED CARE OR THAT IS REFUSING CARE FOR OBVIOUS INJURIES (TREAT AS PATIENT REFUSAL). REMEMBER, IF EMS IS CALLED BY A THIRD PARTY WHO IS NOT ON SCENE WHEN EMS ARRIVES AND THE INDIVIDUAL FOR WHOM EMS WAS CALLED IS DENYING ILLNESS OR INJURY AND IS REFUSING TRANSPORT, MAY BE DECLARED A NON-PATIENT /"DRY RUN".

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1.2.5 DNR / RESUSCITATION CONSIDERATIONS / DOA / OBVIOUS DEATH / SIGNAL 7

This protocol is divided into separate sections that cover the different situations of death in the field that the medical responder will be presented with.

All patients found in cardiac arrest **will** receive cardiopulmonary resuscitation unless an exception is met as outlined in the following sections:

I. Advanced Directives / Do Not Resuscitate Order (DNRO).

II. Determination of Death.

III. Discontinuance of CPR.

I. ADVANCED DIRECTIVES / DO NOT RESUSCITATE ORDER (DNRO)

A. LEGISLATIVE AUTHORITY.

Under Chapter 401.45, Florida Statues (F.S.) "Denial of Emergency Treatment Civil Liability" a competent adult, or an incompetent adult, through health care surrogate who was previously chosen, or proxy or guardian, has the right to be able to control decisions regarding medical care, including the withdrawal or withholding of life-prolonging procedures. This legislation authorizes EMS personnel to honor a prehospital **Do Not Resuscitate Order (DNRO)**. This legislative authority **does not** include a **"Living Will."**

B. VALID DO NOT RESUSCITATE ORDERS.

1. An original yellow DNRO DOH Form 1896 executed as required by State Statute (with original signatures).

2. A copy on yellow paper (or similar color to the original) of DNRO DOH Form 1896 executed as required by State Statute (with original signatures).

3. The patient is wearing a bracelet, which identifies the patient and indicates the patient has executed a DNRO in accordance with DOH Form 1896.

    a. In this instance, EMS personnel MUST receive the original DNRO DOH Form 1896 or a copy on yellow paper that contains original signatures (attach to EMS Run Report).

4. A DNRO document from a licensed health care facility or hospice facility, either the original or a copy with original signatures. To honor a facility's DNRO it shall:

    a. State that it is a DNRO and provides instructions that the patient is not to be resuscitated in the event of cardiac or respiratory arrest.

    b. Have an effective date, which predates the date the assistance is requested.

    c. Includes the patient's full legal name typed or printed.

d. Be signed by the patient's attending physician and include the physician's medical license number, telephone number, and date completed.

e. Be signed and dated by the patient if competent or if the patient is incompetent, by the patient's health care surrogate, legal guardian, or proxy.

f. Be signed and dated by at least two witnesses.

5. Oral orders from non-Physician staff members, or telephoned requests from an absent Physician do not adequately assure Paramedics that the proper decision-making process has been followed and are **NOT** acceptable.

C. CONFIRMATION AND DOCUMENTATION.

1. The Medical Responder must confirm the identity of the patient with a DNRO through a driver's license, other photo identification, or from a witness in the presence of the patient. If a witness is used to identify the patient, this shall be documented in the EMS Run Report and will include:

a. The full name of the witness.

b. The address and telephone number of the witness.

c. The relationship of the witness to the patient.

II. DETERMINATION OF DEATH

The First Responder or EMT or PARAMEDIC may determine that the patient is dead/non-salvageable and decide not to resuscitate the patient under the following guidelines.

A. The patient may be determined to be dead/non-salvageable and will not be resuscitated or transported if all four (4) presumptive signs of death and at least one (1) conclusive sign of death is identified.

1. The four presumptive signs of death that MUST be present are:

a. Unresponsiveness.

b. Apnea.

c. Pulseless.

d. Fixed dilated pupils.

2. In addition to the four presumptive signs of deaths, at least one (1) of the conclusive signs of death that MUST be present are:

a. Injuries incompatible with life (eg. decapitation[1], massive crush injury, incineration, etc.).

[1] EXCEPTION: Pregnant patients > 28 weeks gestation will receive full resuscitation measures.

b. Massive tissue decomposition.

c. Rigor Mortis of any degree with warm air temperature.
Hardening of the muscles of the body, making the joints rigid.

d. Liver Mortis (Lividity) of any degree and/or generalized cyanosis.

Venous pooling of blood in dependent body parts causing purple discoloration of the skin, which does blanch with pressure.

e. Asystole in three leads recorded on monitor. An EKG monitor strip should be attached to each patient care form, when feasible. This will require and ALS provider

3. Patients with suspected hypothermia, barbiturate overdose, or electrocution require full ALS resuscitation unless there are injuries incompatible with life or tissue decomposition.

4. All Medical Responders may contact medical direction for a "determination of death" anytime support in the field is desired. Clearly state the purpose for the contact as part of your initial hailing.

5. Children are excluded from this protocol unless EMS personnel make contact with medical direction for consultation. Only in cases of obvious prolonged death should CPR not be started or discontinued on infants, children, young adults.

B. A trauma victim who does not meet the "Determination of Death" criteria listed above may be determined to be dead/non-salvageable based on the following criteria:

1. Pulselessness and apnea with asystole (confirmed in three leads[2]) associated with:

a. Blunt trauma arrest.

b. Prolonged extrication time (> 15 minutes) where no resuscitative measures can be initiated prior to extrication.

2. If there is any concern regarding leaving the patient at the scene, begin resuscitation and transport.

3. Consideration should be given for the possibility of organ harvest; however this should not be the sole reason for resuscitation.

C. Absence of pulse or spontaneous respiration in a multiple casualty situation where EMS resources are required for stabilization of living patients.

The local law enforcement agency, which has jurisdiction, will be responsible for the body once death has been determined. The body is to be left at the scene until a disposition has been made by the Medical Examiner's Office or local jurisdiction.

[2] Requires ALS Provider

III. DISCONTINUANCE OF CPR

A. Resuscitation that is started in the field by EMS personnel cannot be discontinued without an order from medical direction. EMS personnel are not obligated to continue resuscitation efforts, which were started inappropriately by others at the scene. HOWEVER, contact with medical direction is necessary to cease resuscitative efforts in ALL situations.

B. When there is a delay in presenting a DNRO to EMS personnel, resuscitation must be started. However, once the DNRO is presented to EMS personnel, the EMT or PARAMEDIC with an order from medical direction may terminate resuscitation.

C. A PARAMEDIC with an order from medical direction may terminate resuscitation provided the following criteria are met:

1. Appropriate BLS and ALS have been attempted without restoration of circulation and breathing.

2 Persistent asystole or agonal EKG patterns are present, and no reversible causes are identified.

Hypovolemia	Hypoxia	Acidosis	Hypokalemia	Hyperkalemia	Hypothermia
Hypoglycemia					
Toxins	Tamponade	Tension pnumo	Thrombosis	Trauma	

a. Patients with suspected hypothermia, barbiturate overdose, or electrocution require full ALS resuscitation, unless there are injuries incompatible with life or massive tissue decomposition.

D. Provide appropriate grief counseling or support to the patient's immediate family, bystanders, or others at the scene.

1. Provide family members with appropriate referral information, if available.

E. Patient Preparation.

1. Once it has been determined that the patient has died and resuscitation will not continue, DO NOT cover the body with a sheet or other suitable item. DO NOT remove any property from the body or the scene for any purpose.

2. **If death attended by physician, i.e.: (under physician's care, such as in nursing home or hospital)**, immediately notify nursing supervisor. Nursing supervisor will contact attending physician and notify of death, and make disposition of the body per attending physician instructions. If the death is unattended, i.e.: (such as at residence or in ALF) notify the appropriate law enforcement agency (if not done already) and remain on scene until their arrival for disposition of body.

3. Complete the EMS run report, documenting the above criteria. Paper reports may leave a copy with law enforcement for the Medical Examiner's Office. If computer form, a copy will be faxed to the Medical Examiner's Office via Department's EMS Billing Division.

4. EKG rhythm documentation must be attached to the EMS run report on all deceased patient, if possible.

5. All interventions must be left in place, as is, at the moment of termination. This includes, but not limited to: intravenous lines, cardiac/deffibrilation electrodes, NG/OG tubges, IO lines and airway devices such as LMA, ETT. The ET tube must be left in place and the ET tube's confirmation must be recorded on the EMS run report. Improperly placed ET tubes should be left in place and reported to the appropriate personnel. (Proper ET tube placement must be confirmed prior to terminating resuscitation.)

6. Consult the patient's family for "Organ Donor" information, if appropriate.

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1.2.6 A patient with a Living Will, Power of Attorney, Health Care Surrogate, Guardianship:

Purpose: Describes how to manage patients with a living will, power of attorney, health care surrogate or guardianship.

Policy:

1) A patient with a **Living Will** shall have this document honored UNLESS the patient or immediate family member(s) provide verbal or written instruction to the contrary.
    i) Definition of a **Living Will**: an advanced directive, prepared when an individual is alive, competent, and able to make decisions, regarding that person's specific instructions about end-of-life care. Living wills allow people to specify whether they would want to be intubated, ventilated, treated with pressor drugs, shocked with electricity (to stop life-threatening heart rhythms), and fed or hydrated intravenously (if unable to take food or drink). Some also specify the person or persons who have power of attorney to make health care decisions on the patient's behalf, if the patient is no longer competent to make choices for himself or herself.
        (1) Living Will may be revoked at any time by the patient or designated health care surrogate. If so, follow their wishes and resuscitate if requested.
        (2) If any doubt exists as to the applicability or validity of a Living Will, EMS personnel will initiate full treatment measures.

2) Definition of a **Durable Power of Attorney for Health Care:** An advanced directive that designates another person to make health care decisions regarding how aggressive treatment should be **if the patient becomes incompetent or unable to make decisions in the future**, for example, in the case of coma or a persistent vegetative state. The document also lists medical treatments that the person would not want to have done. Durable power of attorney goes into effect when the document is signed. A power of attorney for health care must be "durable." Durable is a legal term that means a power of attorney remains in effect even when you become incapacitated. ***A health care power of attorney is not used unless patient is incapacitated***. If a person does not have the capacity to execute a power of attorney (and does not already have a durable power in place), often the only way for another party to act on their behalf is to have a court impose a conservatorship or a guardianship.
    i) If POA is presented
        (1) Verify the identity of the person who claims to be POA
        (2) Patient MUST be incapacitated for POA to be effective

3) **Health Care Surrogate**
    i) A **Health Care Surrogate** designation is a document in which the patient designates someone else to make health care decisions if the patient is unable to make those decisions. Unlike a Power of Attorney, a health care surrogate

decision-maker has no authority to act until such time as the attending physician has determined the patient lacks the capacity to make informed health care decisions.

(1) Patient must be incapacitated for health care surrogate to make decisions.

4) A **Legal Guardian (**In some states, conservatorships are called adult guardianships, but the terms mean roughly the same thing) is a person appointed by court, who has the legal authority (and the corresponding duty) to care for the personal and property interests of another person, called a ward. Usually, a person has the status of guardian because the ward is incapable of caring for his or her own interests due to infancy, incapacity, or disability. The guardian of the ward's person may exercise those rights that have been removed from the ward and delegated to the guardian, such as providing medical, mental and personal care services and determining the place and kind of residential setting best suited for the ward. The guardian of the person must also present to the court every year a detailed plan for the ward's care along with a physician's report. If the court finds the ward partially incapacitated, it will appoint a limited guardian to perform only those rights which the ward is incapable of exercising.
    i) Identify if guardianship is limited or total
        (1) If limited, be sure it covers health care decisions
    ii) Verify the identity of the "legal guardian"
    iii) You may follow the wishes of the legal guardian, regardless of patient's mental status.

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1.2.7 Load and Go Situations:

Purpose: To identify conditions where scene time should be as brief as possible. Majority of care should be provided in back of ambulance while in route to the hospital.

Policy:

1. The following is a list of situations that you must consider as load and go situations (not limited to):
    a. **Medical Conditions**:
        i. Complicated Childbirth
        ii. New onset unresponsiveness with no gag reflex
        iii. Altered Mental Status, etiology cannot be established
        iv. New onset stroke < 5 hours
        v. Elevated intracranial pressure per signs/symptoms
        vi. Uncontrolled bleeding
        vii. Shock (hypoperfusion)
        viii. Chest pain with SBP < 100 mm/Hg
        ix. Chest pain with EKG evidence of ↑ or ↓ ST segment
        x. Severe uncontrolled pain > 8
        xi. Impending respiratory failure
        xii. Uncontrolled airway
        xiii. Transport time > 35 minutes
        xiv. Status epilepticus
    b. Trauma Priority Patients (Follow local Trauma Alert Criteria)
        i. Based on initial assessment
        ii. Rapid trauma assessment
        iii. Mechanism of injury
        iv. Burn factors
        v. Contributing factors

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1.2.8 HIPPA/ Privacy

Purpose: To explain the policy on protecting patient confidentiality and to meet Federal requirements for HIPPA-1996.

Procedure: Ensure the proper handling patient medical information to maintain patient confidentiality and define the department's policy on the release of patient medical information.

A. Use of infectious disease identifiers and other infectious specific information regarding patient's diagnosis shall not be given over radio frequencies, phone, or pagers.

B. Personnel shall not use the patient's name on the radio unless they have first received permission from the patient. When permission was obtained, document this on the patient care form.

C. Personnel are prohibited from discussing calls or specific patients with anyone other than the appropriately involved medical personnel, the Medical Director(s), EMS administrative staff, and others as allowed by law.

D. Discussion of a call or a patient is prohibited when those who are not authorized to have access to this confidential information may overhear it.

E. Patient care forms shall not be shared or given to anyone other than those authorized personnel. Persons, allowed by law, may obtain a copy of a patient care form by presenting a specific subpoena or a signed Authorization to Release Medical Information Form to the EMS Administration Office.

F. Any patient medical information printed or copied for Quality Assurance / Improvement shall remain confidential and shall be shredded when no longer needed.

In accordance with **§401.30(4) of the Florida Statutes (2000)** or when and where applicable in ECDPS operations outside of Florida, other similar/equivalent, state statutes in Texas, Louisiana, Alabama, Tennessee and Georgia, **& Health Insurance Portability and Accountability Act of 1996 (HIPPA)**, Patient Care Records, Emergency Call Records, and other documents containing patient examination and treatment information are confidential and cannot be disclosed without the consent of the patient to whom the records pertain. Disclosure of the records may be made without the consent of the person to whom they pertain if it is:

1. to the patient's guardian, to the next of kin if the person is dead, or to a parent if the person is a minor;
2. To hospital personnel for use in conjunction with the treating the patient;
3. to the Department of Health;
4. to the service Medical Director;
5. For use in a critical incident stress debriefing where the discussions are considered privileged communications under §90.503 of the Florida Statutes (or when applicable, similar/equivalent state statutes in Texas, Louisiana, Alabama, Tennessee, and Georgia for similar concerns/activities in those operations outside the state of Florida);
6. In any civil or criminal action, unless otherwise prohibited by law, upon the issuance of a subpoena from a court of competent jurisdiction and proper notice

by the party seeking the records to the patient or the patient's legal representative;

7. To a local trauma agency or a regional trauma agency, or a panel or committee assembled by a local or regional trauma agency to assist the agency in performing quality assurance activities in accordance with a plan approved under §395.401 of the Florida Statutes (or when applicable, similar/equivalent state statutes in Texas, Louisiana, Alabama, Tennessee, and Georgia for similar concerns/activities in those operations outside the state of Florida); however records obtained under this paragraph are confidential and exempt from §119.07(1) of the Florida Statutes and §24(a), Article 1 of the Florida Constitution (or when applicable, similar/equivalent state statutes in Texas, Louisiana, Alabama, Tennessee, and Georgia for similar concerns/activities in those operations outside the state of Florida).
8. To any law enforcement agency or any other regulatory agency responsible for the regulation or supervision of emergency medical services and personnel. Before patient medical information is released, the person requesting the information must complete a notarized Authorization to Release Medical Information, even if it is the patient. If a request to release medical information is not made in person, the Authorization can be forwarded to the person making the request for completion and returned. For example, if an attorney for a patient makes a request for medical records on behalf of the patient, the Authorization must be completed before the release of the records. Patients or other persons requesting copies of our documentation should be referred to the EMS Administrative Office.
9. Escambia County Department of Public Safety's HIPPA Compliance officer is: Shandra Jenkins, 6575 North W Street, Pensacola, Florida 32505. 850.471.6400

References:

§401.30, Florida Statutes (2012)

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1.2.9 Care Facility - Nursing Staff Confrontations/disputes

Purpose: This protocol addresses the policy for dealing with treatment of patients by Care Facility Staff (Nursing homes, etc).

Policy: If you are dispatched to a care facility such as a nursing home, rehab center, dialysis center, assisted living facility, etc., please DO NOT challenge or criticize the care (or lack of) provided by the facility staff. Simply accept report, evaluate your patient and treat according to our protocols. If you feel the patient was in eminent danger or grossly mismanaged due to the actions or lack of action by the facility staff, treat the patient according to our protocols to stabilize. Notify the supervisor after the call and write a separate incident report as soon as possible. The EMS Administration will then address it with the care facility administration in an appropriate time relative to the call. If you are asked by the care facility staff to "just get the patient out of here" without proper packaging or treatment, simply and courteously explain that you are required follow protocols. At no time should you be confrontational or rude. Always do what's right for the patient, always. Any questions please contact medical director or discuss with EMS Supervisor.

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1.2.10 Transporting patients to step down/lower acuity settings

Purpose: This policy addresses all patient transports that involve moving a patient from any care facility to a step down or lower acuity setting (hospital to nursing home, hospital to residence, dialysis center to home, hospital to hospital for equal or lower acuity care, etc.). This policy serves to identify patients whose condition may have deteriorated from time of request for transfer to the actual arrival of the EMS unit.

Procedure:

1. Upon arrival on scene, make patient contact within a reasonable time period (should be within 3 – 5 minutes)
2. Record a set of vital signs. Can use a set of vital signs taken by care facility IF they were taken within the previous 10-15 minutes prior to your arrival; otherwise obtain a set of vitals prior to moving patient. Include; BP, P, RR, Temp, pulse ox.
3. Make contact with patient's nurse for report and final approval for departure. MAKE SURE THE CURRENT/MOST RECENT SET OF VITAL SIGNS AND THE CURRENT MENTAL STATUS ARE IN LINE WITH WHAT ARE IN THE PATIENT'S RECORD OR FROM THE NURSING REPORT. If there is a significant discrepancy in vitals (BP now very low or very high, pulse ox very low, tachy or Bradycardic, febrile, etc) or a change in baseline mentation, this MUST be discussed with the nurse prior to departing. If it is determined that no corrective action needs to be taken (hopefully the nurse discussed it with the patient's doctor), you are to document this in your report and include the name of the nurse.
4. If you arrive at the patient's bedside and find the patient in a potentially unsafe condition (i.e. severe respiratory distress, low pulse ox, in need of suctioning) and take emergency corrective action (i.e. suction airway, open airway, or change the oxygen setting from baseline), you must notify the nurse of such corrective action and have the nurse re-assess the patient prior to loading. If it is determined that there is no change in the patient's condition from pre-discharge status, you may proceed with the transfer but document the event and provide the nurses name.
5. If it is expected that patient will potentially decline and even succumb after leaving the hospital (i.e. terminally ill, on hospice), you may proceed with the transfer as per physician's order.

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1.2.11 EMS Standby Services Protocols, Prolong EMS Operations, Extended EMS Operations

Purpose: This protocol will guide ECDPS EMTs and Paramedics (and other authorized individuals) in caring for patients with minor illness/injuries during gatherings or events in which ECDPS has been requested to provide EMS Standby Services. EMTs and Paramedics will be able to assess, treat, and release (or transport to a hospital, if deemed necessary) patients who present to the designated ECDPS Treatment Area with the following types of illness/injury:

1. Alcohol intoxication
2. Animal/Human Bite
3. Asthma (mild)
4. Contact Dermatitis
5. Dehydration
6. Diarrhea
7. Eye irritation (mild)
8. Headache (minor)
9. Heat cramps/Heat exhaustion
10. Hypoglycemia (mild)
11. Insect sting/bite
12. Marine sting/bite
13. Menstrual cramps
14. Nausea/Vomiting related to recent food intake
15. Pain (mild); (i.e. dental)
16. Soft tissue cuts and scrapes
17. Strains and sprains (minor)
18. Sunburn
19. Over the counter drugs allowed
    a. Advil/Ibuprofen 200 mg
    b. Aloe vera lotion with lidocaine
    c. Anti-fungal cream
    d. Anti-microbial hand wash/wips
    e. Benadryl 25 mg
    f. Bug spray
    g. Calamine or Caladry lotion
    h. Chap stick
    i. Cough drops
    j. Hydrocortisone cream
    k. Hydrogen Peroxide
    l. Imodium
    m. Maalox/Mylanta
    n. Neosporin Ointment
    o. Rubbing alcohol
    p. Saline for irrigation
    q. Sudafed
    r. Sunscreen
    s. Tylenol 325 mg or 500 mg

t. Vinegar
u. Zantac 150 mg

Procedure:

1. All patients that present for evaluation shall be treated with respect
2. Wash your hands with soap and water or antimicrobial hand wash/wipes before, after, and in-between patients.
3. Keep all surfaces and working areas clean, wipe down frequently with antimicrobial products/wipes or alcohol.
4. All patients shall have a complete set of vitals taken and recorded
5. Any patient with abnormal vital signs, i.e. elevated blood pressure, tachycardia or bradycardia, which are asymptomatic, recheck in opposite arm. If still abnormal, inform patient and instruct him/her to follow up with their physician or a primary care physician for evaluation.
6. A patient record shall be made on all encounters (abbreviated form OK for most of the cases you will see).
7. Follow the appropriate protocol for the presenting complaint (see below or use the protocols from the protocol book for more serious problems)
8. Repeat and record vital signs every 15 – 30 minutes
9. Record progress or changes in your patient's condition every 15 – 30 minutes
10. Depending on the setting and resources, patients can be observed for maximum of 2 – 4 hours and if unable to be released, then arrangements for transport to the hospital should be considered
11. At anytime a patient's condition deteriorates or you have a concern about keeping patient in the treatment arena, transport to hospital.
12. Under these Event Standby Protocols, EMTs, Paramedics, RNs and any other person authorized by the medical director are allowed to administer or apply over the counter medications listed below and as directed in the appropriate protocols.
13. BEFORE ANY MEDICATION IS ADMINISTERED OR APPLIED, YOU MUST FIRST OBTAIN/KNOW THEIR DRUG ALLERGIES. If there is ANY question as to the safety of using a drug, call the medical director before giving/applying the medication.

Alcohol Intoxication:

<u>Signs/symptoms may include</u>; obvious odor of ETOH on breath or admits to drinking ETOH or friends/relatives report observed pt drinking. Staggering gait, slurring speech, nausea/vomiting, belligerent, uncooperative, euphoric, incontinent of urine

<u>Treatment</u>:

1. Assess for trauma or other possible causes (stroke, head injury, drug overdose) based on history of what happened, medications and past medical problems
2. If altered mental status appears beyond isolated alcohol intoxication, refer to the appropriate medical/trauma protocol and arrange for transport to the hospital.
3. If signs and symptoms are consistent with acute mild ETOH intoxication (no nausea or vomiting, acting giddy but able to cooperate) you can observe for a

period of time up to several hours and if able to tolerate PO fluids, allow to drink non-alcoholic beverages. Release (preferably to a responsible person) when patient improves; instruct him/her not to drive for 8 hours.

4. If signs and symptoms are consistent with acute moderate ETOH intoxication, start an IV (qualified EMTs, Paramedics) and give 1 – 2 liters of NS wide open
5. If nausea/vomiting, may treat (Paramedic or RN) with Zofran 4 mg IV x 1 dose. If nausea/vomiting persist, contact medical control for additional dosing or arrange transport to hospital.
6. If no significant improvement after a 2-4 hour (depending on manpower) max observation, transport to hospital. If symptoms resolve or significantly improve, may release (preferably to a responsible person) with instructions not to drive for 8 hours.

Animal/Human Bite:

Signs and symptoms: single or multiple puncture wounds, bleeding, lacerations, scrapes, swelling at site.

Treatment:

1. Clean affected area with soap and water, or irrigate with at least a liter of normal saline.
2. Control bleeding with direct pressure
3. Apply antibiotic cream and dress with sterile dressing
4. Tylenol 650 – 1000 mg or Advil 2 - 4 tabs (400 – 800 mg) if for pain
5. If patient not up to date on Tetanus immunization (more than 5 years), recommend they follow up with their MD or the health department within 72 hrs for a Tetanus Toxoid shot.
6. If the animal was a skunk, fox, dog, cat, bat, coyotes, or a raccoon, patient should be referred to the health department for prophylactic treatment of rabies.
7. If patient presents with a hand injury as the result of a human bite or punching someone in the mouth, clean very thoroughly and instruct patient to follow up as soon as possible with a doctor, especially if any swelling, redness and drainage develops, as these type of injures can become seriously infected, despite good local wound care.

Asthma (mild):

Signs and symptoms: Complaining of shortness of breath. Appears to be mildly short of breath, Wheezing, No significant/obvious respiratory distress. May indicate history of asthma and may use an inhaler routinely or as needed.

Treatment:

1. If symptoms are related to an exposure, such as chemical vapor or spray, remove from the source and remove any clothing that may be harboring the chemical. Decontaminate the skin as needed.
2. Place on oxygen via nasal cannula, or simple mask as needed
3. If symptoms are of a moderate to severe nature, refer to the appropriate medical protocol, treat, and transport to the hospital.
4. If symptoms are of a mild nature (no obvious distress, wheezing only, no retractions, not sweating, mildly anxious) can assist patient with two puffs from their personal inhaler (if available) and/or give an Albuterol/atrovent neb (paramedic or nurse) x 1. If wheezing continues or the patient continues to complain of shortness of breath, you may give one additional Albuterol only neb. If symptoms persist, contact medical control for additional neb order or arrange transport to hospital and follow complete asthma protocols (third neb tx Dexamethazone, Epi 1:1000 subq)

Contact Dermatitis:

Signs and symptoms: Itching, irritated skin, rash isolated to a specific region after contact with some object or material.

Treatment:

1. Remove any remaining object or material from contact with skin
2. Clean region with soap and water or irrigate with normal saline
3. Dry affected area
4. Apply 1% hydrocortisone cream or Calamine/Caladryl lotion
5. May give one OTC Benadryl 25 mg PO (EMT, paramedic or RN) if itching is intense involving the contact region.
6. If reaction appears to be more general, follow full allergic reaction protocol and transport to hospital

Dehydration (mild):

Signs and symptoms: Thirsty, profuse sweating, rapid pulse, +/- nausea, weakness/fatigue, decrease urine output or report of dark (concentrated) urine. They may report not eating/drinking well over previous 24 – 48 hours, recent infection, recent or concurrent diarrhea or over exertion activity.

Treatment:

1. If no nausea and can take po fluids, allow patient to drink water, 10K, Gatorade, or equivalent fluids
2. Provide for a cool, quiet, comfortable place for patient to relax
3. If nausea or vomiting present, start IV (qualified EMT, paramedic or RN) and give 1 – 2 liters of NS.
4. Can give 1 dose of Zofran 4 mg IV.
5. May observe for several hours if staffing permits

6. If nausea persist after above or patient shows no sign of improvement, or patient has positive orthostatic vital signs (pulse goes up by 20 beats/min from lying to standing or Systolic BP drops 20 mm Hg from lying to standing) transport to hospital for further evaluation/management.

Diarrhea:

Signs and symptoms: Complaint of watery/loose stools, may also have abdominal cramps.

Treatment:

1. If no nausea, allow patient to drink po fluids
2. If symptoms less than 24 hours do not treat the diarrhea (carries out the offending organism and is usually self limited).
3. If symptoms > 24 hours, give;
    a. (Adult) Imodium 4 mg po x 1 dose then 2 mg po after each loose stool: max: 16 mg/day.
    b. (Child) 2-3 yr (13 – 20 kg) 1 mg po x1 after each loose stool, Max; 3 mg/day.
    (Child) 6 – 8 yr (20-30 kg) 2 mg x 1, then 1mg after each loose stool. Max; 4 mg/day.
    (Child) 8-11 yr (30-40 mg) 2 mg x 1 then 1 mg po after each loose stool; Max 6 mg/day.
    (Child) >12 yr 4 mg po x 1 then 2 mg po after each loose stool; Max-~~8 mg/day~~
4. If nausea/vomiting present start IV (qualified EMT, paramedic or RN) and give 1 – 2 liters of NS wide open (20 ml/kg for children x 2 boluses). Can give 1 dose of Zofran 4 mg IV
5. If symptoms improves (nausea/vomiting resolve [diarrhea will not resolve immediately]) may release patient.
6. If symptoms persist or worsen after observation, consider transport to hospital for further care.

Eye Irritation:

Signs and symptoms: watery, itchy, sensation of foreign body, injected conjunctiva (red eye), +/- mild swelling of eyelids, blurred vision.

Treatment:

1. Inspect eye for obvious foreign body
2. Irrigate with at least 200 ml normal saline (each affected eye). Repeat x 2 if needed
3. If still symptomatic after treatment or foreign body still present, patient will need further evaluation/treatment at hospital.

Headache (mild):

Signs and symptoms: Patient may complain of headache without associated symptoms of nausea, vomiting, photophobia (eyes sensitive to light), blurred vision, fever, neck stiffness. Should not be described as worst headache of their life which would indicate a potential serious condition.

Treatment:

1. Simple, uncomplicated headache can be treated with one of the following:
    a. Tylenol 650 – 1000 mg po x 1 dose
    b. Ibuprofen 400 –800 mg (2 – 4 Advil) po x 1
2. Observe patient and document response to treatment, release when better.
3. If patient does not feel significantly ill and chooses not to remain for a period of observation, at least invite them to return to the treatment area if symptoms persist or becomes worse.
4. If symptoms worsen or if there is associated symptoms of nausea, vomiting, photophobia, blurred vision, neck stiffness, fever, it is strongly suggested the patient be transported to the hospital for evaluation.

Heat cramps/Heat exhaustion:

Signs and symptoms: History of exposure to sun, hot environment, poorly ventilated structure for a period of time, profuse sweating, muscle cramps, nausea, vomiting, fatigue, rapid breathing, rapid pulse.

Treatment:

1. Place patient in cool, quiet place
2. Remove heavy clothing (preserve modesty)
3. If no nausea, allow to drink po fluids
4. If nauseated, start IV (qualified EMT, paramedic or RN) and give 1- 2 liters of NS wide open. May give one dose of Zofran 4 mg IV.
5. Moisten skin (may already be sweaty) and cool with a fan
6. Observe for period of time, maximum 2 – 4 hours. If symptoms resolve, release but restrict from returning to same environment. If symptoms persist, may need transport to hospital for further evaluation.

Hypoglycemia (mild):

Signs and symptoms: Thirsty, not feeling well, hx of diabetes, low blood sugar by accucheck (< 60 mg/dl)

Treatment:

1. In no nausea, allow to eat and/or drink a sweetened liquid

2. Recheck blood glucose 30 minutes following #1. If patient feels better you can release. If still not feeling well, continue to give PO fluids, observe for period of time and reassess. Consider transport to hospital if no improvement after 1 – 2 hours.
3. If patient is nauseated, give oral glucose under the tongue
4. If blood glucose less < 60 with altered mental status, follow regular Hypoglycemic Protocol and consider transport to hospital.

Insect sting/bite:

Signs and symptoms: Localized area of skin redness, itching, mild localized swelling associated with an insect bite or sting. May involve multiple sites. Systemic signs and symptoms may include nausea, vomiting, swelling of tongue and lips, difficulty swallowing, difficulty breathing, wheezing. Any patient exhibiting systemic signs and symptoms should be transported to the hospital for further evaluation and management.

Treatment:

1. Clean affected area with soap and water
2. Carefully remove any visible stinger making all possible attempts to avoid squeezing any sac like structure still attached.
3. Apply 1% hydrocortisone cream or Calamine/Caladryl Lotion
4. Apply cool compress/cold pack
5. Offer a Benadryl 25 mg PO and a Zantac 150 mg PO (EMT, Paramedic or RN) if reaction is causing itching or appears to be increasing in size.
6. Tylenol or Advil for pain.
7. If patient develops systemic signs and symptoms, follow appropriate medical protocol for allergic reaction/anaphylactic reaction and transport to the hospital for evaluation.

Marine Sting/Bite:

Signs and symptoms: Localized redness, itching, burning, mild swelling, hives, skin irritation associated with a sting or bite from a marine animal. Bite marks may be single or multiple and consist of a single or a series of puncture wounds. Bleeding may be noted. There may be an associated laceration.

Treatment:

1. Inspect the affected area for residual stingers or foreign bodies
2. Rinse the affected area with saline or water.
3. Gently remove any residual stinger being careful not to squeeze any sac associated with the stinger. If jellyfish tentacles are involved, rinse with salt water and use a credit card or equivalent to scrape off the tentacles.

4. Apply hot compress (can soak in hot water) to region for 20 – 30 minutes (heat will break down some of the marine toxins that cause pain, especially stingrays).
5. Apply/spray area with a 10% vinegar solution (especially jellyfish stings)
6. Tylenol or Advil for pain
7. Benadryl 25 mg po and Zantac 150 mg po for itching or expanding swelling/reaction.
8. Prior to release from the treatment area, apply 1% Hydrocortisone Cream to affected area.
9. If there is a puncture wound or laceration involved, after cleaning thoroughly with soap and water, dry, apply antibiotic cream and dress. Instruct patient to keep clean and dry and seek medical care if any redness, swelling or drainage occurs over the next week.
10. Do not attempt to remove any broken barb/fin that is embedded in the skin. Clean areas around it, dress it, and send to the hospital for removal.
11. If any signs or symptoms of systemic reactions; nausea, vomiting, chills, shortness of breath, swelling of tongue or lips, wheezing, follow appropriate allergic reaction/anaphylactic reaction protocol in the protocol book and transport to the hospital.

Menstrual Cramps:

Signs and symptoms: Intermittent lower abdominal cramps associated with onset or during her menstrual period.

Treatment:

1. Tylenol 650 – 1000 mg or Advil 400 – 800 mg for pain
2. If patient reports her symptoms are different (more intense) from her usual menstrual cramps or her bleeding is heavier than normal, monitor her pulse and BP. If any tachycardia or hypotension, or symptoms persist for more than an hour, consider transport to the hospital for further evaluation.

Nausea and Vomiting related to recent food intake:

Signs and symptoms: Report of nausea and vomiting within four hours of eating. If related to food intake, will usually be self limited. If nausea and vomiting not related to recent food intake, could indicate a more serious medical problem developing.

Treatment:

1. Obtain careful history. Make sure patient is not complaining of other systemic symptoms such as fever, chills, headache, severe abdominal pain, ETC.

2. Start IV (qualified EMT, Paramedic or RN) and give 1-2 liter of NS bolus
3. May give 1 dose of Zofran 4 mg IV (Paramedic or RN)
4. Observe for brief period (max of 1 – 2 hours). If symptoms persist or worsen, consider transport to the hospital or discuss case with medical director for additional orders.
5. If other systemic symptoms; fever, abdominal pain, chills, etc., consider transport to the hospital as this may indicate a more serious problem.

Pain (Mild), (i.e. dental, isolated area of the body, minor trauma):

Signs and symptoms: Complains of pain to an isolated, specific region of an acute or gradual onset. Pain should not be of an intense nature as to cause patient to be diaphoretic, nauseous, tachycardic, hypo or hypertensive. If complaint is chest pain or abdominal pain, patient should be treated per medical protocols and transported to the hospital.

Treatment:

1. Assess the area of pain for signs of swelling, redness, obvious trauma, deformity, increased warmth, tenderness, or drainage
2. Give Tylenol 650 – 1000 mg or Advil 400 - 800 mg
3. Position/splint/dress the affected area for comfort if applicable.
4. Apply cold pack if applicable
5. Release from treatment area when feeling better.
6. If systemic symptoms of diaphoresis, nausea, tachycardia, hypo/hypertension, fever, consider transport to the hospital for further evaluation.

Soft tissue cuts and scrapes:

Signs and symptoms: Minor scrapes or abrasions, minor lacerations that do not appear very deep. Mechanism (or cause) of injury not sufficient to cause serious trauma.

Treatment:

1. If involving arms, legs, hands or feet; assess the injured area for normal movement and presence of normal sensation. If unable to move normal or loss of sensation, patient should be evaluated at the hospital or by their MD.

2. Clean the affected area with soap and water and/or irrigate with normal saline.
3. Control bleeding with direct pressure.
4. Dry wound
5. Apply antibiotic ointment and dress with sterile dressing/Band-Aid.
6. Tylenol 650 – 1000 mg or Advil 400 – 800 mg by mouth if needed for pain.

Strains and sprains (minor):

Signs and symptoms: Mechanism of injury is such that patient over-stretched a muscle, twisted a joint, or hyper-extended a joint. Following injury, there is pain and swelling of the affected part.

Treatment:

1. Assess the affected area for gross deformity, crepitus (clicking or grinding sound of broken bones), breaks in the skin, and sensation (numbness).
2. Elevate the affected part
3. Apply cold pack
4. Apply an ace bandage or splint the affected part
5. Give Tylenol 650 – 1000 mg or Advil 400 – 800 mg for pain
6. If injury looks serious, transport to hospital for further evaluation and management.

Sunburn:

Signs and symptoms: History of exposure to ultra violet light source (sun, tanning booth). Exposed areas are painful, red, and tender.

Treatment:

1. Remove from ultra violet source.
2. Cool affected area with cool compresses or cooling/misting fan if available
3. Drink fluids if not nauseated
4. Tylenol 650 – 1000 mg or Advil 400 – 800 mg by mouth for pain
5. Apply burn cream or sunburn spray or Aloe-vera lotion to affected area.
6. Keep exposed area covered to avoid additional exposure after treatment.

Over the Counter Medications Allowed

1. Advil/Ibuprofen
    - Comes in 200 mg tablets
    - Usual dosage is 400 – 800 mg (2 – 4 tablets)
    - Use to treat pain and fever
2. Aloe-vera lotion with lidocaine
    - Comes in a bottle or tube
    - Apply to affected area

- Used for sunburn and dry skin conditions

3. Anti-fungal cream
    - Comes in a tube
    - Apply to fungal rash
    - Use for suspected fungal rashes
4. Anti- microbial solution/wipes
    - Comes in a variety of packaging
    - Apply to surfaces and clean hands/skin
    - Use frequently before, after and between handling patients
5. Benadryl
    - Comes in blister packs or bottle, 25 mg capsules
    - Can be given 1 tablet (25 mg) every 8 hour
    - Use as antihistamine for allergic reactions
6. Bug/Insect spray
    - Comes in small spray bottle
    - Spray over body, avoiding eyes
    - Use to repel insects
7. Calamine or Caladry lotion
    - Comes in a bottle or tube
    - Apply to itching rash or sunburn
    - is used treat mild pruritic conditions such as sunburn, eczema, rashes, poison ivy, chickenpox, insect bites and stings
8. Chap stick
    - Comes in a small tube canister
    - Apply to dry lips as needed
    - Used to treat dry, cracking lips
9. Cough drops
    - Comes in a variety of packaging
    - Allow to dissolve in mouth
    - Use for minor cough and scratchy throat
10. Hydrocortisone cream
    - Comes in a tube
    - Apply to affected area of the skin, avoiding the eyes
    - Use for minor itching rashes, skin allergic reactions
11. Hydrogen Peroxide
    - Comes in a bottle
    - Apply to minor skin lesions to clean
    - Use for minor scrapes and lacerations
12. Imodium or other anti-diarrhea
    - Comes in 2 mg tablets
    - Give 2 tablets (adults) or 1 tablet (children) as an initial dose followed by 1 tablet after each subsequent loose stool

WEIGHT IN KILOGRAMS (kg)	MAXIMUM DAILY DOSE
from 14 kg	2 tablets
from 20 kg	3 tablets

from 27 kg	4 tablets
from 34 kg	5 tablets
from 40 kg	6 tablets
from 47 kg	7 tablets
from 54 kg	8 tablets

- Use to treat Diarrhea that has been going on for more than 24 hours.

13. Maalox/Mylanta
    - Comes as a liquid or tablets
    - Liquid: 10 to 20 mL (2 – 4 tsp), 4 times a day between meals and at bedtime. Tablets: 2 to 4 tablets, 4 times a day between meals and at bedtime. Tablets should be chewed well.
    - Use for patients with upset stomach following ingestion of food.
14. Neosporin Ointment or other antibiotic ointment
    - Comes in a tube
    - Apply to scrapes and cuts after cleaning with soap and water
    - Use for cuts and scrapes
15. Rubbing alcohol
    - Comes in a bottle
    - Apply to skin as needed
    - Use to clean skin around wounds or wipe of surfaces
16. Saline for irrigation
    - Comes in various size containers
    - Irrigate as needed
    - Use to clean and irrigate contaminated wounds
17. Sudafed
    - Comes in a variety of time released formulas.
    - The recommended dosage of Sudafed for immediate-release tablets is two tablets every four to six hours, not to exceed eight tablets in 24 hours. For extended-release Sudafed 12 Hour tablets, the recommended dosage is one tablet every 12 hours. For the extended-release 24 Hour tablets, the recommended dose is one tablet once a day.
    - Used for relief of sinus congestion and pressure from colds or allergies
18. Sunscreen
    - Comes in lotion, creams or spray
    - Apply to skin prior to exposure to sun
    - Use for skin protection from UV source
19. Tylenol 325 mg or 500 mg
    - Comes in tablets or caplets
    - Can take two tablets or caplets every four hours as needed (two 325 mg will be 650 mg total or two 500 mg will be 1000 mg)
    - Use for treatment of fever or pain
20. Vinegar
    - Standard bottle from grocery store
    - 10% vinegar soaks or spray (mix 10 ml (2 tsp) in 90 ml (18 tsp or 6 tbsp) of saline. Apply to affected area.
    - Use for marine stings or bites

21. Zantac
    - Comes in 75 mg and 150 mg
    - Give 150 mg by mouth 2 x daily
    - Use for allergic reactions or upset stomach

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1.3 Scene / Response Guidelines

1.3.1 SRT / TACTICAL SPECIAL OPERATIONS TEAM PROTOCOL

Administrative Protocol

Purpose: This protocol is written to provide guidelines for EMS agencies responding to active shooter/mass violence incidents when there is **no** dedicated tactical emergency medical support (TEMS) team ("tactical medic" or "tac medic") available to respond with law enforcement agencies. In the Event that ECEMS and ECSO come to an agreement and form an Official, dedicated Tactical Emergency Medical Support (TEMS) Response Team ("Tac Medic" or "Tactical Medic"), follow the guidelines as outlined in the Tactical Emergency Medical Support (TEMS) Protocols, which has been provided to the tactical medical teams in a separate protocol. Usually law enforcement (LE) resources in the initial moments of an active shooter/mass violence event are focused on locating, containing and eliminating the threat, thus EMS resources should emphasize planning for rapid triage, treatment and extrication of the wounded in coordination with LE and as directed by Unified Command (UC). Tactical EMS support personnel are not a typical resource because they are usually very limited in number, not immediately available, and committed to their tactical team's assignment which may preclude them from casualty care activities until the tactical team's objective is met.

Considerations, planning and interagency training should occur around the concept of properly trained and equipped medical personnel who are escorted by LE into areas of mitigated risk, which are cleared but not secured, to execute triage, medical stabilization at the point-of-wounding, and provide for evacuation or sheltering-in place.

Definitions:

Active Shooter – An incident involving a suspect or suspects who are actively shooting at victims with the intent to cause the maximum number of casualties in a short amount of time.

Casualty Collection Point – A cleared area located within the Warm Zone where injured patients are brought to begin the process of triage and immediate life-saving treatment, usually limited to controlling massive external hemorrhage, placing occlusive dressings on open chest wounds and basic airway management.

Cleared – An area that has been checked by LE and no apparent threats have been found.

Cold Zone – The area surrounding the active shooter incident that is secured by LE. All normal EMS activities should take place in the Cold Zone.

Concealment – Anything that obscures you from view of the suspect such as smoke, vegetation, etc. Concealment will not provide ballistic protection.

Cover – Any object that provides ballistic protection, such as a reinforced concrete wall, large dirt mound, etc.

Hot Zone – The area immediately surrounding the shooter(s) that has not been cleared or secured by LE. Only LE or specially trained and equipped EMS personnel (i.e. tactical medics/EMTs) should enter the Hot Zone.

Secured – An area that has been slowly, methodically and deliberately searched by LE and no threats have been found.

Warm Zone – The area outside of the Hot Zone that has been swept/cleared by LE, but has not been completely secured. **Limited numbers of EMS personnel, as determined by UC, may enter the Warm Zone for the purposes of extrication or to establish a Casualty Collection Point. The Warm Zone should be staffed by armed LE when possible for EMS personnel protection.**

Policy:

What you MUST know before responding to an Active Shooter or similar mass violent incident and once you arrive on scene:

1. Multiple agencies will be responding. You MUST stage in a safe location until instructed to approach the scene by law enforcement via incident command "IC" or unified command "UC".
2. There will be a designated "Hot", "Warm" and "Cold" zone established by the incident command "IC" or unified command "UC". The location of these three zones will be directly related to the nature and elements of the immediate threat. The designation of each zone will be a dynamic process and subject to change in an instant based on the volatility, mobility and extent of the immediate threat. You MUST monitor radio traffic and adhere to commands to withdraw to a more secure location when instructed by IC/UC.
3. Unless you are part of a trained tactical emergency medical support (TEMS) team, aka "tactical medic", which has routinely trained with law enforcement, you should not expect to enter the hot zone.
4. While the community-accepted practice has been staging EMS assets at a safe distance (usually out of line-of-sight) until the area is completely secured by LE, considerations should be made for more aggressive EMS operations in areas of higher but mitigated risk to ensure casualties can be rapidly retrieved, triaged, treated, and evacuated. Rapid triage and treatment are critical to survival.
5. Utilize staging areas to limit the number of responders. Don't stack up responders and resources in one location as responders may be targets.
6. Stage responders for rapid evacuation and always have an escape route open to leave the scene quickly if needed.
7. Use a deliberate and cautious approach to the scene. EMS personnel should be escorted by LE whenever possible.
8. Use identification that is discernable from a distance. Be aware that responders may be wearing uniforms and civilian attire, so exercise caution in identifying individuals.
9. Consider establishing a "duress code" known to all responder personnel.

10. If bystanders become hostile, extricate yourself and advise the IC/UC.
11. If exposed to gunfire, explosions or threats, withdraw to a safe area or shelter in place if necessary.
12. Consider the use of apparatus solid parts such as motor, pump, water tank and wheels as cover in the Hot Zone (in the event the hot zone has expanded or shifted to include your current location). Understand the difference between cover and concealment.
13. Consider additional devices and hazards at the main scene and secondary scenes in close proximity to the main scene. Such threats, if identified, would necessitate upgrading the area to a Hot Zone and requiring rapid evacuation of all medical personnel/surviving casualties.
14. Communicate with the IC/UC to determine which agency or personnel will locate casualties, triage them, provide point-of-wounding medical stabilization, and/or remove them to a safe location. Be aware that LE officers may bypass casualties in order to eliminate the threat.
15. Adopt a "scoop and run" response within the Warm Zone. Treatment, including splinting/spinal motion restriction/ALS procedures, can wait until the victim is in a cleared or secured location (cold zone). Utilize gurneys to transport multiple patients, and uninjured victims to assist walking wounded patients as appropriate.
16. Work as teams or in pairs at a minimum. If possible, assign an extra responder to serve as a team spotter. Their role is to observe, identify and avoid threats while the balance of the team executes their EMS assignment. If resources are available, LE should be assigned as the team spotter.
17. Use internal Casualty Collection Points (CCPs) for large facilities with multiple casualties where evacuation distances are long. Point-of-wounding medical stabilization should occur prior to evacuation to the CCP. If this is located in the hot zone, then only the tactical medics should be involved. Limited numbers of EMS personnel, as determined by UC, may enter the Warm Zone for the purposes of extrication or to establish a Casualty Collection Point. Identify all responders and casualties at the CCP for accountability and protection/security purposes.
18. For larger geographic incidents or incidents with travel barriers, consider the use of multiple staging, triage and other supporting setup areas.
19. Events with mobile perpetrators or sequenced attacks may necessitate CCP or staging area relocation and additional protection/security.

Procedure:

A. **Evacuation Care (Hot or Warm Zone)**: **TAC/SRT MEDICS ONLY**

Only LE or specially trained and equipped EMS personnel (i.e. tactical medics/EMTs) should enter the Hot Zone to provide Evacuation Care. The goal of Evacuation Care is to provide life-saving interventions and to prevent casualties from sustaining additional injuries. Minimal trauma interventions are warranted in this phase of care.

1. Consider quickly placing and/or directing casualties to be placed in position to open or protect their airway if necessary.
2. Consider hemorrhage control and treat according to External Hemorrhage Control Protocol, with the following additional considerations:
    a. If required and available, tourniquets should be applied over clothing.
    b. Consider moving to safety prior to tourniquet application if the situation warrants.
    c. Consider instructing casualties and/or bystanders to apply direct pressure to the wound if no tourniquet is available or application is not feasible.
3. Upon approval of the IC/UC, non-tactical EMS personnel may enter the area once it has been cleared by LE in order to provide Evacuation Care. These personnel should be issued appropriate protective gear, if available, and escorted by LE personnel.
4. Casualty Extraction:
    a. If casualties can move to safety, they should be instructed to do so.
    b. If casualties are unresponsive, quickly assess for respirations. If they are not breathing, leave them and move on to the next casualty.
    c. If casualties are responsive but cannot move, a tactically feasible rescue plan should be devised.
    d. Recognize that threats are dynamic and may be ongoing, requiring continuous threat assessments.

B. Casualty Collection Point (CCP) Care/Tactical Field Care (Warm Zone):

Limited numbers of EMS personnel (as determined by the IC/UC) should enter the Warm Zone for the purposes of patient extrication or to establish a CCP. The goal of CCP Care is to stabilize casualties to permit safe evacuation to dedicated medical treatment and transport assets.

NOTE: The warm zone protocols below are the same protocols provided to tactical medics. Perform only those protocols while in the warm zone, that are required to stabilize the patient and extricate to the cold zone. Further care can then be provided in the cold zone.

1. SWAT/Law Enforcement Casualties with an altered mental status should be disarmed immediately
2. **Primary Survey** (**MARCH**)

a. **M**assive hemorrhage

i. Assess for unrecognized hemorrhage and control all sources of bleeding

1. If not already done, use a tourniquet or an appropriate pressure dressing with deep wound packing to control life-threatening external hemorrhage that is anatomically amenable to such treatment.

2. Apply the tourniquet over the clothing as proximal– high on the limb– as possible, or if able to fully expose and evaluate the wound, apply directly to the skin 2-3 inches above wound.

3. For any traumatic total or partial amputation, a tourniquet should be applied regardless of bleeding.

ii. Use **hemostatic dressing** (i.e. **Combat Gauze, Celex Gauze, ChitoGauze, QuickClot, or HemCon)** on severely bleeding wounds for compressible hemorrhage not amenable to tourniquet use. **Hemostatic dressings should be applied with at least 3 minutes of direct pressure**.

iii. Reassess prior tourniquet application. Expose wound and determine if tourniquet is needed. If so, replace tourniquet over uniform with another applied directly to skin 2-3 inches above wound. If a tourniquet is not needed, use other techniques to control bleeding.

iv. When time and the tactical situation permit, a distal pulse check should be accomplished. If a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet, side-by-side and proximal to the first, to eliminate the distal pulse.

v. Expose and clearly mark all tourniquet sites with the time of tourniquet application. Use an indelible marker.

vi. Assess for discontinuation of tourniquets after application of hemostatic dressings (i.e. **Combat Gauze, Celex Gauze, ChitoGauze, QuickClot, or HemCon**) or a pressure dressing, if evacuation time is anticipated to be longer than two hours.

1. As an adjunct to tourniquet removal (if evacuation time is anticipated to be longer than two hours), apply a hemostatic agent in accordance with the directions for its use and an appropriate pressure bandage**.**

Hemostatic dressings should be applied with at least 3 minutes of direct pressure. Before releasing any tourniquet on a casualty who has been resuscitated for hemorrhagic shock, ensure a positive response to resuscitation efforts (i.e., a peripheral pulse normal in character and normal mentation if there is no traumatic brain injury (TBI).

2. If the bleeding site is appropriate for use of a junctional tourniquet, immediately apply a CoTCCC-recommended junctional tourniquet. Do not delay in the application of the junctional tourniquet once it is ready for use. Apply hemostatic dressings with direct pressure if a junctional tourniquet is not available or while the junctional tourniquet is being readied for use.

vii. Use **pressure dressing** on less severe bleeding wounds

b. **A**irway (management options):

i. Chin lift or jaw thrust

ii. **Nasal (preferable) and/or oral airways**

iii. **Extra-glottic device** (**LMA**)

iv. **Surgical Cricothyroidotomy** (consider using as a primary advanced airway intervention in a tactical environment)

v. **Endotracheal Intubation** (Only if feasible in warm zone, otherwise defer till cold zone).

vi. Portable suction

c. **R**espiratory/Breathing

i. **BVM**

ii. **Portable ventilator** if available

iii. **If tension pneumothorax** (suspect if torso trauma and respiratory distress) **Needle decompression** (**ThoraQuick Chest Decompression Device**)

iv. **Sucking chest wound**: Occlusive dressing or **Asherman Chest Seal**

d. **C**irculation (Assess for hemorrhagic shock: altered mental status in the absence of head injury and weak or absent peripheral pulses are the best field indicators of shock)

i. IV with 18 ga needles

ii. I/O if no peripheral IV access (**EZ-IO**)

iii. IV Fluid: LR (preferentially) or NS to maintain systolic at 110 mm Hg (permissive hypotension). Start with 500 mL bolus and repeat the bolus in 30 minutes if there is no clinical response, using pulse strength and level of consciousness

e. **H**ead injury (if altered mental status and has adequate peripheral pulse, it's either because of inadequate cerebral perfusion or cerebral injury)

i. Keep head elevated 30°

Maintain a BP around 120/80 mm Hg if possible

C. Cold Zone:

Once casualties reach the cold zone, EMS will care for these patients based on the appropriate ECDPS protocols. Realize care provided to these patients up to this point was limited to hemorrhage control and basic airway maneuvers.

1. Reassess all interventions applied in previous phases of care. If multiple wounded, perform primary triage for priority AND destination.
2. A run report will be generated on every patient treated
3. Debriefing involving all involved crews will take place with command staff and medical director as soon as possible following a mission.

Suggested Equipment List for WARM zone pack: To be carried in special pack

CAT Tourniquet	2 – 3
Quick Clot Gauze	2 - 3
Sterile 4x4	6 - 8
ABD pad	2 - 3
Kling	2 - 3
Ace wrap	2 - 3
Oral Airway	
Nasal Airway	
LMA	
Tape	
Scissors	
Stethoscope	
BVM	
Thora Quick	

Vaseline gauze or Asherman Chest Seal
IV needles (14, 16, 18 ga)
IV fluid
BIG I/O needle
Mega mover

CROSS REFERENCES:

U.S. Fire Administration Fire/Emergency Medical Services Department Operational Considerations and Guide for Active Shooter and Mass Casualty Incidents, September 2013
http://www.usfa.fema.gov/downloads/pdf/publications/active_shooter_guide.pdf

Improving Survival from Active Shooter Events: The Hartford Consensus (American College of Surgeons/Federal Bureau of Investigations Joint Committee to Create a National Policy to Enhance Survivability From Mass Casualty Shooting Events)
http://www.naemt.org/Libraries/Trauma%20Resources/Hartford%20Consensus%20Document%20Final%204-8-13.sflb

Tactical Emergency Casualty Care Guidelines| C-TECC. (2014, January 17). Retrieved from Committee for Tactical Emergency Casualty Care: http://ctecc.org/tactical-emergency-casualty-care-guidelines

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1.3.2 HOSPITAL DIVERSION/BY-PASS:

Purpose:

1. To establish guidelines under which receiving hospital emergency departments divert fire-rescue and ambulance patients when it has been determined, through pre-established criteria, that the hospital is unable to accommodate additional patients.
2. To define procedures for communicating changes in diversion status.
3. To establish guidelines for fire-rescue, ambulance and other out-of-hospital provider operations when a receiving hospital is on diversion.
4. To define exceptions to the Hospital Diversion Status when hospitals follow procedures defined herein.
5. DIVERSION CATAGORIES

    a. ELECTIVE: Defined as all patients requiring bed space, except critical patients. Minor Care patients shall be defined as follows:
        1. Any patient who can safely wait in the emergency department waiting room for an extended period of time.
        2. Any patient that does not require continuous ongoing medical therapy, such as oxygen or intravenous treatment.
        3. Any patient who at any point is not felt to be of urgent need of assistance, as determined by any level of healthcare provider.
        4. Any patient who does not have respiratory or cardiac complaints.
        5. Any patient who does not have uncontrolled or significant hemorrhage.

    b. CRITICAL: Defined as all patients requiring critical care support. Clinical conditions that may be considered are:
        1. Potentially life threatening dysrhythmias.
        2. Hypotension with shock.
        3. Unstable Chest pain.
        4. Hypothermia.
        5. Altered mental status unresponsive to Dextrose 50% Water.
        6. Status epilepticus.
        7. Any condition determined by the paramedic to be of a critical nature.

    NOTE: Cardiac or Respiratory Arrest, and Trauma Alerts, are NOT subject to CRITICAL CARE DIVERSION.

    c. TECHNICAL: Defined as all patients in need of technical or specialty evaluation, for which the receiving facility is unable to provide. This may include:
        1. Malfunction or repair of medical equipment.
        2. Unable to accommodate a particular type of patient because of resource unavailability.
        3. Emergency Department is rendered inoperative due to loss of infrastructure facilities, such as loss of power, or flooding. Such a situation must be noted, at which time ALL patients will be diverted away from affected facility.

Policy/DIVERSION PROCEDURE:

1. Activation of diversion will be done by the ED Supervisor after he/she has assessed the need for hospital diversion and the hospital's capacity to accommodate such patients. EMS systems that are impacted will be notified. Previously identified individuals or dispatch systems, as declared by each EMS system, will be the point of contact.
    a. Hospitals must give notice in advance of the transport of patients to their facility. Depending on how close the EMS unit is to the hospital, we may be unable to divert if we are being notified (for the first time) of a diversion status while enroute to the hospital with a patient on board. If you are unable to divert due to patient condition or patient request, proceed to the hospital that can then provide a medical screening exam and transfer patient to another facility as per EMTALA.
    b. The dispatcher will log information relating to the divert status, including time/date on and off divert status, and name of notifying house supervisor.
    c. Log any information related to any actual ambulance diversions, including patient name, diverting hospital, ER physician, destination hospital, and reason for diversion.
2. EXCEPTIONS
    a. During an actual patient call, **patients** (or authorized representative) will be notified/advised of the diversion status of a hospital and may request an override of diversion. They will then be asked if there is an alternative choice of hospitals to be taken to.
        i. If the patient (or authorized representative) refuses transport to any alternative hospital, they will be informed of a possible substantial delay in care and possible adverse effects on their health if taken to the hospital on diversion.
        ii. If patient (or authorized representative) still refuses to be taken to an alternative hospital, they will be taken to the hospital of their choice and will need to sign acknowledgement/release of liability form indicating they understand the risk of their actions (see Hospital Diversion Form in Forms Section in back). This will be granted if the patient believes it to be necessary to be transported to a particular facility because their medical records and physician may be exclusive to that facility. From time to time one or more hospital emergency departments may go on by-pass or diversion of various services or for various reasons. Usually a particular service or department is saturated and cannot safely handle additional patients. The patient will be taken to the hospital of their choosing and the hospital will be notified of the patient's decision.

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1.3.3 AEROMEDICAL EVACUATION (HELO)

Purpose:
This protocol will serve to guide the EMS personnel on utilizing an air ambulance to transport patients to the hospital. The objective will always be to consider what is best for the patient. EMS personnel should ask themselves the following three questions when considering aero medical transport:

1. Is there anything about the location/logistics of the call that would delay transporting patient by ground?
    a. Remote geographic location with a reasonable location to land a helicopter.
    b. Prolonged extrication (from vehicle or building).
    c. Relative location of the patient (and all the equipment [monitors, IV bag, oxygen]) to the ground unit as well as the terrain (in the middle of a field, pasture or wooded area that would require substantial manpower to carry the patient and equipment back to the ground unit).
    d. Known/anticipated traffic issues
        i. "Rush Hour"
        ii. Road construction/closures
2. Is there anything about the patient's condition that would benefit from rapid transport to the hospital?
    a. I.E. Patients with MIs or Strokes who would benefit from rapid administration of thrombolytics or intra-arterial catheterization to resolve a blood clot blocking a vessel. The sooner this can be done, the more CELLS can be saved
    b. Studies have shown that trauma patients have a much greater chance of survival if resuscitative care is provided during the "golden period" immediately following significant trauma. This includes getting patient to the operating room rapidly.
    c. In general, if a patient with a critical, life threatening condition can be delivered to an appropriate hospital, such that there is a savings of twenty minutes or more, using an air resource vs a ground resource, then it is reasonable for a ground crew to request air transport. So the question to ask…if an air resource is used, can they arrive at the hospital twenty minutes quicker than if patient went by ground (see Early Activation Algorithm)?
3. Is there anything about the mechanism of injury (or illness) that would potentially cause the patient to rapidly deteriorate before arrival at the hospital (even though they look stable on first arrival)?
    a. I.E. by history; patient with an abdominal aortic aneurysm having sudden severe abdominal pain (leaking/ruptured aneurysm). A pregnant female with sudden severe lower abdominal pain (ruptured ectopic).
    b. I.E. by mechanism; a patient involved in a motorcycle accident or sporting accident (football helmet to the abdomen) who has severe left or right upper quadrant abdominal pain and tenderness (ruptured spleen or liver laceration). Diving accident with a "stinging" sensation in the neck and tingling in arms and/or legs

If the answer to question 1 is yes AND the answer to either question 2 or 3 is yes, then a request for aero medical transport is reasonable (b).

Other considerations for the EMT/Paramedic on-scene to consider in requesting aero medical transport:

1. **Physiologic criteria**:
   a. Multisystem blunt or penetrating trauma with unstable vital signs
   b. Greater than 25% TBS burns, burns to the face, hands, feet, or genital area and/or possible transport directly to a burn center
   c. Paralysis or spinal injury
   d. Amputation proximal to wrist or ankle
   e. Flail or crushed chest
2. **Situational Criteria**:
   a. High energy mechanisms
   b. Prolonged entrapment
   c. Multiple casualty incident
   d. Transport time by ground exceeds air transport time
3. **Medical criteria**
   a. Any critically ill patient with unstable vitals, unstable airway, unstable cardiac rhythm > 30 minutes travel time by ground or transport time by ground exceeds air transport time
   b. Patients who may be suffering from an acute stroke or myocardial infarction and would benefit from rapid transport to the hospital for definitive care such as thrombolytic therapy or intra-arterial catheterization.

Procedure:

1. EMS dispatcher will request the helicopter based on; the nature of the call and/or information received during the initial call taking, request from law enforcement, fire department personnel or EMS personnel while enroute (based on nature of call) or after arrival on scene. EMS personnel should consider EARLY ACTIVATION of the air resource based on information received prior to arrival on scene (if auto launch criteria was not utilized) or as soon as possible after arrival if it is anticipated that scene time will be significantly delayed and there is a significant distance to the hospital. All correspondence with the helicopter service dispatcher should go through the EMS dispatcher as not to duplicate (and potentially confuse the helicopter service dispatcher) with request from other agencies on the same call.
2. A landing zone will be identified and secured by fire department and/or law enforcement personnel (aka the Marshaller) who have been trained by the helicopter service in helicopter scene safety.
3. When instructed to by the EMS dispatcher (in conjunction with the helicopter service dispatcher), the ground crew will communicate with the helicopter pilot/crew to coordinate and facilitate the landing. The same type of communication will be needed for lift off from the scene.
4. The Marshalling(a):
   a. Positioning:
      i. Will stand at the outer edge of the landing zone perimeter on the windward side with his/her back to the wind.
      ii. Apparatus Lieutenant/Captain will have the primary responsibility for the marshalling duties.

iii. An additional firefighter who is assigned to the Marshaller will maintain constant radio contact with the helicopter as well as visual and verbal contact with the Marshaller.
iv. Remain in eye contact with the pilot at all times.
v. DO NOT approach the helicopter; remain vigilant at your post.

Note:
(a) The Marshaller is one of several tools that are at the disposal of the Pilot in Command (PIC) for the accomplishment of a safe landing and departure. There are several factors the PIC considers when making an approach or departure into a confined area. This being the case, he/she may not always follow the exact direction of the Marshaller. It should be noted that most approaches will be to the ground, not to hover. The PIC, at his/her discretion may elect to land without the assistance of a Marshaller and may request that the Marshaller remain clear of the LZ until after the helicopter has landed. If the PIC does not follow the exact direction of the Marshaller, be assured there are reasons for his/her actions.

(b) The earlier you request the helicopter the better for the patient. The following is an optimistic average of how long it takes a helicopter to arrive on scene and move a patient to the hospital emergency room if there are no mitigating factors. The total time to get the patient to the hospital should be compared to how long it would take for a ground unit to move the same patient to the emergency room.
From time of request by field unit:

1)	2 minutes	Dispatch
2)	7 minutes	Safety checks warm up and lift off.
3)	5-12 minutes	Average flight time for a helicopter service to arrive on scene. Time will be extended if a helicopter from outside the local County is called. Flight arrival time will extend 12-15 minutes.
4)	3-4 minutes	Landing time
5)	5-7 minutes	Patient transfer, moving patient to helicopter stretcher
6)	5-12 minutes	Average flight time to hospital
7)	10 minutes	Average time to get from the pad to the emergency department.

39-50 minutes average total time

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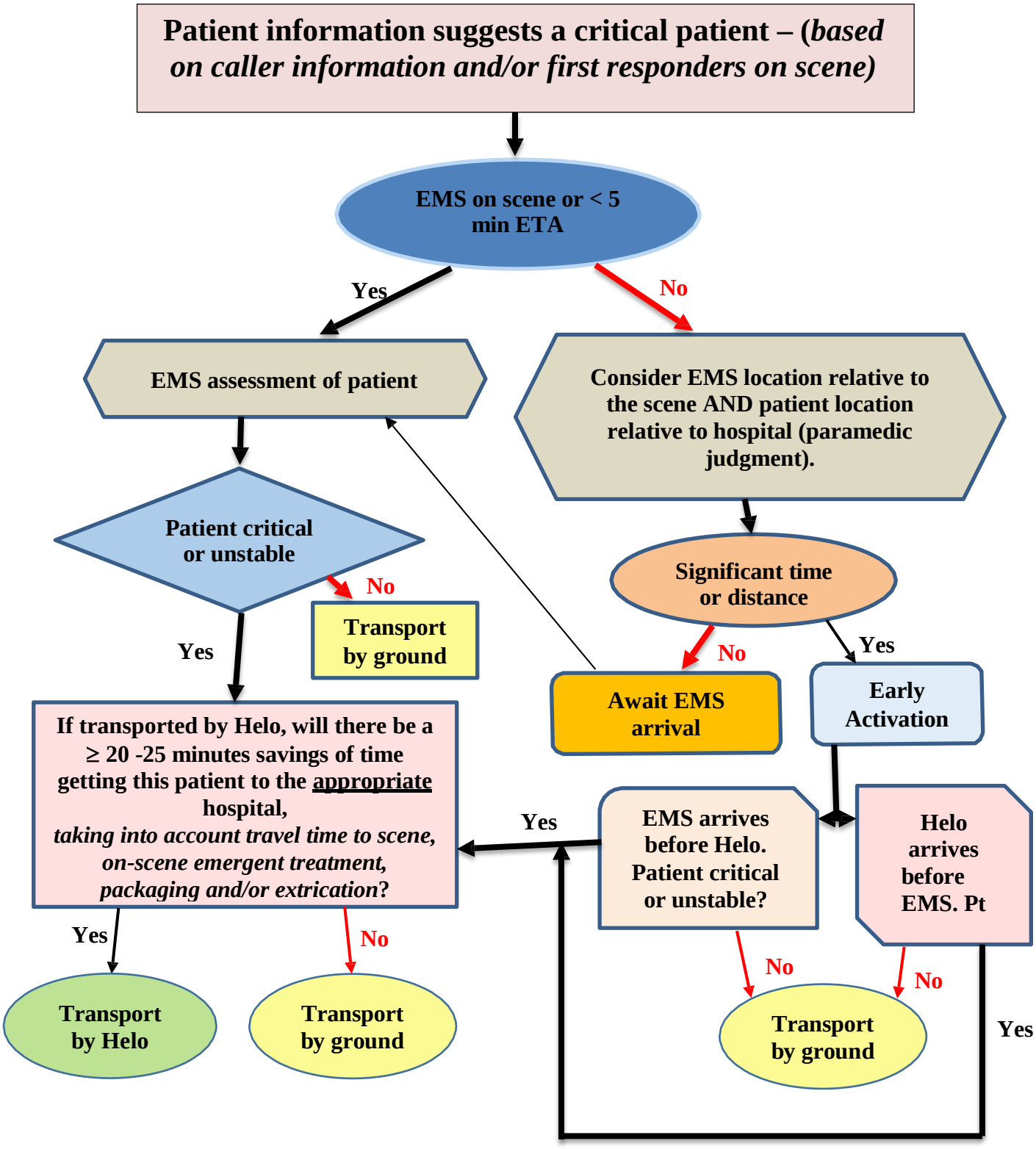
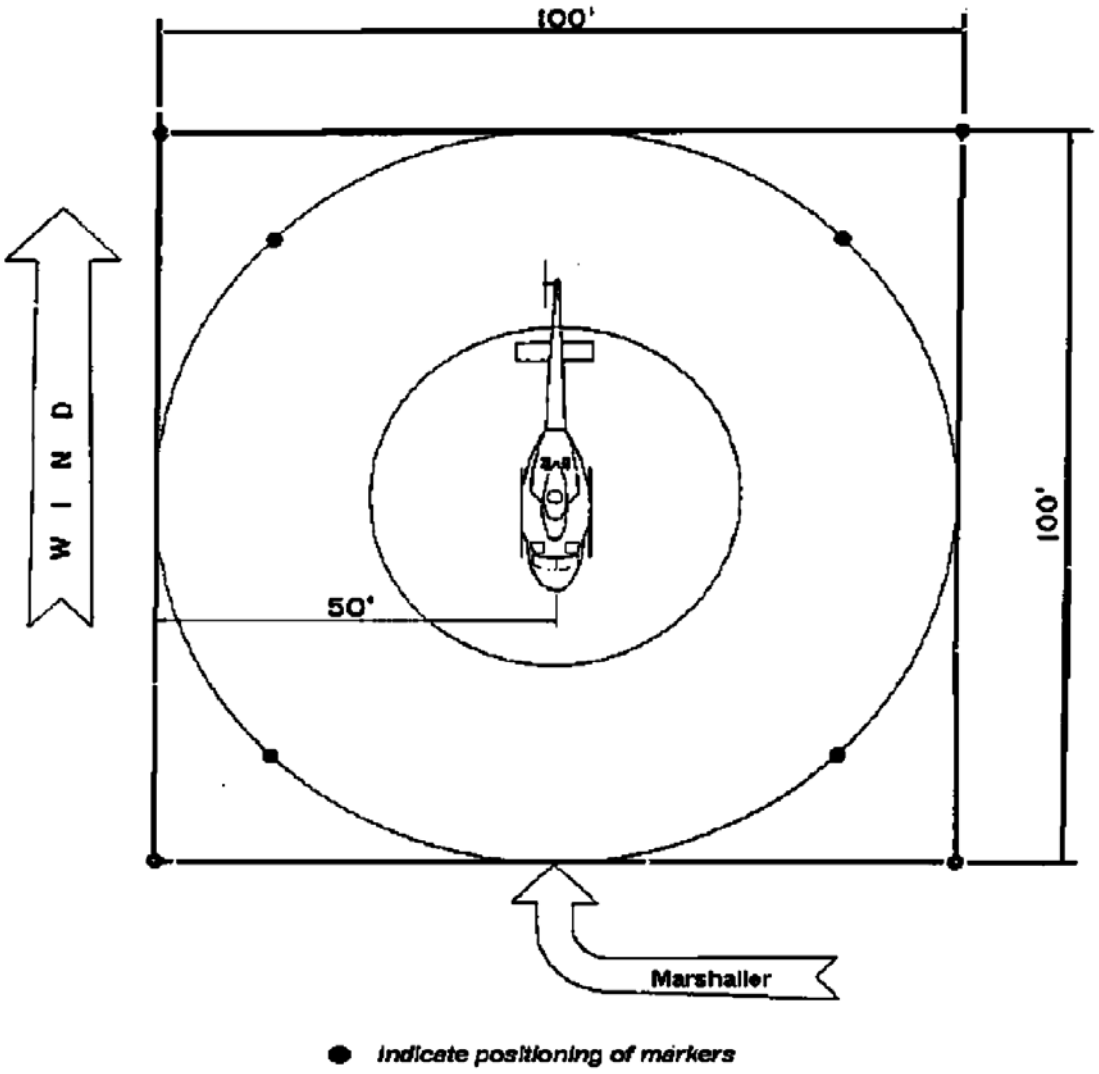
Early Activation of Air Resources



Landing Zone Criteria



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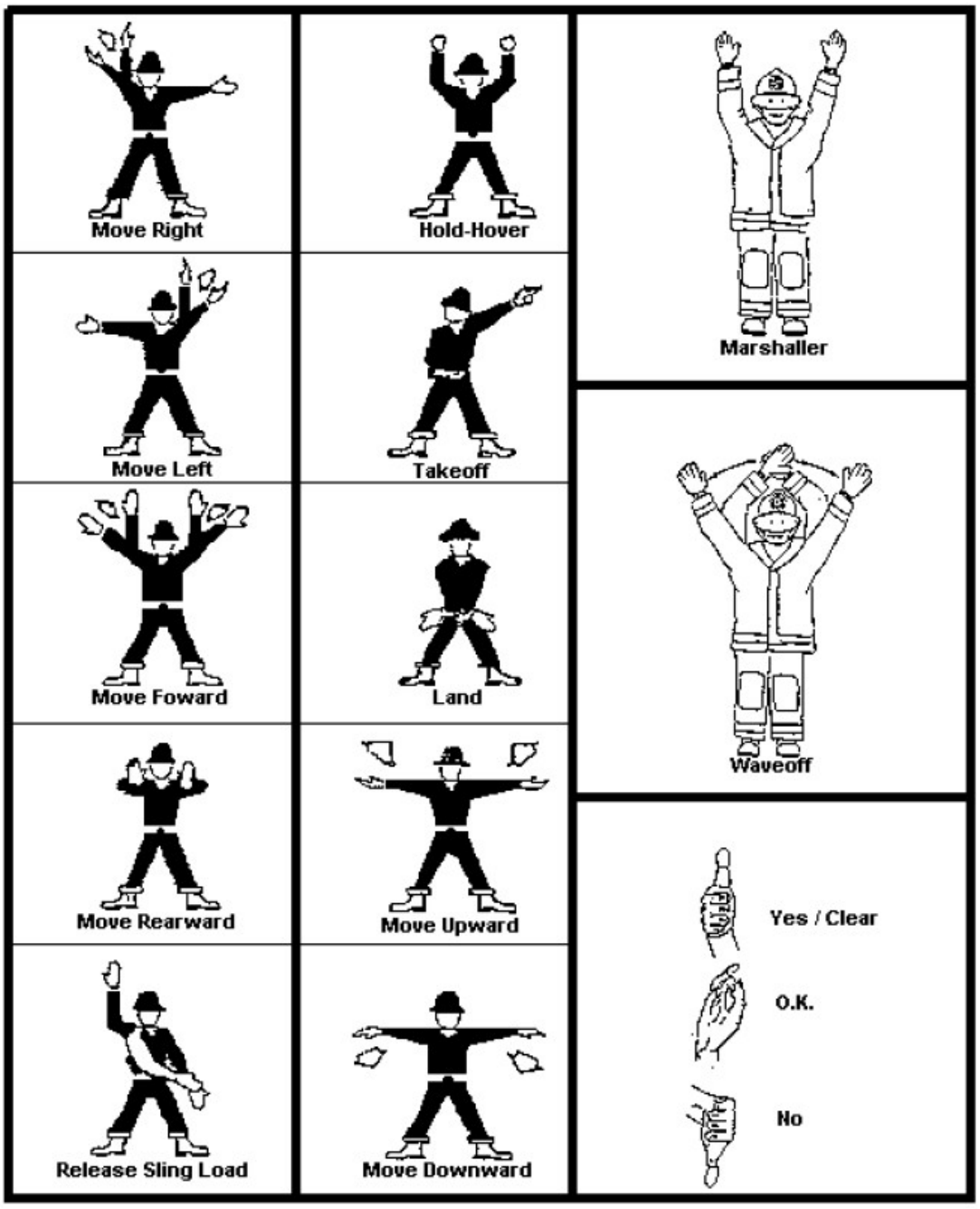

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1.3.4 Crime Scene Response

Purpose: The safety of EMS personnel and emergency care for the victim(s) remain the primary goals in all crime scene operations, however, preservation of the scene remains the most important secondary goal. Never compromise patient care to preserve a crime scene.

Procedure:

1. EMS responders should not approach any scene suspected of involving violence unless law enforcement personnel are on scene and the scene is reasonably secure. EMS responders should not approach any crime scene in which law enforcement personnel are not present, in which law enforcement personnel are in defensive positions, or when law enforcement personnel are presenting weapons.
2. EMS responders should approach every call with caution while being observant. This is particularly true of scenes that may involve a crime against person or property. Noise and light discipline should be used with emergency warning equipment. If possible, shut down some distance from the incident. EMS personnel should be very observant upon approach.
3. A portable radio to call for assistance is recommended. EMS should not approach any scene that appears suspicious without law enforcement personnel present.
4. Use caution when approaching buildings and never stand directly in front of doors when knocking for entry.
5. If a weapon is involved, try to secure the weapon unless the weapon is still in the assailant's possession. The weapon should be secured in such a way that it does not jeopardize the patient or your life. The weapon as potential evidence should not be compromised if at all possible.
6. If your life is in danger it may be necessary to leave your patient behind. Always have a planned escape route.
7. All information regarding a call should be gathered. Calls involving crimes in progress, the use of weapons, or any suspicious call in high crime areas, should be treated with caution. It is suggested that EMS personnel wait till scene is declared safe by law enforcement personnel
8. When approaching a crime scene with law enforcement present, ask for the best route to approach and avoid destroying what may be valuable evidence. Use only one route in and out of the scene and disturb only what is absolutely necessary. If law enforcement personnel refuse access to the crime scene, do not become confrontational. Notify the EMS Agency Supervisor and complete an incident report as required.
9. Avoid disturbing possible tire tracks or footprints and avoid blood on any environmental surfaces.
10. REMEMBER, When on scene:
    a. Keep your medical equipment close to the victim.
    b. Stay close to the body.
    c. Keep your hands out of any blood that has pooled.
    d. Do not wander around the scene.

e. Minimize destruction of the patient's clothing. If the patient's clothing has a puncture, do not use the hole in the clothing to start cutting. Begin cutting at another part of the garment. Removed clothing should be left with the patient or turned over to law enforcement personnel.
f. Do NOT go through the victim's personal effects, clean the body, or cover the body with a sheet or other material (if expired).
g. Do NOT move, take, or handle any object at the scene or litter the crime scene with medical equipment, dressings, bandages, or other supplies. Do not disturb items present on the scene unless absolutely necessary.
h. If resuscitation efforts are deemed necessary, transfer the victim from the scene to the vehicle expeditiously and stabilize the victim in the vehicle, when possible.
i. If the patient relates any information relating to the crime while in transit to the medical facility, inform law enforcement personnel at once.

11. Remove any medical items brought into the scene.
12. When possible, place any victim(s) to be transported on a clean sheet. When the victim is removed at the hospital, retain this sheet and any others for law enforcement investigators. This is particularly important in crimes in which trace evidence may be transferred from the suspect to victim. Retain, preferably wrapped in a clean sheet or placed in an unused paper bag, any clothing or other items removed by EMS personnel while in the ambulance. DO NOT place blood-contaminated items in a plastic bag as this may ruin their value as evidence.
13. Do not touch or handle items, particularly weapons, found at a crime scene unless absolutely necessary. Do not handle expended bullets or casing with metal forceps if they should be found in the clothing or on a sheet. Retain them in the sheet or clothing they are found in and notify law enforcement investigators.
14. It may be required that EMS personnel enter a crime scene to confirm an obvious death. However, this procedure can be accomplished with minimal scene disturbance. Coordinate with law enforcement personnel in preserving the crime scene to the greatest extent possible.
15. Be aware of any statements made by victims, suspects, or others present at a crime scene. Make certain to scan the scene noting how it appears upon your arrival, particularly the victim, and remember any changes made to the crime scene during patient assessment and/or treatment.
16. Make copious notes outside your PCR (patient care report) following the incident regarding actions and observations made during the incident. Any statements made outside the presence of law enforcement personnel by the victim or suspect should be carefully noted and notify law enforcement investigators. Enforce HIPPA laws.
17. If a scene appears suspicious, then await the arrival of law enforcement personnel before approaching.
18. Documentation: A detailed report that covers all aspects of your involvement at the crime scene is suggested and is important in case you are later called to testify in court. These narratives should cover your observations and conversations with the family or person present at the scene, location of

response vehicles and equipment, furniture, weapons, or clothing that has moved, items that were handled by EMS responder, and your route to the victim. This narrative should be a separate report from your Patient Care Form, perhaps on a form that you keep in a file in the event you are called to testify in a case.

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1.3.5 Hazardous Material Incidents

Purpose: EMS personnel may be first on the scene of a hazardous materials situation because of shorter response time or no knowledge of dispatch that hazardous materials are involved. This protocol is intended to guide EMS personnel who do not normally function in hazardous materials scenes and are only trained to the awareness level. The protocol is intended to compliment any existing hazardous materials guidelines of fire agencies. If the two are in conflict, the existing fire department protocol stands.

a. If the scene you are responding to is a known or suspected (based on information from dispatch) hazardous materials situation, stage and wait for the hazardous materials personnel.
b. When you have arrived at the scene and find out during scene assessment that hazardous material are involved, stage and wait for the hazardous materials personnel.

All scenes (MVC, industrial, etc.) should be considered as being a potential hazardous materials situation. The following approach should be used:

Procedure:

1. Approach (All Scenes):
    a. Utilize a cautionary approach at all times.
    b. The reported location may be inaccurate and response into contaminated area might occur.
    c. Approach upwind and upgrade if possible. If unable to approach from upwind/upgrade, approach at 90 degrees to wind/grade if possible, with safety in mind
    d. Position vehicle well away from problem and headed away from the incident.
    e. Communicate your actions or intended actions with EMS dispatch.
    f. Remember. Contaminated and /or exposed response personnel may add to the overall problem and reduce their effectiveness to help.
2. If at any time you suspect a hazardous materials situation:
    a. If first-in responder, confirm that fire and police have been notified.
    b. The agency responsible for hazardous materials response may respond with different levels of personnel and equipment based upon the information received. Do not always expect a hazardous materials team to respond.
    c. If you are the first-in responder, first priority is scene isolation. KEEP OTHERS AWAY! KEEP UNNECESSARY EQUIPMENT FROM BECOMING CONTAMINATED.
    d. If you believe that you or your vehicle is contaminated, stage in an isolated area.
3. Person in Charge (PIC)
    a. If the EMT/Paramedic is the first medical person on the scene, he/she assumes the role of PIC of medical care (not necessarily scene control) until hazardous materials trained EMT/Paramedic arrives. Everyone should work as a team.
    b. The EMT/P will direct all patient care.
    c. The EMT/P, in concert with the incident commander, will determine the method of transport of the exposed patient(s) (air vs. ground)
    d. The EMT/P will determine who will provide care during transport
4. Patient care for the contaminated patient

a. Types of incidents which may require decontaminations of the patient(s): 1) Radiation, 2) Chemical, 3) Biological hazards, 4) Toxic substances.
b. Contamination can occur through 1) Smoke, 2) Vapor, 3) Direct contact, 4) Run-off
c. Transporting contaminated patients should be a serious concern to those involved. Patients who have been in contact with, or who are even suspected of having been in contact with, hazardous substances should be transported for evaluation.
d. The hazardous materials team must be contacted about removal of contaminated clothing and packaging of the patient with regard to your protection and the patient's
e. Determine the hazardous substance involved and provide treatment as directed by EMT/P in charge. Refer to the hazmat treatment protocols for specific treatment.

5. Ambulance Preparation
    a. The EMT/P shall determine the process needed for ambulance preparation.
    b. Remove any supplies and equipment that would not be needed for patient care, i.e. extra medical kits, etc.
    c. Seal cabinets and drape interior, including floor and squad bench, with plastic or visqueen (if available from hazardous materials team).
    d. Prepare stretcher for removing foam pad and placing down long backboard. Cover with plastic and tape in place if needed (if available from hazardous materials team).
6. Transport and arrival at hospital
    a. If an ambulance has transported a patient from an incident that is subsequently determined to involve hazardous materials exposure, scene personnel must immediately relay all relevant information to the transporting unit(s) and/or receiving facility(s) involved.
    b. On-line medical direction and the receiving hospital should be contacted as s o o n as possible. The EMT/P should communicate the material involved, degree of exposure, decontamination procedures used, and patient condition.
    c. The ambulance should park in an area away from the emergency department or go directly to a decontamination center or area.
    d. Patient(s) should not be brought into the emergency department before EMT/P receives permission from the hospital staff.
    e. Once the patient(s) has been released to the hospital, follow the EMT/Ps direction and if necessary double bag the plastic sheeting used to cover the gurney and the floor into plastic bags. Double bag any equipment that may have become contaminated.
    f. After unloading patient from ambulance, check with the fire department incident commander to see where the ambulance can be safely decontaminated and whether or not there is equipment available for this purpose. Do not begin decontamination until after consultation with Hazardous Materials Team Leader.
    g. Following decontamination recommendation from the "hazardous materials team", decontaminate the ambulance and the personnel before returning to the incident scene. If returning to the incident scene, bring bags containing

contaminated materials, equipment, clothing, etc. and turn over to the hazardous materials team.

7. EMT/P Exposure
    a. If an EMT/P is exposed or is concerned with the possibility of exposure, medical help should be sought immediately
    b. Report all exposures to the hazardous materials team, Poison Center, and your risk manager or supervisor.
    c. Do not return to service until cleared to do so by the fire department incident commander or Poison Center, and your supervisor
8. The Poison Information Center is authorized to direct all medical care (Supportive Care, ALS Level 1 and ALS Level 2) for toxicology and hazardous material exposure patient. Poison Information Center number 800-222-1222.
9. Refer to section 08 Hazardous Material Exposure for additional and specific management of various hazardous exposures.

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1.3.6 Orders from Transferring/Receiving Physicians

Purpose: To provide guidelines to EMTs and Paramedics who may receive orders from a transferring physician concerning the patient at a care facility being transferred to another facility.

Policy:

1. During inter-facility (hospital, clinic, or physician's office) transport, medical crews will be asked to continue treatment initiated at the transferring facility. It is the responsibility of the transferring MD to provide written orders to cover the needs of the patient during transport. These orders should be in writing. Please attach a copy of these orders to your run report and submit with your other reports at the end of your trip.
2. Verbal orders must be written on an order sheet by the medical crew and indicate these are "verbal orders" from Dr. (name of physician). Attached a copy to the run report. Ideally, the transferring physician should sign these orders.
3. If, at any time the Paramedic or Critical Care Transport Crew questions orders from a referring or receiving physician, on-line medical control or medical director MUST be contacted.
4. Likewise, anytime a transferring or receiving physician asks the Paramedic or Critical Care Transport crew to carry out medical treatment for which they have not been trained (beyond their scope), or which appears to be in conflict with established treatment protocols, on-line medical control or medical director MUST be contacted before initiating care.
5. If orders are given to administer larger quantities of a drug than we carry on our units, you must obtain the additional drug from the facility before leaving with the patient.

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1.3.7 ON-SCENE PHYSICIANS

Purpose: To provide guidelines to EMTs and Paramedics who may encounter physicians on scene. This will include patients in a physician's office or clinic.

Policy:

1. A physician on scene prior to EMS arrival:
    a. May retain medical control/responsibility for his/her patient provided he/she accepts full responsibility (medical/legal) and accompanies the patient to the hospital in the ambulance.
    b. Verify the physician (on scene at an accident or outside of a physician's office) is a qualified M.D. or D.O. to give orders/assist EMS crew. If necessary, have the on-scene physician call and talk with medical control or the medical director.
    c. If orders given by the on-scene MD differ from our written protocols, call medical control or medical director to approve the orders
2. Physician on scene after EMS arrival:
    a. If a physician arrives on scene and offers assistance, verify the physician is a qualified M.D. or D.O. If necessary, have the on-scene physician call and talk with medical control or the medical director.
    b. Any assistance offered must comply with current medical protocols. Any deviation from protocols must be approved by the medical director or the on line medical control physician.
    c. Final authority for approving orders given by on scene physician assistance rest with the medical control or medical director.
3. Patients in physician's office
    a. If this is an established patient of the physician, and he/she knows the patient's health history, and if the chief complaint or current medical problem is within the scope of practice of the physician (e.g. chest pain patient in a cardiologist office), then the physician can provide assistance/guidance and orders to the EMT and Paramedic provided the orders are within the scope of practice of the medical crew and do not deviate significantly from these protocols. Any deviations or concerns of the medical crew contact medical control or medical director for advice.
    b. Physicians who may not be familiar with the patient (e.g. new patient) or patient's medical problems (specialist not involved with patient's general medical care) such that patient's chief complaint is not routinely treated by the physician (e.g. patient who develops chest pain while having a urological procedure by a urologist) will most likely allow the Paramedic and EMT to carry out their duties as trained. You may allow the physician to assist unless inappropriate orders are given at which time you are to continue treating the patient according to your training and the protocols. Any problem, refer the physician to medical director or medical control.

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1.3.8 On-Scene times

Purpose: To establish guidelines for managing on-scene times. To define what constitutes on-scene times.

Procedure:

1. For a given ambulance or unit assigned to a call, on-scene time will be defined as the time from patient contact until the time the transport to the receiving facility (wheels rolling) is initiated or from patient contact until hand-off of patient to another healthcare agency (helicopter service for example). In cases of patient refusal, on-scene time will be defined as the time from patient contact until the time patient signs the refusal.
2. It is reasonable to expect on-scene times to be ≤ 25 minutes 80% of the time.
    a. For scene times that exceed 25 minutes, it should be explained in the run report. Acceptable reasons for prolonged (> 25 minutes) scene times include, but not limited to:
        i. Multiple patients needing evaluation and treatment
        ii. Extrication from vehicle, building, or other location
        iii. Significant distance separating patient from ambulance (pasture, field, wooded area)
        iv. Morbidly obese patients over various terrain
3. Crews who fail to provide satisfactory reasons for a prolonged scene time will receive counseling and follow up monitoring for compliance.
4. Regarding inter-facility transfers
    a. On-scene times for inter-facility transfers should be kept to a minimum as much as possible. There are multiple factors that can contribute to the on-scene time of an inter-facility transfer that are not in the EMT/paramedic's control. A reason should be documented in the run report when a scene time exceeds 30 minutes on an inter facility transport. There may be opportunity for EMS Administrative follow up to educate the staff and assist in minimizing delays in transport.

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1.3.9 Standard Medical Communications

Purpose: To assure proper radio communication for the duration of a call. To ensure proper notification as well as providing adequate patient information to the receiving medical facility

Procedure:

I. Reports on Scene

A. Ensure all patient care assessment information and treatment provided is conveyed in an accurate, precise, and timely manner to the attending Paramedic upon arrival at a scene.

1. Upon arrival of the attending Paramedic from ECDPS (EMS), First Responder, EMT, or Paramedic administering patient care, will provide a detailed report of all signs, symptoms, vital signs, and history of the patient. The report may be a combination of verbal and written documentation. The attending Paramedic is responsible for receiving and documenting this information, while ensuring pertinent questions are addressed relating to information that requires additional clarification. All participating health care professionals are expected to maintain the highest level of professionalism, courtesy, and compassion when interacting with other agencies, the patient's family members and good Samaritans specifically involved in this incident.
2. The ECDPS (EMS) employees or mutual aid attending Paramedic will be in charge of managing the patient upon their arrival. All participating agencies are expected to honor and abide by this prescribed standard. The proper care, management, and expeditious transport of the patient should always be the primary focus of all involved agencies. Concerns about scene or patient management that do not present an immediate threat to the health and well-being of the patient should be addressed with your immediate supervisor at a more opportune time.
3. If a situation arises where the course of treatment being rendered is "considered or perceived" as inconsistent with normal practices/protocols, the other medical personnel on scene should address this with the primary care provider immediately. If the suggestion or recommendation is not accepted, then the attending Paramedic will have the final decision on proper course of treatment. The On-duty Supervisor and the highest-ranking Fire official on scene will be notified on any scene irregularities. Contingent upon the situation, this individual will notify their immediate Supervisor and/or Medical Director(s) for further guidance and direction.

II. . Radio Reports to Hospitals

A. The ideal radio report should relate all pertinent information regarding both the patient and the plan for treatment in less than two minutes. The report itself must be prefaced with an explanation of the type of report to follow. Reports must be described as emergent or non-emergent. This statement must be followed by noting if on-line physician orders are to be requested or if the report is for information only. It is understood that some pre-hospital situations preclude providing a complete report to the destination facility.

However, paramedics should strive to furnish a complete report at the earliest possible opportunity, and deviations from this standard must be for the benefit of the patient.

B. Ambulance identification
    1. Vehicle identification
    2. Paramedic name (if asked)
    3. Location of vehicle, including description of scene (if on site) and estimated time of arrival to the destination facility.

C. Patient data
    1. Patient's age, sex, and chief complaint
    2. Brief history of the present illness; include past medical history, medications, and allergies only if relevant to the chief complaint.
    3. Vital signs (to include pulse, respiratory rate and depth, blood pressure, cardiac rhythm, and oxyhemoglobin saturation as appropriate).
    4. General appearance (including level of consciousness) and pertinent physical findings.
    5. Care in progress.
    6. Request for orders and confirmation of same.

D. Contacting the Hospitals:
    1. Radio report should be given to the hospitals via their respective radio system(s).
    2. If unable to contact a hospital via their assigned radio channel;
        1 You may attempt to make contact via telephone;
        2. If unsuccessful or unavailable, you may relay a short report to dispatch and they will relay the information to the hospital. Provide only the following information, if possible:
            a. Age
            b. Sex
            c. Patient(s) condition & chief complaint
            d. ETA to the hospital

        Examples: “Advise ***Hospital Name*** that we are en-route to them with a stable, 21 y/o male, c/o chest pain, ETA 7 minute.”

        “Advise ***Hospital Name*** that we are en-route to them with an unstable, 8 month old female with severe difficulty breathing, ETA 3 minutes.”

        “Trauma Alert to ***Hospital Name***, 35 y/o male, GCS less than 12, ETA 15 minutes.”

        “Setup ***Hospital Name*** for a Cardiac Arrest, 55 y/o female, ETA 20 minutes.”

III. **Arrival at Facility**

A. The attending paramedic will immediately advise the appropriate nursing station that they have arrived, request a room number, and request that the appropriate staff be sent to the room.

B. Arrival at Room with Patient

1. Patients, which can be safely moved to the hospital stretcher without additional assistance, will be placed in the designated bed.
2. The side rails will be placed in the "up" position and any treatment modalities (oxygen, monitor, etc.) will be appropriately reconnected to hospital equipment.
3. The attending paramedic will either give report to the hospital staff in the room or the non-attending crewmember will remain with the patient and the paramedic will report to the nursing station and ask the physician /nursing staff if there are any further questions.
4. Upon completion of the verbal report, the attending paramedic will advise the hospital staff that the patient is formally released to their care.
5. The attending paramedic will return to the room to release their partner.
6. The crew will then restock and begins the documentation.
7. EMS employees should avoid performing any procedures within the receiving hospital, once the patient is placed in a hospital bed. Therefore, the timely response of hospital staff is essential.

IV. **Documentation of Delays in Accepting Patients**

A. Crews should advise dispatch of any unreasonable delays in the hospital staff accepting patients so it will be documented in CAD. This will allow for extended turnaround times to be more closely analyzed.

B. Delays of > 30 minutes for hospital to accept or direct EMS patient to a hospital room, gurney or wheelchair, and release the EMS crew, will be brought to the attention of the shift supervisor immediately. EMS personnel will continue to provide any emergency care necessary to ensure the safety and well being of the patient (e.g. oxygen, cardiac monitor, monitor IV fluids, in necessary, administration of an emergency drug (e.g. epinephrine, atropine) to prevent further deterioration of a patient's condition. It is **NOT** the responsibility nor is it appropriate for EMS to remain in the hospital and continue to monitor the patient for any extended period of time. This puts the community in jeopardy if too many EMS crews are tied up in emergency departments awaiting transfer of patient care to the hospital personnel. There is a possibility the hospital may incur a monetary assessment to cover the cost of the EMS crew to continue monitoring and/or providing care to the patient for times beyond 30 minutes of arrival of the EMS units(s).

1. EMS Shift Supervisor will assess the situation and try to resolve the issue with the hospital staff.
   As a last resort, ECDPS (EMS) may choose to assign one paramedic or EMT to remain with patient, re- equip the EMS Unit with a stretcher, supplies and personnel to respond to additional calls in the community.

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1.3.10 COMMUNICATION PROBLEMS

Purpose: To provide guidance to the paramedic and/or EMT (concerning treatment of a patient) and they are unable to contact medical control or the medical director while on scene.

Policy:

1. In the event an EMT and/or Paramedic cannot contact medical control or medical director (i.e. mass casualty or radio/telephone problem), all protocols become standing orders. Likewise, in the event that a medical control physician cannot respond to the radio/telephone within two minutes of the call, all protocols are considered standing orders. An emergency department nurse at the medical control hospital may relay orders from the emergency physician in cases where it is impractical for the physician to come to the radio/telephone. It is not necessary to speak with a medical control physician concerning treatment modalities that are considered to be standing orders except if a question arises concerning the planned treatment.

2. In the event medical control cannot be contacted, and treatment protocols were carried out as standing orders, the record should be pulled for review by the medical director. Following review, the medical director indicating retroactive approval will sign the record.

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1.3.11 Transportation Safety

Purpose: Define the Department's policy/procedure on the safe transportation of crew, patients, and passengers.

Procedure:

A. All persons in a moving ambulance shall be buckled in seat belts or restrained in some other approved fashion. Exception to this rule include the personnel who are attending to patient(s); and the extremely obese patient who exceeds the size or weight limits of our equipment and is unable to be restrained. All exceptions to this policy/procedure must be thoroughly documented.

B. Always provide optimal care to all patients and make the best use of available resources.

C. Never leave a patient unattended in an ambulance.

D. Follow the Trauma Transport Protocols regarding multiple patients and calling for additional resources.

E. Ensure that all occupants are properly restrained, and all equipment, supplies, and patient belongings are secured prior to putting the ambulance in motion.

F. Personnel should use the "three point" method (e.g. feet on floor and one hand holding a secure point) to move around the ambulance when the ambulance is in motion.

G. The attendant is encouraged to remain in a seat belt as often as possible.

H. EMTs, Paramedic students or any other third riders shall remain in a seat belt unless they are directly attending to the patient(s).

I. Only one person may ride in the cab with the driver as long as they are restrained.

Restraining patients:

A. Stretcher patients shall be secured with a minimum of three straps. In addition, shoulder harness straps must be used when available.

B. Backboard patients transported on the crew bench shall be secured to the crew bench with a minimum of two straps.

C. Patients should be secured to backboards with four straps (minimum of three straps).

D. Patients transported by suspension method shall be secured with a minimum of three straps to the flexi-cot.

E. Patients transported "sitting position" shall be secured to the crew bench or Captain's chair with a seat belt.

F. Pediatric patients not spinally immobilized shall be secured in the following manner:

1. Patients weighing less than 10 lbs shall be transported in an approved child's seat secured to the stretcher with the back rest in high fowler position or secured to the Captain's chair or in the integrated child's seat in Captain's chair, if available.
2. Patients weighing at least 10 lbs but not more than 40 lbs shall be secured to the stretcher using the Pedi-mate or in the integrated child's seat in the Captain's chair.
3. Patients weighing more than 40 lbs shall be secured with a minimal of three straps. In addition, shoulder harness straps should be used when available.

G. Crews may request that the on-duty supervisor bring them a child's seat if there is no other way to safely secure the child and it does not delay treatment of the patient(s).

H. All straps and seat belts should be snuggly secured but not so tight as to restrict circulation or affect any respiratory efforts.

I. The following methods of restraints may be used for securing violent patients (see procedural physical restraint protocol):

1. Stretcher and Backboard straps (to be in place on all devices used for moving patients).
2. Towel or sheet wraps
3. Gauze wraps (minimum width 2")
4. Velcro straps (minimum width 2")
5. Leather restraints
6. Soft restraints

J. ECDPS (EMS) employees may not use the following methods to restrain patients:

1. Handcuffs
2. Polyethylene cable ties
3. Nylon cuffs
4. Any type of metal restraint

If a law enforcement officer has placed any of these devices on a patient, they may be left in place as long as a law enforcement officer rides with the patient or follows close behind so that the devices can be removed quickly if necessary to treat the patient. When a law enforcement officer places these devices on a patient, document what device was used, where the device(s) were placed, and who places the device on the patient. Patients should NOT be transported in a prone position with hands restrained behind their back. Patients should never be transported in a "hog tied" position (face down with arms and legs restrained behind the patient.

Transportation of two patients

A. On incidents in which two patients are to be transported, it is preferable that one unit transport both patients, unless, both patients are critically injured and additional resources are readily available.

B. One patient should be safely secured to the stretcher with a minimum of three straps and the second patient should be safely secured to bench seat with seatbelt(s).

C. If patients on scene want to be transported to different facilities, call for additional unit to transport 2nd patient to other facility. Only as a last resort (if no other transport unit is available), should more than one patient be transported who is requesting a different facility. The attending paramedic should provide a quick report to the first hospital before transporting to the second hospital. At no time should the 2nd patient be left unattended in the unit while at the first facility.

D. If either of the patients is critically injured, the attending paramedic should request a third rider to assist with patient care, if at all possible.

Transportation of three patients

A. When the patients are not critically injured, it is acceptable to suspend a third patient.
B. Optimum care cannot be rendered to more than two critically injured patients at a time.
C. The attending paramedic should request a third rider to assist with patient care.
D. Crews should avoid transporting three patients without a third rider to assist with patient care, if one of the patients is critical.

Unusual Transportation Situations:

Patients will always be transported in the safest manner possible. However, there may be situations, such as disasters, multiple patient incidents, system overload, etc., where based upon patient(s) condition, it may be in the patients' best interest to be transported in a non-traditional method. (e.g. on the floor of the ambulance) In these situations, the attending paramedic shall request and receive prior approval from a Supervisor, Operations Chief, EMS Manager, or a Training Coordinator. The attending paramedic shall make every effort to restrain the patient and transport the patient in as safe a manner as possible.

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1.3.12 Critical Care Inter-facility Transport (STAT, SCT, and Critical Patient Transfers)

I. **PURPOSE**:
To make a determination regarding the critical nature of a patient based on information from the transferring hospital in order to meet the needs of the patient in terms of personnel, equipment, and response time.

II. **GUIDELINE**:
When ECDPS is requested to transport a critical patient between hospitals, be sure we are provided sufficient information from the transferring hospital in order to meet the needs of the patient in terms of personnel, equipment, and response time. This is achieved through exchange of vital information (as listed in C and D below) between the transferring hospital and the ECDPS EMS staff. This information will be used to select the appropriate personnel and equipment needed to continue providing high quality critical care while outside of a hospital setting. This information will also be the basis for putting the EMS MD on alert of a critical care transport in progress. The EMS MD can either make contact with the EMS crew to review the case and answer any questions or be available by radio, phone, or video webcam to assist the transport team as needed.

III. **PROCEDURE**:

A. Please understand that when a patient is transferred between hospitals, it is the transferring physician/hospital that is responsible for the orders to care for the patient until arrival and transfer of care at the receiving hospital. The EMS MD will assist you as needed should the transferring MD fail to provide sufficient orders or if there is a change in the patients status during transport.
   1. **This is primarily meant to address patients that are admitted in the hospital (floor or critical care unit) and being transferred to another hospital (especially long distance/out of town transports in excess of one hour travel time)**.
   2. Patients who are being transferred from the emergency department typically will not have a lot of data back and the determination of how critical they are is based on their vital signs, limited lab data and the history/physical findings by the ED MD.
   3. IF AFTER PATIENT CONTACT, ANY PARAMEDIC WHO FEELS THE CRITICAL NATURE OF THE PATIENT IS BEYOND THE SCOPE OF THEIR PRACTICE OR TRAINING, HE/SHE SHOULD NOTIFY THEIR SUPERVISOR IMMEDIATELY BEFORE LEAVING THE TRANSFERRING HOSPITAL. EMS MD SHOULD BE NOTIFIED IF THERE IS ANY CONCERN FOR THE SAFETY OF THE PATIENT DUE TO THE NEED FOR ADDITONAL PERSONNEL OR EQUIPMENT.

B. A Pre-Transfer Data Form for Interfacility Transfer of Critical Patient is to be filled out prior to our arrival at the transferring facility. This form can either be faxed to the facility for a nurse to fill out or the paramedic/EMS supervisor/flight crew can fill out when they call for report. If it was faxed to the hospital, it should be faxed back to the paramedic/EMS supervisor/flight crew ASAP. At some point, this form should be made available to all the hospitals we service as part of their transport request packet. In lieu of filling out parts of

the form, the hospital may fax copies of the most recent information (lab reports, ABG results, X-ray reports, EKG, etc) to ECDPS Supervisor, Paramedic or flight crew for immediate review. This new form will have a place for the transferring nurse or physician to provide the transferring MD's orders. These orders should cover the care for this patient during transport, including management of all IV fluids, medications, ventilator settings and any equipment being used on this patient during the transport. The information gathered by the above process will help us determine:

1. If the transfer can be safely handled by a single paramedic
2. Will additional personnel be required, i.e. Critical Care RN or Respiratory Therapist from the transferring facility, or additional paramedic from our service.
3. Will additional equipment be needed, i.e. additional medication pumps, additional oxygen, etc?
4. Do we have the appropriate ventilator for the patient or will we be able to use the hospital's ventilator (along with their respiratory therapist)?
5. Are the drugs infusing within the scope of practice of the paramedic?
6. Will additional medications be needed?
    a. NOTE: Any medication due to administered while patient is being transferred should be provided by the transferring facility including antibiotics and pain medication. We have had some hospitals that refuse to dispense controlled substances to EMS, prompting us to use our own stock. If the medication ordered is not one of the drugs we carry, the order from the transferring MD MUST be changed to reflect the new drug.
7. Depending on the distance involved, whether air transport would be more appropriate.

C. A **CRITICAL** patient is one that is being transported to a higher level of care and meets any ONE of the following criteria:

1. Intubated or trached and on a ventilator or being ambu bagged
2. In respiratory distress on BiPAP therapy
3. On one of the following drugs via a pump;
    a. Dopamine,
    b. Dobutamine,
    c. Heparin
    d. Nipride
    e. Nitroglycerin drip
    f. Norepinephrine/Levophed
    g. Any paralytic
    h. Propofol or any drug by continuous drip to keep patient unconscious/sedated (Versed, etc.)
    i. Any drug being given by IV pump to support cardiac output or stabilize cardiac arrhythmias (Cardizem, Amiodarone, Lidocaine, etc.)
    j. Tocolytics to arrest labor
4. Chest tube
5. Ventriculostomy tube
6. Administration of any blood products
7. Arterial Line for monitoring blood pressure or other advanced hemodynamic monitoring lines (i.e. Swan Ganz Cath, CVP monitoring device, etc.)

8. Any one or more abnormal vital signs (Adult), that are also on drugs listed in #2 and/or on a ventilator, or receiving wide open IV fluids to treat shock
    a. BP systolic <80, >200
    b. HR <45, > 130
    c. RR <10, > 28
    d. Pulse ox < 90%
9. Abnormal labs/studies and unstable vital signs
    a. Hgb < 6.5
    b. Hct < 25 Plt < 80
    c. K+ < 2.6, > 6
    d. pH < 7.28, > 7.5
    e. pCO2 <25, >60
    f. pO2 <80
    g. Glu < 60
    h. CXR that shows:
        i. Pneumothorax
        ii. Chest tube placement
        iii. Severe pneumonia (with abnormal blood gas (pO2 < 80 mm Hgb) or O2 sat < 90%)
10. Cardiac monitor showing
    a. Recurrent V-Tach
    b. Recurrent V-Fib
    c. 3rd degree AV block with BP systolic < 90 with or without external or transcutaneous pacer being used.

D. A **STAT TRANSFER** is a patient with one of the following diagnosis AND the destination is another emergency department, intensive care unit, operating room, or cardiac cath lab. A STAT transfer can also be looked at as a condition that is associated with a time sensitive intervention or prolonged disruption of on-going hospital care could result in a deterioration of the patient's condition. Note: a STAT patient may also be a CRITICAL patient IF they meet any of the criteria noted above. **The prime difference is that a critical patient may require additional resources such as equipment and/or advance trained or multiple personnel for the transport. An ALS paramedic crew with our standard equipment can most likely handle a stat transfer.** Examples of STAT transfers include, but are not limited to;

1. Acute myocardial infarction (code STEMI)
2. Acute Stroke (Stroke Alert)
3. Trauma Alert (based on trauma alert criteria)
4. Acute intracranial hemorrhage
5. Post cardiac arrest with return of spontaneous circulation
6. Severe burn patient
7. Risk of losing limb
8. Acute respiratory distress on CPAP
9. Septic patient
10. OB patient as long as EMTALA laws are complied with.
11. Seriously ill child in need of surgical/intensive care pediatric services

12. Dissecting aneurysm
13. Testicular or Ovarian Torsion
14. Acute paralysis from non-traumatic causes.
15. Request of transferring MD for STAT transfer based on potential for rapid deterioration of patient's condition.

E. Both STAT and CRITICAL patients will be transported with lights and sirens between facilities (this also applies if you are picking up a flight crew who is caring for a critical patient and/or is in-bound to an intensive care unit). You should have with you, the name and phone number of the transferring MD as well as the receiving MD. You should contact one or both during your trip if there is a change for the worse in the condition of your patient. You can call your medical director if unable to reach the transferring or receiving MD and you need help. Remember, THE TRANSFERRING MD IS RESPONSIBLE FOR WRITING THE ORDERS TO COVER CARE FOR THE PATIENT WHILE IN TRANSIT TO THE RECEIVING HOSPITAL.

F. If the Pre-transfer Data Form indicates a critical care transport (as described in "C" above or identified by any one of the blocks checked off in #1 of the Pre-Transfer Data Form for Interfacility Transfer of Critical Patient), THE EMS MD MUST BE PUT ON ALERT VIA TEXT MESSAGE, PHONE OR RADIO NOTIFICATION THAT A CRITICAL CARE TRANSPORT IS IN PROGRESS. THE EMS MD WILL BE ON STANDBY TO OFFER ASSISTANCE TO THE TRASFERRING CREW VIA RADIO/PHONE OR VIDEO-WEBCAM SHOULD THE TRANSFERRING CREW NEED ASSISTANCE WITH ANY ASPECT OF PATIENT CARE DURING THE TRANSFER. When the EMS MD is notified via text messaging, the following information should be included:
   1. Lead medic/flight nurse in charge of care
   2. Phone number or radio/unit # for radio contact with medical crew
   3. Diagnosis/criteria making it a critical transport
   4. Estimated time patient will be out of/between hospital(s)
   5. Phone number and name of transferring and receiving MD

G. EMS MD WILL ACKNOWLEDGE THE RECEIPT OF THE REQUEST TO BE ON STANDBY VIA TEXT MESSAGE, PHONE OR RADIO COMMUNICATION WITH DISPATCH AND/OR CRITICAL CARE TEAM.

H. EMS MD AND LEAD CRITICAL CARE TEAM MEMBER SHOULD DISCUSS PRIOR TO EXECUTING THE TRANSPORT, THE FOLLOWING:
   1. Review vent settings
   2. Address need for additional personnel or equipment
   3. Review drugs in use
   4. Review orders of transferring MD
   5. Discuss any equipment that may be in use and not familiar to the crew.

I. Following completion of the transport, the EMS MD will be notified via text messaging that transport is complete, and MD can stand down.

J. ECDPS does have a limited group of critical care paramedics. However, all ALS Ambulances share in SCT duties for out of town transport, STAT, and critical patients involving IV monitoring and medication administration, ventilator dependency, and high acuity patients.

K. Our intent is to have a reasonable response time and to minimize the out of hospital time for the patient. After approval of a transport, a unit will be dispatched to the requesting hospital's location. Examples of varying response time are listed below, but are not limited to the following:
   1. Contracts
   2. Verbal agreements
   3. Location and routing
   4. Call volume

L. Documentation:

Documentation by the paramedic for critical care patients MUST be very detailed and accurate in terms of chronologic events. The flow of the report should make it easy to follow and mentally reproduced the care provided. The report must include but is not limited to:

1. Chief complaint/reason for transport
2. History of present illness (a brief description of what happened and why the patient is in the current condition)
3. Pertinent past medical history and surgical history
4. Current medications
5. Allergies.
6. A detailed physical examination, including ongoing and frequent vital signs (q 10 to 15 minutes), head to toe assessment, location of any external or penetrating appliances/devices, IV sites (type of fluid, rate, inspection of IV site), type and location of any tubes as well as what is draining, size and depth of ET tube.
7. Settings: Ventilators, medication drips (including drug name, concentration, drip rate, amount remaining to infuse at time of pick up), suction (i.e. if on chest tube).
8. Any changes in the patient's status, any treatments provided, and any changes made to baseline or initial settings.
9. Names of staff members who provided you orders or requested changes

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1.3.13 Trauma Transport Protocol

Statement of Purpose:

Escambia County Emergency Medical Services (ECEMS) shall comply with Florida Statutes and 64J-2, Florida Administrative Code, with the development and practice of Trauma Transport Protocols.

Protocol:

I. DISPATCH PROCEDURES

A. 9-1-1 calls for ambulance assistance within the City of Pensacola are received at the Pensacola Police Department and are transferred to the Call-Taker, located within the Escambia County Emergency Communications Center. 9-1-1 calls within the County are directly received by the Call-Taker.

B. The Call-Taker will, in a timely manner, determine from an individual requesting emergency medical assistance:

1. The location of request
2. The call back number and caller's name
3. The chief complaint or nature of call
4. The number of patients
5. The extent and severity of injuries
6. The priority of the request based upon the criteria set forth in the Medical Priority Dispatch System by Medical Priority Consultants, Inc.

C. The Call-Taker shall enter the information into the Computer-Aided Dispatch (CAD) computer and electronically "ship" the information to the EMS Dispatcher (who is also located within the Escambia County Emergency Communications Center).

D. The EMS Dispatcher shall send the closest available ambulance to the emergency call.

E. When possible, the Call-Taker shall remain on the line and provide pre-arrival instructions to the caller. These instructions are contained within the Medical Priority Dispatch System.

F. Based upon information received from the caller and the response agreement for each fire department, the Call-Taker may electronically "ship" the call to the Fire Dispatcher (who is also located within the Escambia County Emergency Communications Center). The Fire Dispatcher shall immediately dispatch the closest appropriate fire department.

G. The EMS Dispatcher shall notify, by telephone or direct line, the appropriate law enforcement agency when their assistance is needed.

H. When the EMS Dispatcher receives information that the scene is not secured, that information will be relayed to any responding unit and a determination to "hold back" may be made.

I. The EMS Dispatcher will initiate the dispatch of the LifeFlight helicopter by contacting the Air Communications Dispatcher by calling 1-(800)-874-1555 direct line. LifeFlight will be launched:

1. When information received from an on-scene Paramedic (currently certified Florida Paramedic who is employed either full or part-time by a recognized local EMS agency) indicates there is a Trauma Alert patient and there is an increased risk of mortality or morbidity to the patient if the patient were not transported by air ambulance.
2. When the call is designated a "Code Delta" (highest priority call, potential Trauma Alert patient) by the EMS Dispatcher and it would take a ground ambulance more than fifteen (15) minutes to reach the patient.
3. When terrain or obstructed traffic dictates that access by a ground vehicle would result in a delay in patient care or transport.
4. When a call is designated as a "Code Delta" (highest priority call, potential Trauma Alert patient) and no ground vehicle is available to respond.
5. The responding Paramedic in the ground ambulance may request that LifeFlight be launched if information from medical personnel, law enforcement or the fire department suggests that significant injury has occurred and that the trauma patient may meet Trauma Alert criteria.

J. If the EMS Dispatcher dispatches the last available land ambulance in the south end of Escambia County, the EMS Dispatcher shall attempt to advise all in-service ambulance crews that "all units 10-6 (busy) on calls". If the EMS Dispatcher dispatches the north end unit, the EMS Dispatcher shall request back up from a neighboring provider under existing mutual aid agreements. The provider receiving the request shall immediately notify the ECEMS Dispatcher if they are able to provide back up and, if so, the receiving provider shall place at least one ambulance on standby to handle any emergency call in the designated standby area. These measures are intended to improve response times to a patient in an emergency situation by placing in-service units in a "hurry up" mode and by identifying back up resources.

K. If the EMS Dispatcher is "holding" (has received a request for emergency assistance, however, there are no available ground units to dispatch) a call in the south end of Escambia County, the EMS Dispatcher shall:

1. Call by radio, all in-service ambulance crews and advise "ECEMS is 10-75" ("holding" a call) and give the nature and location of the emergency.
2. Page, and call by radio, the on-duty EMS Shift Supervisor; advise that "ECEMS is 10-75" and give the nature and location of the emergency. The on-duty Shift Supervisor shall "first respond" to the emergency and provide ALS care until an ambulance can arrive on scene.

3. If there is going to be a delay in getting a unit available for the emergency call, the EMS Dispatcher shall notify off duty ECEMS personnel (full-time and part-time) by radio and/or text message and advise "ECEMS is 10-75" ("holding" a call) and give nature of the call and the location. Off duty personnel shall notify the ECEMS Dispatch Center if they are able to help with handling the emergency call and will either respond to the scene or the office to get an ambulance available for the call per existing policy.
4. The EMS Dispatcher shall immediately request assistance from the closest mutual aid provider to the incident. The requested mutual aid provider shall respond to the emergency call promptly and without delay.
5. Once the EMS Dispatcher has an available unit, the EMS Dispatcher will advise "ECEMS is no longer 10-75" (no longer "holding" a call) by radio. The EMS Dispatcher shall also notify any backup provider that their assistance is no longer needed.

II. PRE-HOSPITAL PROCEDURES

A. Upon arrival at the incident, the EMT or Paramedic shall assess the condition of each trauma patient using the trauma scorecard methodology as defined in 64J-2.004 and 64J2.005, to determine the transport destination.

B. Using the following trauma scorecard methodology criteria, the EMT or Paramedic shall determine the need for calling a Trauma Alert to the nearest Trauma Center, Pediatric Trauma Referral Center or other hospital. As soon as one of the Trauma Alert criterions, listed below, is met, the EMT or Paramedic shall issue a Trauma Alert to the Dispatch Center by using the words "Trauma Alert". The Dispatch Center will notify the appropriate facility and advise the crew that they have done so. As soon as possible, the EMT or Paramedic shall contact the receiving facility by radio to relay patient assessment as per the Radio Report Protocol.

C. Trauma Scorecard – Age Criteria

1. Determination of Pediatric Versus Adult Patient

a. Pediatric patients are those persons who have the anatomical and physical characteristics of a person less than 16 years of age (the period from birth to the day of the 16th birthday).
b. Pediatric patients will be defined by age, if known. If the patient's age is unknown and in the best judgment of the Paramedic, Trauma Alert patient is believed to meet the pediatric characteristics above, the patient will be treated as a pediatric patient and transported to the Pediatric Trauma Referral Center.

c. Adult patients will be defined by age, if known. If the patient's age is unknown and in the best judgment of the Paramedic, the Trauma Alert patient is not believed to meet the pediatric characteristics above, the patient will be treated as an adult and transported to the closest appropriate Trauma Center.

2. Pediatric Trauma Scorecard Methodology

a. The EMT or Paramedic, upon arrival at an incident, shall assess all pediatric Trauma patients using the following criteria and **if any of the following conditions are identified, the patient shall be considered a "Pediatric Trauma Alert" patient and be transported to Sacred Heart Hospital, the state approved Pediatric Trauma Referral Center.**

1. **Airway:** in order to maintain optimal ventilation, the patient's airway is:
    a. intubated
    b. maintained through such measures as manual jaw thrust
    c. continuously suctioned
    d. ventilated through the use of other adjuncts
2. **Consciousness:** the patient exhibits an altered mental status that includes:
    a. drowsiness
    b. lethargy
    c. the inability to follow commands
    d. unresponsiveness to voice
    e. totally unresponsive or in a coma
    f. paralysis, suspicion of spinal cord injury or loss of sensation
3. **Circulation:** the patient has:
    a. a faint or non-palpable carotid or femoral pulse
    b. a systolic BP of less than 50 mmHG
4. **Fracture:** there is evidence of:
    a. an open long bone fracture (humerus, radius, ulna, femur, tibia or fibula)
    b. multiple fracture sites or multiple dislocations (except for multiple fractures or dislocations isolated to the wrist or ankle)
5. **Cutaneous:** the patient has a major soft tissue disruption including:
    a. major de-gloving injury
    b. major flap avulsion
    c. 2nd or 3rd degree burns to 10 percent or more of the total body surface area
    d. amputation at or above the wrist or ankle
    e. any penetrating injury to the head, neck, torso (excluding superficial wounds where the depth of the wound can be determined)

b. In addition to the criteria listed in 2.a (above), **a "Trauma Alert" shall be called when a condition is identified from any two of the components below and the patient shall be transported to Sacred Heart Hospital, the state approved Pediatric Trauma Referral Center:**

1. **Consciousness:** the patient exhibits signs of amnesia, or there is a loss of consciousness.
2. **Circulation:** the carotid or femoral pulse is palpable, but the radial or pedal pulses are not palpable or the systolic BP is less than 90 mmHG.
3. **Fracture:** the patient reveals signs of a single long bone fracture (long bone fractures do not include isolated wrist or ankle fractures).
4. **Size:** Pediatric trauma patients weighing 11 kilograms or less, or the body length is equivalent to this weight on a pediatric length and weight emergency tape (the equivalent of 33 inches in measurement or less).

c. In the event that none of the criteria in "a" or 'b" of this section are identified in the assessment of the pediatric patient, the EMT or Paramedic can call a Trauma Alert and transport the patient to Sacred Heart Hospital if, in his or her judgment, the trauma patients condition warrants such action. Where EMT or Paramedic judgment is used as the basis for calling a trauma alert, it shall be thoroughly documented within the narrative portion of the run report.

3. Adult Trauma Scorecard Methodology:

a. The EMT or Paramedic, upon arrival at an incident, shall assess all adult trauma patients using the following criteria in the order presented, and if any of the following conditions are identified, the patient shall be considered a "Trauma Alert" patient, and be transported to the closest appropriate Trauma Center.

1. **Airway:** the patient receives active airway assistance beyond the administration of oxygen.
2. **Circulation:** the patient:
    a. lacks a radial pulse with a sustained heart rate of greater than 120 beats per minute, or
    b. has a blood pressure of less than 90 mmHG.
3. **Best Motor Response (BMR):**
    a. the patient exhibits a score of four or less on the motor assessment component of the Glasgow Coma Scale, or
    b. the patient exhibits the presence of paralysis, or
    c. the patient has a loss of sensation, or
    d. there is suspicion of a spinal cord injury

4. **Cutaneous:** the patient has:
    a. 2nd or 3rd degree burns to 15 percent or more of the total body surface area, or
    b. an amputation proximal to the wrist or ankle, or
    c. any penetrating injury to the head, neck, or torso (excluding superficial wounds where the depth can be determined)
5. **Long bone Fractures:** the patient reveals signs or symptoms of two or more long bone fracture sites (humerus, radius, ulna, femur, tibia or fibula)

b. Should the patient not be identified as a Trauma Alert patient using the criteria listed in "a" above, the trauma patient shall be further assessed using the following criteria. The patient shall be considered a Trauma Alert, and be transported to the closest appropriate trauma center when a condition is identified from any two of the following seven components:

1. **Airway:** the patient has a respiratory rate of 30 or greater
2. **Circulation:** the patient has a sustained heart rate of 120 beats per minute or greater.
3. **BMR:** the patient has a BMR of 5 on the motor component of the Glasgow Coma Scale.
4. **Cutaneous:** the patient has a soft tissue loss from either:
    a. a major de-gloving injury
    b. a major flap avulsion of greater than 5 inches
    c. has sustained a gunshot wound to the extremities of the body
5. **Long bone Fractures:** the patient reveals signs or symptoms of a single long bone fracture resulting from a motor vehicle collision or a fall from a height of 10 feet or greater
6. **Age:** the patient is 55 years of age or greater
7. **Mechanism of injury:**
    a. the patient has been ejected from a motor vehicle (excluding any motorcycle, moped, all terrain vehicle, bicycle or the open body of a pick-up truck, or
    b. the driver of a motor vehicle has impacted the steering wheel causing steering wheel deformity
    c. If the adult trauma patient is not identified as a Trauma Alert patient after evaluation using the criteria in "a" and "b" above, the trauma patient shall be assessed using all elements of the Glasgow Coma Scale. **If the score is 12 or less, the patient shall be considered a Trauma Alert patient** (excluding those patients whose normal Glasgow Coma Scale Score is 12 or less, as established by the patient's medical history or pre-existing medical condition when known).

d. In the event that none of the conditions identified in “a”, “b” or “c” above, the EMT or . Paramedic can call a Trauma Alert, if in his or her judgment, the patient’s condition warrants such action. Where EMT or Paramedic judgment is used as the basis for calling a trauma alert, it shall be thoroughly documented within the narrative portion of the run report.

e. The results of the patient assessment shall be thoroughly documented within the uniform run report.

8. The EMT or Paramedic shall det ermine the need for additional resources after performing a primary survey. If any of the following conditions exist, the EMT or Paramedic may request additional ground or air ambulance assistance.

a. **Ground Response**

1. more than one “Trauma Alert” patient
2. more than two moderate patients
3. more than three code Alpha patients

b. **Air Response**

1. when ground transport from the scene to Trauma Center is calculated to take longer than twenty minutes for a state defined Trauma Alert patient
2. when extrication, and ground transport time is calculated to take longer than twenty-five minutes for a Trauma Alert patient
3. when no ground ambulance is available for response to a state defined Trauma Alert patient

III. HOSPITAL DETERMINATION

A. All adult state defined Trauma Alert patients will be transported to either Sacred Heart Hospital, which is a state approved Level 2 Trauma Center or Baptist Hospital, which is a state approved Level 2 Trauma Center, based upon the shortest transport time.

B. All pediatric patients which meet Trauma Alert criteria will be transported to Sacred Heart Hospital, which is a state approved Pediatric Trauma Referral Center.

C. Patients not meeting state Trauma Alert criteria will be transported to either the hospital (within the service area of Escambia County EMS, see VI.C 1-6) of the patient’s choice, or the closest hospital, if the patient has no preference. ECEMS routinely delivers patients to these hospitals. However, ECEMS will not deliver Trauma Alert patients to these hospitals.

IV. EXCEPTIONS TO TRANSPORT TO A TRAUMA CENTER OR THE PEDIATRIC TRAUMA REFERRAL CENTER

A. In the event that the Trauma Centers or Pediatric Referral Center becomes fully saturated or unavailable, a Trauma "Bypass" will go into effect.

B. The Trauma Centers or Pediatric Referral Center may go on "Bypass" for the following reasons:

1. **CT Scan:** lack of availability of CT scan will result in a "Bypass" situation for trauma patients with an isolated head injury, and a Glasgow Coma Scale Score of 12 or less.
2. **Trauma Surgery:** When the on-call trauma surgeons are involved with previous Trauma Alerts and another trauma surgeon is unavailable or when a Trauma Center has received two (2) Trauma Alerts within a period of thirty (30) minutes, a "Bypass" situation will result.
3. **Neurosurgery:** when the on-call neurosurgeon is unavailable due to involvement in emergency surgery, a "Bypass" situation will result for a trauma patient with an isolated head injury and/or a Glasgow Coma Scale Score of 12 or less.
4. **Internal Disaster:** Any hospital, which has a facility accident or emergency that closes that facility in its entirety, its emergency department or its surgery unit, will go on "Bypass" until such time as it is back in service.

C. When a Trauma Center is on "Bypass", Trauma Alert patients will be taken to the next nearest Trauma Center. For example, if Baptist Hospital is on "Bypass", all adult Trauma Alert patients will be taken to Sacred Heart Hospital, and conversely if Sacred Heart Hospital is on "Bypass", all adult Trauma Alert patients will be taken to Baptist Hospital.

D. If one Trauma Center is on "Bypass" and the other Trauma Center must meet the criteria (B, 1-4, above) to go on "Bypass", all Trauma Centers will go off "Bypass". All Trauma Centers will begin accepting Trauma Alert patients, with those Trauma Alert patients being transported to the closed Trauma Center. All Trauma Centers will remain in this mode until such time that one of the Trauma Centers no longer meets the criteria to be on "Bypass". At that time, the Trauma Center no longer on "Bypass" will begin accepting all adult Trauma Alert patients.

E. If the Pediatric Trauma Referral Center (Sacred Heart) is on "Bypass", pediatric Trauma Alert patients will be transported to the closest Trauma Center. The Trauma Centers will continue accepting pediatric Trauma Alert patients until the PTRC no longer meets the criteria to be on "Bypass".

F. If the need for immediate stabilization of the Trauma Alert patient exists, the Paramedic always has the right to override the hospital's "Bypass" status and transport the patient to the Pediatric Trauma Referral Center or the closest Trauma Center.

G. A ground ambulance may transport any Trauma Alert patient (pediatric or adult) to the closest Trauma Center or Pediatric Trauma Referral Center for the following:

1. To place life saving central lines, provide airway management or place chest tubes to stabilize a suspected pneumothorax and/or hemothorax.
2. In the best judgment of the on-scene Paramedic that the patient will expire en-route to the Trauma Center or Pediatric Trauma Referral Center.

G. A ground ambulance may transport a Trauma Alert (pediatric or adult) patient to Gulf Breeze Hospital for the following:

1. Ground transport time to the Trauma Center of Pediatric Trauma Referral Center exceeds 30 minutes and air transport is not available.
2. The transporting ground ambulance will pass by (in close proximity to) the hospital, and

    a. the patient needs immediate advanced airway control, or
    b. the patient is in cardiac arrest, or
    c. there is a multiple casualty incident

3. The transporting ground ambulance will remain at the Emergency room, and be readily available to continue the transport to the Trauma Center or Pediatric Trauma Referral Center. If there will be an extended delay, the transfer of the patient will be handled as outlined with the Critical Care Inter-facility Transfer Policy (attached).

H. In the event of a mass casualty incident, the transport of all patients will be coordinated through Escambia County Public Safety Communications. Patients will be routed to the Trauma Centers, the Pediatric Trauma Referral Center, and area hospitals based upon the available resources at each facility.

V. INTER-FACILITY TRANSFERS

A. Request for the transfer of a Trauma Alert patient will be handled as outlined within the Critical Care Inter-facility Transfer Policy (attached).

B. Pediatric Trauma Alert patients who either present to a Trauma Center via private vehicle, or are delivered to a Trauma Center by EMS (due to bypass or need for immediate stabilization) will be stabilized and transferred to the Pediatric Trauma Referral Center for admission.

VI. LIST OF TRAUMA CENTERS, PEDIATRIC TRAUMA REFERRAL CENTERS, AND OTHER HOSPITALS

A. State Approved Trauma Centers, Level 2:

1. Baptist Hospital of Pensacola
2. Sacred Heart Hospital

B. State Approved Pediatric Trauma Referral Center:

Sacred Heart Hospital of Pensacola

C. Other Hospitals within Service Area:

1. Jay Hospital (Santa Rosa County)
2. Santa Rosa Medical Center (Santa Rosa County)
3. Gulf Breeze Hospital (Santa Rosa County)
4. Atmore Community Hospital (Atmore, Alabama)
5. D.W. McMillan Hospital (Brewton, Alabama)
6. West Florida Regional Medical Center of Pensacola
8. Perdido Bay ER (West Florida Hospital freestanding Emergency Department)

VII. TRAUMA REGISTRY FORMS

The EMT or Paramedic shall complete a patient record for each patient encountered. The trauma scorecard section of the patient record will be completed for each trauma patient. This will be accomplished through either completing the paper Run Report or entering the data into the pen based (Tablet) computing system utilized by Escambia County EMS.
EMT and Paramedic employees of Escambia County EMS shall attempt to leave a copy of the patient records at the hospital, at time of service, whenever possible. If the computer generated patient record is not left, a copy will be faxed to the hospital prior to the end of the shift (generally within 12 hours). Paper patient records copies, which are not left at the time of service, will be sent to the hospital via the stock clerks during their next scheduled trip. Those attending employees using the pen based computing system will enter their data in lieu of actually completing a paper patient record. All computer generated patient records will be downloaded to the administration station by the attending Paramedic crew member. The patient record will be generated by the computer, and the report will be faxed to the hospital.

VIII. GEOGRAPHICAL CONSIDERATIONS

The EMT or Paramedic will determine the closest Trauma Center on the basis of historical transport time factors. The EMS providers have a high level of confidence in using time factors, as opposed to distance, due to varying road conditions and traffic patterns that occur during different times of the day throughout the district.

IX. DOCUMENTATION OF DEVIATIONS FROM THESE PROTOCOLS

Any deviation from these protocols will be thoroughly documented and justified within the narrative portion of the patient record.

Approved by:

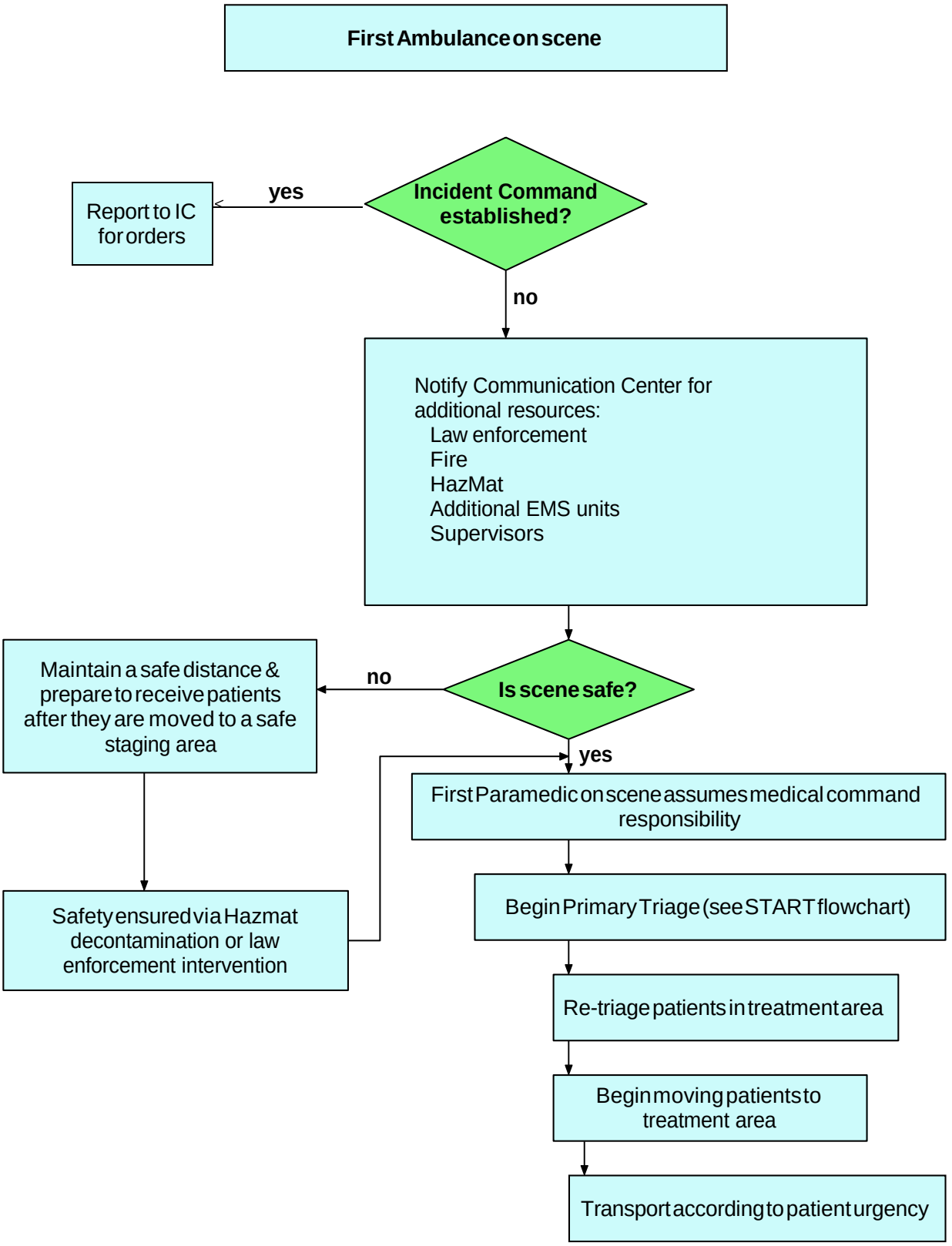
_____ _____

Rayme Edler, MD, MSPH
Medical Director

Date

1.4 Mass Casualty Incident

1.4.1 Mass Casualty Incident Response Protocol



1.4.1 Mass Casualty Incident Response Protocol

I. PURPOSE.

To efficiently triage, treat and transport victims of mass/multiple casualty incidents (MCIs). The following protocol is applicable to all multiple victim situations. This protocol is intended for the everyday MCI when the number of injured exceed the capabilities of the first arriving unit, as well as large scale MCIs. The number of casualties may exceed the capabilities of the local jurisdiction and will require assistance from other EMS providers.

II. PROCEDURE.

A. The officer of the first arriving unit will establish MED BRANCH and;

1. Perform a size up:
    a. Estimate the number of victims.
    b. Request a Level 1, 2, 3, 4, or 5 response (see 2.D).
    c. Request additional units and/or specialized equipment as required.
2. Identify a staging area.
3. If it is an active shooter incident or any tactical environment with a MCI establish a Unified Command (UC) with Law Enforcement (LE). Consider establishing Liaisons for FD and LE, the Liaisons can interact with each other allowing the transfer of info between agencies. Law Enforcement will make entry with their contact team and provide feedback to the UC and the decision may be made to establish a Rescue Task Force (team of LE officers providing forced protection for rescue personnel). The Rescue Task Force will initiate triage and provide immediate life saving treatment (i.e hemorrhage control).
4. If area is deemed safe to enter, direct the remaining crewmembers and any additional personnel arriving to initiate triage.
    a. Triage will be performed in accordance with START or Jump START.
    b. Tag victims utilizing the color-coded ribbons as either:
        - Red - Immediate
        - Yellow - Delayed
        - Green - Ambulatory (minor)
        - Black - Deceased (non-salvageable)
5. Locate and remove the walking wounded to one location away from the incident, if possible. These victims need to be assessed as soon as possible. Assign someone to keep the walking wounded together.
6. Active shooter incidents considerations: Be on high alert for suspicious individuals, packages, vehicles or potential IEDs. Integrated active shooter/assailant response should include the critical actions contained in the acronym THREAT
    Threat suppression
    Hemorrhage control
    Rapid **E**xtrication to safety
    Assessment by medical providers
    Transport to definitive care

B. As additional units arrive, MED BRANCH will designate the following officers:
    1. TRIAGE (Initially the responsibility of the First Arriving Officer).
    2. TREATMENT.
    3. TRANSPORT.
    4. STAGING.

C. Additional officers may be required depending on the complexity of the incident. These officers may include, but are not limited to:
    1. MEDICAL BRANCH.
    2. LANDING ZONE.
    3. EXTRICATION.
    4. HAZ MAT.
    5. REHABILITATION.
    6. SAFETY.
    7. Public Information Officer (PIO)
    8. MEDICAL INTELLIGENCE – to assist with WMD events for de-con antidotes and treatment.

D. Predetermined Response Plan.
    1. **Considerations**:
        a. An MCI shall be classified by different levels depending on the number of victims. The number of victims will be based on the initial size-up, prior to triage.
        b. Levels of response will augment the units already on the scene. Units on scene or enroute will be included in the assignment. The exception will be when in conjunction with a Fire Alarm assignment (e.g. Fire with multiple victims may be a Second Alarm with a MCI Level 3 response – this will be two separate assignments).
        c. COMMAND can downgrade or upgrade the assignment at any time.
        d. All units will respond to the Staging Area unless otherwise directed by COMMAND.
        e. When announcing an MCI, specify the general category (trauma, HAZMAT, smoke inhalation, heat exhaustion, etc.) and number of patients.
        f. Any victim meeting Trauma Transport Criteria must be reported to a State-Approved Trauma Center for determination of a transport destination. Trauma Transport Criteria will be determined during the secondary triage in the Treatment Phase. When the trauma center(s) are overwhelmed they will notify MedCom of the need for units to transport to other trauma centers or non-trauma centers
        g. All units are to respond to the Staging Area in emergency response mode unless otherwise directed by COMMAND.
        h. Consider **air transpor**t for special needs, **mass transit** resources for multiple “walking wounded,” and **private BLS transport units.**
        i. Consider Mobile Command Vehicles, Medical Supply Trailers and Communication Trailers.

j. Upon n of a MCI – Medical Control (Medcom/MRCC) will gather each hospital's capability and relay this information to the Transport Officer or Medical Communication Officer.

k. On a large-scale incident, consider sending a Hospital Coordinator to each hospital to assist with communications.

l. Request Law Enforcement to set up a safety perimeter

2. **Definitions:**

a. Active shooter assailant: The Department of Homeland Security's (DHS) definition of an active shooter is an individual actively engaged in killing or attempting to kill people in a confined, populated area; in most cases, active shooters use firearms and there is no pattern or method to their selection of victims.

b. Active shooter assailant Incident: Active shooter assailant situations are unpredictable and evolve quickly; most are over within 10 to 15 minutes.

c. Casualty Collection Point (CCP): A safe location(s) where fire rescue personnel can receive victims. Victims may have to be carried or dragged to the CCP. This may be inside a structure or exterior. This may be the same as the treatment area if located in the cold zone.

d. Concealment: Concealment is a law enforcement term that represents an object that only provides protection from observation.

e. Contact Team: Contact team is a law enforcement term used to designate the team of law enforcement officers that make entry with the specific intention of ONLY going after and neutralizing the perpetrator.

f. Cover: Cover is a law enforcement term that represents an object or location that provides protection from direct gunfire.

g. Improvised Explosive Device (IED): The Department of Defense (DOD) definition of an IED is a device placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic, or incendiary chemicals and designed to destroy, incapacitate, harass, or distract. It may incorporate military components, but is normally devised from nonmilitary components.

h. Litter Bearer: A team of personnel assigned to Triage to move victims from the incident site to the treatment area or Transport Units.

i. Rescue Task Force: Rescue personnel and Law Enforcement personnel formed to make entry into a structure to triage victims and provide life saving immediate treatment as needed i.e stopping hemorrhage.

j. Strike Team: Five of the same type of units, including common communications and a leader (i.e., an ALS Transport Unit Strike Team would consist of five ALS Transport Units with a leader).

k. Tactical Environment – Any environment that Law Enforcement has a tactical objective due to a threat assessment (which may require a Fire Rescue/EMS component).

l. Task Force: Five different types of units, including common communications and a leader. MCI Task Force: May be two ALS Transport Units, two BLS Transport Units, and one Suppression Unit, including common communications and a leader.

m. THREAT: acronym for Threat suppression, Hemorrhage control, Rapid Extrication, Assessment by medical providers, and transport to definitive care.

n. Zones in relation to Active Shooter/Mass Casualty Incidents:

1. Hot Zone – Direct Threat Care/Care Under Fire - This zone shall be designated at the area of the structure that has not been cleared by law enforcement or the area that the perpetrator is currently in.
2. Warm Zone – Indirect Threat Care/Tactical Field Care - This zone shall be designated at any area of the active shooter incident that has been declared available for entry by Fire Rescue/EMS personnel with armed LE coverage to perform immediate life saving treatment and triage to victims prior to their removal from the initial hazard.
3. Cold Zone – Evacuation Care/Tactical Evacuation Care - This zone extends beyond the warm zone and is not reachable by the perpetrator. This zone shall encompass positions such as the command post, staging and other functional groups.

3. **MCI LEVEL 1 (5–10 victims)**

4 ALS Transport Units
2 Suppression Units
1 Battalion Chief
1 EMS Supervisor

Note: The 2 closest hospitals & Trauma Center to the incident will be notified by Medical Control (MedCom or local communication center).

4. **MCI LEVEL 2 (11–20 victims)**

6 ALS Transport Units \
3 Suppression Units
2 Battalion Chiefs
2 EMS Supervisors

Note: The 3 closest hospitals & 2 Trauma Centers to the incident will be notified by Medical Control.

5. **MCI LEVEL 3 (21–100 victims**)

8 ALS Transport Units
4 Suppression Units

3 Battalion Chiefs
3 EMS Supervisors
1 Operations Chief
1 Command Vehicle
1 Supply Trailer

Note: The 4 closest hospitals & 2 Trauma Centers to the incident will be notified by Medical Control. The Warning
Point will notify the Emergency Management Agency.

6. **MCI LEVEL 4 (Over 100 victims)**
5 MCI Task Forces
2 ALS Transport Unit Strike Teams
1 Suppression Unit Strike Teams
2 BLS Transport Unit Strike Teams
2 Mass Transit Buses
5 Battalion Chiefs
3 EMS Supervisors
1 EMS Chief
1 Operations Chief
1 Command Vehicle
2 Supply Trailers
1 Communications Trailer

Note: The 10 closest hospitals & 5 Trauma Centers to the incident will be notified by Medical Control. The Warning
Point will notify the Emergency Management Agency.
Metropolitan Medical Response System (MMRS) may be notified.

7. MCI LEVEL 5 (Over 1000 victims)
10 MCI Task Forces
4 ALS Transport Unit Strike Teams
2 Suppression Unit Strike Teams
4 BLS Transport Unit Strike Teams
4 Mass Transit Buses
10 Battalion Chiefs
6 EMS Supervisors
2 EMS Chiefs
2 Operations Chiefs
2 Command Vehicles
4 Supply Trailers
1 Communications Trailer

Note: The 20 closest hospitals & 10 Trauma Centers to the incident will be notified by Medical Control. The Warning
Point will notify the Emergency Management Agency,
Metropolitan Medical Response System (MMRS), Disaster

Medical Assistance Team (DMAT), and International Medical & Surgical Response Team (IMSuRT).

III. OFFICER RESPONSIBILITIES.

A. **COMMAND.**

1. Established by the First Arriving Officer.
2. Radio designation: MED BRANCH.
3. If active shooter or tactical environment incident get briefing from LE, establish a Unified Command and co-locate with LE. Consider establishing Liaisons for FD and LE, the Liaisons can interact with each other allowing the transfer of info between agencies.
4. Follow Field Operations Guide FOG #1.
5. Remain in a fixed and visible location, uphill and upwind of incident.
6. Determine the MCI Level (1, 2, 3, 4, or 5). If unknown victims in an active shooter/tactical environment initiate a MCI level 2 until a count can be determined.
7. Designate a Staging Area.
8. Assign positions to perform the functions of TRIAGE, TREATMENT, TRANSPORT and STAGING.
9. Advise Communications Center of the number of victims and their categories once triage is complete.
10. During large scale or complex MCIs (e.g. fire with multiple victims, victims/tactical environment incident), designate a Medical Branch to reduce the span of control.
11. If the incident is due to Weapons of Mass Destruction (WMD), establish a Medical Intelligence Officer to assist with documentation, antidotes and treatment of victims. (WMD FOG #8)
12. If active shoter/tactical environment refer to FOG #9
13. Ensure proper security of the incident site, treatment area, and loading area; also provide for traffic control and access for emergency vehicles, including law enforcement.

B. **MEDICAL.**

1. Radio designation: MEDICAL. Follow FOG #2.
2. Work directly with COMMAND. Work with Command, and direct and/or supervise on-scene personnel from agencies such as the Medical Examiner's Office, Red Cross, private ambulance companies, and hospital volunteers.
3. Assure TRIAGE, TREATMENT and TRANSPORT have been established. If established by COMMAND, TRIAGE, TREATMENT and TRANSPORT will report to MEDICAL.
4. Direct and/or supervise on-scene personnel from agencies such as Medical Examiner's Office, Red Cross, ambulance companies and hospital volunteers.
5. Ensure activation of Medical Control (Medcom/MRCC).

6. If the incident is due to a known or suspected WMD, refer to WMD FOG #8 and designate a Medical Intelligence Officer to assist with decontamination, antidotes, and treatment of victims.
7. If active shooter/ tactical environment refer to FOG #9
8. Ensure proper security of incident site, treatment area, and loading area; also provide for traffic control and access for emergency vehicles, including law enforcement.

C. **TRIAGE OFFICER**.

Reports to Command or the Medical Branch. Supervises the Triage Personnel, Rescue Task Force (if needed) and Litter bearers. Also directs Medical Examiner personnel locate deceased victims.

1. Radio designation: TRIAGE.
2. Follow FOG #3.
3. Organize the Triage Team to begin initial triaging of victims, utilizing the START/JumpSTART triage system. Assemble the walking wounded and uninjured in a safe area.
4. Advise COMMAND (or MEDICAL if establish), as soon as possible, if there is a need for additional resources.
5. Coordinate with TREATMENT to ensure that priority victims are treated first.
6. Ensure that all areas around the MCI scene have been checked for potential victims, walking wounded, ejected victims, etc., and that all victims have been triaged.
7. Supervise the Triage Personnel, Litter Bearers and Morgue/Medical Examiner Personnel.
8. Maintain security and control of the Triage Area. Request Law Enforcement.
9. If a RTF (Rescue Task Force) is formed designate a Triage Aide to communicate with the RTF.
10. If there is more than one RTF team, designate the teams as RTF 1, RTF 2 etc. Have the RTF mark the doors with the victim count using a grease pencil R= , Y= , G= , B=___(greens should have left the area but may stay to assist with care or supervision, i.e. a teacher).
11. Provide periodic status reports to COMMAND or MEDICAL.
12. Report to COMMAND or MEDICAL upon completion of duties for further assignments.

D. **TREATMENT OFFICER**.

Reports to COMMAND or MEDICAL. Supervises the TREATMENT RED, YELLOW, GREEN Manager. Coordinates the re-triage and tagging of all victims and on-site medical care. Directs movement of victims to loading areas.

1. Radio designation: TREATMENT.
2. Follow FOG #4.
3. Consider assigning a "Documentation Aide" to assist with paperwork.
4. Direct personnel to either begin treatment on the victims where they lay or establish a centralized Treatment Area.

5. Considerations for a Treatment Area:
    a. Capable of accommodating the number of victims and equipment.
    b. Consider weather, safety and the possibility of hazardous materials.
    c. Designate entrance and exit areas, which are readily accessible (funnel points).
    d. On large-scale incidents, divide Treatment Area into three distinct areas based on priority. Designate a Treatment Manager for each area (Red, Yellow, Green). Use color tarps if available.
6. Complete a "Treatment Log" as victims enter the area.
7. Ensure that all victims are re-triaged through a secondary exam and the assessment is documented on the Triage tag (Disaster Management System Tag [DMS Tag] or METTAG). The rescuer filling out the DMS Tag or METTAG will keep a corner of the METTAG for future documentation.
8. All Red tagged victims will be transported immediately as transport units become available. These victims should not be delayed in the Treatment Area.
9. Ensure that enough equipment is available to effectively treat all victims.
10. Establish communicates with TRANSPORT to coordinate proper transport of the appropriate victims. Direct movement of victims to ambulance loading areas.
11. Provide periodic status reports to COMMAND/MEDICAL.

Note:
RED, YELLOW, GREEN TREATMENT MANAGERS – report to the TREATMENT Officer and are responsible for the treatment and continual re-triaging of victims in their assigned areas. Notify TREATMENT Officer of victim readiness and priority for transportation. Assure that appropriate victim information is recorded.

E. **TRANSPORT OFFICER.**

Reports to COMMAND or MEDICAL. Supervises the Medical Communication Coordinator and Documentation Aide(s). The TRANSPORT Officer is responsible for the coordination of victims and maintenance of records relating to victim identification, injuries, mode of transportation and destination.

1. Radio designation: TRANSPORT.
2. Follow FOG #5.
3. Assign a Documentation Aide with a radio to assist with paperwork and communications.
4. Assign a Medical Communication Coordinator to establish continuous contact with Medical Control (MedCom or MRCC).
5. Establish a victim loading area. Advise STAGING of the location and direction of travel. Consider Law Enforcement for security of loading area.
6. Arrange for the transport of victims from the Treatment Area. Maintain "Hospital Transportation Log" #5B. Keep piece of triage tag for future documentation.

7. Communicate with the Landing Zone (LZ)/ Helispot Officer and relay the number of victims to be transported by air.
    a. Air transported victims should be assigned to distant hospitals, unless the victim's needs dictate otherwise (eg.Trauma Center, burn unit, etc.).

F. **MEDICAL COMMUNICATION COORDINATOR.**

Reports to the TRANSPORT Officer and is responsible for maintaining communication with Medical Control to assure proper victim transport information and destination.

1. Radio designation: MEDICAL COMMUNICATION.
2. Follow FOG #5A.
3. Establish communication with Medical Control. Advise Medical Control of the overall situation (e.g. smoke inhalation, trauma, burns, Hazmat exposure, etc.), amount and category of victims.
4. Medical Control will survey area hospitals to determine their capabilities and capacities, and then relay this information.
   Document this information on the Hospital Capability Worksheet #5C and maintain this for the duration of the incident.
5. When units are prepared to transport, advise Medical Control and supply them with the following information:
    a. The unit transporting.
    b. The number of the victims being transported.
    c. Their priority:
        Red - Immediate
        Yellow - Delayed
        Green - Ambulatory (minor)
    d. Any special need victims (e.g. cardiac, burns, trauma, etc.).
6. The Medical Communication Coordinator, in conjunction with Medical Control, will determine the most appropriate facility.
   Ground transported victims should be assigned to hospitals on a rotating basis.
7. Once Medical Control receives the information from the Medical Communication Coordinator, Medical Control will notify the appropriate hospital.
8. Transporting units will not contact the individual hospital on their own, unless there is a need for medical direction/care outside of protocols.

G. **MEDICAL SUPPLY COORDINATOR**.

Reports to MEDICAL and is responsible for acquiring and maintaining control of all medical equipment and supplies.

1. Radio designation: MEDICAL SUPPLY.
2. Follow FOG #6.
3. Assure necessary equipment is available on the transporting vehicle.
4. Provide an inventory of medical supplies at the Staging Area for use on scene.

H. **STAGING OFFICER**.

Reports to COMMAND and is responsible for managing all activities within the Staging Area.

1. Radio designation: STAGING.
2. Follow FOG #7.
3. Establish the location of a Staging Area and notify the Communications Center to direct any incoming units.
4. Maintain a "Unit Staging Log"#7A.
5. Ensure that all personnel stay with their vehicles unless otherwise directed by COMMAND.
    a. If personnel are directed to assist in another function, ensure that the keys stay with each vehicle.
6. Coordinate with the TRANSPORT Officer the location for a victim loading area and best route to the area.
7. Maintain a reserve of at least 2 transport vehicles. When the reserve is depleted request additional units through COMMAND.

IV. DOCUMENTATION.

A. The Incident Commander will, at the completion of the incident, coordinate the gathering of all pertinent documentation.

B. A Post Incident Analysis (PIA) should be completed on all MCIs.

Note

(a) MRCC - Medical Resource Coordination Center - prime function is to maintain a status as to the number of victims and the hospital readiness status to accept victims, coordinate transportation and direct them to the appropriate hospital during a disaster or other situation requiring a high demand of medical resources.

V. MCI KITS.

Each Unit will carry an MCI bag. Included in the MCI bag will be:

A. Two (1) Triage packs with:

B. One (1) additional set of triage ribbon.

C. Fifty (50) Triage tags – Disaster Management Tags (DMS tags) or METTAGs.

VI. MCI SUPERVISOR KIT

A. Complete vest set with the following identification vests:
   1. White for Command.
   2. Blue for Medical Officer.
   3. Yellow for Triage Officer.
   4. Red for Treatment Officer.
   5. Green for Transport Officer.
   6. Green for Medical Communication Coordinator.
   7. Blue for Medical Supply Officer.
   8. Orange for Staging Officer.

B. Clipboard which contains paperwork for each officer, pens/pencils/grease pencils, and paper.

C. EMS Command Board.

D. Tarp set: red, yellow, green, black tarps.

E. Patient tracking device/Scanner (if available)

F Bullhorn (if available)

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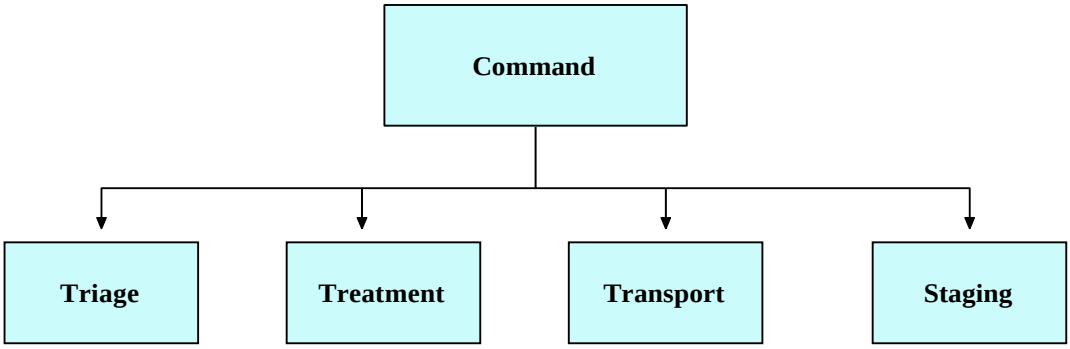
Multiple patients/Trauma

1.4.1b BASIC MCI COMMAND STRUCTURE FOR MEDICAL RESPONSES



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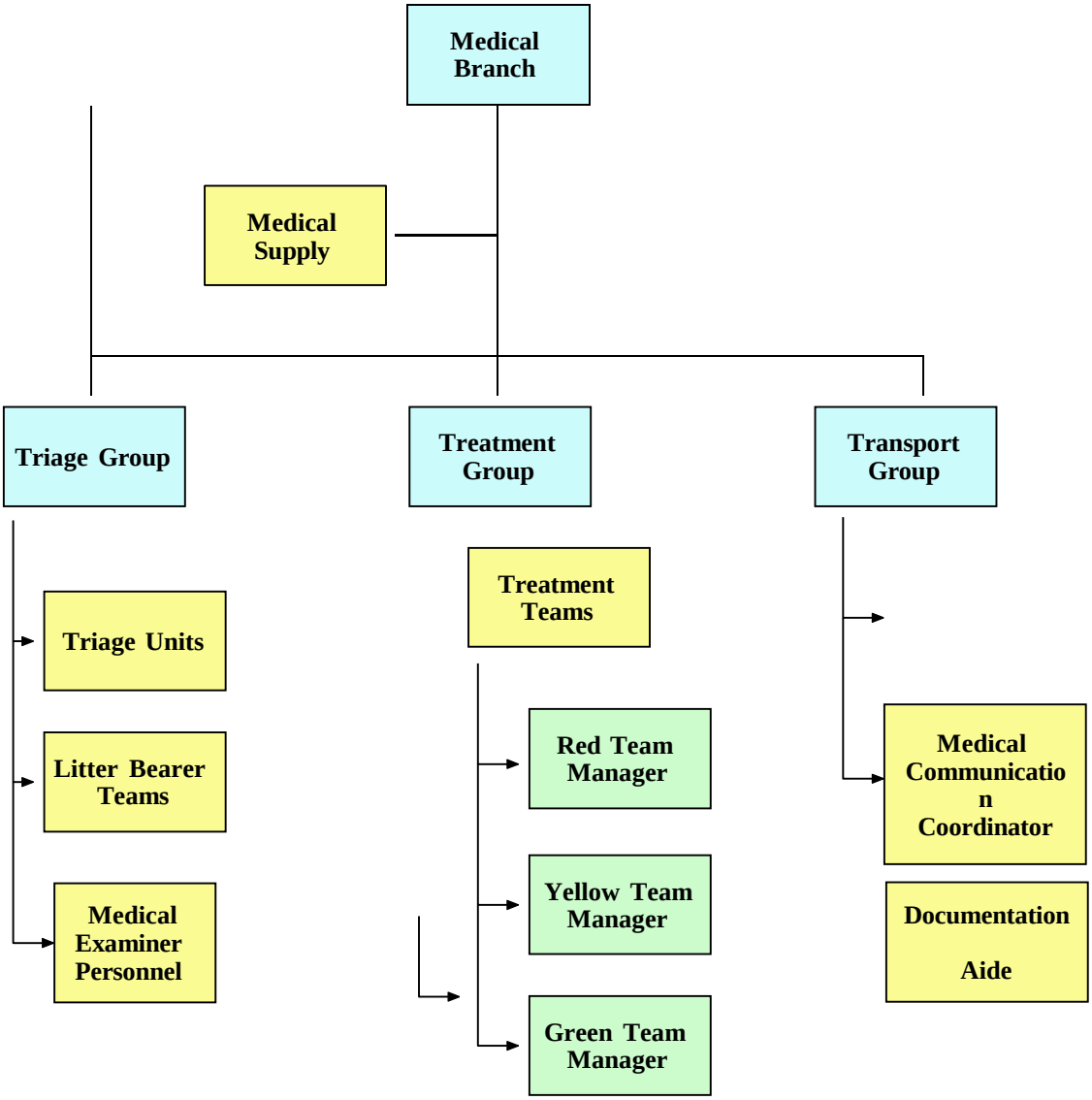
1.4.1b COMPLEX MCI COMMAND STRUCTURE FOR MEDICAL RESPONSES



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1.4.2 FIELD OPERATIONS GUIDE

Purpose: To provide a brief explanation and description of the various positions/roles of the team leaders in a mass casualty incident

I. COMMAND - FOG 1

A. Don the appropriate vest and use the radio designation **"COMMAND."** Establish the Command Post in a visible and fixed location.
B. Perform the initial size-up. Determine any special needs such as fire suppression, Hazmat, extrication, etc. and request additional units as needed.
C. Approximate the number of victims and category of injury (trauma, burns, smoke inhalation, chemical exposure, etc.).
    1. Level 1 5-10 victims.
    2. Level 2 11-20 victims.
    3. Level 3 21-100 victims.
    4. Level 4 Over 100 victims.
    5. Level 5 Over 1000 victims.
D. Request additional units early, as needed.
E. Establish staging area as soon as possible.
F. Utilize the EMS Tactical Command Worksheet when available.
G. Assign positions to perform the following functions:
    1. MEDICAL BRANCH (as needed).
    2. TRIAGE.
        a. Litter Bearers.
    3. TREATMENT.
        a. RED, YELLOW, GREEN Treatment Managers.
    4. TRANSPORT.
        a. Documentation Aide.
        b. Medical Communication Coordinator.
    5. STAGING.
    6. MEDICAL SUPPLY, REHAB, SAFETY (as needed).
H. Ensure proper security, traffic control and access for emergency vehicles.
J. When applicable, have a liaison of each involved party at the Command Post. Some examples would include: Law Enforcement, Medical Examiner, Emergency Management Agency, Occupancy owner/representative, etc.

II. MEDICAL - FOG 2

A. Don the appropriate vest and use the radio designation **"MEDICAL."**
B. Establish in a fixed and visible location or co-join command post.
C. Set-up the EMS Tactical Command Worksheet.
D. Verify that COMMAND has requested appropriate number of units.
E. Assign positions to perform the following functions (if not done by COMMAND):
    1. TRIAGE.
        a. Litter Bearers.
    2. TREATMENT.
        a. RED, YELLOW, GREEN Treatment Managers.
    3. TRANSPORT.

a. Documentation Aide.
b. Medical Communication Coordinator.

4. STAGING.

F. Advise the Communication Center of the exact number of victims and their categories, once reported from TRIAGE.

G. Determine amount and type of additional medical supplies needed. Consider Medical Supply Officer.

III. RIAGE OFFICER - FOG 3

A. Don appropriate vest and use the radio designation **"TRIAGE."**

B. Direct personnel to triage and tag victims where they lie if the scene is safe.

C. Prioritize victims using colored triage ribbons.

D. Request Litter Bearer Teams from MEDICAL COMMAND to assist with movement of victims from the incident site to the Treatment area.

E. Assign personnel to triage the "walking wounded."

F. Report to MEDICAL COMMAND the number and category of victims.

G. Ensure that all areas of the incident have been checked for victims and that all victims have been triaged.

H. Once triage is completed contact COMMAND for further assignment.

IV. . TREATMENT - FOG 4

A. Don appropriate vest and use the radio designation **"TREATMENT. "**

B. Direct personnel to either begin treatment on victims where they lie OR establish a centralized Treatment Area.

C. Coordinate the movement of victims into the Treatment Area with the Litter Bearers.

D. Consider obtaining a Documentation Aide to assist with paperwork. E. Request additional medical supplies as necessary from the MEDICAL SUPPLY Coordinator.

F. Ensure personnel perform a secondary triage and tag victims with a triage tag. Personnel will then remove the colored ribbon and remove a portion of the triage tag for future documentation.

G. If the incident size warrants it, designate a "Treatment Team Manager" for each color category (RED, YELLOW, GREEN).

H. Advise TRANSPORT of victim(s) requiring immediate transportation.

I. Account for all victims triaged and treated on the Treatment Log.

J. Advise MEDICAL COMMAND as to any changes in the victim count or category.

V. TRANSPORT OFFICER - FOG 5

A. Don appropriate vest and use the radio designation **"TRANSPORT."**

B. Obtain a Medical Communication Coordinator to maintain continuous communication with Medical Control and document the hospital information on the Hospital Capability Worksheet.

C. Obtain a Documentation Aide.

D. Establish a Victim Loading Area accessible to the Treatment Area and preferably having clear entry and exit points.

E. Consult with TREATMENT on the amount and priority of victims.

F. Coordinate the loading of patients by priority to transport units and helicopter – if needed coordinate with the Landing Zone officer/Helispot.

G. Record the triage tag number and destination hospital for each victim on the Hospital Transport Log. Keep a portion of the triage tag.
H. Request additional transport units from STAGING.

VI. MEDICAL COMMUNICATION - FOG 5A

A. Don appropriate vest and use the radio designation **"MEDICAL COMMUNICATION."**
B. Establish early contact with Medical Control.
C. Advise Medical Control of overall situation (e.g. smoke inhalation, trauma, burns, HazMat exposure, etc.) amount and priority of victims.
D. Medical Control will gather hospital capabilities and capacities. Document this hospital information on the Hospital Capability Worksheet.
E. When units are prepared to transport, advise Medical Control and supply them with the following information:
    1. The unit transporting.
    2. The number of victims to be transported.
    3. Patient priority:
        a. RED = Immediate.
        b. YELLOW = Delayed.
        c. GREEN = Ambulatory (minor).
    4. Any special need victims, cardiac, burn, trauma, etc.
F. Ground transported victims should be assigned to hospitals on a rotating basis.

VII. MEDICAL SUPPLY - FOG 6

A. Don appropriate vest and use the radio designation **"MEDICAL SUPPLY."**
B. Assure necessary equipment is available on the transporting vehicle.
C. Consult with TREATMENT on the need for medical supplies in the Treatment Area.
D. Provide an inventory of medical supplies at the Staging Area.

VIII. STAGING OFFICER - FOG 7

A. Don appropriate vest and use the radio designation **"STAGING."**
B. Maintain Staging Area established by COMMAND or establishes a location and notifies the Communication Center to direct all incoming units.
C. Establish a visible location in the Staging Area.
D. Maintain a Unit Staging Log.
E. Ensure that personnel stay with their vehicle unless otherwise directed.
F. If personnel leave their vehicle, keep the keys with each vehicle.
G. Coordinate with TRANSPORT the need for units and direct units to the Loading Zone.
H. Maintain a reserve of at least 2 transport units. Should this go down, advises COMMAND.

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1.4.3 START and JumpSTART System of Triage

I. Purpose:

This procedure will be based on the Simple Triage and Rapid Treatment or START method for adult victims and the JumpSTART adaptations for the pediatric victim. These methods of triage are designed to assess a large number of victims objectively, efficiently, and rapidly and can be used by personnel with limited medical training.

II. Procedure:

A. **Initial Triage** – Using the START or JumpSTART methods (Sections III or IV).

1. Locate and direct all of the walking wounded into one location away from the incident if possible. Assign someone to keep them together (Fire Rescue Personnel, Law Enforcement Officer, or capable bystander).
2. Begin assessing all non-ambulatory victims where they lay.
3. Utilize the Triage Ribbons (color-coded plastic strips). One should be tied to an upper extremity in a VISIBLE location.
    a. RED - Immediate.
    b. YELLOW - Delayed.
    c. GREEN - Ambulatory (minor).
    d. BLACK - Deceased (non-salvageable).
4. Independent decisions should be made for each victim. Do not base triage decisions on the perception of too many REDs, not enough GREENs, etc.
5. If borderline decisions are encountered, always triage to the most urgent priority (e.g. GREEN/YELLOW patient, tag YELLOW).

B. **Secondary Triage**.

1. Performed on all victims during the Treatment Phase. If a victim is identified in the initial triage phase as a RED and transport is available, do not delay transport to perform a secondary assessment.
2. Utilize the Triage Tags (Disaster Management System Tag [DMS Tag] or METTAGs) and attempt to assess for and complete all information required on the tag (time permitting). Affix the tag to the victim and remove ribbon.
3. The Triage priority determined in the Treatment Phase should be the priority used for transport. If trauma related, the Trauma Criteria will be applied to trauma victims during the secondary triage in the Treatment Phase.

START TRIAGE (refer to the START flowchart).

NOTE: Remember the pneumonic RPM (Respirations, Perfusion, and Mental Status). The first assessment that produces a RED stops further assessment. Only corrections of life-threatening problems, such as airway obstruction or severe hemorrhage should be managed during triage.

START *modified 9/2015*	
Move the Walking Wounded	**GREEN**

No Respiration after head tilt	**CK**
Control Severe Bleeding	
Respirations over 30/min/ Respiratory Distress	**RED**
Perfusion (No radial pulse)	**RED**
Mental Status (unable to follow commands)	**RED**
Stable RPM/Walking	**GREEN**
Stable RPM/Non ambulatory	**YELLOW**
Conduct Secondary Triage in the Treatment Phase	

A. Assess **RESPIRATIONS**:

1. If respiratory rate is 30/min. or less go to PERFUSION assessment.
2. If respiratory rate is over 30/min, Prioritize RED.
3. If victim is not breathing, open the airway, remove obstructions, if seen, and assess for (1) or (2) above.
4. If victim is still not breathing, Prioritize BLACK.

B. Assess **PERFUSION:**

1. Performed by palpating a radial pulse or assessing capillary refill (CR) time.
2. If radial pulse is present or CR is 2 seconds or less, go to MENTAL STATUS assessment.
3. No radial pulse or CR is greater than 2 seconds, Prioritize RED.

NOTE: Any major external bleeding should also be controlled at this time.

C. Assess **MENTAL STATUS**:

1. Assess the victim's ability to follow simple commands and their orientation to time, place, and person (COAx3).
2. If the victim does not follow commands, is unconscious, or is disoriented, Prioritize RED.
3. If the victim follows commands, oriented X3, Prioritize GREEN.

NOTE: Depending on injuries (e.g. burns, fractures, bleeding) it may be necessary to Prioritize YELLOW.

JumpSTART TRIAGE (refer to the JumpSTART flowchart).

NOTE: Physiological differences in children necessitate the need to adapt the standard START triage method to children =8 years of age or those victims with the anatomical or physiological features of a child in the age group. The same parameters (R.P.M.) will be utilized with the adaptations indicated.

A. Assess **RESPIRATIONS:**

1. If respiratory rate is between 15 and 45/min. go to PERFUSION assessment.
2. If respiratory rate is over 45/min or under 14/min, Prioritize RED.
3. If victim is not breathing, open the airway, remove obstructions, if seen, and assess for (1) or (2) above.

4. If victim is still not breathing and no obstructions are present, check a peripheral (radial or pedal) pulse. If peripheral pulse is present, provide five (5) ventilations (approximately 15 seconds) via any type of barrier device. If spontaneous respirations resume, Prioritize RED.
5. If victim is still not breathing, Prioritize BLACK.

B. Assess **PERFUSION:**

1. Performed by assessing a peripheral pulse.
2. If peripheral pulse is present, go to MENTAL STATUS assessment.
3. If peripheral pulse is absent, Prioritize RED.

NOTE: Any major external bleeding should also be controlled at this time.

C. Assess **MENTAL STATUS**:

1. Assess the child through AVPU scale. Assess whether the victim is either ALERT, responds to VERBAL stimuli, responds to PAINFUL stimuli, or is UNCONSCIOUS.
2. If the victim is unconscious or only responds to painful stimuli, Prioritize RED.
3. If the victim is alert or responds to verbal stimuli, assess for further injuries, Prioritize YELLOW or GREEN.

NOTE:

a) Infants who are developmentally unable to walk should be triaged using JumpSTART algorithm either during initial triage or in the GREEN area if carried out by a non-rescuer. During triage, if they do not fulfill the criteria of a RED victim and no other outward signs of significant injury, they may be triaged as a GREEN victim.

b) *START Triage system developed by Newport Beach Fire Rescue and Hoag Hospital. JumpStart Triage system developed by Lou Romig, MD (Miami Children's Hospital*).

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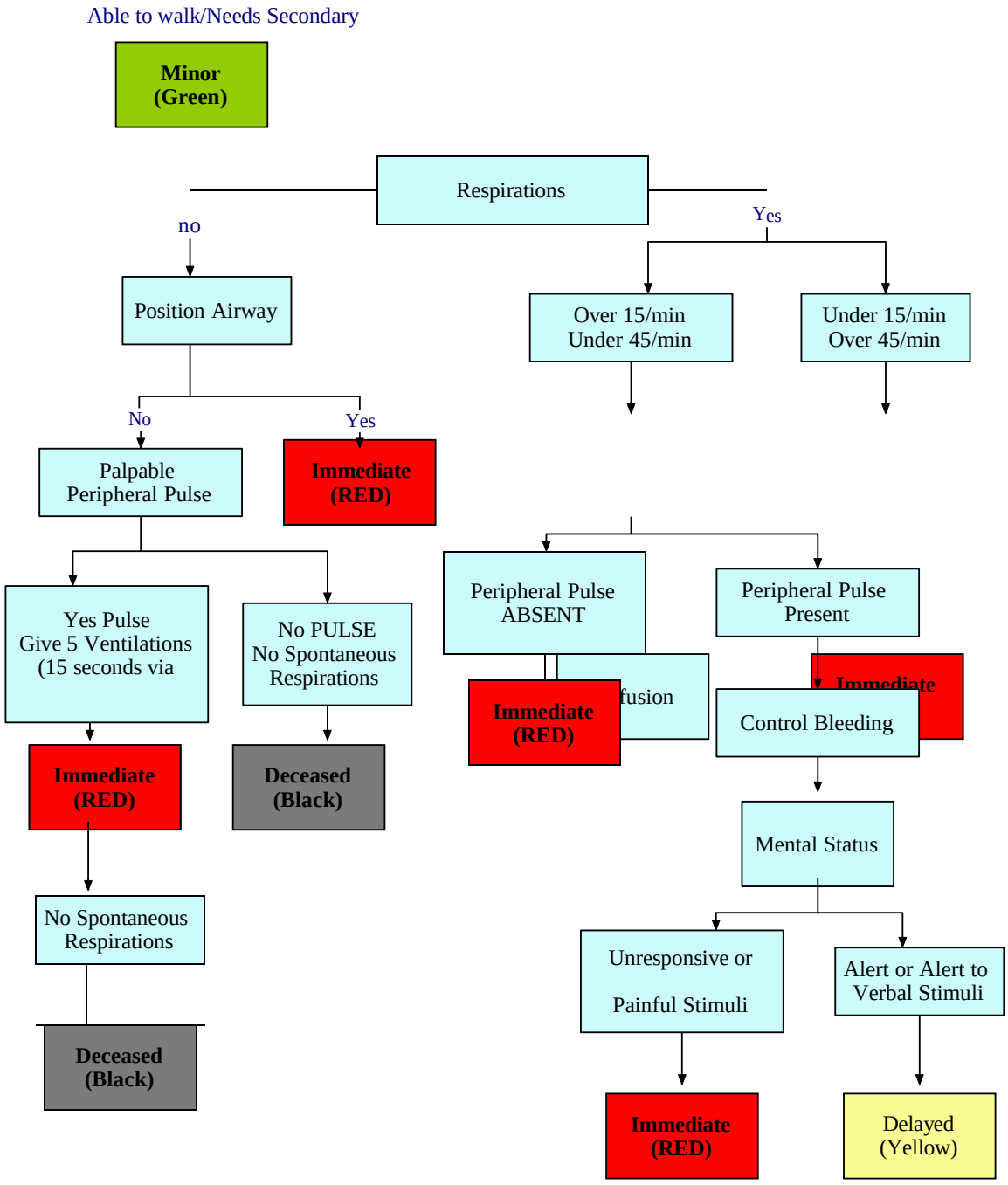
1.4.3a JumpSTART TRIAGE



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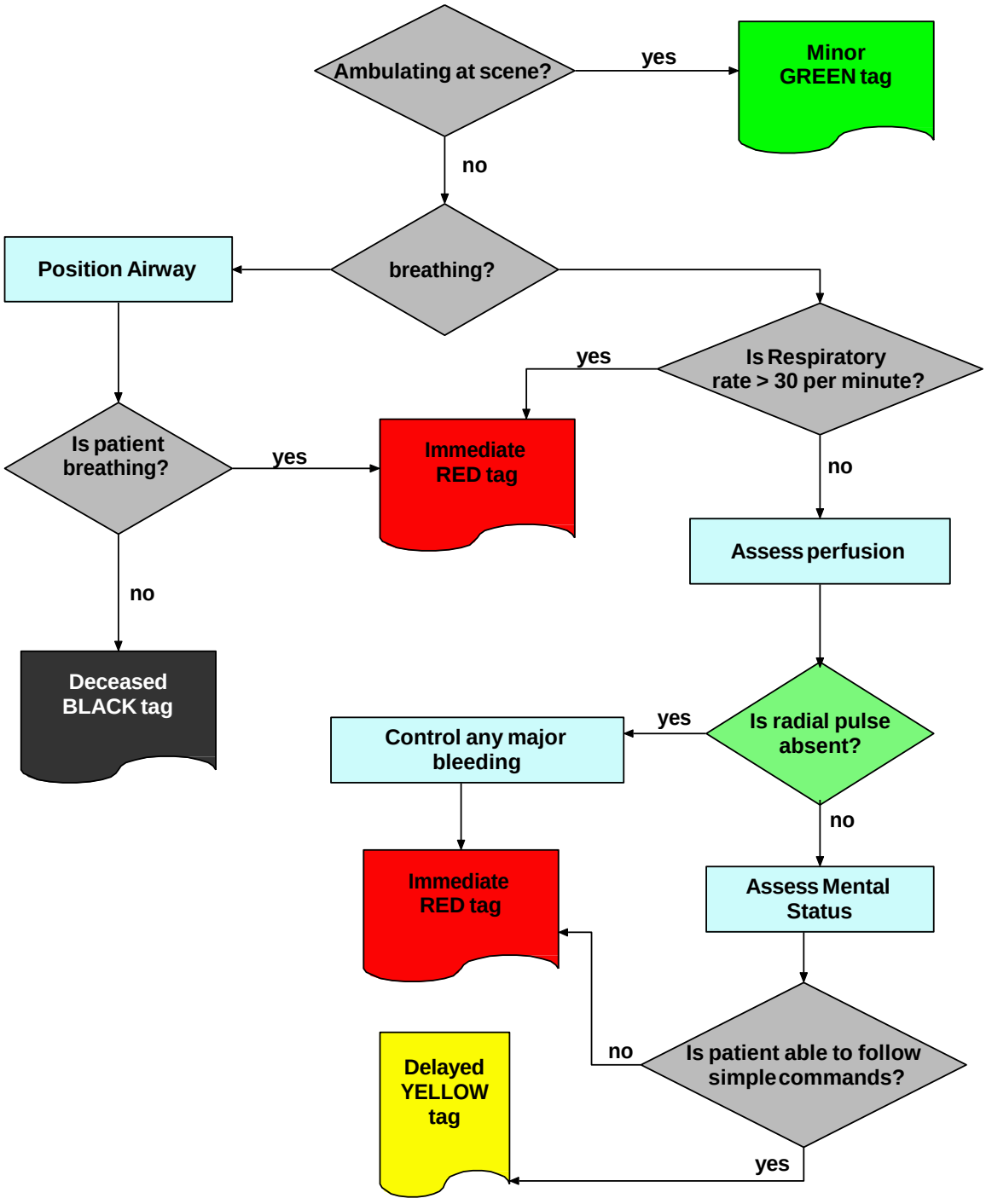
1.4.3b SIMPLE TRIAGE AND RAPID TREATMENT PROTOCOL



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1.5 Equipment Issues

~~1.5.1~~ Minimum Equipment on each Ambulance

I STATEMENT:

This is the minimum equipment list to comply with section 64j – Florida Administrative Code.

II. GUIDELINE:

The following list of equipment is the minimum equipment to be carried on board all ECDPS Ambulances.

III. EQUIPMENT LIST:

1. Bandaging, dressing, and taping supplies:
    a. Adhesive, silk, or plastic tape – assorted sizes.
    b. Sterile 4 × 4 inch gauze pads.
    c. Triangular bandages.
    d. Roller gauze.
    e. ABD (minimum 5 × 9 inch) pads.
2. Bandage shears.
3. Patient restraints, wrist and ankle.
4. Blood pressure cuffs: infant, pediatric, and adult.
5. Stethoscopes: pediatric and adult.
6. Blankets.
7. Sheets (not required for non-transport vehicle.)
8. Pillows with waterproof covers and pillow cases or disposable single use pillows (not required for non-transport vehicle).
9. Disposable blanket or patient rain cover.
10. Long spine board and three straps or equivalent.
11. Short spine board and two straps or equivalent.
12. Adult and Pediatric cervical immobilization devices (CID), approved by the medical director of the service.
13. Padding for lateral lower spine immobilization of pediatric patients or equivalent.
14. Portable oxygen tanks, “D” or “E” cylinders, with one regulator and gauge. Each tank must have a minimum pressure of 1000 psi, and liter flow at 15 liters per minute.
15. Transparent oxygen masks; adult, child and infant sizes, with tubing.
16. Sets of pediatric and adult nasal cannulae with tubing.
17. Hand operated bag-valve mask resuscitators, adult and pediatric accumulator, including adult, child and infant transparent masks capable of use with supplemental oxygen.
18. Portable suction, electric or gas powered, with wide bore tubing and tips which meet the minimum standards as published by the GSA in **KKK-A 1822E** specifications.
19. Extremity immobilization devices. Pediatric and Adult.
20. Lower extremity traction splint. Pediatric and Adult.

21. Sterile obstetrical kit to include, at minimum, bulb syringe, sterile scissors or scalpel, and cord clamps or cord-ties.
22. Burn sheets.
23. Flashlight with batteries.
24. Occlusive dressings.
25. Oropharyngeal airways. Pediatric and Adult.
26. Installed oxygen with regulator gauge and wrench, minimum "M" size cylinder (minimum 500 PSI) with oxygen flowmeter to include a 151pm setting, (not required for non-transport vehicles.) (Other installed oxygen delivery systems, such as liquid oxygen, as allowed by medical director.)
27. Gloves – suitable to provide barrier protection for biohazards.
28. Face Masks – both surgical and respiratory protective.
29. Rigid cervical collars as approved in writing by the medical director and available for review by the department.
30. Nasopharyngeal airways, pediatric and adult.
31. Approved biohazardous waste plastic bag or impervious container per Chapter 64E-16, F.A.C.
32. Safety goggles or equivalent meeting A.N.S.I. Z87.1 standard.
33. Bulb syringe separate from obstetrical kit.
34. Thermal absorbent reflective blanket.
35. Multitrauma dressings.
36. Pediatric length based measurement device for equipment selection and drug dosage.

MEDICATION

1. Atropine Sulfate.
2. Dextrose, 50 percent (we will use D10 bags but has the equivalent 25 grams of glucose).
3. Epinephrine HCL 1:1,000.
4. Epinephrine HCL 1:10,000.
5. Ventricular dysrhythmic.
6. Benzodiazepine sedative/anticonvulsant.
7. Naloxone (Narcan).
8. Nitroglycerin.
9. Inhalant beta adrenergic agent with nebulizer apparatus, as approved by the medical director.

I.V. SOLUTIONS

1. Lactated Ringers or Normal Saline.

EQUIPMENT

(a) Laryngoscope handle with batteries.
(b) Laryngoscope blades; adult, child and infant sizes.
(c) Pediatric I.V. arm board or splint appropriate for I.V. stabilization.
(d) Disposable endotracheal tubes; adult, child and infant sizes. Those below 5.5 mm shall be uncuffed. 2.5 mm – 5.0 mm uncuffed; 5.5 mm – 7.0 mm; 7.5 mm – 9.0 mm).
(e) Endotracheal tube stylets pediatric and adult.
(f) Magill forceps, pediatric and adult sizes.
(g) Device for intratracheal meconium suctioning in newborns.
(h) Tourniquets.
(i) I.V. cannulae 14 thru 24 gauge.

(j) Micro drip sets.
(k) Macro drip sets.
(l) I.V. pressure infuser.
(m) Needles 18 thru 25 gauge.
(n) Intraosseous needles and three way stop cocks.
(o) Syringes, from 1 ml. to 20 ml.
(p) D.C. battery powered portable monitor with defibrillation and pacing capabilities, ECG printout and spare battery. The unit shall be capable of delivering pediatric defibrillation (energy below 25 watts/sec and appropriate equipment).
(q) Monitoring electrodes for adults and pediatrics.
(r) Pacing electrodes. Pediatric and Adult.
(s) Glucometer.
(t) Approved sharps container per Chapter 64E-16, F.A.C.
(u) Flexible suction catheters.
(v) Electronic waveform capnography capable of real-time monitoring and printing record of the intubated patient (effective 01/01/2008).

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2 ADULT MEDICAL PROTOCOLS

2.1 Adult Initial Assessment & Management

Overview: Protocols in Section 2.1 are designed to guide the EMT or paramedic in his or her initial approach to assessment and management of adult patients. Supportive Care is specified as EMT and Paramedic (BLS) and Paramedic Only (ALS).

Protocol 2.1.1 should be used on all adult patients for initial assessment. During this assessment, if the EMT or paramedic determines that there is a need for airway management, Protocol 2.1.2 should be used for the management of the adult airway. These protocols are frequently referred to by other protocols, which may or may not override them in recommending more specific therapy.

Protocol 2.1.3 presents the basic components of preparation for transport of medical patients. Due to the significant differences in priorities and packaging in the pre-hospital care of trauma and hypovolemia cases, a separate Trauma Supportive Care protocol has been developed. After following Protocol 2.1.1, this Medical Supportive Care protocol may be the only protocol used in medical emergency situations where a specific diagnostic impression and choice of additional protocol(s) cannot be made. Judgment must be used in determining whether patients require ALS or BLS level care. This protocol is frequently referred to by other protocols, which may or may not override it in recommending more specific therapy.

Protocol 2.1.4 presents the basic components of preparation for transport of trauma patients. Due to the significant differences in priorities and packaging in the pre-hospital care of medical cases, a separate Medical Supportive Care protocol has been developed. After following Protocol 2.1.1, this Trauma Supportive Care protocol may be the only protocol used in trauma or hypovolemia situations where a specific diagnostic impression and choice of additional protocol(s) cannot be made. Judgment must be used in determining whether patients require ALS or BLS level care. This protocol is frequently referred to by other protocols, which may or may not override it in recommending more specific therapy.

Protocol 2.1.5 should be used by paramedics ONLY for pain management.

2.1.1 Initial Assessment Protocol: EMT and Paramedic (4)

Adult Medical Protocol

Purpose: This will be the initial protocol followed by EMTs and Paramedics on all calls you are dispatched to (or that you roll up on).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Scene size up**.
    a. Review of dispatch information
    b. Assess need of body substance isolation
    c. Assessment of scene safety
    d. Determine mechanism of injury
    e. Determine the nature of the illness.
    f. Determine location of patients
    g. Determine need for additional resources
    h. Consider c-spine immobilization.
2. **Initial assessment.**
    a. General impression of patient
    b. Assess mental status (AVPU) – Maintain spinal immobilization PRN.
        i. **A** = alert
        ii. **V** = responsive to verbal stimuli
        iii. **P** = responsive to painful stimuli
        iv. **U =** unresponsive
    c. Assess Circulation- (rapid evaluation of pulse, major bleeding, skin color, and temperature). Assess need for defibrillation: VF/VT without pulse.
    d. Assess Airway
    e. Assess Breathing.
    f. Assess Disability- Movement of extremities
    g. Expose and Examine Head, Neck, Chest, Abdomen, and Pelvis (check back when patient is rolled on side).
    h. Identify Priority Patients.
        1. Poor general impression.
        2. Unresponsive patients.
        3. Responsive but does not or cannot follow commands.
        4. Difficulty breathing
        5. Hypoperfusion or shock
        6. Complicated child birth
        7. Chest pain with a systolic BP below 100 mm Hg.
        8. Uncontrolled bleeding
        9. Severe pain anywhere
        10. Multiple injuries
3. **Initial Management**
    a. Airway Management (2.1.2) Protocol/C-spine stabilization p.r.n.
    b. Medical Supportive Care (2.1.3) and/or Trauma Supportive Care (2.1.4) Protocols
4. **Secondary Assessment**
    a. Conduct a head-to-toe survey

b. Neurological Assessment
    1) Pupillary response
    2) Glasgow Coma score
c. Assess Vital Signs
    1) Respirations
    2) Pulse
    3) Blood Pressure
    4) Skin Condition
        - Color
        - Temperature
        - Moisture
        - Capillary Refill
    5) Lung Sounds
d. Obtain a Medical History
    1) **S** – Symptoms, Chief Complaint
        a. O- Onset and Location
        b. P – Provocation
        c. Q – Quality
        d. R-Radiation
        e. R- Referred
        f. R- Relief
        g. S- Severity
        h. T-Time
    2) **A** – Allergies
    3) **M** – Medications
    4) **P** – Past Medical History
    5) **L** – Last Oral Intake
    6) **E** – Events leading to illness or injury
e. Refer to specific medical/trauma protocols for continued management

5. **Other assessment techniques to be used as the situation warrants**:
    a. Cardiac Monitoring (EMT can connect patient to monitor while paramedic performing other task)
    b. Pulse Oximetry
    c. Glucose Determination
    d. Monitor Core Temperature
    e. Capnography

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2.1.2 Airway Assessment/Management Protocol
Adult Medical Protocol

Purpose: **Airway assessment and management is the most important and first order of business when patient contact is made (immediate removal from unsafe scene may on occasion trump airway management). An algorithm for general airway assessment/management provides a general overview and road map for the EMT/Paramedic to follow if needed. This algorithm will in turn direct the EMT/Paramedic to either a Non-breathing Airway Protocol or a Breathing Patient Airway Protocol. If a decision is made to intubate a patient, follow the Universal Airway Algorithm. Once the airway is controlled/secured, attention can be given to the other medical/trauma problems and care directed according to the appropriate protocol. New 2015 ACLS guidelines recommend titrating oxygen delivery to maintain pulse ox at >90% when acute coronary syndrome is suspected. In addition, EMS should administer oxygen if the patient is dyspneic, is hypoxic, or has obvious signs of heart failure. Because the usefulness has not been established In patients with normal oxy-hemoglobin levels, patients with suspected or confirmed ACS, providers may consider withholding supplementary oxygen therapy in these patients.**

Procedure**:**

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Assessment Protocol 2.1.1
2. If spontaneous breathing is present without compromise:
    a. Monitor breathing during transport
    b. Administer oxygen vía nasal cannula (2-6 L/min) to maintain pulse ox ≥ 94% (unless ACS is suspected then ≥ 90%)
    c. Avoid over oxygenation wean oxygen concentration as tolerated
3. If spontaneous breathing is compromised:
    a. Maintain airway patency (e.g. modified jaw thrust)
    b. Administer oxygen to maintain pulse ox ≥ 94% via nasal cannula (2-4 L/min), simple mask (4-6 L/min) or non-rebreather mask (10-15 L/min)
    c. Consider CPAP if severe distress and patient able to cooperate with use of CPAP. See CPAP Protocol
    d. If unconscious, insert oropharyngeal or nasopharyngeal airway PRN (If patient accepts oropharyngeal airway, consider the need for subglottic airway (EMT or Paramedic) or intubation (ALS Level I)
    e. Assist ventilations with bag-valve-mask device (BVM) attached to supplemental oxygen at 15 – 25 L/min PRN
4. Suction PRN
5. Monitor pulse oximetry and capnography, as soon as possible
6. If spontaneous breathing is absent or markedly compromised:
    a. Maintain airway (e.g. modified jaw thrust)
    b. If unconscious, insert oropharyngeal or nasopharyngeal.
    c. Assist ventilation with a BVM device attached to supplemental oxygen at 15-25 L/min as needed. Maintain O2 saturation of 94% or greater. Avoid over oxygenation: Wean oxygen concentration as tolerated.
    d. Suction PRN
    e. If unconscious and intubation is not available, insert LMA(or other

approved blind intubation/extra glottic device) (a).

f. Monitor pulse ox and capnography or $ETCO_2$ monitoring device, as soon as possible

ALS LEVEL 1: PARAMEDIC ONLY

1. Consider CPAP (~~AEMT, EMT-I,~~ Paramedic) if severe distress and patient able to cooperate with use of CPAP. See CPAP Protocol
2. If indicated go to SMART AIRWAY MANAGMENT, perform endotracheal intubation (stabilize C-spine prn) (a).
    a. Confirm ETT placement by three methods and document
3. Secure ETT with commercial device
    a. Apply cervical collar for additional security
    b. Go to post intubation management
4. Attach end-tidal CO_2 monitoring device
5. Monitor SpO_2 with pulse oximeter.
6. If unable to intubate and patient cannot be adequately ventilated by any other means, perform a cricothyroidotomy (see Surg Cric Protocol or Needle Cric Protocol) and transport rapidly to the hospital. (b)

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for questions or concerns.

NOTE:

(a) medical director may authorize other airway devices for use.

(b) Once decision to intubate has been made, follow Universal Airway Algorithm on all intubations (see Smart Airway Management Protocol for more algorithms and direction)

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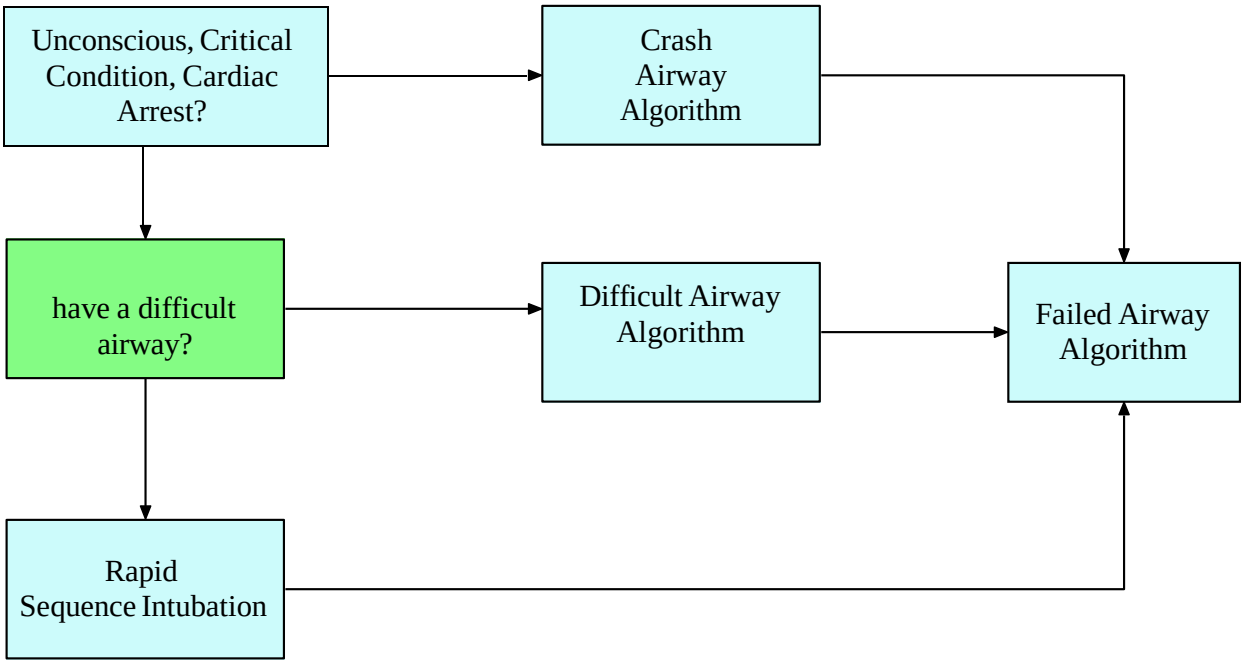
Universal Airway Algorithm



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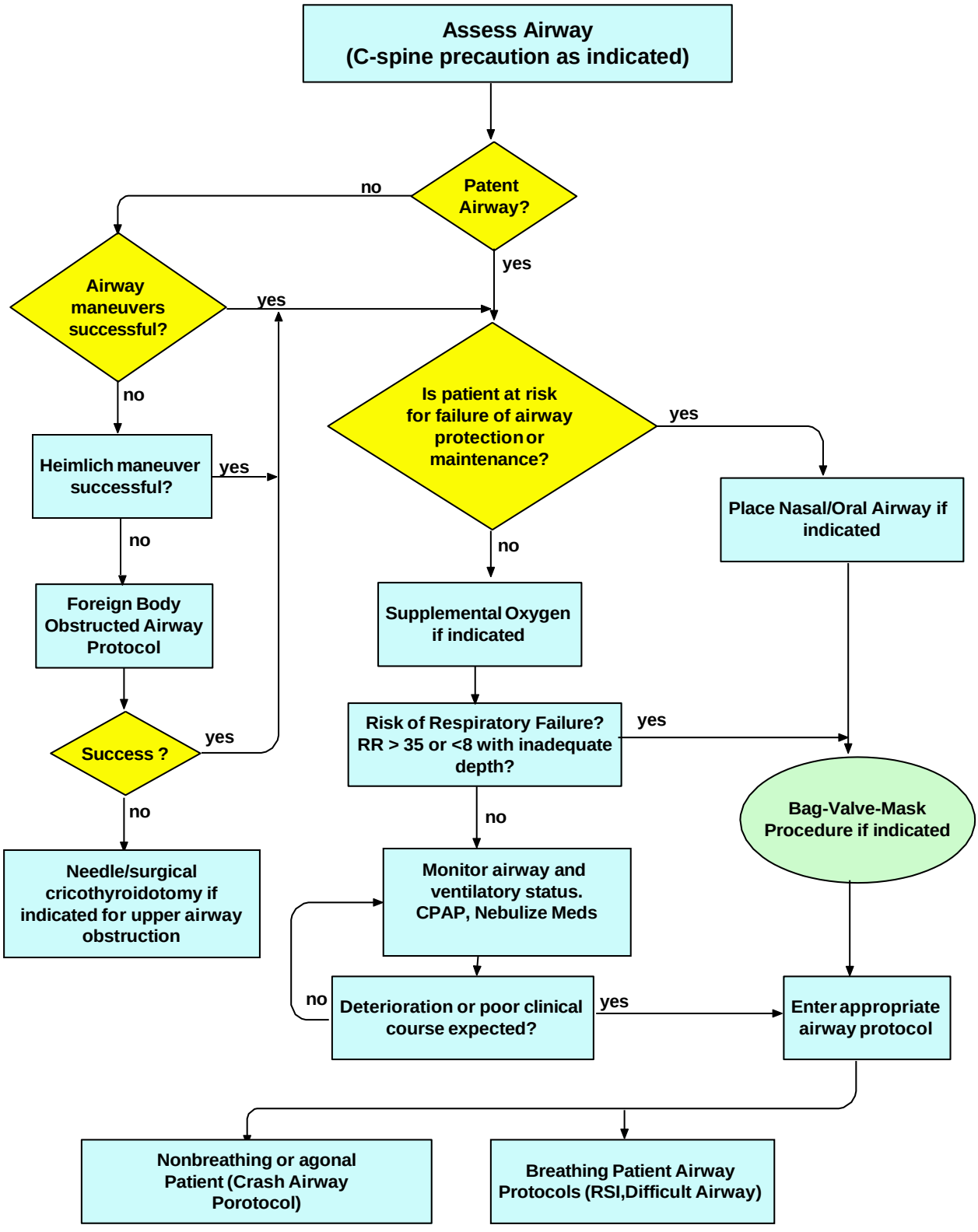
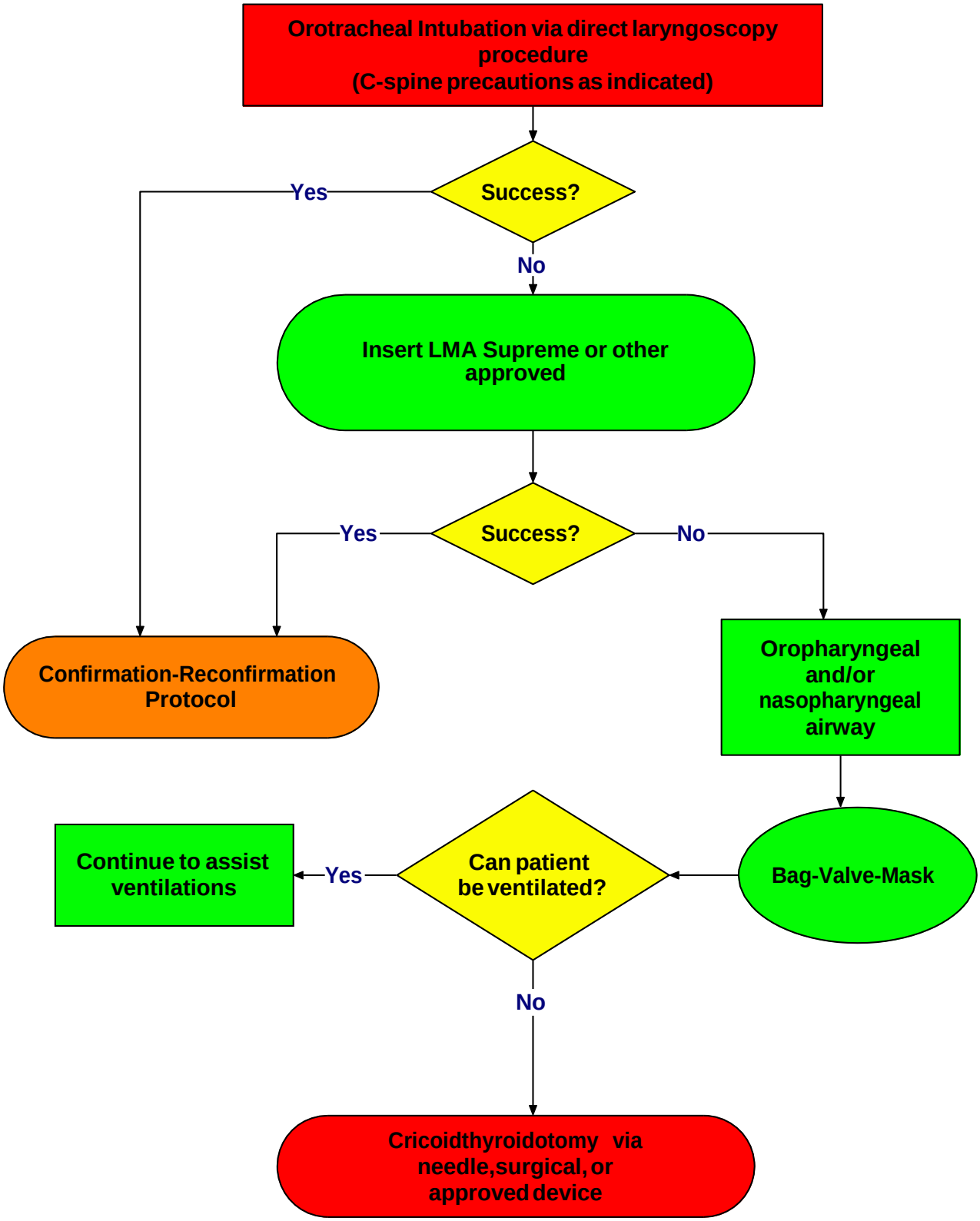
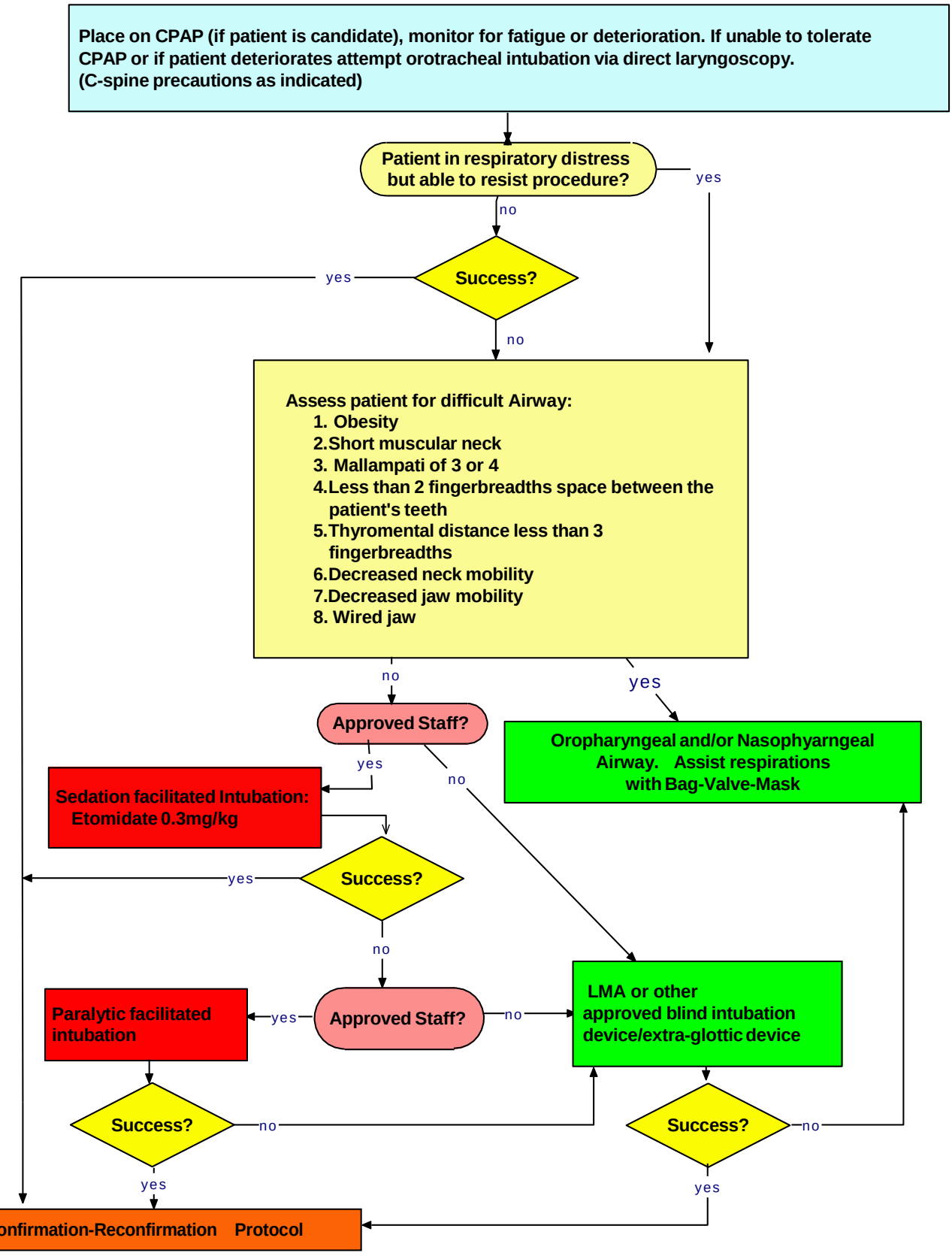
Adult Airway Assessment



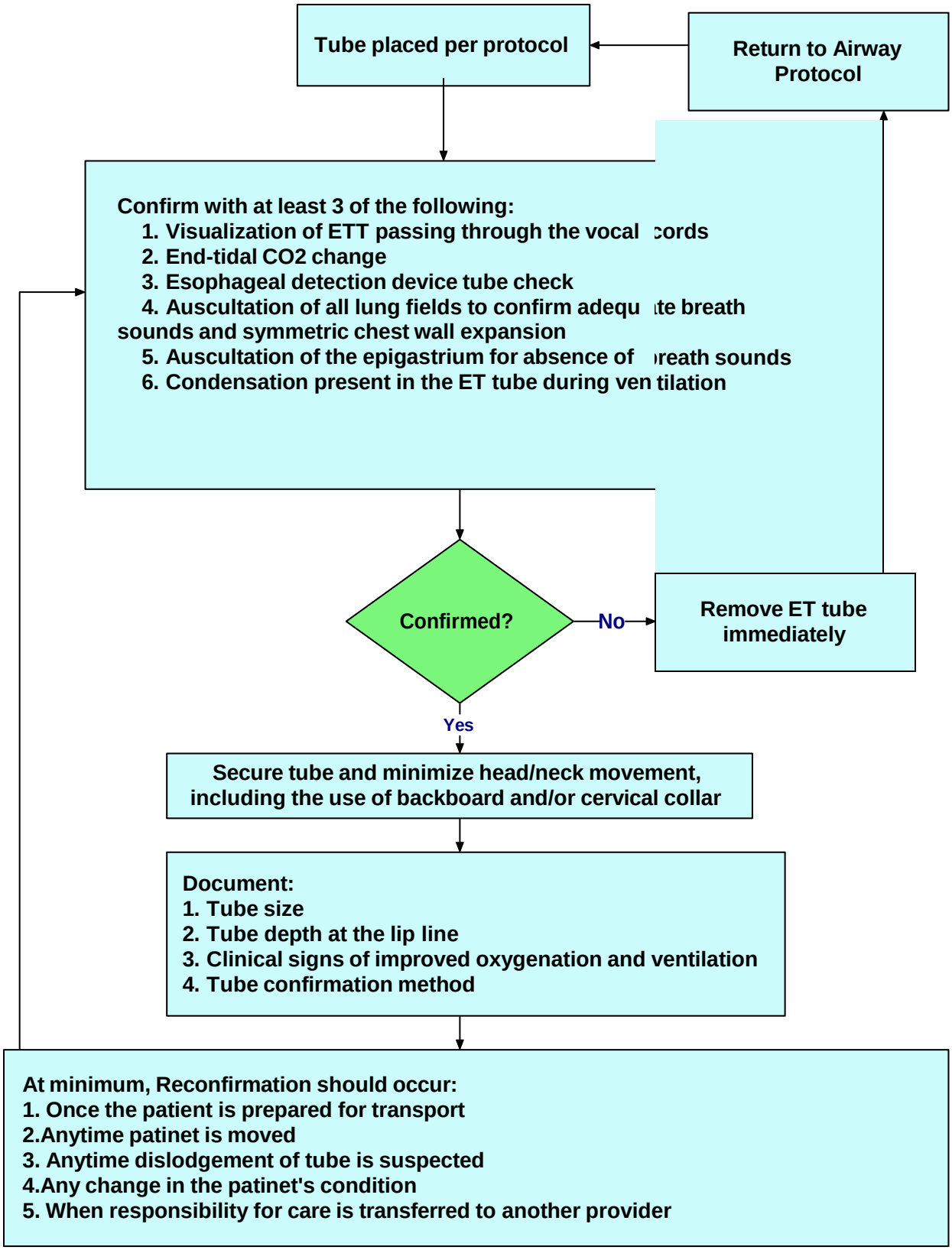
Airway Assessment Protocol: Non-Breathing Patient



Airway Assessment Protocol: Breathing Patient



Airway Confirmation-Reconfirmation Protocol:



2.1.3 Medical Supportive Care

Adult Medical Protocol

Purpose: This protocol is used in conjunction with the Initial patient Assessment Protocol 2.1.1 and Airway Management Protocol 2.1.2.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial assessment protocol 2.1.1**
2. If spontaneous breathing is present without compromise:
    a. Monitor breathing during transport
    b. Administer oxygen vía nasal cannula (2-6 L/min) to maintain pulse ox > 94% (unless ACS is suspected then > 90%)
    c. Avoid over oxygenation Wean oxygen concentration as tolerated
3. If spontaneous breathing is compromised:
    a. Maintain airway patency (e.g. modified jaw thrust)
    b. Administer oxygen to maintain pulse ox ≥ 94% via nasal cannula (2-4 L/min), simple mask (4-6 L/min) or non-rebreather mask (10-15 L/min)
    c. If unconscious, insert oropharyngeal or nasopharyngeal airway PRN (If patient accepts oropharyngeal airway, consider the need for subglottic airway (EMT or Paramedic) or intubation (ALS Level I)
    d. Assist ventilations with bag-valve-mask device (BVM) attached to supplemental oxygen at 15 – 25 L/min PRN
4. Suction PRN
5. Monitor pulse oximetry and capnography, as soon as possible
6. If spontaneous breathing is absent or markedly compromised:
    a. Maintain airway (e.g. modified jaw thrust)
    b. If unconscious, insert oropharyngeal or nasopharyngeal.
    c. Assist ventilation with a BVM device attached to supplemental oxygen at 15-25 L/min as needed. Maintain O2 saturation of 94% or greater. Avoid over oxygenation: Wean oxygen concentration as tolerated.
    d. Suction PRN
    e. If unconscious and intubation is not available, insert LMA (or other approved blind intubation/extra glottic device) (a).
    f. Monitor pulse ox and capnography or ETCO2 monitoring device, as soon as possible
7. EMT should apply the AED
8. Establish hospital contact for notification of an incoming patient.

ALS LEVEL 1: PARAMEDIC ONLY

1. Perform endotracheal intubation and document the following:
    a. Confirm ETT placement via three methods
    b. Secure ETT with commercial device
        1) Full spinal immobilization is recommended
    c. Attach end-tidal CO_2 monitoring device
    d. Monitor SpO_2 with pulse oximeter

2. If unable to intubate and patient cannot be adequately ventilated by other means, perform cricothyroidotomy (see **Surgical Cric Protocol** or **Needle Cric Procedure**)
3. Establish IV of normal saline with a regular infusion set (a) (b), unless overridden by the specific protocol.
4. In a critical medical patient, an intraosseous (IO) line may be considered (Medical Procedures 4.17) OR Medication may be administered intranasal (IN) via the MAD device. (Medical Procedure, IM/IO Med Admin)
5. Monitor ECG as needed.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director if any concerns or questions.

(a) Authorized IV routes include all peripheral venous sites. External jugular veins may be utilized when other peripheral site attempts have been unsuccessful or would be inappropriate. A large bore intracatheter should be used for unstable patients. Avoid use of access sites below the diaphragm.
(b) An IV lock or MAP may be used in lieu of an IV bag in some patients, when appropriate.

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2.1.4 Trauma Supportive Care

Adult Medical Protocol

Purpose: This protocol is used in conjunction with the Initial Assessment Protocol 2.1.1.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Assessment Protocol 2.1.1,** Initiate "Trauma Alert" if applicable
2. **Airway Management Protocol 2.1.2.**
3. Correct any open wound/sucking chest wound (occlusive dressing)
4. Control hemorrhage
5. Immobilize fractures
6. Determine if the patient is taking any anticoagulant such as warfarin (Coumadin) or antiplatelets such as dabigatran (Pradaxa). (b)
7. Immobilize C-spine (if unable to clear in field) and secure patient to backboard per protocol **Spinal Motion Restriction/Spinal Motion Restriction Clearance**
8. Expedite transport
9. The following steps should not delay transport:
    a. Complete bandaging, splinting and packaging PRN
    b. Establish hospital contact for notification of incoming patient and for the Paramedic to obtain consultation for level 2 orders

ALS LEVEL 1: PARAMEDIC ONLY

1. Correct any massive flail segment that causes respiratory compromise (intubate)
2. Correct any tension pneumothorax with needle decompression as per **Needle Decompression** protocol.
3. Establish IV of normal saline with a regular infusion set (a) (b), unless overridden by the specific protocol.
4. In a critical trauma patient, an intraosseous (IO) line may be considered (Medical Procedure, IM/IN Med Admin)
5. Monitor ECG as needed.

ALS LEVEL 2: MEDICAL CONTROL

5. Call medical control or medical director if any concerns or questions.

(a) Authorized IV routes include all peripheral venous sites. External jugular veins may be utilized when other peripheral site attempts have been unsuccessful or would be inappropriate. Two IVs using large bore intracatheters should be initiated in unstable patients. Avoid use of access sites below the diaphragm.
(b) If the exam reveals any new deficit, or if a witness actually saw the patient strike their head, consideration shall be given to transport to the nearest appropriate Trauma Center as a High Index of Suspicion Patient. Should the patient deteriorate enroute, to the point where they meet Trauma Alert criteria, an immediate upgrade should be called into the Trauma Center.

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2.1.5 Pain (GENERAL) Management
Adult Medical Protocol

Purpose: This protocol is to be used for managing pain in patients with the following conditions:

- Isolated Extremity Fracture from a low mechanism of injury (simple fall)
- **Acute** back strain
- Renal colic (kidney stone)
- Soft tissue injuries, burns, bites and stings.
- Discomfort related to attached devices or inserted tubes such as a foley catheter, NG tube, chest tube, etc. This will apply to intra-facility transfers.

Do not use this protocol without going through med control if there is multisystem trauma or hemodynamic instability or if injury was from a high transfer of energy (i.e. MVA, long fall). Keep in mind that severe back pain can sometimes be indicative of a condition that may require emergency surgery such as appendicitis, ruptured or dissecting aneurysm, ruptured ectopic pregnancy, etc. Be sure you do a good abdominal exam on patients complaining of back pain. If any abdominal tenderness is found, do not give pain med until advised by medical control or medical director. If patient has severe enough back pain that you are considering giving pain medication for, be sure the history is consistent with back strain, e.g. lifting heavy material and felt a pull., e.g. fractured extremities, serious soft tissue injures. If you're not sure, call med control for advice. Kidney stone patients may report a history of kidney stones and may or may not have hematuria (blood in urine). Use caution in the elderly with "kidney stone" pain, as this is how aneurysm problems can present. Always monitor respiratory status and pulse ox after administration of a narcotic. Intervene as needed to keep pulse ox ≥ 95 %

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol 2.1.2.** If indicated, Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 91%).
3. Attach cardiac monitor and pulse oximeter if indicated

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV lactated Ringer's or Normal Saline at 100ml/hr.
2. If pain is from an isolated extremity injury or from discomfort related to attached devices or inserted tubes:
    a. Assess for circulation compromise (note color, swelling, sensation, palpable pulses)
    b. Reposition for comfort, reassess for circulatory compromise
    c. If extremity wrapped in a dressing, consider (per med control) removing dressing to assess for cause of pain
    d. Elevate affected extremity if edematous
    e. If extremity has obvious deformity and is not splinted, splint it.
    f. If pain from attached device or inserted tube, be sure they are functioning properly.
    g. If pain persist despite above, proceed as below

3. If systolic BP > 90 mm Hg give one of the following over several minutes:
    a. **Fentanyl 50 – 100 mcg IV or IM or IN (a)**. For doses beyond 100 mcg (when given for pain control), you will need written MD order or contact medical control.
    b. **Morphine 2 – 10 mg IV or IM** (give in 2 mg increments). For doses beyond 10 mg, you will need written MD order or contact medical control.
4. If nausea also present from pain or the pain medication give one of the following;
    a. **Zofran** 4 – 8 mg IV or IM
    b. **Benadryl 25 mg IV or IM**

ALS LEVEL 2: MEDICAL CONTROL

c. 1. **Ketamine 0.1 – 0.5 mg/kg IV/IO or 5 mg/kg IM or 0.5 mg/kg IN**

NOTE:

(a) Intra-nasal medications must be administered via a medication atomizer device (MAD). Maximum amount allowed is 1 ml per nostril

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2.2
Adult Respiratory Emergencies

Assessment of the adult patient in respiratory distress requires specific attention to the function of the respiratory system. The EMT's and paramedic's assessment should be more concentrated in this area, to include the following considerations:

1. Assessment of chest wall movement, including the rate and depth of ventilation as well as the presence of symmetrical rise and fall.
2. Assessment of accessory muscle use.
3. Auscultation of bilateral lung sounds.
4. Use of pulse oximetry.
5. Use of EtCO2, monitor wave form.

The paramedic must be able to determine the adequacy of ventilation and understand its relationship to respiration. If signs of hypoxia and respiratory distress are present, immediate airway and ventilatory management should be initiated. These signs include altered mental status, tachypnea, and use of accessory muscles, nasal flaring, pursed lips, abnormal lung sounds, tachycardia, and cyanosis. In addition, the general signs of shock may be seen. Other signs of respiratory insufficiency that should alert the paramedic to the need for immediate airway and ventilatory management, including placement of an advanced airway, are respiratory rate below 10/min or above 36/min, SpO2 below 94%, or EtCO2 outside the normal range of 35-45mmHg.

In patients with chronic respiratory disease, the paramedic must be able to differentiate between what is chronic and what is acute, as it pertains to the respiratory assessment. Specific questions about the chief complaint and accompanying symptoms may prove to be invaluable in this setting. Assessment of lung sounds should be combined with patient history. For example, a patient with a history of CHF who has wheezing on auscultation of lung sounds should not be automatically classified as an "asthma patient." The paramedic must remember that patients with CHF may also present with wheezing. If this patient does not have a history of asthma or allergic reaction, the more prudent assessment would be that of CHF.

Specific treatments for the different causes of respiratory distress are outlined in the following protocols. When the paramedic is unsure as to which protocol to follow, he/she should follow the protocols in Section 2.1 and contact medical control for further direction.

2.2.1 Airway Obstruction

Adult Medical Protocol

Purpose: This protocol is to guide you in management of a patient with an airway obstruction. Causes of upper airway obstruction include the tongue, foreign bodies, swelling of the upper airway due to angio-neurotic edema (from allergic reaction) and trauma to the airway. Differentiation of the cause of the upper airway obstruction is essential to determining the proper treatment.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol. 2.1.2 Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox at ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. If air exchange is inadequate and there is a reasonable suspicion of foreign body airway obstruction (FBAO) (see FBAO protocol), apply abdominal thrust (chest thrust if pregnant or obese).
    a. If air exchange is adequate with a partial airway obstruction, do not interfere and encourage patient to cough up obstruction. Continue to monitor for adequacy of air exchange. If air exchange becomes inadequate continue with protocol.
    b. If patient becomes unresponsive then begin CPR, starting with compressions. Continue CPR with the addition of looking in the mouth before delivering breaths.
4. Attach cardiac monitor and pulse oximeter.

ALS LEVEL 1: PARAMEDIC ONLY

1. If unable to relieve FBAO, visualize with laryngoscope and extract foreign body with McGill forceps.
2. If obstruction is due to trauma and/or edema, or if uncontrollable bleeding into the airway causes life-threatening ventilatory impairment, utilize an advanced airway.
3. If unable to intubate and patient cannot be adequately ventilated by other means, perform Cricothyroidotomy (only if you have received training) **(**see procedure **Needle Cric or Surgical Cric)**
4. Establish an IV: give nomal saline KVO

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

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2.2.2 Asthma/Bronchospasm

Adult Medical Protocol

Purpose: This protocol is used for patients who are complaining of dyspnea and who are wheezing. Whenever possible, allow these patients to assume whatever position is comfortable (they may not tolerate laying flat). A patient with a history of CHF that has wheezing on auscultation of lung sounds should not be automatically classified as an "asthma patient". If the CHF patient does not have a history of asthma or allergic reaction, the more prudent assessment would be that of CHF (cardiac asthma) (See **CHF/Pulmonary Edema protocol**)

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol 2.1.2** Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox at ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Place patient in Fowler's position and assist ventilations as needed
4. If Severe distress, consider CPAP.
5. Attach cardiac monitor and pulse oximeter.
6. Transport to designated hospital.

ALS LEVEL 1: PARAMEDIC ONLY

1. If severe distress consider CPAP with in-line nebulized medication may or may not help (keep in mind, it is the medications that will work best to break the bronchospasm)
2. Administer **Albuterol (Ventolin)** 2.5mg (in 2.5cc normal saline) by nebulizer. May repeat twice PRN. DO NOT GIVE ALBUTEROL OR IPRATROPIUM BROMIDE IF THE HEART RATE IS > 140
3. May add **Ipratropium Bromide (Atrovent)** 0.5 mg (2.5ml) to the Albuterol neb (x1)
4. If indicated, start IV of Normal Saline or Lactated Ringer's at TKO
5. For persistent respiratory distress after several albuterol nebs, give
6. **Dexamethasone** 8 to 10mg IV.
7. For severe dyspnea, **Epinephrine (1:1000) 0.4 mg** IM Adult (Peds: 0.01 ml/kg.) Caution should be used with administration of Epinephrine when the patient has a history of hypertension or heart disease (call med control if you have any concerns)
   Consider need for endotracheal intubation.
8. If patient still has dyspnea after IM Epi, 3 Albuterol nebs (1 with Atrovent), and Decadron, consider **Magnesium Sulfate 2 gms** IV (mixed with 250ml of 0.9%NS given over 10 – 15 minutes)

ALS LEVEL 2: MEDICAL CONTROL

1. Repeat **Epinephrine (1:1000)** 0.4 mg IM

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2.2.3 COPD/Emphysema /Bronchitis (with Dyspnea) will

Adult Medical Protocol

Purpose: This protocol is used for patients with a history of emphysema and/or chronic bronchitis that complain of dyspnea. If at any point, the patient's respiratory status deteriorates, consider CPAP or endotracheal intubation and administration of Albuterol via the ET tube as a mist, and transport immediately. See Oxygen Tolerence in COPD in Appendix

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox at ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Place the patient in the Fowler's position and assist ventilations as needed
4. Attach cardiac monitor and pulse oximeter.

ALS LEVEL 1: PARAMEDIC ONLY

1. If patient is in moderate to severe distress and is still alert and cooperative, **consider CPAP (**with in-line nebulized medication) per CPAP Protocol .
2. Administer **Albuterol** 2.5 mg in 2.5ml of normal saline and **Atrovent (Ipratropium**) 0.5mg via nebulized breathing treatment (x1), may repeat Albuterol q 20 minutes as needed x 3 doses total. Discontinue therapy if patient develops marked tachycardia (HR > 140) or chest pain.
3. If signs of severe hypoventilation despite CPAP and/or Nebulized bronchodilators: (See **Airway Assessment Protocol, 2.1.2)**
   a. Assist ventilations with BVM with 100% oxygen.
   b. Consider an advanced airway
4. Initiate IV lactated Ringer's or normal saline TKO.
5. For persistent respiratory distress after several albuterol nebs, give Dexamethasone 8 to 10mg IV

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.
2. Consider (per med control) **Versed** 1-2 mg IVP for anxiety, however patient may then need to be intubated. MUST FIRST attempt to correct the hypoxia which may be causing the anxiety.

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2.2.4 Pulmonary Edema /CHF (Congestive Heart Failure)

Adult Medical Protocol

Purpose: This protocol is used for patients who are exhibiting signs/symptoms of pulmonary edema – CHF including: tachypnea, orthopnea, JVD, edema, dyspnea with rales and/or wheezing (cardiac asthma). The patient may also have diminished air exchange. In severe case, patient may be pursed lip breathing. Other treatment for the causes of pulmonary edema-CHF should be considered (e.g. supraventricular tachycardia, myocardial infarction and cardiogenic shock). A patient with a history of CHF that has wheezing on auscultation of lung sounds should not be automatically classified as an "asthma patient". The paramedic must remember that patients with CHF may also present with wheezing. If the CHF patient does not have a history of asthma or allergic reaction, the more prudent assessment would be that of CHF (cardiac asthma).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol. 2.1.1**
2. **Airway Assessment/Management Protocol.2.1.2**. Put patient in position of comfort (likely the fowler's position). Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox at ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter.
4. Check Temperature if temp > 99.0 consider pneumonia.
5. If Severe distress, Consider CPAP

ALS LEVEL 1: PARAMEDIC ONLY

1. Administer CPAP (if available). Titrate to 10cm of pressure (see **CPAP Protocol)** (a)
2. If patient's respiratory status deteriorates (fatigues, does not respond to CPAP, obvious persistent distress), assist ventilations with BVM with 100% oxygen and consider an advanced airway. If patient has end-stage disease and has previously expressed to family (verbally or in writing) he/she does not want to be intubated, and then continue assisting with BVM or CPAP.
3. Initiate IV lactated Ringer's or Normal Saline TKO.
4. If systolic BP > 100 mm Hg; give **Nitroglycerine** 0.4mg sublingual (spray or tablet) followed by **Nitroglycerin paste** 1 inch to chest wall (Avoid if patient used Viagra, Cialis, Levitra or other ED drugs. (May repeat sublingual Nitro every 3 minutes up to 3 doses total if patient is hypertensive or has chest pain). (b) (c)
5. Do 12 Lead EKG. Transmit if abnormal and time permits

ALS LEVEL 2: MEDICAL CONTROL

1. **Lasix** 40-80 mg IV.
2. Contact medical control or medical director for any concerns or questions.

Note:

(a) The CPAP mask must be tight fitting. Some patients may not tolerate CPAP at 10 cm H2O PEEP initially, in which case you may start with lower pressures (5 – 7.5cm H2O PEEP. CPAP should not be used if the patient's systolic BP below 100 mm Hg.

(b) Consider withholding if the clinical presentation of the patient indicates signs of hypovolemia (e.g., poor skin turgor, decreased capillary refill, and elevated temperature).

(c) It is preferred to have an IV in place prior to NTG administration. However, if you are unable to establish IV access, NTG may be administered with caution

2.2.5 Pneumonia (SUSPECTED)

Adult Medical Protocol

Purpose: Patients complaining of dyspnea should be suspected of having pneumonia when they present with fever, productive cough, and possible pleuritic chest pain, history of being bedridden, known immunocompromise, diabetes, elderly and lung sounds indicative of consolidation (rales and/or rhonchi with egophony over area of consolidation).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox at ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter
4. Check temperature if able

ALS LEVEL 1: PARAMEDIC ONLY

1. Consider CPAP (per CPAP protocol) for severe dyspnea/air hunger. It may or may not help but will not harm.
2. Initiate IV lactated Ringer's or Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.
3. If dyspnea noted, administer **Albuterol** 2.5 mg in 2.5ml of normal saline and **Atrovent (Ipratropium)** 0.5mg via nebulized breathing treatment x 1. Do not give if HR ≥ 140. Repeat Albuterol q 20 minutes as needed x 2 doses. Discontinue therapy if patient develops marked tachycardia (HR > 140) or chest pain.
4. If signs of severe hypoventilation despite CPAP and/or Nebulized bronchodilators: (See Airway Assessment Protocol 2.1.2)
    a. Assist ventilations with BVM with 100% oxygen.
    b. Consider advanced airway
5. **DO NOT USE DIURETICS!!**

ALS LEVEL 2: MEDICAL CONTROL

1. Notify medical control or medical director for any problems or concerns.

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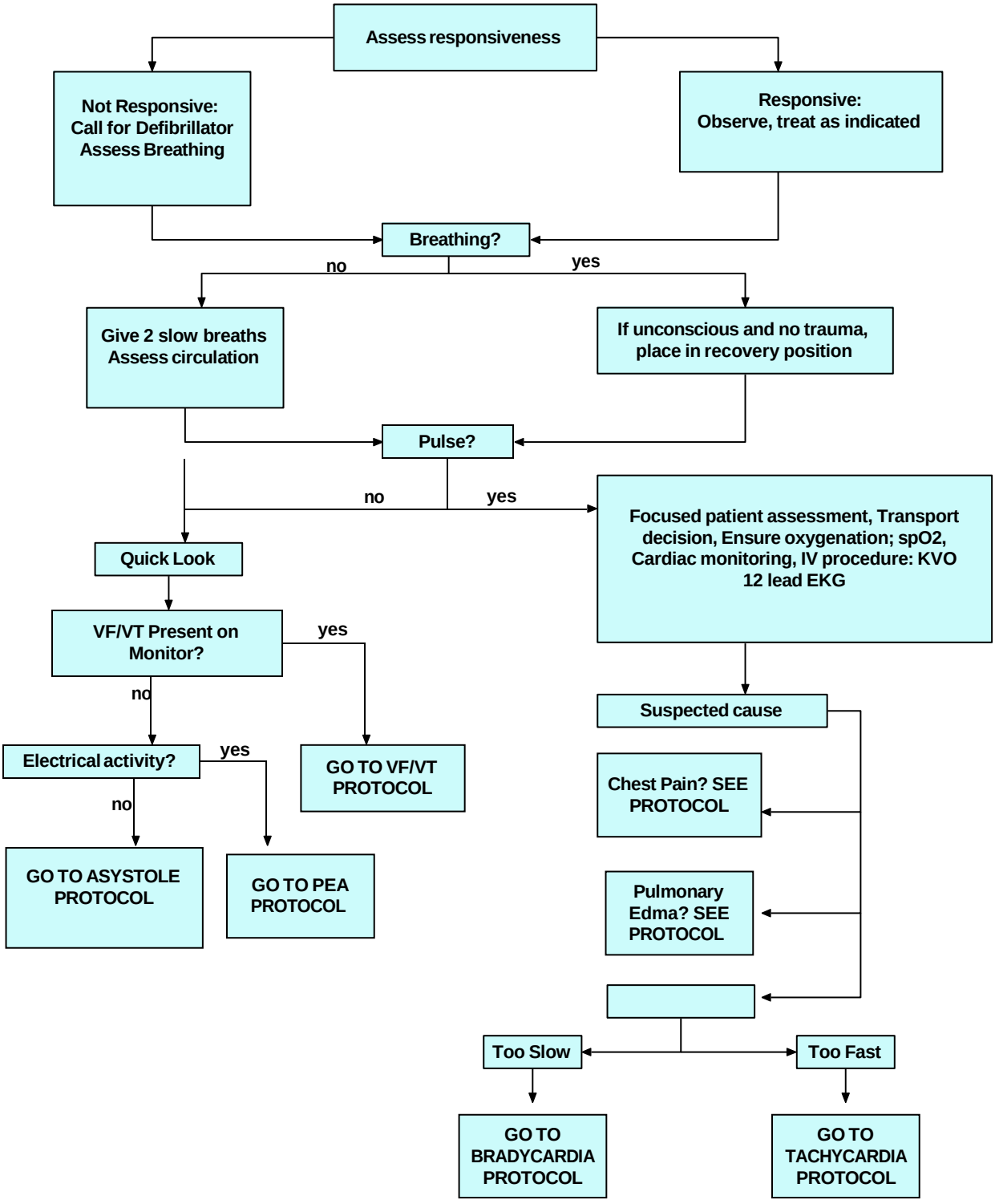
2.3
Adult Cardiac Dysrhythmias

2.3 CARDIAC CARE: UNIVERSAL ALGORITHM



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2.3.1 Cardiac Dysrhythmias: ASYSTOLE (Algorithm)

Adult Medical Protocol

Purpose: Use this protocol for patients who are in asystole on the cardiac monitor.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Consider criteria for death/no resuscitation (1.2.5 DNR / RESUSCITATION CONSIDERATIONS / DOA)
2. **Initial Patient Assessment Protocol. 2.1.1**
3. Look for no breathing or only gasping and check pulse (simultaneously)
4. If no pulse, begin CPR using cycles of 30 compressions and 2 breaths for 2 minutes while monitor is being attached.
5. Attach cardiac monitor and pulse oximeter as soon as possible.
6. Oxygenate with 15-25 L/min via bag-valve mask (BVM) with an appropriate airway adjunct (**Airway Assessment/Management Protocol 2.1.2.**) (a).
7. Do not interrupt the 2 minutes of CPR to check the heart rhythm. **Continuous uninterrupted CPR is paramount to patient survival**.
8. Check the heart rhythm; confirm asystole in two leads.
9. Resume 2 minutes of CPR at a rate of 100-120 per minute; check the heart rhythm. Initiate BLS/High quality CPR as indicated. Therapies are designed around periods of 5 cycles (two minutes) of uninterrupted CPR until an advanced airway is placed
10. Consider the H's and T's.

ALS LEVEL 1: PARAMEDIC ONLY

1. Intubate or Insert LMA (or other extra glottic device)
2. Establish IV of Lactated Ringers or Normal Saline via Peripheral IV Site or Intraosseous site. Bolus with 250 ml then 100cc/hr. Bolus may be repeated up to one liter.
3. Confirm asystole in more than one lead.
4. Administer **Epinephrine** (1:10,000) 1mg every 3-5 minutes IV or IO. Follow each intravenous drug bolus with 20 milliliters of IV fluid and elevate extremity.
5. For known pre-existing metabolic acidosis or possible hyperkalemic such as renal failure patient, consider giving 1 ampule of Calcium Chloride followed by a flushing bolus then administer **Sodium Bicarb** 1 amp IV or IO.
6. Consider possible causes:

Possible cause:	**Treatment:**
Hypovolemia	IV/IO fluid bolus, 250 ml increments
Hypoxia	Oxygenate and Ventilate
Hyperkalemia (increased potassium)	$NaHCO_3$, CaCl
Hypokalemia (decreased potassium)	ABCs and transport
H+ (Pre-existing **Acidosis)**	$NaHCO_3$

Hypoglycemia	D10
Drug overdose (narcotic, CCB, Beta Block)	Narcan, Calcium, Glucagon
Hypothermia	Re-warming
Tension Pneumo	Needle decompression
Tamponade, cardiac	Load and go,
Toxins	Obtain hx, treat accordingly
Thrombosis, pulmonary	Load and go
Thrombosis, coronary	AMI protocol
Trauma	Load and go

7. You will perform 20 minutes (for unwitnessed) or 30 minutes (for witnessed) of ACLS, including an advanced airway, IV/IO access, and at least two doses of Epinephrine, you should contact med control to consider **discontinuing** resuscitation efforts. (Refer to administrative section **Resuscitation Considerations** for further information on discontinuation procedures) Be sure to note the time of death in the PCR.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any further directions or questions.

NOTE:

(a) Provide a 30:2 compression to ventilation ratio.
Once an advanced airway is in place, provide 1 breath every 6 seconds.

(b) If EtCO2 less than 10mmHg: Attempt to improve CPR (compressions vs. ventilation).
If EtCO2 = 12 - 25mm Hg: Goal during resuscitation.
If EtCO2 = 35 - 45mm Hg: Check for ROSC

(c) If ROSC achieved, wean down oxygen to maintain a SpO_2 equal to greater than 94%

See Asystole Algorithm on next page.

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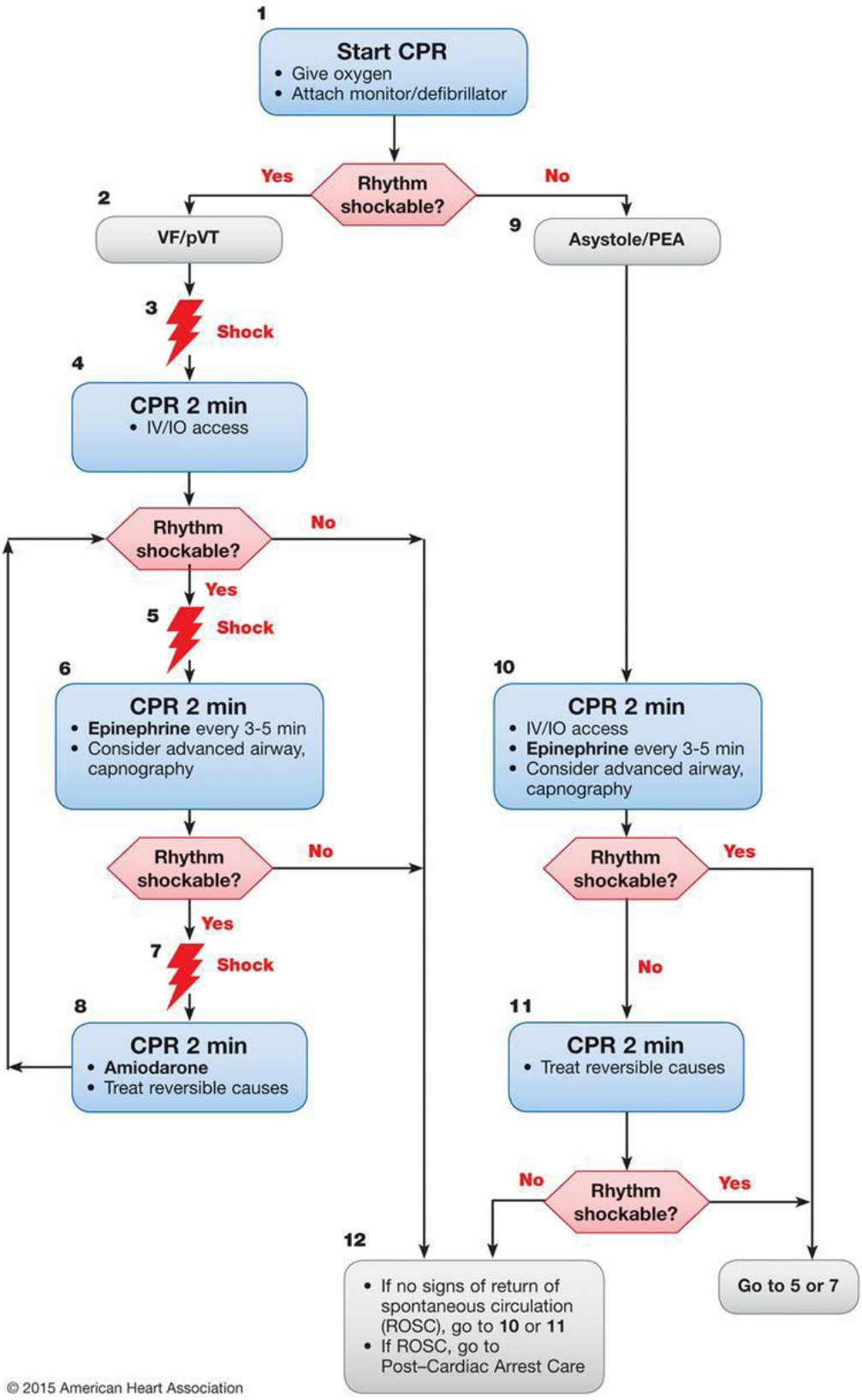
Adult Cardiac Arrest Algorithm—2015 Update



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CPR Quality

- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Rotate compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If P_{ETCO_2} <10 mm Hg, attempt to improve CPR quality.
- Intra-arterial pressure
  - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.

Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Drug Therapy

- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in P_{ETCO_2} (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

Note: The National Association of EMS Physicians (NAEMSP) supports out-of-hospital termination of resuscitation for adult, nontraumatic cardiac arrest patients who have not responded to full resuscitative efforts. The following factors should be considered in establishing termination of resuscitation protocols: 1) Termination of resuscitation may be considered for any adult patient who suffers sudden cardiac death that is likely to be medical. 2) Unwitnessed cardiac arrest with delayed initiation of cardiopulmonary resuscitation (CPR) beyond 6 minutes and delayed defibrillation beyond 8 minutes has a poor prognosis. 3) In the absence of "do not resuscitate" or advanced directives, a full resuscitative effort including CPR, definitive airway management, medication administration, defibrillation if necessary, and at least 20 minutes (unwitnessed) or 30 minutes (witnessed) of treatment following Advanced Cardiac Life Support (ACLS) guidelines should be performed prior to declaring the patient dead. 4) A patient whose rhythm changes to, or remains in, ventricular fibrillation or ventricular tachycardia should have continued resuscitative efforts. Patients in asystole or pulseless electrical activity should be strongly considered for out-of-hospital termination of resuscitation. 5) Logistic factors should be considered, such as collapse in a public place, family wishes, and safety of the crew and public. 6) Online medical direction should be established prior to termination of resuscitation. The decision to terminate efforts should be a consensus between the on-scene paramedic and the online physician. 7) The on-scene providers and family should have access to resources, such as clergy, crisis workers, and social workers. 8) Quality review is necessary to ensure appropriate application of the termination protocol, law enforcement notification, medical examiner or coroner involvement, and family counseling.

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2.3.2 Cardiac Dysrhythmias: BRADYCARDIA (Algorithm)

Adult Medical Protocol

Purpose: This protocol is to be used for patients with heart rates < 50 per minute and any of the following signs and symptoms:

- Chest pain
- Shortness of breath
- Acutely Decreased level of consciousness
- Low blood pressure (< 90 mm Hg)
- Shock
- Pulmonary edema
- Congestive heart failure
- Acute MI or acute ischemia on 12 lead EKG
- Ventricular escape beats

If patient is asymptomatic, do not treat unless ordered to do so by medical control. Bradycardia with hypotension may be due to inferior wall MI associated with right ventricular infarction (confirmed by 12 lead EKG V4R ST Elevation). When an inferior wall MI is associated with right ventricular MI, avoid use of nitrates (Nitroglycerin). If bradycardia and hypotension exists, pacing and IV fluids may improve the patient's hemodynamic status.

Consider the potential causes:

Acute myocardial infarction	Calcium-channel blockers
Head injury	Clonidine
Atrio-ventricular block	Digitalis (e)
Hypoxia	Toxins
Hypoglycemia	Sick sinus syndrome
Medications (beta blockers)	Spinal cord lesion
Trauma	

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient/Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol 2.1.2
3. Assess CABs and vital signs
4. Attach cardiac monitor and pulse oximeter.

ALS LEVEL 1: PARAMEDIC ONLY

1. Start IV or IO of lactated Ringer's or normal saline TKO. Bolus with 250ml increments up to 1 liter as needed for hypotension. Check vitals and breathe sounds between each bolus.
2. Perform 12 lead EKG (transmit to hospital if capable). If inferior wall MI is identified, perform additional 12 lead EKG with V4R to confirm/rule out concurrent right ventricular MI
3. **IF no inferior wall MI**, administer **Atropine** 0.5 mg IV or IO. May repeat IV or IO **Atropine** every 3-5 minutes up to: (a)(c)(e)
   - 2 mg for patients weighing less than 110 pounds (<50 kg)
   - 3 mg for patients weighing 110-165 pounds (50-75 kg)
   - 4 mg for patients weighing 165-220 pounds (75-100 kg)

4. If **inferior wall MI with right ventricular infarction** is present and is associated with bradycardia and hypotension,
5. Pace with external pacer per External Cardiac Pacing protocol.
6. If pacer is unavailable or ineffective, **Dopamine** infusion @ 5-20 mcg/kg/min (1600 mcg/ml infusion concentration = 15 – 60 gtts/min). Titrate to maintain a minimum systolic BP of 90 mm Hg with good capillary refill. Maximum BP 120 mm Hg (Maximum dose 20 mcg/kg/min)
7.
8. IV fluid bolus 250ml increments up to 1 liter with vital sign and lung exam between each bolus
9. For 2nd degree AV block type II and 3rd degree AV block, omit Atropine and go to External Cardiac Pacing protocol.
10. If patient is conscious and aware of situation during pacing, administer one of the following benzodiazepines:
    a. **LORAZAPAM (Ativan)** 1mg IV or IO, may repeat once PRN (up to max of 10 mg). (e)(d)
    b. **Midazolam (Versed)** 2mg IV or IO, may repeat once PRN (up to max. 4 mg). (e)(d)
11. If patient experiences pain from external cardiac pacing, may give **Fentanyl** 25 – 50 mcg IV slow, may repeat q 5 minutes up to 100 mcg then contact med control for additional dosing if needed.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.
2.
3. Consider **Calcium Chloride 1-2 gms** IV over 10 min if on Calcium Channel Blockers

NOTES:

(a)) Consider pacing before giving the maximum dose of atropine.
(b) –blank-
(c) Use atropine with caution in the presence of myocardial ischemia.
(d) Administer benzodiazepines slowly, titrate to effect, and be aware of associated hypotension
(e) If suspected digitalis toxicity, Atropine improves AV nodal conduction. Caution should be used with pacing because it can lower the fibrillatory threshold and induce arrhythmias. Refer to treatment of dig toxicity in Protocol 2.6.2 Toxicology.
(f) If pacing is chosen as the second-line treatment and it is also ineffective, begin an infusion of dopamine or epinephrine

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Adult Cardiac Dysrhythmia Cardiogenic Shock

See Bradycardia Algorithm next page

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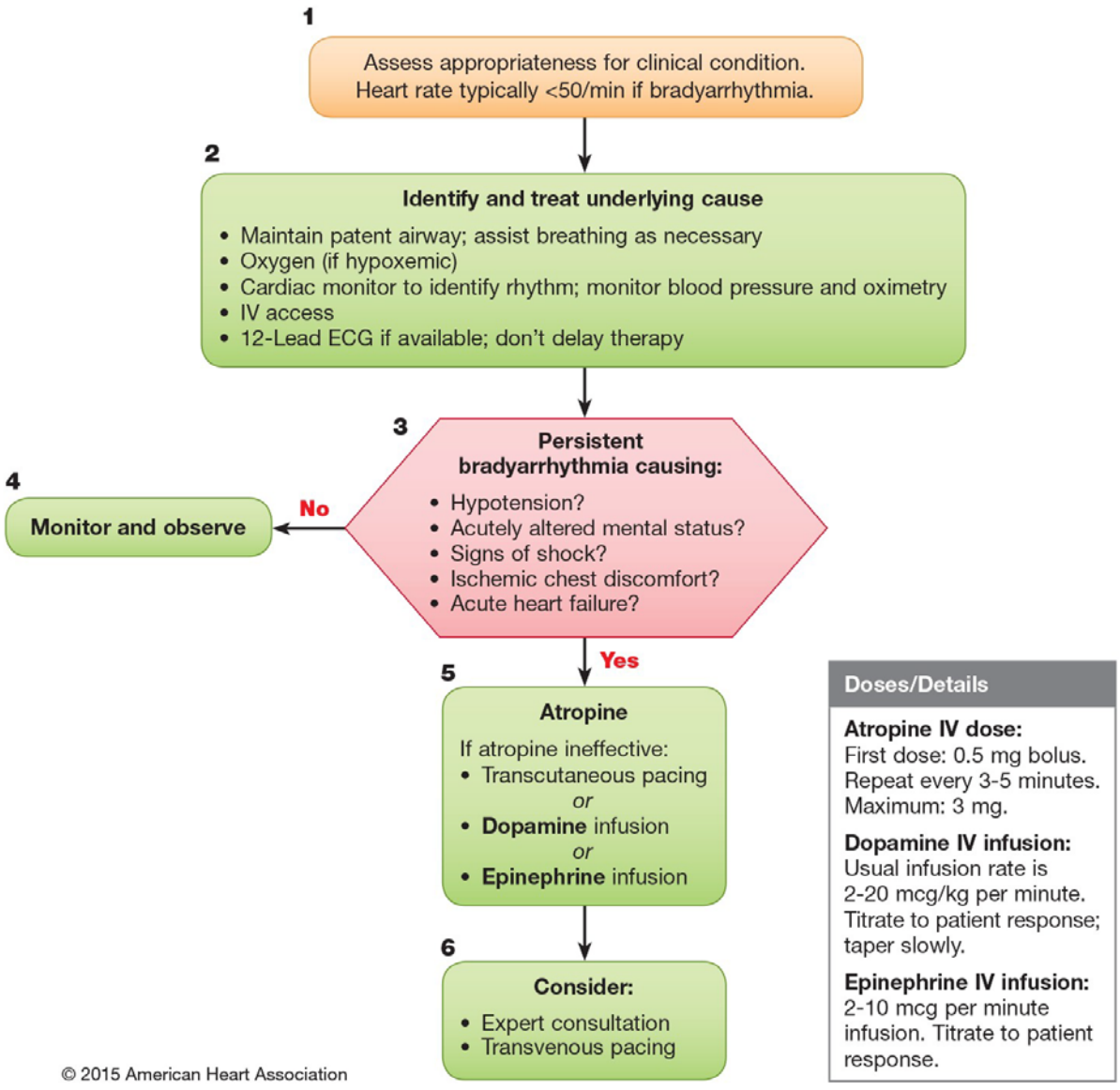
Adult Bradycardia With a Pulse Algorithm



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2.3.3 Cardiac Dysrhythmias: *STABLE* NARROW COMPLEX TACHYCARDIA-SVT (JUNCTIONAL OR ATRIAL TACH) (Algorithm)

Adult Medical Protocol

Purpose: Patients suffering from tachycardia may or may not exhibit symptoms. It is important to note that narrow complex tachycardia has many origins. The atrial rate may be helpful in differential interpretation of these types of tachycardia. The following rates should be considered:

- Sinus Tachycardia ranges from 100 - 160 per minute
- Junctional tachycardia ranges from 100 - 180 per minute
- Atrial tachycardia ranges from 150 - 250 per minute
- Atrial flutter ranges from 250 – 350 per minute
- Atrial fibrillation starts at 350 per minute (atrial rate)

In addition, wide complex tachycardia (QRS ≥ 0.12 seconds) should initially be considered as ventricular in origin, unless proven otherwise (e.g. documented QRS morphology consistent with pre-existing BBB).

Those patients who present with SVT may have evidence of cardiovascular dysfunction. Those patients who present with symptomatic signs and symptoms may be treated with medications. Those patients who present with "unstable" signs and symptoms should be cardioverted immediately. The following table shows stable to unstable signs and symptoms:

Symptomatic (Stable)	Critical (Unstable)
• Alert and oriented • SBP equal to greater than 90 mm Hg • Mild chest discomfort • Mild to Moderate Shortness of breath	• Decreased level of consciousness • SBP below90 mm Hg (shock) • Chest pain • Severe Shortness of breath • Diaphoresis • Pulmonary edema/CHF

Procedure:

PSVT (JUNCTIONAL OR ATRIAL TACHYCARDIA) AND HR ≥ 150/MIN

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient/Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol.2.1.2
3. Attach cardiac monitor (Verify narrow complex tachycardia. If wide-complex tachycardia, see Ventricular Tachycardia Protocol) and pulse oximeter.

ALS LEVEL 1: PARAMEDIC ONLY

- Start IV of lactated Ringer's or normal saline Administer 250ml fluid bolus.

1. If the patient is asymptomatic, provide medical supportive care and transport immediately.
2. For symptomatic patients, attempt vagal maneuvers (see procedure: Vagal Maneuver Protocol) if not contraindicated (have patient do a Valsalva maneuver).

3. If above fails or is contraindicated and the patient is not in A-fib or Aflutter, place patient in supine position and give **Adenosine Triphosphate (Adenocard)** 6mg rapid IVP followed by 20ml of NS flush
5. If, after 1-2 minutes, no response noted, administer **Adenosine** 12 mg IV push over 1-3 seconds, followed by 20ml of NS flush.
6. **Diltiazem (Cardizem)** 0.25mg/kg IV (over 2 minutes) (20mg for average patient) for narrow complex SVT. Do not use if patient has history of WPW. May repeat dose at 0.35mg/kg IV over two minutes (25mg for the average patient)

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical director with any questions or concerns
2.

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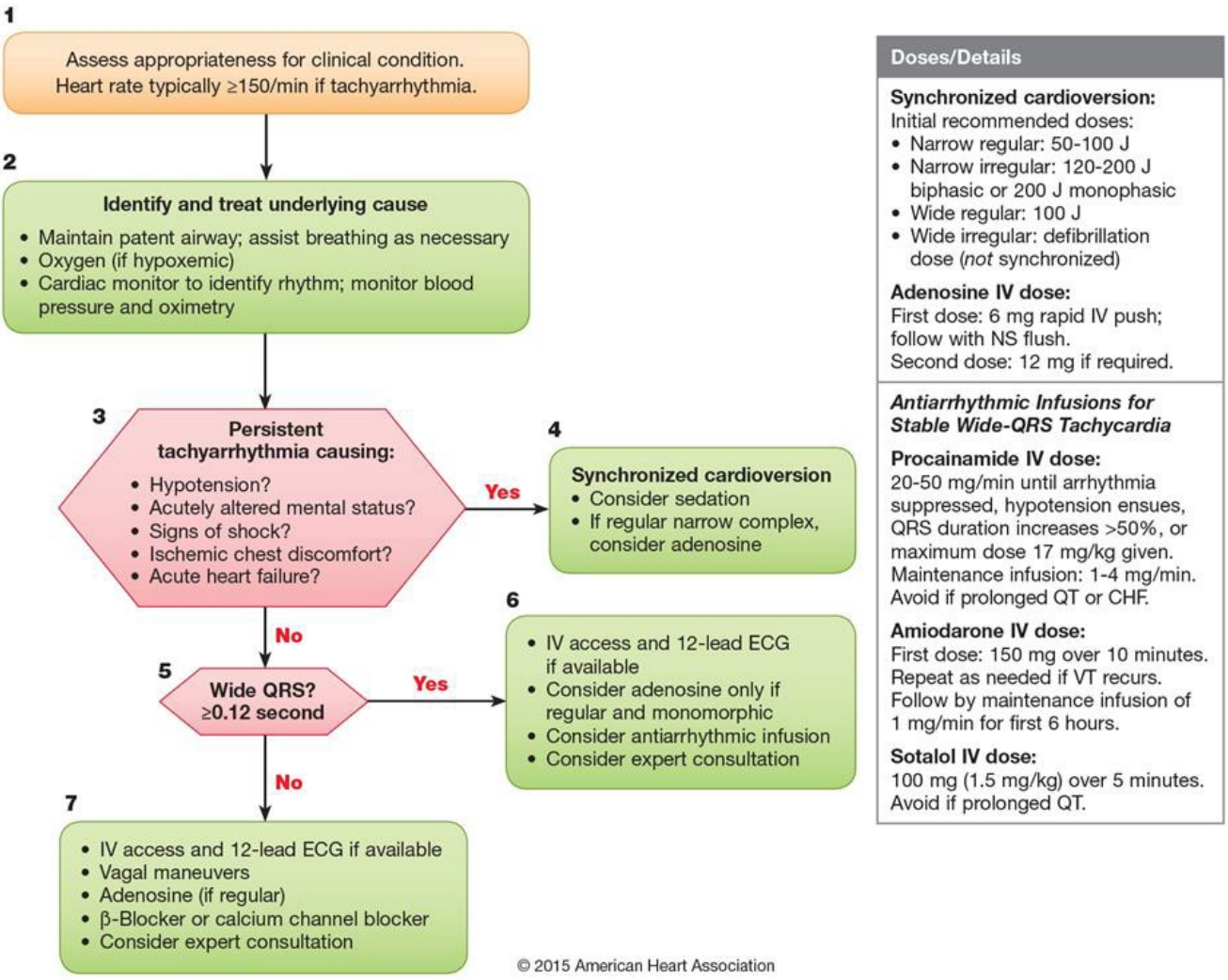
Adult Tachycardia With a Pulse Algorithm



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2.3.3.1 Cardiac Dysrhythmias: NARROW COMPLEX TACHYCARDIA- *STABLE*

A-FIB or A-FLUTTER (Tachycardia Algorithm)

Adult Medical Protocol

Purpose: This protocol is for patients who are in an **atrial fibrillation** or **atrial flutter** rhythm and considered stable (BP > 90 mm Hg, no chest pain, no dyspnea or diaphoresis). The ventricular rate in a-fib will be irregular and the p-waves may not be discernable. P-waves in a-flutter may have a saw tooth appearance and a rapid +/- regular ventricular rhythm. Adenocard generally does not work on A-fib/a-flutter. If HR ≥ 150 proceed with protocol.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient/Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol. 2.1.2
3. Attach cardiac monitor (Verify narrow complex tachycardia. If wide-complex tachycardia, see Ventricular Tachycardia Protocol) and pulse oximeter.

ALS LEVEL 1: PARAMEDIC ONLY

1. Start IV of lactated Ringer's or normal saline TKO. Bolus as needed with 250mls of IV fluid. Repeat as needed up to 1 liter. Check vital signs
2. Administer the following anti-arrhythmic drugs: Do not use if patient has history of WPW.

Diltiazem (Cardizem) 0.25mg/kg IV (over 2 minutes) (20mg for average patient) for narrow complex SVT. May repeat dose in 15 minutes at 0.35mg/kg IV over two minutes (25mg for the average patient) in no response from the first dose.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

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2.3.3.2 Cardiac Dysrhythmias: UNSTABLE A-fib and A-Flutter and PSVT (NARROW COMPLEX TACHYCARDIAS) (Tachycardia Algorithm)

Adult Medial Protocol

Purpose: This protocol is used for patients considered to be unstable with narrow complex tachycardia. Consider patient to be unstable and prepare for immediate cardioversion if patient exhibits any of the following signs or symptoms:

- Crushing chest pain, diaphoresis, heart rate ≥ 150
- Significant Shortness of breath
- Decreased level of consciousness
- Low blood pressure / shock (sys ≤ 90 mm Hg)
- Pulmonary edema / congestive heart failure
- Acute MI

.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient/Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol. 2.1.2
3. Attach cardiac monitor (Verify narrow complex tachycardia. If wide-complex tachycardia, see Ventricular Tachycardia Protocol [w/pulse] or V-Fib and V-tach w/o pulse]) and pulse oximeter.

ALS LEVEL 1: PARAMEDIC ONLY

1. **NOTE: If the rhythm is a rapid atrial fibrillation and onset of a-fib has been greater than 48 hours, contact medical control for assistance with medication vs cardioversion! If ordered to cardiovert, proceed. All other unstable tachyarrhythmias proceed as below.**
2. Start IV of lactated Ringer's or normal saline TKO. Bolus as needed with 250mls of IV fluid for systolic BP < 90 mm Hg. Repeat as needed up to 1 liter. Check vital signs in between each bolus.
3. If patient is conscious and aware of situation, sedate with one of the following benzodiazepines:
   a. **Midazolam (Versed)** 2 – 4 mg IV, IO, IM, IN , may repeat once PRN (up to max. 4mg.)
4. Synchronized cardioversion, start at:
   a. **50 - 100 joules for a-flutter and PSVT** (if no response try 200 joules)
   b. **120 - 200 joules for a-fib** (if no response try 300 joules)

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

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2.3.4 Cardiac Dysrhythmias: PREMATURE VENTRICULAR ECTOPY (PVC'S)

Adult Medical Protocol

Purpose: Treatment of ventricular arrhythmias after MI has been a controversial topic for two decades. Similarly, management of ventricular arrhythmias during the acute phase of MI continues to evolve as treatment strategies are reviewed in the context of new information and changing epidemiological data during the era of adjunctive medical and reperfusion therapy. At present, the treatment of asymptomatic premature ventricular ectopy (PVC's) **is not recommended**. Current ACLS protocols recommend amiodarone for the treatment of hemodynamically stable
VT and prevention of recurrent VF.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient/Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol. 2.1.2
3. Attach cardiac monitor

ALS LEVEL 1: PARAMEDIC ONLY

1. Start IV of lactated Ringer's or normal saline TKO. Bolus as needed with 250mls of IV fluid if systolic BP < 90 mmHg. Repeat as needed up to 1 liter. Check vital signs following each bolus.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for further orders and any questions or problems

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2.3.5 Cardiac Dysrhythmias: PULSELESS ECLECTRICAL ACTIVITY (PEA) (Algorithm)

Adult Medical Protocol

Purpose: This protocol is used for pulseless electrical activity.

The most frequent cause of PEA includes:

Hypovolemia	**T**ablets (drug OD, accidents)
Hypoxia	**T**amponade, cardiac
Hydrogen Ion- Acidosis	**T**ension pneumothorax
Hyper-/Hypokalemia	**T**hrombosis, coronary (ACS)
Hypothermia	**T**hrombosis, pulmonary (PE)

Treatment should be given with respect to the identifiable cause and therefore, may not reflect the sequence suggested below.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

Initial Patient/Assessment Protocol. 2.1.1

Airway Assessment/Management Protocol. 2.1.2

Attach cardiac monitor

High quality CPR as indicated

ALS LEVEL 1: PARAMEDIC ONLY

1. Start IV or IO of lactated Ringer's or normal saline and give initial bolus in 250ml increments of IV fluid up to 1 liter. Check vital signs and lung sounds between boluses. Repeat as needed with second liter.
2. **Epinephrine** (1:10,000) 1mg IV or IO and repeat every 3-5 minutes for duration of pulselessness. Can give via ETT at twice IV dose if no access
3. Consider cause and possible treatment options (see specific protocols).
4. For known pre-existing metabolic acidosis, or renal failure with possible hyperkalemia, consider **Sodium Bicarbonate** (8.4%) 1mg/kg IV or IO
5. If patient taking calcium channel blocker, or suspected hyperkalemia, renal failure, give **Calcium Chloride** 10% 1gm or 10ml IV or IO over 10 minutes.
6. If Return of Spontaneous Circulation (ROSC) go to Return of Spontaneous Circulation Protocol

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

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Adult Cardiac Dysrhythmia External Pacing

2.3.6. cardiac Dysrhythmias: WIDE COMPLEX TACHYCARDIA WITH PULSE (V-TACH WITH PULSE) (Tachycardia Algorithm)

Adult Medical Protocol

Purpose: This protocol is for patients with V-tach and a pulse. If patient is stable (good vitals, no chest pain), treat with medication as per STABLE PATIENT below. If Unstable (systolic BP < 90 mm Hg, chest pain, dyspnea, CHF, altered mental status) treat with cardioversion per UNSTABLE PATIENT BELOW.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

Initial Patient/Assessment Protocol. 2.1.1

Airway Assessment/Management Protocol. 2.1.2

Attach cardiac monitor

ALS LEVEL 1: PARAMEDIC ONLY

FOR STABLE PATIENT:

1. Start IV or IO of lactated Ringer's or normal saline TKO. Bolus as needed in 250ml increments of IV fluid up to 1 liter. Repeat as needed with second liter. Check vital signs and lung sounds between boluses
2. Administer ONE of the following antiarrhythmics:
    a. If you are unsure if the wide complex tachycardia is V-tach vs an SVT with aberrancy; NOTE: 2015 ALS Guidelines allow for **Adenosine (Adenocard)** (give 6mg Adenosine Rapid IV Push) In the initial diagnosis and treatment of stable, undifferentiated REGULAR, monomorphic wide-complex tachycardia (DO NOT USE FOR IRREGULAR WIDE COMPLEX TACHY). If it is clearly V-tach, proceed as follows.
    b. **Amiodarone** 150mg in 50 - 100 ml of 0.9%NS over 10 minutes IV or IO. May repeat every 10 minutes to maximum dose of 2 gm.
3. Use only one antiarrhythmic medication. If patient does not convert with maximum dose, treat as unstable (synchronized cardiovert).

FOR UNSTABLE PATIENT: (systolic BP < 90 mm Hg, chest pain, dyspnea, CHF, altered mental status).

1. Start IV or IO of lactated Ringer's or normal saline TKO. Bolus as needed for systolic BP < 90 mm Hg in 250ml increments of IV fluid up to 1 liter. Repeat as needed with second liter. Check vital signs between boluses
2. If patient is conscious and aware of situation, sedate with one of the following benzodiazepines:
    a. **Midazolam (Versed)** 2 – 4 mg IV, IO, IM, IN may repeat once PRN (up to max. 8 mg.)
    b. **Lorazapam (Ativan)** 1 mg IV, IO, IM may repeat once PRN (up to max. of 10 mg).
3. **Synchronized cardioversion @ 100, 200, 300, 360 joules** if monomorphic V-tach. If polymorphic V-tach, treat as V-fib. If unsure if rhythm is polymorphic or monomorphic and patient is unstable, deliver unsynchronized defibrillation

shock (200 joules)

4. If patient converts rhythm, give **Amiodarone** 150mg in 50 - 100 ml of NS over 10 minutes IV or IO.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

SEE TACHYCARDIA ALGORITHM

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Adult Cardiac Dysrhythmia Cardiogenic Shock

2.3.7 **Cardiac Dysrhythmias: V-FIB and/or PULSELESS V-TACH (cardiac arrest algorithm)**
Adult Medical Protocol

Purpose: Use this protocol for patients in V-Fib and V-Tach with no pulse. Changes in ACLS treatment of cardiac arrest have been designed to minimize interruptions in chest compressions for rhythm check, pulse check, and ACLS therapies. To minimize interruptions in chest compressions, the team leader should plan interventions such as rhythm check, insertion of an airway, and even drug administration around uninterrupted periods of CPR. There is much less emphasis on drug therapy during cardiac arrest and much more emphasis on CPR with minimal interruptions in chest compressions.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

Initial Patient/Assessment Protocol. 2.1.1
Airway Assessment/Management Protocol. 2.1.2
Attach cardiac monitor
Early CPR

ALS LEVEL 1: PARAMEDIC ONLY

1. Verify the patient is in V-fib (check for loose electrodes). Do CPR while defibrillator is charging!
2. **If a shock CAN** be delivered within 4 minutes of the onset of V-fib/pulseless V-Tach (onset occurs in presence of EMS), then give one shock at 360 joules (biphasic defibrillator) or 360 joules (monophasic defibrillator) followed immediately by two minutes of CPR (5 cycles of 30:2 compressions: breaths) before checking for a pulse and assessing the rhythm on the monitor.
   If a shock CAN NOT be delivered within 4 minutes of onset of V-fib/pulseless V-tach, or if it is unknown how long patient has been in V-fib/pulseless V-tach at the time of patient contact, do 5 cycles (about 2 minutes) of CPR BEFORE delivering the first shock at 360 joules, immediately followed by two more minutes (5 cycles [30:2]) of CPR before checking for pulse and analyzing the rhythm.
3. Analyze rhythm/check pulse; if still in V-fib/pulseless V-tach, resume CPR, and perform the following actions with minimal interruptions in CPR.
4. Endotracheal Intubation or LMA (or other blind insertion device). If an advanced airway is inserted, rescuers should no longer deliver "cycles" of CPR. Chest compressions should be delivered continuously (100 per minute) and rescue breaths delivered at a rate of 8 to 10 breaths per minute (1 breath every 6 to 8 seconds).
5. Establish IV or IO with Normal Saline or Lactated Ringers at KVO.
6. If establishing the IV/IO and administering the drug(s) cannot be done during the 5 cycles (or two minutes) of CPR prior to the second shock, give the second shock (if shockable rhythm), then immediately do another 5 cycles (or two minutes) of CPR and continue working on getting the IV/IO established and the drugs administered.
7. Give the following drug (drugs should be administered during uninterrupted CPR after the first or second shock):

a. **Epinephrine (1:10,000) 1 mg** IV or IO. May repeat every 3 – 5 minutes for duration of pulselessness.

8. Continue the sequence, escalating the shocks IF the monitor is capable:
   a. CPR (5 cycles of 30:2 ratio or two minutes)→ Rhythm check/Charge (↯) defibrillator to 360 joules (while checking rhythm) → shock → CPR (5 cycles of 30:2 ratio or two minutes) → Rhythm check/↯ defib to 360 joules (→ shock → CPR…..3rd shock would be 360 joules
   b. All subsequent shocks at 360 joules.

NOTE: Drugs may be administered during the CPR that is performed while the defibrillator is charging, or during the CPR performed immediately after the shock is delivered.

9. Continue defibrillating at 360 joules during the appropriate time in the sequence after each medication is administered for the duration of the VF or VT without pulse
10. Continue with **Epinephrine** as above but also give (if V-fib/pulseless V-tach persist) one of the following;
    a. **Amiodarone 300mg IV or IO** (rapid IV push if pulseless/no BP, otherwise dilute in 250 ml of NS and give over 10 minutes to decrease risk of hypotension). May repeat once at 150 mg in 3 – 5 minutes. If successfully converted after bolus, administer Amiodarone drip at 1mg/min. Mix 150mg Amiodarone in 150ml of NS and administer at rate of 15gtts/min (Drain 100ml from 250ml 0.9%NS bag)
11. Give up to 2 ampules of Sodium Bicarb. (8.4%) if VFib/Pulseless VTach is refractory to the above meds and possible pre-existing acidosis or hyperkalemia.
12. If Torsades de Pointes: give Magnesium Sulfate 1 to 2 grms IV or IO (dilute in 250ml) over 1 to 2 minutes. If the magnesium converts rhythm, start Magnesium Sulfate maintenance infusion (1gm in 250NS at 30 to 60gtts/min)
13. IF ROSC got ROSC Protocol

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

See: ADULT CARDIAC ARREST CIRCULAR ALGORITHM 2015 UPDATE

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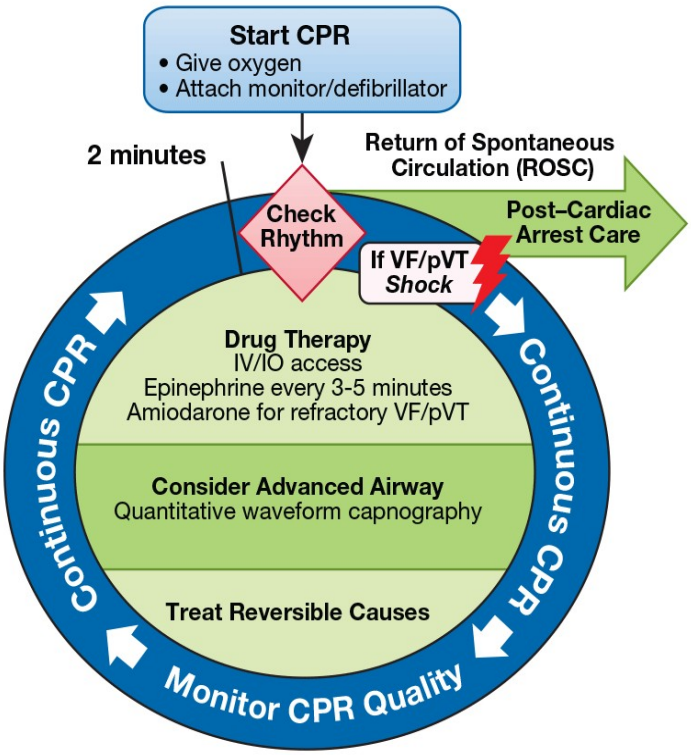
Adult Cardiac Arrest Circular Algorithm—2015 Update



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CPR Quality

- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Rotate compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If P_{ETCO_2} <10 mm Hg, attempt to improve CPR quality
- Intra-arterial pressure.
  - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.

Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Drug Therapy

- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in P_{ETCO_2} (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

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2.3.8 **Return of Spontaneous Circulation (ROSC)**
Adult Medical Protocol

Purpose: Post-resuscitation is an extremely unstable period for the patient, so the patient should be monitored closely and reassessed frequently. The immediate goals of post-resuscitation care are as follows:

- Provide cardio-respiratory support to optimize tissue perfusion, especially to the brain.
- Institute antiarrhythmic therapy to prevent recurrence of the arrest.
- Attempt to identify the precipitating cause of the arrest.
- Rapidly transport the patient to the closest appropriate facility.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Assessment Protocol 2.1.1.**
2. Reassess the CABs and vital signs.

ALS LEVEL 1: PARAMEDIC ONLY

1. Maintain an open airway with an appropriate airway adjunct device, administer 100% O2 (then wean FiO2) to maintain SpO2 greater than or equal to 94%, and monitor with electronic EtCO2 capnography/waveform.
2. Ventilate at 10-12 BPM; **avoid hyperventilation** (d).
3. Determine the patient's hemodynamic stability.
    a. If systolic blood pressure below 90 mm and lungs are clear, administer IV NS 500 ml; may repeat once to maintain systolic BP above 90 mm Hg (a).
    b. If systolic BP remains below 90 mm Hg:
        i. Give a Dopamine infusion at 5 – 10 mcg/kg/min; titrate to maintain minimum systolic BP of ≥ 90 mm Hg and a maximum systolic BP of 120 mm Hg
4. Manage dysrhythmias according to the specific protocol.
5. If the cardiac arrest was the result of VF or VT, manage the patient as follows:
    a. If an antiarrhythmic medication was *not* used to convert the heart rhythm, administer Amiodarone 150 mg in 150 mL in NS over 10 minutes IV/IO (b).
    b. If Amiodarone was administered during resuscitation, do not administer additional Amiodarone.
6. Transport the patient to the closest appropriate facility

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

NOTES:

(a) If rales or crackles are auscultated in the lungs or the patient's systolic blood pressure remains less than 90 mm Hg despite fluid therapy, proceed directly to dopamine administration.

(b) Do not use Amiodarone if the patient has a heart rate less than 60, second-degree type II AV block, third-degree AV block or if patient is hypotensive

(c) If the patient's airway is compromised or crews are unable to manage the patient, transport the patient to the nearest facility.

(d) If EtCO2 is less than10mmHg: Attempt to improve CPR (compressions vs. ventilation).
If EtCO2 = 12-25mm Hg: Goal during resuscitation.
If EtCO2 = 35-45mm Hg: Check for ROSC

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2.4

Other Adult Cardiac Emergencies

2.4.1 Cardiogenic Shock

Adult Medical Protocol

Purpose: This protocol is to be used for a patient that is hypotensive (systolic BP < 90 mm Hg) with signs and/or symptoms that are cardiac in origin, e.g. Pulmonary Edema-CHF (dyspnea with rales and/or wheezing), suspected acute myocardial infarction (ST segment elevations on EKG, severe substernal chest pain). If cardiogenic shock is suspected, medical control will need to help guide you in management. The treatment options will need to take into account medications that affect the contractile force of the heart, as well as pre-load and after-load concerns.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol 2.1.2.
3. Attach cardiac monitor and pulse oximeter.
4. Consider possible causes (e.g. the H's and T's)

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV/IO lactated Ringer's or normal saline **TKO**.
2. If patient is short of breath with signs of pulmonary edema (dyspnea, wheezing, rales, tachypnea)
    a. Assist ventilations with BVM with 100% oxygen.
    OR
    b. Apply **CPAP** Mask if patient awake enough and able to tolerate and systolic BP > 90 mmHg.
    OR
    c. Consider advanced airway
3. If hypotensive:
    a. Be sure to remove any transdermal nitroglycerine patch and inform medical staff that you have done so.
4. Obtain 12 lead EKG and transmit if capable.
5. If the patient is not experiencing pulmonary edema, administer a fluid challenge of 500 mL normal saline. If this measure does not improve the patient's systolic blood pressure, the fluid challenge may be repeated once (a).
6. If the fluid challenge does not improve blood pressure, or if the patient is experiencing rales (or pulmonary edema), administer a **Dopamine infusion** at 5-20 mcg/kg/min (b).
7. Titrate **Dopamine** to maintain a minimum systolic SBP of 100 mm Hg and a maximum systolic BP of 120 mm Hg.
8. If the heart rate is slow, less than 60/min, **Adult Protocol 2.3.2. Bradycardia**.
9. If the heart rate is fast, greater than 150/min, **Adult Protocol 2.3.3. Narrow Complex Tachycardia**, or **Adult Protocol 2.3.6. Wide Complex Tachycardia with a Pulse**, as appropriate.
10. Treat dysrhythmias per the appropriate protocol.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for further orders as needed.

Notes:

(a) Avoid giving fluids if an anterior wall MI is suspected (evidenced by ST elevations in leads I, AVL, V1 through V6).

(b) Dopamine 1600 mcg/mL infusion concentration = 15-60 gtts/min with a 60-gtt set. The maximum dose is 20 mcg/kg/min.

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2.4.2 Chest Pain-Suspected Acute MI-Acute Coronary Syndrome-Angina

Adult Medical Protocol

Purpose: This protocol is used for patients experiencing chest pain or discomfort **suspicious** for cardiac cause (angina pectoris or suspected MI). Pain may be described as dull, aching, squeezing, fullness, band-like sensation, tightness, and sensation of someone or something sitting on chest. The pain may or may not radiate to the neck, jaw, left shoulder or down left arm. The patient can also have the following symptoms with or without chest pain; diaphoresis, nausea/vomiting, short of breath, feel a sense of doom, weak, fatigued. Treat patients for possible cardiac cause of pain IF any of the following:

- Age ≥ 30 (or if < than 30 with personal history of coronary artery disease)
- History of: HTN, Smoking, morbid obesity, Diabetes, Positive Family history of cardiac issues (when family member was same age as patient at onset of problem), hypercholesterolemia, cocaine use.
- Anyone with abnormal/suspicious findings on the cardiac monitor or EKG, proceed with the following;

All other chest pain patients less than 30 yrs of age do not need to be treated with nitroglycerine and aspirin. If you have any doubt, contact medical control for guidance. Consider other causes in young patients such as musculoskeletal strain, respiratory (bronchitis, pneumonia, bronchospasm), trauma, GI (reflux, gall stones), etc.

If nontraumatic chest pain other than angina/AMI is suspected consider other potential causes; dissecting aortic aneurysm, pericarditis, spontaneous pneumothorax, pulmonary embolism, pneumonia, pleurisy, costochondritis, hiatal hernia, esophageal spasm, peptic ulcer, cholecystitis, pancreatitis, and cervical disk problem. These conditions should not be treated under this protocol, refer to specific protocol and utilize Appendix 6.7, Chest Pain Differential.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol. 2.1.2 Oxygen via nasal canula @ 2-4 LPM to maintain > 94% (use non-rebreather @15 LPM if SpO_2 < 90%)
3. Attach cardiac monitor and pulse oximeter.Aquire 12 lead EKG if available
4. If not contra-indicated, have patient take one(1) 324mg ASA or chew four(4) 81mg ASA.
5. Place in position of comfort

ALS LEVEL 1: PARAMEDIC ONLY

1. Obtain (and transmit if capable) 12 lead EKG within 10 minutes of patient contact or as soon as possible. Transmit 12 Lead EKG to closest appropriate facility. Forall arrhythmias identified, refer to the appropriate protocol. If ACUTE MI IS

IDENTIFIED, NOTIFY THE APPROPRIATE RECEICVING FACILITY AND CALL A "STEMI ALERT" (d). If inferior wall MI is identified, perform additional 12 lead EKG with V4R to confirm/rule out concurrent right ventricular MI. (b).

2. Initiate an IV of lactated Ringer's or normal saline at a TKO rate. May require IV Bolus if hypotensive (systolic BP < 90 mm Hg). Give boluses in 250ml increments with vital sign and breath sound recheck in-between each bolus.
3. Administer 1 **Aspirin tablet (325 mg) PO** or chew 4 Baby Aspirin if patient not allergic to Aspirin and does not have ulcer disease and has not taken a 325 mg dose within the past 24 hours. (a).
4. Administer 1 **Nitroglycerin tablet or spray (0.4mg)** sublingually if systolic blood pressure greater than 100 mm Hg (avoid if HR < 50/min,or HR > 150/min). **IT IS NOT NECESSARY TO WITHHOLD NITROGLYCERIN UNTIL YOU HAVE AN IV IN PLACE AS LONG AS SYSTOLIC BP IS > 100 mm Hg.** IF BP drops after administration of nitroglycerine, and you haven't been able to start an IV, consider placing an I/O and bolusing with IV fluids. If BP remains systolic > 100 mm Hg, may be repeated every 5 minutes until:
    a. 3 tablets/sprays have been administered,
    b. Pain is relieved, or,
    c. Systolic blood pressure falls below 100 mm Hg.

    NOTE: DO NOT GIVE NITRO IF PATIENT HAS TAKEN Viagra, Cialis, Levitra or any other medication for erectile dysfunction in past 24-48 hours.
5. If pain was relieved by sublingual nitro, place 1 inch of **nitroglycerine paste** to chest wall).
6. If pain continues and patient is not hypotensive (systolic BP < 100 mm Hg), administer one of the following (Fentanyl first-line)
    a. **Fentanyl** may be given 50 mcg IN increments every 3-5 minutes to a maximum of 200 mcg IN

    OR

    IM/IV dose 1mcg/kg SLOW IV increments every 3-5 minutes up to a maximum initial dose of 100 mcg, titrated to pain and BP remains above 90 mm Hg.

    Second dose if needed, maximum total dose of 200mcg IV/IN/IM.

    If Fentanyl was initially given IN and an IV is then established, one IV dose (50mcg) can be given if needed.

    b. **Morphine Sulfate slow IV in 2mg** increments every 3-5 minutes titrated to pain and BP > 90 mm Hg, up to maximum of 10 mg. Monitor respirations and blood pressure closely.
7. If patient becomes nauseated, give one of the following:
    a. **Zofran 4 – 8 mg IVP**
    b. **Benadryl 25 mg IVP**
8. Minimize venipunctures.
9. IF time permits and transporting to a non cardiac cath facility (do not delay treatment or transport), perform Fibrinolytic screening checklist (see forms). This may prevent a delay if hospital will be giving thrombolytics in the event cardiac catheterization is not immediately available.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control for further orders as needed.

NOTE:

(a) Allergies to ASA should be suspected in patients with anaphylaxis signs and symptoms (e.g., flushed itchy skin, increased heart rate, dyspnea, or urticaria).

(b) Bradycardia with hypotension may be due to inferior wall MI associated with right ventricular MI (confirmed on 12 lead EKG -V4R ST elevation). When an inferior MI is associated with right ventricular MI, **avoid use of nitrates (Nitroglycerin)**. If bradycardia and hypotension exists, pacing and IV fluids may improve the patient's hemodynamic status

(c) Other causes of non-traumatic chest pain include: angina pectoris, dissecting aortic aneurysm, pericarditis, spontaneous pneumothorax, pulmonary embolism, pneumonia, pleurisy, costochondritis, hiatal hernia, esophageal spasm, peptic ulcer, cholecystitis, pancreatitis, and cervical disk problem. The paramedic will not always be able to differentiate the cause of a patient's chest pain. It is imperative for the paramedic to obtain a good history and perform a good physical exam including a chest exam/breath sounds, abdominal exam and evaluation of peripheral pulses, as well as monitor cardiac activity and vital signs in order to identify those patients who are hemodynamically unstable.

(d) AMI is probable when there is:

1. A minimum of 1mm ST elevation in two or more related leads on the 12-leadECG with a history suggestive of AMI, signs and symptoms regardless of onset time.
2. A "new onset" left bundle branch block (LBBB) on the ECG with signs/symptoms and history suggestive of AMI.
3. Patients meeting the above criteria should be transported to the nearest cardiac center and pre-alert the hospital of a Cardiac Alert

(e) Minimize the Cardiac Alert on-scene time to 10 minutes or less.

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Chest Pain Protocol Checklist

- ❑ **Assure ABC's.**
- ❑ **Administer oxygen via nasal cannula or non-re-breather.**
- ❑ **Obtain symptom duration, time of onset or last time patient was seen normal.**
- ❑ **Obtain 12 lead EKG and transmit as soon as possible (if capable).**
- ❑ **Notify medical control of any findings that indicate MI or other abnormalities.**
- ❑ **Place patient in position of comfort.**
- ❑ **Pulse ox.**
- ❑ **Vital signs.**
- ❑ **Initiate intravenous line. Establish two if possible.**
- ❑ **Determine serum glucose level if history of diabetes or Altered Mental Status.**
- ❑ **Administer 1 Nitro spray (gr. 1/150) sublingually if systolic pressure greater than 100 mm Hg. (Do not give Nitro if patient has had Viagra or similar medication in the past 24-48 hours.**
- ❑ **Repeat Nitro till pain relieved, 3 tablets administered, or systolic pressure drops below 100 mm Hg.**
- ❑ **1 inch of Nitro Paste to chest wall if pain is relieved.**
- ❑ **Administer 4 baby aspirin or 1 325mg tablet if patient is not allergic or have ulcers.**
- ❑ **Treat dysrhythmias per protocol.**
- ❑ **Consider Fentanyl 50 – 200 mcg IN, IM, or IVP or Morphine 2 mg IVP then titrate 1 mg prn up to 10mg.**
- ❑ **Consider Zofran 4 mg IVP for nausea.**
- ❑ **Transport. Document all items on run report.**

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FIBRINOLYTIC INCLUSION/EXCLUSION CHECKLIST:

Patient Name:_____Date: _____

Inclusion Criteria	YES	NO
1. Patient ≥ 18 years old		
2. Ischemic discomfort ≥ 30 min. but not > 12 hours		
3. ST segment > 1mm in ≥ 2 contiguous leads or ST elevation ≥ 2mm in ≥ 2 contiguous precardial leads or presumed new LBBB		

Exclusion Criteria	YES	NO
Any "YES ANSWER" to the below listed questions will "EXCLUDE" the patient from being a candidate for thrombolytic therapy. Paramedic must check each box as the question is answered.		
1. Any active internal bleeding within the last 4 weeks (e.g. black tarry stools, hematemesis).		
2. History of CVA or TIA.		
3. ANY surgery within the past 4 weeks		
4. Brain tumor, AVM (arterial-venous malformation), Cerebral aneurysm		
5. Hemophilia or any known bleeding disorder		
6. Presenting hypertension, any blood pressure PRIOR to the delivery of thrombolytics that exceeds 180 systolic or 110 diastolic.		
7. Use of cocaine or amphetamines in the past 3 days		
8. Patient in cardiogenic shock (BP < 90), or intubated		
9. Recent trauma, including CPR > 2 minutes		
10. Back Pain indicative of a Dissecting Aneurysm, presenting as a tearing or ripping pain, in the upper back, accompanied by unequal blood pressures or distal pulses.		
11. Being treated for pericarditis, endocarditis		
12. Pregnancy		
13. Patient taking oral anticoagulation meds within the past 3 days		
Paramedic Signature:		

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2.4.3 Hypertensive Emergencies

Adult Medical Protocol

Purpose:

Hypertensive emergencies are commonly defined as accelerated blood pressures (systolic greater than 220 mm Hg, diastolic greater than 120 mm Hg) with signs and symptoms of end organ failure. Neurologic end-organ damage due to uncontrolled BP may include hypertensive encephalopathy and cerebral vascular accident. Cardiovascular end-organ damage may include myocardial ischemia/infarction, acute left ventricular dysfunction, acute pulmonary edema, and aortic dissection. Other organ systems may also be affected by uncontrolled hypertension, which may lead to acute renal failure, and eclampsia.

Hypertension is rarely treated in the prehospital setting. Treatment should focus on the patient's presentation and not the blood pressure by itself. Blood pressures that should **not** be treated in the prehospital setting include:

- Transient hypertension secondary to pain, anxiety, hypoxia, or drug intoxication. (Treatment should be directed at the underlying causes, not antihypertensives)
- Chronic hypertension. (Rapid reduction of blood pressure in asymptomatic patients may cause more harm than benefit)
- Thrombotic stroke. (Elevated blood pressure is a normal physiologic response to brain ischemia, excessively lowering of blood pressure in these patients may extend the area of injury)

You are NOT trying to correct a patient's chronic elevation of blood pressure on a one-time EMS visit. You will NOT always see a significant change in blood pressure during the short time patient is in your possession. This protocol should be applied to patients who are:

Asymptomatic:

1. IF patient has a persistent systolic BP > **220** mm Hg and/or a diastolic BP > **130** mm Hg after 2 separate readings, 5 minutes apart, proceed as below. (If possible, take BP in other arm for one of the readings). DO NOT delay transport for BP readings/treatment. The goal is to gradually lower the BP to a more manageable range of a systolic ≤ 180 mm Hg and a diastolic BP ≤ 95. Should you arrive at the hospital before both readings are obtained, inform ED staff and treatment can be provided by the ED staff. If either of the two BPs falls below the 220 systolic or 130 diastolic, do not treat unless you contact medical control first.

Symptomatic:

1. IF patient has systolic BP >**180** mm Hg and/or diastolic BP > **110** mm Hg AND has **Chest pain and/or CHF/Pulmonary Edema symptoms**, follow protocol for symptoms (Suspected AMI/Acute Coronary Syndrome, and/or Pulmonary Edema/CHF). High blood pressure will be treated by following those protocols.

2. IF systolic BP > **180** mm Hg and/or diastolic BP > **110** mm Hg AND patient has epistaxis (nosebleed), follow protocol below
3. IF systolic BP > **180** mm Hg and/or diastolic BP > **110** mm Hg AND patient has severe headache with or without blurred vision, follow protocol below.
   If you suspect a stroke (protocol CVA/Stroke), **do not lower BP** unless ordered to do so by medical control.
4. Eclampsia should be considered with female patients in their third trimester or postpartum who are hypertensive and/or seizing (Refer to 2.7.4 Eclampsia Protocol)

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter

ALS LEVEL 1: PARAMEDIC ONLY

1. Establish an IV of Lactated Ringers or Normal Saline at KVO prn.
2. For nose bleed;
   a. Hold pressure against nostril on affected side. (Apply ice pack if possible).
   b. Keep head of bed elevated between 45 – 90 degrees.
   c. Verify elevated BP with two separate readings (one in each arm or one in same arm 5 minutes apart). If elevated BP (systolic >180 mm Hg or diastolic > 110 mm Hg) x 2 readings, proceed to #4 below.
3. For severe headache with or without blurred vision;
   a. Review patient's home medications and inquire if any medications are taken for high blood pressure.
   b. Inquire if patient has taken their high blood pressure medication as scheduled. If patient has not yet taken their blood pressure medication and is due a dose now or over the next 2 -3 hours, have them take a dose of their prescribed medication if no nausea/vomiting. Transport and report the name of medication taken by patient to ED Staff
   ~~c.~~ Inquire if patient has taken any medication for the headache in the past 6 hours (Tylenol, Motrin/Ibuprofen, any prescribed pain Rx), ~~if not, give or assist patient with taking 1 gm of Tylenol (if not allergic) po.~~
   d. Examine patient for stroke symptoms (Cincinnati Stroke Scale). Do not lower BP if stroke suspected without med control
   e. After above measures, verify elevated BP with two separate readings (one in each arm or one in same arm 5 minutes apart). If elevated BP (systolic >180 mm Hg or diastolic > 110 mm Hg) x 2 readings, proceed to #4 below.
4. Administer **Nitroglycerine** 0.4mg (1 tab or spray) sublingually. Repeat q 5 - 10 min prn x 3. Monitor vital signs every 3-5 minutes. Make sure patient

has not taken any erectile dysfunction drugs in previous 24 – 48 hours prior to giving nitro

5. Apply 1 inch of **Nitro paste** to patient's chest.
6. If blood pressure falls too low (systolic < 90), remove the Nitro Paste and give IV fluid as needed to maintain systolic between 90-110

ALS LEVEL 2: MEDICAL CONTROL

1. ~~**Labetalol (Normadyn) (Trandate)** 10–20 mg IV slowly over 2 minutes – for HTN not associated with CVA. May repeat q 10 minutes to max dose of 300mg. Contact medical control if pulse < 60.~~
2. Contact medical control or medical director if any concerns or any questions.

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2.4.4 Hypotension/Shock (Unknown Cause or Immediate Cause Not Identified)

Adult Medical Protocol

Purpose: This protocol is to be used for patients who are found to be hypotensive (Systolic BP ≤ 90 mm Hg) and the immediate cause may not be known. Possible causes include (but not limited to):

1. **Medications** (As per intended purpose such as any of the antihypertensive medications or as an adverse reaction or side effect of a non-antihypertensive medication):
    a. Beta Blockers
    b. Calcium Channel Blockers
    c. ACE Inhibitors
    d. Diuretics
2. **Cardiac Causes**
    a. Low Cardiac Output (e.g. Myocardial Infarction, myocarditis)
        i. Cardiogenic Shock
    b. Cardiac Tamponade
3. **Low Volume States**
    a. Severe Dehydration
    b. Anemia acute or chronic
    c. Acute hemorrhage (e.g. Acute GI bleed, ruptured Aortic Aneurysm)
4. **Medical Causes**
    a. Sepsis
    b. Anaphylaxis
    c. Endocrine Derangements (Adrenal Crisis)
5. **Traumatic Causes (refer to appropriate trauma protocol)**
    a. Acute traumatic hemorrhage
6. **Neurologic causes**
    a. Head Injury
    b. Spinal Cord Injury
    c. CVA
    d. Vasovagal Fainting

Signs and Symptoms:

1. Hypotension (systolic ≤ 90 mm Hg)
2. Normal or Decreased LOC
3. Tachycardia (may not be present due to certain medications)
4. Tachypnea and Bradycardia may be seen in spinal cord injuries
5. NOTE: Spinal Shock: Clinical presentation differs from hemorrhagic shock in that there is no catecholamine release, thus:
    a. No pallor
    b. No tachycardia or diaphoresis
    c. Decreased blood pressure with normal or slow heart rate
    d. Skin warm, dry and pink
    e. Patient may be more alert than expected for his/her blood pressure.

If an immediate or obvious cause can be identified, refer to the appropriate protocol for additional guidance, e.g. if trauma involved, refer to the appropriate trauma protocol, for cardiac causes, refer to the appropriate cardiac protocol.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol.2.1.2.
3. Attach cardiac monitor and pulse oximeter.
4. Consider placing in Trendelenburg

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV of Normal Saline. If BP Systolic ≤ 90 mm Hg, bolus with 250 ml IV fluid and repeat up to 1 liter (2 liters if trauma). Check vital signs and breath sounds in-between each bolus.
2. If patient develops pulmonary edema during fluid bolus, discontinue bolus and follow cardiogenic shock protocol,

ALS LEVEL 2: MEDICAL CONTROL

1. If after first liter (or second liter for trauma) of IV fluid bolus (and no obvious cause of hypotension), and patient's systolic BP is still ≤ 90 mm Hg, contact medical control for advice on giving a second liter of fluid bolus or starting a **Dopamine** drip. Start Dopamine 5 – 10 mcg/kg/min (1600 mcg/mL infusion concentration = 15 – 60 gtts/min). It will depend on the circumstances.

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LVAD Proto Chem Tx Guide Blue Addrenal Insufficiency

2.4.5 Left Ventricular Assist Devices

Purpose: The purpose of this protocol is to guide the EMS crew with managing a patient tethered to a left ventricular assist device. A ventricular assist device is a mechanical pump that is used to support heart function and blood flow in people who have weakened hearts. The device takes blood from the lower chamber of the heart and helps pump it to the body and vital organs just as a healthy heart would. Patients and family members are well versed on the management of these devices and should be able to guide you in management. Be sure when transporting patients with LVADs, that ALL the necessary supplies accompany the patient. This includes the extra batteries, chargers, and any other spare/backup components. Keep in mind, with many LVADs, you will not hear or detect a blood pressure. You will instead rely on the patient's level of consciousness, and the skin color and condition. Pulses may or may not be palpable. When the chest is auscultated, you will hear the humming of the device.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol.2.1.2. Supplemental oxygen if any respiratory signs or symptoms are present
3. Attach cardiac monitor and pulse oximeter. Pulse ox may not work on these patients.

ALS LEVEL 1: PARAMEDIC ONLY

1. Auscultate Heart Sounds to determine if the device is functioning and what type of device it is. If it is continuous flow device, you should hear a "whirling sound"
2. Assess the device for any alarms.
3. Look on controller usually found around the waist of the patient to see what color tag and device it is.
4. Match the color on the device tag to the LVAD guideline Intervene appropriately based on the type of alarm, tag (device) and EMS Guide.
5. Initiate IV of Normal Saline or LR at KVO.
6. Assess vital signs – Use Mean BP with Doppler – with the first sound you hear is the Mean Arterial Pressure (MAP).
7. If no Doppler, use the Mean on the non-invasive blood pressure machine. A manual blood pressure may not be obtainable, but with an automated cuff you will be able to obtain a pressure with a narrow pulse pressure.
8. Transport to closest VAD center if possible, otherwise to closest hospital if patient is hemodynamically unstable or to hospital of choice if patient is stable. Call the number on the device for the LVAD coordinator on call.
9. Bring all of the patient's equipment.

10. Bring the significant other if possible to act as an expert on the device in the absence of consciousness in the patient.
11. If the patient is unconscious, unresponsive to stimuli, and pulseless listen to the patient's chest. If you hear the whirling sound of the LVAD, **DO NOT PERFORM CPR**. The LVAD device has been surgically placed into the left ventricle and CPR could dislodge this device, causing death. If you cannot hear the device then CPR should be performed per cardiac arrest protocol.
12. Monitor blood glucose level if any weakness, altered mental status or history of diabetes. Treat per Diabetes Protocol
13. Nothing by mouth, unless patient is known diabetic with hypoglycemia and is able to self-administer oral glucose paste, or a glucose containing beverage.
14. Above all else please remember that these patients, along with their families, have been well trained in the care of themselves and their devices. LISTEN TO THEM!
15. Evaluate a 12 lead ECG if chest pain or ischemic equivalent symptoms (i.e. abdominal pain above the umbilicus, nausea, dizziness, chest tightness or shortness of breath.)
16. If patient meets STEMI criteria on 12 lead ECG, follow Chest Pain Protocol
17. All dysrhythmias should be treated in accordance with appropriate Dysrhythmia Protocol.
18. For conscious electrical defibrillation, the patient may be sedated with **Versed** 1mg if the MAP is greater than 65mmHg.
19. Record and monitor continuous O2 saturation, sometimes not obtainable with LVAD patients. In addition you may utilize End Tidal Co2 capnography.
20. If evidence of dehydration, bolus 250 ml of Normal Saline with a max of 500 ml of NS until patient is normotensive, (= or > 65 MAP). If patient shows signs of Congestive Heart Failure (crackles on auscultation of lungs, JVD or peripheral edema) withhold fluid bolus.
21. . If patient suffering from severe nausea or vomiting, follow Protocol Nausea and Vomiting .
22. . Minimize on scene time when possible

ALS LEVEL 2: MEDICAL CONTROL

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2.5
Adult Neurological/Psychological/Behavioral Emergencies

2.5.1 **Altered Mental Status/Coma**

Adult Medical Protocol

Purpose: This protocol is to be used for any patient with an altered mental status or unconscious for unknown reasons. Remember, the cause could be multifactorial. Look for clues at the scene, i.e. empty pill bottles, notes. Check for medical alert bracelets or necklace that may identify diabetics or other medical conditions. Use appropriate discretion regarding immediate intubation of patients who may quickly regain consciousness, such as hypoglycemics after D10 or opiate overdose cases after Narcan. Remember C-spine precautions if indicated.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2
3. Attach cardiac monitor and pulse oximeter.
4. Alcoholics with any evidence of head trauma and altered mental status must be considered to have a closed head injury until proven otherwise. Treat them as such including C-spine precautions.
5. Notify law enforcement for assistance with any combative or uncooperative alcoholic with an altered mental status. (b)
6. Assess for and document Glascow Coma Scale
7. Consider restraining patient if a threat to self or others
8. Transport to designated hospital.

ALS LEVEL 1: PARAMEDIC ONLY

1. Consider need for advanced airway and always remain vigilant of the patient's respiratory status. (a)
2. Initiate IV of lactated Ringer's or normal saline at TKO. If patient is tachycardia and/or hypotensive, give a 250cc bolus then run at 100cc/hr.
3. Determine serum glucose level with Glucometer or Dextrostix;
    a. **If sugar 60 mg/dl - 80 mg/dl**; **Sublingual glucose paste (if patient is able to swallow and handle scretions)** or Hang 250 ml **D10W** and run 100 ml wide open (titrate to effect). Give second dose of 100 ml **D10W** if glucose still < 80 mg/d. when glucose rechecked in 5 minutes..
    b. **If Blood sugar < 60 mg/dl;** Hang 250 ml of D10W and run bolus of 200 – 250 ml wide open (titrate to effect
    c. If Blood sugar > 300mg/dL with signs of dehydration, administer bolus of IV normal saline 500cc then run in at 100cc/hr
4. If history of drug abuse, and patient has constricted pupils or respiratory depression, assist respirations as needed and administer **Narcan** 0.4 mg IV/IM/IO/ (IN Dose to be 1.0mg) titrate to effect up to 2.0 mg (titrate to effect). Repeat as needed. Usual doses should not exceed 10 mg. (c), (d)

5. If history of Benzodiazepine usage, monitor/support respirations and report to Emergency Department staff.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact Medical Control or Medical Director for any questions or problems.

NOTE:

(a) Use appropriate discretion regarding immediate placement of an advanced airway in patients who may quickly regain consciousness, such as hypoglycemic after administration of D10 or opiate overdose cases after administration of Narcan. If the patient is conscious with control of the airway, oral glucose may be given

(b) Consider restraints if necessary, for patient and/or personnel's protection per restraint procedure protocol.

(c) Administration of Narcan to patients with chronic use of narcotics may induce withdrawal and/or violent behavior.

(d) Recent increase of synthetic opioids may require higher initial doses of Naloxone. Consider starting at 2 mg initial dose.

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2.5.2 Behavioral / Violent /Psychiatric Emergencies

Adult Medical Protocol

Purpose: This protocol is for patients with psychiatric problems. If patient is violent and an immediate threat to him/herself, EMS crew or bystander safety exists, restraints (chemical and/or physical) should be used to prevent patient from harming him/herself or others.

If patient is not violent, be observant for possibility of violence and avoid provoking patient. Particular caution should be exercised when any "non-lethal" law enforcement device (e.g. pepper spray, taser, etc.) has been employed. Respect the dignity of the patient. Teamwork between EMS personnel and law enforcement will improve patient care.

Typical findings for any violent and/or impaired patient:

- P – Psychological issues
- R – Recent drug / alcohol use
- I – Incoherent thought process
- O – Off (clothes) and sweating
- R – Resistant to presence / dialogue
- I – Inanimate objects / shiny / glass – violent
- T – Tough, unstoppable, superhuman strength
- Y – Yelling

Excited delirium syndrome is a state in which a person is in a psychotic and extremely agitated state. Mentally the patient is unable to focus and process any rational thought. The condition is brought on by overdose on stimulant or hallucinogenic drugs, drug withdrawal, or psychiatric patient not taking medication for significant amount of time.

Typical signs and symptoms to suspect excited delirium are elevated temperature, nudity, profuse sweating, and change from aggressive behavior to "instant tranquility." These patients should be closely observed for cardiac and respiratory changes.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. If indicated Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Rule out other causes other than psychiatric (e.g. hypoglycemia, hypoxia, CVA, drug overdose, ETOH).

4. If attempts at verbal control are unsuccessful, use reasonable physical restraints. Every attempt should be made to avoid injury to the patient when using physical restraint. If necessary, use standard restraining techniques and devices. Use sufficient padding on extremity restraints on elderly patients or others with delicate skin.
5. **Avoid positional asphyxia!!! Do Not transport patient in a "hog tied" prone position. Transport patient lying on their side or supine. If patient still agitated, have law enforcement ride in back of ambulance. If law enforcement refuses to reposition a restrained prone patient on their side, law enforcement MUST ride in with patient.**
6. Communicate in a calm and non-threatening manner.
7. Attach cardiac monitor and pulse oximeter if indicated (must be on any patient restrained, physical or chemical)
8. Monitor end tidal CO2 via nasal cannula on all physically and chemically restrained patients. If marked elevation or marked decrease, immediately assess your patient, and in particular, their respiratory status.
9. Constantly monitor and observe the patient to prevent injury.
10. Carefully document the rationale for the use of restraints.
11. All individuals being transported for psychological evaluation under the premise of a Baker Act (or equivalent document for involuntary evaluation/treatment) should be accompanied by a police officer. The paramedic in charge shall determine whether the police officer will ride in back or follow behind the EMS unit.
12. In those situations where a female patient is being transported and a female is not part of the EMS crew, the paramedic should attempt to have a female police officer accompany the patient to the hospital. This is imperative in situations such as possible rape. Also document beginning and ending mileage with dispatch via radio.

ALS LEVEL 1: PARAMEDIC ONLY

1. If altered mental status, determine serum glucose level with Glucometer or DextroStix:
    a. If sugar 60 mg/dl - 80 mg/dl; give; 100 ml **10% Dextrose** IV or Sublingual glucose paste, May repeat x 1 if after 15 minutes recheck fingerstick glucose < 80 mg/dl
    b. If Blood sugar < 60 mg/dl; 100 – 250 ml **10% Dextrose** IV or
    c. If glucose > 80 mg/dl and < 200 mg/dl, provide supportive care, keep NPO
    d. If glucose > 200 mg/dl, go to Hyperglycemia Protocol.
2. Use chemical restraints in conjunction with physical restraint if the latter is unsuccessful in controlling violent behavior.
3. For Chemical restraint:
    a. Establish and IV of Lactated Ringers or Normal Saline at KVO (if patient's extremity can be held down for the procedure [with assistance]), otherwise give medications IM
    b. Administer one of the following:
        i. **Midazolam** (**Versed**) 2 – 4 mg IV or IM or IN. May repeat x 1 PRN. Higher dosing per medical control. (a)

ii. **Lorazepam (Ativan)** 2 mg IV/IM/IN; may repeat once (max dose of 4 mg) (a)

4. Consider Benzodiazapines (Versed, Valium or Ativan) after patient is sedated and restrained and IV access established for continued sedation if needed with respiratory and cardiac monitoring in place.
   a. **Midazolam** (**Versed**) 0.5 – 1 mg IV prn, (monitor cardiac, vitals and O2 sats, should be on Oxygen 2L/min)
   b. **Lorazepam (Ativan)** 1 – 2 mg IV prn (monitor cardiac, vitals and O2 sats, should be on Oxygen 2 L/min
5. Monitor any physically or chemically restrained patient closely for respiratory compromise and plan to intervene accordingly

ALS LEVEL 2: MEDICAL CONTROL

1. Notify medical control or medical director for any problems or concerns.

Note: Florida specific:

1. BAKER ACT
   Florida Statute Chapter 394.463—Mental Health relates to the authorization of police, physicians, and the courts to dictate certain medical care for persons who pose a threat to themselves or to others
2. INCAPACITATED PERSONS LAW
   Florida Statute Chapter 401.445 allows for examination and treatment of incapacitated persons in emergency situations. (Patients who are not capable of informed consent as provided in FS Chapter 766.103 cannot refuse medical care.) Florida Statutes may be viewed online at www.leg.state.fl.us/statues

(a) In some instances, IV administration may present a safety concern; in this case, IM or IN administration of sedatives may be the more desirable route.

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2.5.3 Excited Delirium

Medical adult protocol

Purpose: This protocol is to be used on patients suspected of being in a state of excited delirium. Excited delirium is reported to result from substance intoxication (especially cocaine, Spice and Bath Salts), psychiatric illness, alcohol withdrawal, head trauma, or a combination of these. Excited delirium is sometimes called **excited delirium syndrome** if it results in sudden death (usually via cardiac or respiratory arrest), an outcome that is sometimes associated with the use of physical control measures, including police restraint and tasers. The signs and symptoms for excited delirium may include:

- Paranoia
- Insensitivity to pain
- Psychomotor agitation
- Anxiety
- Disorientation
- **Hyper-aggression**
- Tachycardia
- Hallucination
- Incoherent speech or shouting
- **Seemingly superhuman strength or endurance (typically while trying to resist restrain efforts)**
- Hyperthermia (overheating)/profuse sweating (even in cold weather)

Other medical conditions that can resemble excited delirium are panic attack, hyperthermia, diabetes, head injury, delirium tremens, and hyperthyroidism.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. THESE PATIENTS ARE HYPER-AGITATED AND CAN HAVE SUPER-HUMAN STRENGTH. DO NOT ATTEMPT TO APPROACH PATIENT UNTIL SCENE IS SCECURED BY LAW-ENFORCEMENT
2. YOU MUST HAVE SUFFICIENT NUMBER OF TEAM MEMBERS TO MANAGE THESE PATIENTS.
3. Initial Patient Assessment Protocol 2.1.1 when able to gain control of patient
4. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox $\geq$ 94% (non-rebreather @15 LPM if SpO_2 < 90%). (Patient is using a lot of oxygen during hyper-metabolic state)
5. Rule out other causes other than psychiatric (e.g. hypoglycemia, hypoxia, CVA, drug overdose, ETOH).
6. If attempts at verbal control are unsuccessful, use reasonable physical restraints until such time as patient can be medicated. Use the least restrictive method of restraint; allow the patient to correct inappropriate behavior. Every attempt should be made to avoid injury to the patient when

using physical restraint. If necessary, use standard restraining techniques and devices. Use sufficient padding on extremity restraints on elderly patients or others with delicate skin.

7. **Avoid positional asphyxia!!! Do not transport patient in a "hog tied" prone position. Transport patient lying on their side or supine. If patient still agitated, have law enforcement ride in back of ambulance. If law enforcement refuses to reposition a restrained prone patient on their side, law enforcement MUST ride in with patient.**
8. Communicate in a calm and non-threatening manner.
9. Attach cardiac monitor and pulse oximeter as soon as it is feasible (**must** be on any patient restrained, physical or chemical)
10. Constantly monitor and observe the patient to prevent injury.

ALS LEVEL 1: PARAMEDIC ONLY

1. If it is not possible to safely manage patient due to hyper-aggression and agitation, administer one of the following:
   a. **Versed 2 –** 4 mg IM/IN via atomizer (or IV if able to safely get an IV) may repeat 3 – 5 minutes PRN up to 10 mg.
   b. **Lorazapam(Ativan)** 5 – 10mg IM (or IV if able to safely get an IV) may repeat x 1 PRN.
   c. ~~**Haldol 5 – 10 mg** IM (DO NOT GIVE HALDOL IV!) followed by **Diphenhydramine (Benadryl)** 25 mg IM or IV. Must be on cardiac monitor~~
   d. **Ketamine (Ketalar)** 5 mg/kg IM x 1 dose, or 2 mg/kg IN via atomizer (concentration 100 mg/ml), OR alternatively, if the patient already has an IV, then give Ketamine 1 – 2 mg/kg IV slow over 30 – 60 seconds and titrate to effect. May repeat in 20 minutes if desire effects are not met.
   e. Watch for hypersalivation/increased bronchial secretions. Give **Atropine** 0.5 mg IV/IO every 5 minutes to maximum of 0.04 mg/kg or 3 mg total
2. After adequate sedation, if IV had not been established before, start IV of Lactated Ringers or NS at KVO. Bolus with 250 mg increments as needed for systolic BP < 90 mm Hg and/or HR > 120.
3. Consider Benzodiazapines (Versed) after patient is sedated and restrained and IV access established for continued sedation if needed with respiratory and cardiac in place.
4. If altered mental status, and when safe to do so, determine serum glucose level with Glucometer or DextroStix:
   a. If sugar 60 mg/dl - 80 mg/dl; give; 100 ml **10% Dextrose** IV or r Sublingual glucose paste, May repeat x 1 if after 15 minutes recheck fingerstick glucose < 80 mg/dl
   b. If Blood sugar < 60 mg/dl; 100 - 250 ml **10% Dextrose** IV
   c. If glucose > 80 mg/dl and < 200 mg/dl, provide supportive care, keep NPO
   d. If glucose > 200 mg/dl, go to Hyperglycemia Protocol

! Medical Control is Granting the Use of 5 to 10mg of Ativan in the Setting of Excited Delirium. The combination of EMS Supervisor, ALS Fire and Med Unit would have multiple vials of Ativan.

5. If patient body temperature exceeds 102° F, move patient to cooler environment, and remove clothing. Cool aggressively with wet sheets, cool packs, and/or evaporative airflow. Avoid ice packs and cold water immersion. Lower body temperature to 102° F (39C).
6. If patient goes into cardiac arrest, treat accordingly and administer **1 amp of Sodium Bicarb** early as they are usually very acidotic.
7. Monitor any physically or chemically restrained patient closely for respiratory compromise and plan to intervene accordingly
8. ALL SEDATED PATIENTS MUST MONITORED USING END TIDAL CO2.

ALS LEVEL 2: MEDICAL CONTROL

1. Notify medical control or medical director for any problems or concerns.

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2.5.4 **Seizures**
Adult Medical Protocol

Purpose: This protocol should be used when the patient has witnessed continuous convulsions (generalized tonic-clonic seizure or Grand Mal) or repeating episodes without regaining consciousness or sufficient respiratory decompensation. Consider underlying etiology, such as: hypoglycemia, drug overdose, head injury, or fever.
Other types of seizures include absence (Petit Mal), simple partial (focal motor and Jacksonian), complex partial (Psychomotor or Temporal Lobe), atonic (drop attacks), and myoclonic. When the patient is continuously showing signs of these other types of seizures, medical supportive care should be initiated, and the paramedic should contact medical control for further direction.
Females in their second or third trimester of pregnancy (≥ 20 weeks gestation) that are seizing should be assumed to have eclampsia. It should also be noted that eclampsia can occur postpartum (≤ 1 week).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ to 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter
4. Assess for and document the Glascow Coma Scale
5. **If not actively seizing**:
    a. Open airway and suction PRN.
    b. Proceed with secondary survey.
    c. Obtain history.
6. **If actively seizing**:
    a. Protect patient from injury.
    b. Do not attempt to insert tongue blade or oral airway.
    c. Suction p.r.n.
    d. Nasopharyngeal airway may be useful.
7. **If recent seizure, and patient is postictal:**
    a. Place in recovery position.
    b. Suction p.r.n.
    c. Transport.

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV lactated Ringer's or Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.
2. If Eclamptic female (go to Eclampsia Protocol), administer **Magnesium Sulfate** 2-4gms IV (mixed in 250 ml of 0.9%NS given over 5 – 10 minutes)
3. If seizing, administer one of the following benzodiazepines:

a. **Midazolam (Versed) 5 mg IM or 10 mg IN (5mg/ml concentratrion) as first line or 1 – 2.5 mg IV/IO**. May repeat each x 1 PRN

~~b.~~

c. Lorazepam (Ativan) 2 – 4 mg IV/IO or IM

4. Determine serum glucose level with Glucometer or DextroStix:
    a. If sugar 60 mg/dl - 80 mg/dl; 100 ml 100 – 250ml 10% Dextrose IV/IO
    b. If Blood sugar < 60 mg/dl; 100 – 250ml 10% **Dextrose** IV (titrate to effect)
    c. If glucose > 80 mg/dl and < 200 mg/dl, provide supportive care, keep NPO
    d. If glucose > 200 mg/dl, go to Hyperglycemia Protocol.

ALS LEVEL 2: MEDICAL CONTROL

1. Notify medical control or medical director for any problems or concerns.

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2.5.5 Suspected CVA - STROKE

Adult Medical Protocol

Purpose: This protocol is used for those patients exhibiting signs consistent with acute stroke/CVA/"Brain Attack" (altered mental status, slurred speech, loss of function of any body part, hemiplegia, loss of vision, weakness of facial muscles, loss of sensation, drooling, etc.). Other causes should be ruled out (hypoglycemia, drug overdose, hypoxia, etc.).

History	Signs and Symptoms	Differential Diagnosis
Previous stroke/TIA	Impaired understanding of speech	TIA
Previous neurological deficit	Aphasia/dysarthria Weakness/hemiparesis	Seizure Hypoglycemia
Hypertension	Facial droop	Drug ingestion
Heart disease	Poor coordination/balance	Tumor
Diabetes	Loss of peripheral vision	Trauma
Anticoagulant medications	Syncope, dizziness/vertigo	Stroke:
Family history	Headache, vomiting, stiff neck seizures	• Ischemic
Smoking		• Hemorrhagic

STROKE ALERT INCLUSION CRITERIA

- Utilize the Rapid Arterial occlusion Evaluation (RACE) scale
- Time last seen normal is less than 24 hours (Includes Wake Up Stroke). Many hospitals use 6 hours as cut off if not a comprehensive stroke center.
- Deficit not likely due to head trauma, TIA or stroke mimic.
- Blood glucose is greater than 60 OR symptoms don't resolve after correction of BGL.
- Paramedic judgment; altered mental status, vision (loss of vision or double vision), loss of sensation, poor coordination & balance, severe headache, nausea & vomiting, dizziness/severe vertigo, dysarthria/expressive aphasia.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1.
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox of ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%)
3. When CVA is suspected, transport to the hospital should not be delayed. Determine if patient has facial droop, abnormal speech, or arm drift.
4. If possible place in Semi-Fowler's position with head of bed elevated 30 degrees for transport (if patient unable to tolerate, transport flat).
5. Assess for and document Glasgow Coma Scale
6. Attach cardiac monitor and pulse oximeter.
7. Keep patient NPO.
8. **Determine time last seen normal or without symptoms. If onset of symptoms is within 6 hours notify hospital of a "stroke alert".(a)(b)**

9. Try to ascertain if patient had a seizure prior to onset of "stroke" symptoms as he/she may have a condition called Todd's paralysis, which is NOT treated with thrombolytics. Relay this information to the hospital

TRANSPORT: DESTINATION DETERMINATION

10. Cincinnati Pre-hospital Stroke Scale: (CPSS)
    a. Assess for the unilateral presence of at least one of the following:

Item Description

1. Facial droop: Ask the patient to smile. Watch for weakness on one side of the face.
2. Arm drift: Ask the patient to hold both arms out with palms up and eyes closed for 10 seconds. Watch for a drift of one side. A positive result is present if there is weakness in one arm. Weakness in both arms and/or normal strength is a negative test result.
3. Slurred speech: Ask the patient to repeat a simple sentence such as "The sky is blue in Cincinnati." Inability to repeat the words correctly and intelligibly is a positive result.

If CPSS positive, proceed to Rapid Arterial Occlusion Evaluation: (RACE)
Any patient presenting with stroke symptoms of any kind, should, at minimum be transported to a designated stroke center (either **Primary or Comprehensive**).(a)(b)

11. Rapid Arterial Occlusion Evaluation: (RACE)

ITEM	Instruction	Result	Score	NIHSS Equivalent
Facial Palsy	Ask patient to show their teeth (smile)	**Absent** (symmetrical movement) **Mild** (slight asymmetrical) **Moderate to Severe** (completely asymmetrical)	**0** **1** **2**	0-3
Arm Motor Function	Extending the arm of the patient 90° (if sitting) or 45° (if supine)	**Normal** to **Mild** (limb upheld more than **10** seconds) **Moderate** (limb upheld less than **10** seconds) **Severe** (patient unable to raise arm against gravity)	**0** **1** **2**	0-4
Leg Motor Function	Extending the leg of the patient 30° (in supine)	**Normal** to **Mild** (limb upheld more than **5** seconds) **Moderate** (limb upheld less than **5** seconds) **Severe** (patient unable to raise leg against gravity)	**0** **1** **2**	0-4
Head & Gaze Deviation	Observe eyes and head deviation to one side	**Absent** (eye movements to both sides were possible and no head deviation was observed) **Present** (eyes and head deviation to one side was observed)	**0** **1**	0-2
Aphasia (R side)	Difficulty understanding spoken or written words. Ask patient to follow two simple commands: 1. Close your eyes. 2. Make a fist.	**Normal** (performs both tasks requested correctly) **Moderate** (performs only 1 of 2 tasks requested correctly) **Severe** (Cannot perform either task requested correctly)	**0** **1** **2**	0-2
Agnosia (L side)	Inability to recognize familiar objects. Ask patient: 1. "Whose arm is this?" (while showing the affected arm) 2. "Can you move your arm?"	**Normal** (recognizes arm, and attempts to move arm) **Moderate** (does not recognize arm **or** is unaware of arm) **Severe** (does not recognize arm **and** is unaware of arm)	**0** **1** **2**	0-2
		RACE SCALE TOTAL		

12. For any patient with a Rapid Arterial Occlusion Evaluation (RACE) score of 4 or above, the patient should be transported to a **Comprehensive Stroke Center,** if available.

ALS LEVEL 1: PARAMEDIC ONLY

1. Advanced airway if patient does not have an intact gag reflex or for markedly decreased LOC, inability to maintain a patient airway, or for GCS <= 8.
2. Initiate IV lactated Ringer's or normal saline at 75cc/hr for patients 12 yrs. or older. Obtain two intravenous lines if possible.
3. Determine serum glucose level with Glucometer or DextroStix:
    a. If sugar 60 mg/dl - 80 mg/dl; give; 100 ml 10% Dextrose IV or Sublingual glucose paste, may repeat x 1 if after 15 minutes recheck fingerstick glucose < 80 mg/dl
    b. If Blood sugar < 60 mg/dl; 100 - 250 10% Dextrose IV (titrate to effect) or
    c. If glucose > 80 mg/dl and < 200 mg/dl, provide supportive care, keep NPO
    d. If glucose > 200 mg/dl, go to Hyperglycemia Protocol.
4. If a stroke patient is found to be hypertensive, do not treat in the pre-hospital setting unless ordered to do so by medical control. Hypertension could represent a compensatory response to the stroke to increase the cerebral perfusion pressure.
5. Treat seizures with one of the following Benzodiazipams:
    a. Versed 5 mg IM or 10 mg IN (5mg/ml concentration) or 1 – 4 mg IV/IO
    b. Lorazepam (Ativan) 2 – 4 mg IV/IO or IM

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control if seizure did not respond to Ativan or Versed
2. Contact medical control for treatment of agitation with:
    a. Ativan 1-2 mg IVP/IM. May repeat every 10 minutes to a maximum of 10 mg. Or
    b. Versed 2 mg IV/IM/IN. May repeat x 1 PRN.
3. In the presence of acute stroke (CVA), hypertension may be lowered in special circumstances only with a physician order.
4. If patient is being administered tPA by sending hospital. Contact medical control to review case and refer to the tPA- Interfacility Transport of Patient on tPA Protocol.

The **Cincinnati Prehospital Stroke Scale** is a system used to diagnose the presence of a stroke in a patient. It tests three signs for abnormal findings which may indicate that the patient is having a stroke. If any one of the three tests shows abnormal findings, the patient may be having a stroke and should be transported to a hospital as soon as possible.

1. *Facial droop:* Have the person smile or show his or her teeth. If one side doesn't move as well as the other so it seems to droop, that could be sign of a stroke.
    - Normal: Both sides of face move equally
    - Abnormal: One side of face does not move as well as the other (or at all)
2. *Arm drift:* Have the person close his or her eyes and hold his or her arms straight out in front for about 10 seconds. If one arm does not move, or one arm winds up drifting down more than the other, that could be a sign of a stroke.
    - Normal: Both arms move equally or not at all

- Abnormal: One arm does not move, or one arm drifts down compared with the other side

3. *Speech:* Have the person say, "You can't teach an old dog new tricks," or some other simple, familiar saying. If the person slurs the words, gets some words wrong, or is unable to speak, that could be sign of stroke.
   - Normal: Patient uses correct words with no slurring
   - Abnormal: Slurred or inappropriate words or mute

Patients with 1 of these 3 findings as a new event have a 72% probability of an ischemic stroke. If all 3 findings are present the probability of an acute stroke is more than 85%

The **Rapid Arterial Occlusion Evaluation (R.A.C.E.)** is based on an abbreviated version of the National Institutes of Health Stroke Scale (**NIHSS)**, the "gold standard" for evaluating stroke victims. The maximum score is **9** (not **11**) because the evaluation of the final two components is done based on the left or right side presentation, not both simultaneously.

The **NIHSS** equivalent is provided for the benefit of receiving facility. The **NIHSS** score may be higher than the "snap shot" provided in the **R.A.C.E.** because the **NIHSS** evaluates additional areas not covered in the **R.A.C.E.** which is short by design for EMS field use. · The **R.A.C.E.** is a universal ***quantitative*** tool that is needed to determine the ***severity*** of a stroke and to identify strokes with large vessel occlusions (LVO) which would benefit going to a **Comprehensive Stroke Center (CSC).** This is similar to a 12-lead EKG identifying a STEMI and being transported to a PCI Cardiac Center for intervention.

The Cincinnati (CPSS – which is incorporated into this protocol), the F.A.S.T., the Miami (MENDS), the Los Angeles (LAPSS) stroke scales are good scales that offer high degree of sensitivity for strokes, but they are all ***qualitative*** scores (positive or negative) and not ***quantitative*** (severity). The cut-score of 4 is based on the significant global accuracy of **R.A.C.E.** predicting an LVO and its close correlation to the **NIHSS,** as demonstrated in several peer reviewed, multi-center studies.

NOTE:

(a) Minimize the Stroke Alert on-scene time to 10 minutes or less.
(b) Continually reassess the patient to determine if his/her symptoms are worsening or improving, and advise the stroke center of any changes.

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Stroke Protocol Checklist

- ☐ **Assure ABC's.**
- ☐ **Administer oxygen prn O2 sat < 94% by nasal cannula.**
- ☐ **Obtain symptom duration, time of onset or last time patient was seen normal.**
- ☐ **If patient is a "stroke alert" patient, then transport in most expeditious mode possible.**
- ☐ **Position head of bed 30 degrees, if patient unable to tolerate, transport flat.**
- ☐ **If symptoms are within 5 - 6 hours of onset notify receiving facility of a "stroke alert".**
- ☐ **Cardiac monitor. Document cardiac rhythm.**
- ☐ **Pulse ox.**
- ☐ **Vital signs.**
- ☐ **Initiate intravenous line. Establish two if possible. Run fluids on 12 yrs or older at 75cc/hour.**
- ☐ **Determine serum glucose level**
- ☐ **Treat seizures with Versed 5-10 mg.**
- ☐ **Keep patient NPO.**
- ☐ **History of seizures?**
- ☐ **Facial droop?**
- ☐ **Abnormal speech?**
- ☐ **Arm drift?**
- ☐ **Glasgow coma scale.**
- ☐ **Do not lower blood pressure in suspected strokes.**
- ☐ **Document all protocol items on run report.**
- ☐ **Bring a family member to the hospital if it is possible, to answer questions regarding the patient's condition.**

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2.5.6 Syncope

Adult Medical Protocol

Purpose: This protocol should be used for patients with a chief complaint of syncopal episode. Consider history and possibility of dysrhythmia, medication side effects, glucose imbalance, inner ear disorder, CVA, TIA, and MI. Bradycardia with hypotension may be due to inferior wall MI associated with right ventricular infarction (confirm on 12 lead ECG V4R ST elevation). When an inferior wall MI is associated with right ventricular MI, use extreme caution giving nitrates (Nitroglycerine). If bradycardia and hypotension exists, pacing and IV fluids may improve the patient's hemodynamic status.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol 2.1.2**. If indicated Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Obtain pertinent history:
   a. Time of syncopal episode and length of unconsciousness.
   b. Patient's position at time of syncope.
   c. Symptoms preceding event (dizziness, nausea, chest pain, headache, seizures, etc.)
   d. Medications / ETOH / drug usage
   e. Relevant past medical history.
4. Assess for and document the Glasgow Coma Scale
5. Attach cardiac monitor and pulse oximeter if indicated

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV lactated Ringer's or Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.
2. Determine serum glucose level with Glucometer or DextroStix:
   a. If sugar 60 mg/dl - 80 mg/dl; give; 100 ml **10% Dextrose** IV Sublingual glucose paste, may repeat x 1 if after 15 minutes recheck fingerstick glucose < 80 mg/dl
   b. If Blood sugar < 60 mg/dl; give 100 - 250 **10% Dextrose** IV (titrate to effect) or
   c. If glucose > 80 mg/dl and < 200 mg/dl, provide supportive care, keep NPO
   d. If glucose > 200 mg/dl, go to **Hyperglycemia Protocol.**
3. Perform **12 lead ECG**. Transmit 12 Lead ECG to destination hospital, if available. If inferior wall MI is identified (ST segment elevation in leads II, III, and AVF), perform additional 12 Lead ECG with V4R to confirm/rule out concurrent right ventricular MI.
4. If any dysrhythmias, go to the appropriate protocol.

ALS LEVEL 2: MEDICAL CONTROL

1. Notify medical control or medical director for any problems or concerns.

2.6
Adult Toxicology Emergencies

2.6.1 Bites and Stings

Adult Medical Protocol

Purpose: This protocol is for patients who have been bitten or stung by snakes, animals, humans, insects, and spiders. If any marine life was involved please refer to the separate **Marine Envenomation Protocol**. If you have any questions or concerns about the treatment of a particular bite or sting, **Contact Poison Information Center (1-800-222-1222)**. The ALS Level 1 and 2 procedures below apply to all the bites and stings, no matter what the cause. Do not use hydrogen peroxide on deep puncture wounds or wounds exposing fat. Apply sterile dressings to all wounds when appropriate.

Procedure:

SNAKEBITE

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol 2.1.2**. If indicated, Oxygen via nasal cannula @2 - 4 LPM to maintain oxygen saturation ≥ to 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter if indicated
4. Kill the snake if concerned it is poisonous, if practical, and bring the dead snake to the emergency department (or identify). Do not mutilate the snake's head.
5. If bite on extremity, immobilize affected extremity in a neutral/level position.
   Patient should remain still. A constricting band may be of some use in a few circumstances such as immediate care not available or prolonged transport time. Contact med control for order/advise.
6. Remove watches, rings, and jewelry from affected extremity (or all jewelry if general anaphylaxis).
7. Wash area of bite with copious amounts of water.
8. Check temperature and pulse distal to bite on extremity and mark level of swelling and time with pen every 15 minutes
9. If obvious severe reaction developing from obvious poisonous snake, i.e. large amount of ascending edema and ecchymosis from bite of rattlesnake or water moccasin, alert medical control as early as possible so they can start acquiring anti-venom from the pharmacy, some of which takes time to prepare.

General Information:

Pit Vipers: rattlesnake, water moccasin, and copperhead typically cause puncture wounds. There may be ecchymosis at site, localized pain, swelling, weakness, tachycardia, nausea, shortness of breath, dim vision, vomiting, or shock.

Coral Snakes: Usually chewed wound. There may be slight burning pain, mild swelling, blurred vision, drooping eyelids, slurred speech, drowsiness, salivation and sweating, nausea and vomiting, shock, respiratory difficulty, paralysis, convulsions, and coma.

DOG, CAT, AND WILD ANIMAL BITES

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. If indicated, Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox greater than or equal to 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter if indicated
4. Clean area with soap and water (DO NOT use hydrogen peroxide on deep puncture wounds exposing fat).
5. Advise Dispatch to contact animal control and/or law enforcement for identification and quarantine of animal.

INSECT STING (INCLUDING: CENTIPEDES, SCORPIONS, AND SPIDERS)

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. If indicated, Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox greater than or equal to 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter if indicated
4. Remove stinger by scraping skin with edge of flat surface (e.g. credit card). Do not attempt to pull stinger out, as this may release more venom.
5. Clean area with soap and water.

HUMAN BITES

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. If indicated, Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox greater than or equal to 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter if indicated
4. Clean area with soap and water.

ALS LEVEL 1: PARAMEDIC ONLY (For all the above causes):

1. Initiate IV (if indicated, in unaffected extremity) Lactated Ringer's or Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.
2. Refer to Allergic Reaction Protocol if indicated
3. If severe pain, refer to Pain Protocol.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

2.6.2 Toxicology - (Drug Overdose /Poisoning)
Adult Medical Protocol

Purpose: This protocol is to be used for those patients suspected of exposure to toxic substances via any route of exposure. A history of the events leading to the illness or injury should be obtained from the patient and/or bystanders to include: What drugs, poisons, or other substance(s) was the patient exposed? Consider multiple substances, especially on overdoses.

- Route of exposure (ingested, inhaled, injected, surface contamination.)?
- Type and amount of poison/drug?
- Duration of symptoms?
- Is patient depressed, suicidal? History of previous overdose?
- Accidental? Nature of accident?
- Duration of exposure (if applicable)
- Has patient vomited? If so, when?
- History of drug or ETOH usage.
- Pre-existing medical problems

Contact Poison Information Center (**1-800-222-1222**) as needed for assistance and advice. The following is a partial list of drugs/chemicals you may encounter in overdose/exposure situations and a brief review of the signs and symptoms.

CNS DEPRESSANTS: Altered mental status, respiratory depression, hypotension, bradycardia, pulmonary edema, coma, and constricted pupils (opioids only).

Benzodiazepines: generic (trade name)

- Alprazolam (Xanax)
- Chlordiazepoxide (Librium)
- Clonazepam (Klonopin)
- Clorazepate (Tranxene)
- Diazepam (Valium)
- Flunitrazepam (Rohypnol)
- Flurazepam (Dalmane)
- Halazepam (Paxipam)
- Lorazepam (Ativan)
- Midazolam (Versed)
- Oxazepam (Serax)
- Prazepam (Centrax)
- Quazepam (Doral)
- Temazepam (Restoril)
- Triazolam (Halcion)

Barbiturates: generic (trade name)

- Butabarbital sodium (Butisol Sodium)
- Mephobarbital (Mebaral)
- Pentobarbital sodium (Nembutal Sodium)
- Phenobarbital
- Secobarbital sodium (Seconal Sodium)

Designer Drugs:

- Blue nitro, GHB

Opiods, Narcotics, Synthetics and Combinations: generic (trade name)

- Acetaminophen & Codeine phosphate (Tylenol #3, Tylenol #4)
- Alfentanil HCL (Alfenta)
- Alfentanyl (Alfenta)
- Alphaprodine (Nisentil)
- Aspirin & codeine phosphate (Empirin with Codeine #3 and #4)
- Belladonna and opium (B & O Supprettes)
- Buprenorphine HCL (Buprenex)
- Butalbital, aspirin, caffeine, Codeine phosphate (Fiorinol or Fioricet with Codeine)
- Butorphanol (Stadol)
- Codeine
- Dextromethorphan
- Diamorphine (Heroin)
- Diacetylmorphine (Heroin)
- Dihydrocodeine bitartrate, acetaminophen, caffeine (DHC plus)
- Diphenoxylate HCL, atropine sulfate (Lomotil)- no miosis
- Difenoxin HCL with atropine sulfate (Motofen)
- Fentanyl citrate (Sublimaze)
- Fentanyl transdermal (Duragesic)
- Fentanyl citrate & droperidol (Innovar)
- Hydromorphone HCL (Dilaudid, Hydrostat)
- Hydrocodone bitartrate (Lortab, Hycodan, Anexsia)
- Hydrocodone bitartrate & acetaminophen (Hydrocet, Loracet, Vicodin)
- Loperamide HCL (Immodium, Immodium A-D)
- Levorphanol tartrate (Levo-Dromoran)
- Meperidine HCl (Demerol) – no miosis
- MeperidineHCl & promethazine HCl (Mepergan) – no miosis
- Methodone HCl(Dolophine)
- Morphine sulfate (Astramorph/PF, Duramorph, Infumorph 200, Infumorph 500, MS Contin, MSIR, Oramorph, Rescudose, Roxanol)
- Nalbuphine HCL(Nubain)
- Napsylate (Darvocet-N)
- Oxymorphone HCl (Numorphan)
- Oxycodone (Percodan, Percocet, Tylox, Roxicodone)
- Pentazocine HCl (Talwin, Talacen)
- Propoxyphene HCl (Darvon-N)
- Propoxyphene HCl & acetaminophen (Wygesic)
- Sufentanil (Sufenta)

Sedative Hypnotics: generic (trade name)

- Compoz
- Estazolam (Prosom)

- Etomidate (Amidate)
- Ethchlorvynol (Placidyl)
- Propofol (Diprivan)
- Sleep-ez
- Sominex
-
- Zolpidem tartrate (Ambien)

SSRI- Selective Sereotonine Reuptake Inhibitors: generic (trade name)

- Fluoxetine (Prozac)
- Paroxetine (Paxil)
- Sertraline (Zoloft)
- Fluvoxamine (Luvox)
- Citalopram (Celexa)

CNS STIMULANT: Dilated pupils, agitation, paranoia, bizarre behavior, PVCs, tachycardia, hypertension, hyperthermia, seizures, etc.

Cocaine:

- Crack
- Cocaine

Amphetamines:

- Amphetamine variants (DMA, PMA, PMMA, STP, MDA, MDMA, TMA, DOM,DOB)

Designer Drugs:

- Ecstasy

DIGITALIS: Digitalis toxicity should be suspected in patients who are taking digitalis and have a dysrhythmia associated with digitalis toxicity (e.g. bradycardia, AV blocks with rapid ventricular response, supraventricular tachycardia, ventricular ectopy, and other ECG changes: Wide PR interval, short QT interval-rate dependent, spoon-shaped ST segment, peaked T wave). The oleander tree can also cause a digitalis type toxicity, which will cause the same type of dysrhythmias and requires the same treatment.

Digitalis: generic (trade name)

- Digoxin (Lanoxicaps, Lanoxin, Digoxin)
- Digitoxin (Crystodigin)

HALLUCINOGEN: Illusions, hallucinations, poor perception of time and distance, possible paranoia, anxiety, panic, unpredictable behavior, emotional instability, possible flashbacks, dilated pupils, and rambling speech.

- LSD (acid, microdot)
- Mescaline and Peyote (mesc, buttons, cactus)
- DET
- MET
- Psilocybin

TRICYCLIC ANTIDEPRESSANTS: CNS depression, tachycardia, dilated pupils, respiratory depression, slurred speech, twitching and jerking, seizures, ST and T wave changes, wide QRS complex, R waves in lead AVR, S waves in leads AVL and lead I, and shock.

Tricyclic Antidepressant:

- Doxepin HCl (Adapin, Sinequan)
- Amitriptyline HCl (Elavil, Endep)
- Protiptyline HCl (Vivactil)
- Chlordiazepoxide & amitriptyline HCl (Limbitrol)
- Trimipramine maleate (Surmontil)
- Perphenazine & amitriptyline HCl (Etrafon, Triavil)
- Clomipramine HCl (Anafranil)
- Amoxapine (Asendin)
- Desipramine HCl (Norpramin)
- Nortriptyline (Pamelor, Aventyl)
- Imipramine pamoate (Tofranil)

Cyclic Antidepressants:

- Venlafaxine (Effexor)

ORGANOPHOSPHATES; Excessive; salivation, lacramation (tears)/sweating, urinary incontinence, diarrhea, gastrointestinal distress, emesis and bradycardia (tachycardia may occur). CNS; anxiety, restlessness, emotional lability, tremor, headache, dizziness, mental confusion, delirium, hallucinations, and seizures.

Insecticides:

- Diazinon
- Orthene
- Malathion
- Parathion
- Chlorpyrifos

PHENOTHIAZINE: CNS; CNS depression, Dystonic reaction, extrapyramidal symptoms, tartive dyskinesia, neuroleptic malignant syndrome. Cardiovascular; tachycardia, prolonged QT interval, widened QRS, AV blocks, torsade de pointes. Dilated pupils, seizures, cardiac dysrhythmias

- Chlorpromazine (Thorazine)
- Prochlorperazine maleate (Compazine)
- Trifluoperazine (Stelazine)
- Thioridazine (Mellaril)
- Thiothixene (Navane)

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1

2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter
4. Assess for and document the Glasgow Coma Scale
5. Collect all pill bottles, empty or full, and check for suicide notes (if applicable). Transport any/all information or items that may assist in the treatment of the patient to the emergency department.
6. **If inhaled poison:**
    a. Assure personal safety.
    b. Remove patient to fresh air.
    c. Administer 100% oxygen via non-rebreather mask.
7. **If skin or eye contamination:**
    a. Assure personal safety.
    b. Remove contaminated clothes.
    c. Irrigate with water or normal saline.
8. **If actively seizing:**
    a. Protect patient from injury.
    b. If seizing before airway was controlled, do not attempt to insert tongue blade or oral airway. Nasopharyngeal airway may be useful.
    c. Suction p.r.n.

ALS LEVEL 1: PARAMEDIC ONLY

1. Consider need to support respirations/ventilation including need for intubation at any time if respiratory status deteriorates.
    a. Monitor respiratory status frequently.
    b. Use appropriate discretion regarding immediate intubation of patients who may quickly regain consciousness, such as hypoglycemics after D10 or opiate overdose after Naloxone.
2. If condition warrants, initiate IV lactated Ringer's or Normal Saline at 125ml/hr .If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children).
    a. Recheck vital signs and lung exam in-between each increment.
    b. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.
3. If altered mental status, determine serum glucose level with Glucometer or DextroStix:
    a. If sugar 60 mg/dl - 80 mg/dl; give; 100 ml **10% Dextrose** IV or
    b. If Blood sugar < 60 mg/dl; 100 – 250 ml **10% Dextrose** IV (titrate to effect) ~~or~~
    c. If glucose > 80 mg/dl and < 200 mg/dl, provide supportive care, keep NPO
    d. If glucose > 200 mg/dl, go to **Hyperglycemia Protocol** .
4. Treat any dysrhythmias per appropriate protocol.

5. If actively seizing administer one of the following benzodiazepines:
    a. **Midazolam (Versed)** 5mg IM/IN or 2 mg IV. May repeat x 1 PRN.
    b. **Lorazepam (Ativan)** 2 – 4 mg IV/IO or IM
6. If patient is experiencing chest pain, go to chest pain protocol
7. If patient combative, consider need for physical and chemical restraints (see psychiatric emergency protocol)
8. If bronchospasm is present give an **Albuterol (Ventolin)** nebulized treatment, containing 2.5mg of Albuterol pre-mixed with 2.5 ml normal saline. May repeat x 2 PRN. Add **Ipratropium Bromide (Atrovent)** 0.5 mg (0.5 ml) to the first neb treatment only. Do not give Albuterol or Ipratropium Bromide if heart rate is ≥ 140.
9. For symptomatic **CNS DEPRESSANT OVERDOSE**:
    a. Do 12 lead ECG. If QRS complex is wide (> 0.12 seconds), administer **Sodium Bicarbonate** 1 mEq/kg IV
    b. If respiration is depressed, administer **Naloxone (Narcan)** 0.4 mg titrat to effect up to 2mg IV/IO/IM/IN. May repeat **Naloxone (Narcan)** PRN, not to exceed 10 mg.(a),(b),(c)
10. For symptomatic **STIMULANT OVERDOSE**:
    a. If patient is hyperthermic (hot to touch), aggressively cool patient
    b. NOTE: Beta-blockers are contraindicated in cocaine overdose!
11. For symptomatic **DIGITALIS TOXICITY**:
    a. Treat tachydysrhythmias with medication per specific protocol. Avoid the use of **Calcium Chloride.**
    b. If unstable tachycardia > 150/min, synchronize cardiovert with energy settings between 5 – 20 jules
    c.If unstable bradycardia with wide QRS (> 0.12 seconds), give **Sodium Bicarbonate** 1 mEq/kg
12. For symptomatic **TRICYCLIC ANTIDIPRESSANTS OVERDOSE:**
    a. Do 12 lead ECG. If QRS complex is wide (> 0.12 seconds), administer **Sodium Bicarbonate** 1 mEq/kg IV
    b. ROMAZICON, PROCAINAMIDE, AND LABETALOL (ALL BETA BLOCKERS) ARE CONTRA-INDICATED IN TRICYCLIC ANTIDEPRESSANT OVERDOSE.
13. If symptomatic **ORGANOPHOSPHATE POISONING**:
    a. **Atropine** *0.03 mg/kg IVP every* 5-10 minutes until atropinization occurs. (**Peds: 0.05 mg/kg IM** [maximum 3 mg] or 0.02 mg/kg IV q 5-10 minutes till atropinization occurs).

14. If symptomatic **PHENOTHIAZINE** (Thorazine, Compazine, Stelazine, Mellaril, Navane)
    a. **Diphenhydramine (Benadryl)** 25-50mg IV or deep IM

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any problems or concerns.

Note:

(a) Use appropriate discretion regarding immediate intubation of patients who may quickly regain consciousness following treatment.

(b) If patient is a suspected opioid addict, the administration of Narcan should be titrated to increase respirations to normal levels without fully awakening patient to prevent hostile and confrontational episodes. Consider restraining patient. Narcan may need to be repeated in 20-30 minutes to maintain effect.

(c) If administering Naloxone (Narcan) via prepackaged product Nasal Spray then the dose is 4mg/0.1 ml spray IN.

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2.6.3 Marine Envenomations

Adult Medical Protocol

Purpose: This protocol is for patients who are injured by any type of marine life. Call Poison Information Center (**1-800-222-1222**) as needed for assistance. If non-scalding hot soaks are advised, do not delay transport. Soak enroute to hospital.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. If indicated, Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter if indicated

For Sponges:

1. Gently dry skin and remove spicule. Adhesive tape may aid in removal.
2. Soak with 5% vinegar.

For Coelenterates (JELLYFISH):

1. Rinse wound with saltwater or seawater
2. Do not rub skin, do not apply ice, and do not rinse with fresh water.
3. Inactivate toxin with 30 minute soak using a 5% vinegar soak.
4. Remove remaining nematocysts with razor.
5. Consider topical anesthetics once nematocyst is removed.

For Echinodermata (Starfish, sea urchins, sea cucumber,):

1. Immerse in non-scalding hot water for pain relief for 30 – 90 minutes (do not delay transport, soak en-route)
2. Remove any remaining spines.
3. After hot water soak, 5% vinegar soaks.

For Mollusks (Cone shells):

1. Hot water (non-scalding) immersion for pain relief
2. Be prepared for cardiac or respiratory support

For Stingrays:

1. Copious irrigation with removal of any visible spines.
2. Hot water (non-scalding) soaks for pain relief.

For Scorpion fish:

1. Hot water (non-scalding) soaks for pain relief and venom inactivation.
2. Copious irrigation with removal of any visible spines.
3. Patient may require stonefish antivenin for severe envenomation.

For Catfish:

1. Hot water (non-scalding) soaks for pain relief and venom inactivation.

2. Copious irrigation with removal of any visible spines.

For Sea Snakes:

1. Immobilize bitten extremity.
2. Apply pressure immobilization bandage for venous occlusion. Wrap the limb with a broad pressure bandage, starting at the wound site and extending as high up the extremity as possible. The bandage should be wrapped to venous occlusive pressure (approximately70 mm Hg) in a manner similar to wrapping a sprained ankle. An extremity splint completes the immobilization.
3. Keep patient warm and still.
4. Notify medical control, as hospital may need to acquire polyvalent sea snake antivenin.
5. Closely monitor cardiac and respiratory status.

ALS LEVEL 1: PARAMEDIC ONLY

1. Establish large bore IV of 0.9% Normal Saline to maintain systolic pressure > 90 mm Hg.
2. If any chest tightness, wheezing, shortness of breath, difficulty swallowing, intraoral swelling, and/or severe hives;
   a. Administer **Diphenhydramine (Benadryl)** 25-50 mg IV (for peds 2-12 yrs old, give 1- 1.25mg/kg IV or IM).
   b. Consider **Epinephrine 1:1,000** 0.4ml IM or SQ (for peds; 0.01mg/kg, Max 0.3ml). (USE TUBERCULIN SYRINGE)
3. For severe pain consider one of the following:
   a. **Morphine Sulfate** 2-6 mg IV or IM
   b. **Fentanyl** 50 – 100 mcg IV or IM
4. For nausea, give one of the following:
   a. **Zofran** 4 – 8 mg IV or IM
   b. **Benadryl 25 mg IV or IM**

ALS LEVEL 2: MEDICAL CONTROL

c. 1. **Ketamine** 0.1 – 0.5 mg/kg IV/IO or 5 mg/kg IM or 0.5 mg/kg IN questions.

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2.7
Adult OB/GYN Emergencies

Adult OB/GYN Emergencies General Guidelines

The paramedic should use these protocols to guide him/her through the treatment of patients who are pregnant. These protocols cover complications of pregnancy and normal and abnormal labor delivery. In addition to these protocols, the paramedic may need to refer to other protocols (e.g. protocols for seizures). The assessment of these patients should follow the normal approach to patient assessment as well as ask specific questions related to the history of the pregnancy. Questions for pregnancy history include:

1. Number of previous pregnancies (gravida).
    a. Miscarriages.
2. Number of previous live births (para).
3. Expected date of delivery or due date.
4. When did contractions begin?
5. Any history of labor complications?
    a. Premature births?
    b. C-section?
    c. Multiple births?
6. What are the duration and frequency of contractions?
    a. Duration is timed from when the contraction starts to when the contraction stops (e.g., 45 seconds, 1 minute).
    b. Frequency is timed from the beginning of one contraction to the beginning of the next contraction (e.g., 2 minutes apart, 4 minutes apart).
7. Evidence of blood show or spotting?
8. Did the water break?
    a. When?
    b. What was the color (e.g., clear, greenish, brownish)?
    c. Did it have an unusual odor?
9. Does the patient have an urge to push?
10. Does the patient feel like she has to move her bowels? If the patient complains of uterine contractions, an external visual examination for crowning should be done to determine if the delivery is imminent.

2.7.1 Childbirth – Complications

Adult Medical Protocol

Purpose: This protocol outlines the specific treatment for complications to labor and delivery.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1.
    a. Secondary survey should include pertinent OB/GYN history:
        - Number of pregnancies/deliveries.
        - History of problems with pregnancy (vaginal bleeding, prior cesarean sections, high blood pressure, premature labor, premature rupture of membranes.
        - Last menstrual period and due date (if known).
        - Current complaints (onset of labor, timing of contractions, rupture of membranes, or urge to push.)
        - Past medical history (including medications.)
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula.
3. Attach cardiac monitor and pulse oximeter.
4. Perineal examination (do not perform internal vaginal examination)
    a. Vaginal bleeding or leakage of fluid.
    b. Presence of meconium.
    c. Crowning during a contraction.
    d. Presenting part (head, face, foot, arm, cord.)

5. IF HEAVY VAGINAL BLEEDING WITH SIGNS OF SHOCK (SYS BP < 90 mm Hg)
    a. Transport with patient in left lateral recumbent position.
    b. Transport immediately, notify labor and delivery
    c. ALS LEVEL 1: Cardiac monitor.
    d. ALS LEVEL 1: IV lactated Ringer's or normal saline Bolus as needed with two liters of IV fluid in 250 – 500 ml increments to maintain systolic BP > 90 mm Hg. Check vital signs frequently.
6. IF CORD PROLAPSED:
    a. Place mother on back with hips elevated (pillow under her hips) or place her in knee/chest position.
    b. Do not attempt to push cord back. **Wrap cord in sterile saline soaked dressing**
    c. With a gloved hand, palpate the cord for pulse.
    d. If pulse is absent in umbilical cord, and positioning of mother does not restore pulse, insert sterile gloved index and middle fingers into the vagina and push the infant up to relieve pressure on the cord. With the other hand, press on the mother's lower abdomen in an upward and cephalic (towards head) direction. Push the fetus back only far enough to regain a pulse in the umbilical cord.
    e. Transport and notify receiving hospital of impending arrival.

7. IF BREECH PRESENTATION:
    a. Do not pull on the newborn. Allow the delivery to proceed normally, supporting the newborn with the palm of your hand and arm, and allowing the head to deliver.
    b. If the head is not delivered within 3 minutes, place a gloved hand in the vagina with your palm towards the newborn's face. Form a "V" with your index finger and middle finger on either side of the newborn's nose and push the vaginal wall away from the newborn's face to create airspace for the newborn until delivery of the head. Suction may be provided PRN.
    c. Transport immediately, while maintaining the airspace for the newborn.
8. IF LIMB PRESENTATION:
    a. Place mother in either the knee-chest position or supine position with a pillow under the buttocks.
    b. Transport immediately
9. IF SHOULDER DYSTOCIA:
    a. Determine presence of shoulder dystocia as follows: head will deliver normally and then it will retract back into the perineum because the shoulders are trapped between the symphysis pubis and the sacrum (this is called "turtle sign").
    b. If this occurs, Do Not pull on head
    c. Have mother drop her buttocks off the end of the bed and flex her thighs upward to facilitate delivery.
    d. Apply firm pressure with an open hand immediately above the symphysis pubis
    e. If delivery does not occur, transport immediately

ALS LEVEL 1: PARAMEDIC ONLY

1. For any of the above complications do not delay transport. An IV in the mother is not necessarily going to help with any of the above complications except the heavy vaginal bleeding with signs of shock. Even then, any attempts at an IV should be done enroute to the hospital.
2. Monitor cardiac rhythm

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control for any questions or problem

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2.7.2 Childbirth – Normal Delivery

Adult Medical Protocol

Purpose: This protocol is to guide the EMS crew with delivering a newborn. If during your evaluation or during the delivery itself, if any complications arise, refer to the Childbirth-complications protocol that follows.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1.
    a. Secondary survey should include pertinent OB/GYN history:
        - Number of pregnancies/deliveries.
        - History of problems with pregnancy (vaginal bleeding, prior cesarean sections, high blood pressure, premature labor, premature rupture of membranes.
        - Last menstrual period and due date (if known).
        - Current complaints (onset of labor, timing of contractions, rupture of membranes, or urge to push.)
        - Past medical history (including medications.)
2. Airway Assessment/Management Protocol 2.1.2 Oxygen via nasal cannula.
3. Attach cardiac monitor and pulse oximeter.
4. Perineal examination (do not perform internal vaginal examination)
    - Vaginal bleeding or leakage of fluid.
    - Presence of meconium.
    - Crowning during a contraction.
    - Presenting part (head, face, foot, arm, cord.)
5. If active labor, and no vaginal bleeding or crowning:
    a. Check for fetal heart tones.
    b. Transport.
6. If active labor, no crowning and vaginal bleeding with no signs of shock (systolic >90 mm Hg):
    a. Transport.
    b. ALS LEVEL 1: IV lactated Ringer's or normal saline at 100 ml/hour.
    c. ALS LEVEL 1: Cardiac monitor.
7. If imminent delivery:
    a. Place mother in lithotomy position.
    b. Drape mother.
    c. Prepare for neonatal resuscitation.
    d. Assist delivery. Gently and carefully assist expulsion of the newborn from the birth canal in its natural descent. Do not pull or push the newborn.
    e. Upon complete presentation of newborn's head:
        - Instruct the mother to stop pushing.
        - Inspect and palpate the newborn's neck for the umbilical cord. If it is present, carefully unwrap the cord from the neck.

If unable to remove the cord, apply two umbilical clamps and cut between the clamps to release the cord.

- Once the newborn's cord is free from around its neck, instruct the mother to push on her next contraction to complete delivery.

f. Upon complete delivery of the newborn:
- Keep the newborn at the level of the vagina to prevent over or under transfusion of the blood from the cord
- ***Never "milk" the cord, after infant delivery wait at least 30 seconds up to 3 minutes or until the cord stops pulsating to clamp/cut the cord. Apply two umbilical cord clamps (2 inches apart and at least 8 inches from the navel), and then cut the cord between the clamps.***
- Avoid holding the newborn by the legs, allowing the head to hang below the body, as this may cause cerebral hemorrhage to occur
- Only if the airway is compromised (obstructed), gently suction the newborn's mouth and nose with the bulb syringe.
- If meconium is noted in the airway, see Pediatric Protocol 3.4.1, Newborn Resuscitation.
- Warm, dry, and stimulate infant.
- Wrap infant in sterile drape or dry blanket. Be sure to cover the newborn's head, as this is a major source of heat loss.
- Check vitals: if compromised, initiate resuscitation

g. Evaluate Newborn:
- Note time of delivery and APGAR scores at birth and five minutes.
- If newborn is not breathing or APGAR < 7 see 3.4.1 Newborn Resuscitation Protocol.

ALS LEVEL 1: PARAMEDIC ONLY

1. Infuse mother with IV of lactated Ringer's or normal saline at 125 ml/hour.
2. If excessive maternal bleeding, massage uterus gently
3. Transport, do not wait to deliver placenta. Do not pull on the umbilical cord.
4. If delivery completed before arrival, or in-field:
   a. Protect infant from fall and temperature loss.
   b. Check infant's vital signs (perform CPR or assist ventilations as necessary.)
   c. Clamp cord in two places, six inches from infant, and cut cord between clamps.
   d. Suction, warm, dry, and stimulate infant.
   e. Give infant to mother.
   f. Massage uterus gently.
   g. Do not pull on cord or attempt to deliver placenta.
   h. Transport.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

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2.7.3 Vaginal Bleeding (NON-TRAUMATIC)

Adult Medical Protocol

Purpose: This protocol should be used for patients who may or may not be pregnant that present with non-traumatic vaginal bleeding. Examples of causes include ante-partum hemorrhage (abruption placenta, placenta previa and uterine rupture), post-partum hemorrhage, ruptured ectopic pregnancy, ruptured ovarian cyst, spontaneous abortion, etc.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. If indicated Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter if indicated
4. Place all products of delivery (undeveloped fetus, placenta, etc) in a plastic bag and transport with patient to hospital. Do not discard any products on scene. If irretrievable, document the reason and contact supervisor or medical director prior.

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV lactated Ringer's or Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any problems or concerns.

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2.7.4 Eclampsia/ Pre-Eclampsia

Adult Medical Protocol

Purpose: This protocol should be used for the patient in her second or third trimester of pregnancy (≥ 20 weeks gestation) that is exhibiting signs of pre-eclampsia or eclampsia. The signs of toxemia include proteinuria (dark colored urine), excessive weight gain, and hypertension. The presence of two of these signs constitutes pre-eclampsia and all three constitutes eclampsia. The seizing patient in her third trimester of pregnancy should be assumed to be eclamptic and treated as specified below. However, consideration of another underlying etiology, such as hypoglycemia, drug overdose, head injury, or fever, should also be considered. Eclamptic seizures can also occur postpartum (≤ 6 weeks). Witnessed continuous convulsions (generalized tonic-clonic seizure or Grand Mal) or repeating episodes without regaining consciousness or sufficient respiratory decompensation demonstrates a need for immediate treatment.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%)
3. Attach cardiac monitor and pulse oximeter

ALS LEVEL 1: PARAMEDIC ONLY

1. Establish IV of lactated Ringer's or normal saline at 125 ml/hr.
2. Determine serum glucose level with Glucometer or DextroStix.
    a. If glucose <80mg/dl: Proceed to Hypoglycemia Protocol
3. If seizing: give **Magnesium Sulfate** 2g, to 4gm IV or IO (mixed in 250 ml of NS given over 5 – 10 minutes). May repeat once at 2 gm IV or IO (mixed in 50 ml of D5W given over 5 – 10 minutes) PRN. Remember, magnesium sulfate can cause respiratory depression with cardiovascular collapse. If patellar reflexes are absent, shut off the infusion and contact medical control immediately. Antidote is calcium chloride IV over 5 minutes.
4. If patient continues seizing, administer one of the following:
    a. **Midazolam (Versed)** 2mg IV or IO or 5 mg IN (concentration 5mg/ml). May repeat once PRN (10 mg maximum dose).

b. **Lorazepam (Ativan)** 2 mg IV, IO, IM, or IN; may repeat once, up to max of 4 mg.

5. Monitor EKG, vital signs, fetal heart tones, level of consciousness, patellar reflexes, respiratory rate, and oxygenation status every 5 minutes.
6. Keep the patient in left lateral recumbent position.
7. Evaluate for pulmonary edema. If present, apply **CPAP** per protocol.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.
2. ~~If patient is in third trimester and is hypertensive (systolic > 140 mm Hg or diastolic > 90 mm Hg) especially with no prior history of hypertension, call to discuss giving a dose of **Labetalol 20mg IV over two minutes.**~~

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2.7.5 Pre-Term Labor
Adult Medical Protocol

TRANSFER PROTOCOL ONLY

Purpose: This protocol will be used during intra-facility transfers. On occasion a patient in pre-term labor will need to be transferred to a higher level of care. The transferring physician will have determined that the benefits outweigh the risk to the patient and should have initiated the proper **EMTALA** transfer paperwork. The key to this type of transfer is for the transferring physician to have done everything possible to arrest the labor process prior to EMS leaving with the patient. EMS should only have to continue the care and medications initiated by the transferring hospital. If the patient is ≤ 20 weeks gestation, then there is very little chance of delivering a viable fetus. EMS should not transfer a patient in active labor as care for the fetus by the physician at the hospital is better than what can be provided by a paramedic in back of an ambulance (or in an aircraft) with little resources and the need to provide care for the mother as well. A neonatal team can then respond to the transferring hospital with specialty equipment to manage the neonate.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter

ALS LEVEL 1: PARAMEDIC ONLY

1. Confirm with transferring physician that patient is NOT in active labor.
2. IV fluids should already be in progress per the hospital. If so, continue at the rate ordered by the transferring physician. If not initiate IV lactated Ringer's or Normal Saline at 100ml/hr. Consider fluid bolus as initial tocolytic therapy. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.
3. Record frequency, character and duration of contractions, fetal heart tones, blood pressure, and pulse every 15 minutes.
4. Patient may be on one of the following tocolytics as ordered by transferring MD. Must be on an IV pump.
    a. **Magnesium Sulfate** 4 – 6 gms IV over 20 min. Then 2- 4 g / hr x 12- 24 hr.
    b. **Brethine (terbutaline)** 0.25mg SQ q 30 min. (Max: 1mg/4h); or 2.5-10 mcg/min IV up to max of 17.5- 30 mcg/min.

ALS LEVEL 2: MEDICAL CONTROL

1. Notify medical control or medical director for any problems or concerns.

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2.8
Other Adult Medical Emergencies

2.8.1 Allergic Reactions (ANAPHYLAXIS)

Adult Medical Protocol

Purpose: This protocol is to be used for patients who may be experiencing and allergic reaction. The reaction could be triggered by a contact with some object or substance, something ingested or something injected beneath the skin (sting, bite, IM, IV, or SubQ medication or chemical, etc). The reaction could range from a mild irritation and/or itching (with or without a rash) of a localized area of the skin/body to a full-blown anaphylactic reaction with respiratory and cardiovascular collapse.

Signs and symptoms consistent with allergic reaction**:**

- Skin – flushing, itching, hives, swelling, cyanosis.
- Respiratory – dyspnea, sneezing, coughing, wheezing, stridor, laryngeal edema, laryngospasm, bronchospasm.
- Cardiovascular – vasodilatation, increased heart rate, decreased blood pressure
- Gastrointestinal – nausea/vomiting, abdominal cramping, diarrhea
- CNS - dizziness, headache, convulsions, tearing

Treatment is outlined according to the severity of the allergic reaction (mild, moderate, and severe or anaphylaxis).

Procedure:

MILD REACTIONS (redness and/or itching, hives, stable vital signs with a systolic BP > 100 mm Hg without dyspnea)

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol (O_2 PRN) 2.1.2**
3. Attach cardiac monitor and pulse oximeter.
4. Transport to designated hospital.

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV of lactated Ringer's or normal saline at TKO.
2. **Diphenhydramine HCL (Benadryl)** 25mg IV or 50mg IM (Peds; 1-2 mg/kg IV or IM)
   1. Famotidine (Pepsid H2) **ALS LEVEL 2: 20mg IV over 15 minutes**

ALS LEVEL 2: MEDICAL CONTROL

2. Call medical control or medical director for any concerns or help

MODERATE ALLERGIC REACTIONS: (edema, hives, dyspnea, wheezing, "lump in throat" feeling, difficulty swallowing, facial swelling and stable vital signs with a systolic BP > 90 mm Hg)

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol 2.1.2**
3. Attach cardiac monitor and pulse oximeter.
4. Transport to designated hospital.

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV of lactated Ringer's or normal saline at 70cc/hr.
2. **Diphenhydramine HCL (Benadryl)** 25mg IV or 50mg IM (Peds; 1-2 mg/kg IV or IM)
3. **Famotidine** (Pepsid H2)**: 20mg IV over 15 minutes**
4. **Dexamethazone** 8-10mg IV/IO/IM
5. **Epinephrine** (1:1000) 0.4 ml IM Adult (Pedi: 0.01 ml/kg.) Caution should be used with administration of Epinephrine when the patient has a history of hypertension or heart disease (call med control if you have any concerns)

6. If patient shows signs of respiratory distress give; **Albuterol (Ventolin)** 2.5mg mixed with 2.5ml of normal saline nebulizer treatment. May repeat twice PRN
7. May add **Ipratropium Bromide (Atrovent)** 0.5 mg (0.5ml) to the initial Albuterol nebs (x 1 doses).

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any concerns or help

SEVERE ALLERGIC REACTION/ANAPHYLAXIS (edema, hives, severe dyspnea and wheezing, unstable vital signs with systolic BP < 90 mm Hg, and possible cyanosis and laryngeal edema)

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol 2.1.2**
3. Attach cardiac monitor and pulse oximeter.
4. Transport to designated hospital.

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV of lactated Ringer's or normal saline bolus with 250cc prn up to 1 liter (reassess vitals and respiratory status between each bolus) then rate of 125cc/hr. (Bolus children with 20ml/kg then 40cc/hr)
2. **Diphenhydramine HCL (Benadryl)** 25mg IV or 50mg IM (Peds; 1-2 mg/kg IV or IM)
3. **Famotidine** (Pepsid H2)**: 20mg IV over 15 minutes**
4. If patient shows signs of respiratory distress give; **Albuterol (Ventolin)** 2.5mg mixed with 2.5ml of normal saline nebulizer treatment. May repeat twice PRN
5. May add **Ipratropium Bromide (Atrovent)** 0.5 mg (0.5ml) to the initial Albuterol nebs (x 1 doses).
6. **Dexamethazone** 8-10mg IV/IO/IM
7. **Epinephrine (1:1000)** 0.4 ml IM Adult (Peds: 0.01 ml/kg.) Caution should be used with administration of Epinephrine when the patient has a history of hypertension or heart disease (call med control if you have any concerns)

8. If the nebulized treatments do not significantly resolve the respiratory distress,
9. Consider need for intubation

ALS LEVEL 2: MEDICAL CONTROL

1. For refractory hypotension obtain order for **Dopamine** drip starting at 5 mcg/kg/min and titrate to effect. **Dopamine** infusion @ 5-20 mcg/kg/min (1600 mcg/ml infusion concentration = 15 – 16 gtt/min). Titrate to maintain a minimum systolic BP of 90 mm Hg with good capillary refill or a maximum BP of 120 mm Hg (maximum dose 20 mcg/kg/min)

2. **ALTERNATIVELY CONSIDER IV EPINEPHRINE FOR CRITICAL PATIENTS AS BELOW**:

Epinephrine 1:100,000 (0.1 mg/10 mL) IV diluted; to dilute Epinephrine from 1:10,000 to 1:100,000;

- Remove 9 ml of Epi 1:10,000 from the 10 ml prefilled syringe
- Fill the syringe back up with 9 mLs of normal saline, you now have Epi 1:100,000
- Administer the 10 mL Epinephrine (1:100,000) solution IV slowly over 5-10 minutes, titrate to clinical effect and systolic BP greater than 90. Close hemodynamic monitoring is required when providing Epinephrine 1:100,000 IV

A SECOND ALTERNATIVE FOR IV EPI ADMINISTRATION CAN BE CONSIDERED IF PATIENT IS CRITICAL

- Mix 1 mg of Epeinephrine in 1000 cc of NS
  - 1 cc of 1:1,000 or
  - 10 cc of 1: 10,000
- Start at 1 cc/min. (if using 60 gtt IV drip set, 60 drops/min)
- Piggyback into high flow IV
- Titrate to effect q 1 min (starting dose is 1 – 2 mcg/min)
- Monitor HR and BP

2.

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2.8.2 Diabetic Emergencies (Hypo and Hyper-glycemic)

Adult Medical Protocol

Purpose: This protocol is used for diabetic patients with blood sugars below 80 mg/dl or blood sugars over 250 mg/dl. Keep in mind that low or elevated blood sugars (in diabetics) can be affected by medications, infections, stress, alcohol, etc.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol 2.1.2**. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%)
3. Attach cardiac monitor and pulse oximeter

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV of Lactated Ringer's or normal saline at 125ml/hr. If patient is tachycardic (HR >110) and/or hypotensive (systolic BP < 90 mm Hg), bolus with 1 – 2 liters of IV fluid in 250cc increments with vital sign recheck and lung exam between each increment. Discontinue bolus if HR slow < 110, systolic BP > 90 or if signs of pulmonary edema. If no sign/symptoms of pulmonary edema, resume rate at 125 ml/hr. If no IV access, consider an IO ONLY if patient is seriously ill (hypotensive and tachycardic). **Do not place IO simply for high or low blood sugar when patient is otherwise stable.**
2. Determine serum glucose level with Glucometer or DextroStix.

   If glucose <80mg/dl and patient is:

   Asymptomatic (No headache, nausea and/or altered mental status):
   - **If sugar 60 mg/dl – 80 mg/dl**; No emergency treatment (OK for patient to drink a cola, juice or other oral form of glucose they may have with them.
   - **If sugar < 60mg/dl**; Oral glucose (juice, piece of candy, or sublingual glucose)

   Symptomatic (Headache, nausea, and/or altered mental status):
   - **If sugar 60 mg/dl - 80 mg/dl**; **Sublingual glucose paste**, or Hang 250 ml **D10W** and run 100 ml wide open (titrate to effect). Give second dose of 100 ml **D10W** if glucose still < 80 mg/dL. when glucose rechecked in 5 minutes.
   - **If Blood sugar < 60 mg/dl;** Hang 250 ml of **D10W** and run bolus of 200 – 250 ml wide open (titrate to effect).
3. **If glucose > 80 mg/dl and < 250 mg/dl**, no specific treatment, supportive care
4. **If glucose > 250 mg/dl**, and patient exhibiting altered mental status, Kussmaul respirations, dry skin with poor turgor, and/or ketotic breath:

- Bolus with 1 – 2 liters of IV fluid in 250cc increments with vital sign recheck and lung exam between each increment. Discontinue bolus if signs of pulmonary edema.
- Asymptomatic patients with glucose > 250 mg/dl, just give IV fluids at 125ml/hr.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

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2.8.3 Abdominal Pain (NON-TRAUMATIC)

Adult Medical Protocol

Purpose: This protocol should be used for patients that complain of abdominal pain without a history of trauma. Assessment should include specific questions pertaining to the GI/GU systems. See Abdominal Pain Differential in Appendix

Abdominal physical assessment includes:

- ❑ Asking patient to point to area of pain (palpate this area last)
- ❑ Gently palpate for tenderness, rebound tenderness, distention, rigidity, guarding, and pulsatile masses. Also palpate the flank area for CVA tenderness.

Abdominal History Includes:

- ❑ Hx of pain (OPQRST)
- ❑ Hx of nausea/vomiting (color, bloody, coffee grounds)
- ❑ Hx of bowel movement (last BM, diarrhea, bloody, tarry)
- ❑ Hx of abdominal surgery
- ❑ Hx of acute onset of back pain
- ❑ SAMPLE (attention to last meal)

Additional questions should be asked of the female patient regarding OB/GYN history. All female patients of childbearing age complaining of abdominal pain should be considered to have an ectopic pregnancy (even if vaginal bleeding is absent) until proven otherwise.

Non-traumatic abdominal pain can be caused by: appendicitis, cholecystitis, duodenal ulcer perforation, diverticulitis, abdominal aortic aneurysm, pelvic inflammatory disease (PID), pancreatitis, mesenteric ischemia, renal stones, hepatitis, cirrhosis of the liver, bowel obstruction, gastroenteritis, etc.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol 2.1.2**
3. Attach cardiac monitor and pulse oximeter.
4. If patient pregnant and back boarded, tilt board 30 degrees left

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV of lactated Ringer's or normal saline at TKO. If patient is tachycardic and/or hypotensive (SBP < 90 mm Hg) give a 250cc bolus. May repeat bolus for total of 2 liters of IV fluid. Assess vital signs and breath sounds in-between each bolus. If vital signs respond to the bolus(s) (pulse rate slowed down and/or blood pressure improved) run at 100cc/hr. If still hypotensive/tachycardic cautiously bolus a second liter in 250ml increments.
2. If patient is nauseated, give one of the following:
   a. **Ondansetron (Zofran)** 4 – 8 mg IV or IM (If oral ODT form available, give subliqual)

b. Diphenhydramine (Benadryl) 25 mg IV or IM

ALS LEVEL 2: MEDICAL CONTROL

1. This is one of the times you will need medical control for pain medication orders.
2. If pain medication requested, call and discuss with med control first.

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2.8.4 Sickle Cell Crisis

Adult Medical Protocol

Purpose: This protocol is for patients with a history of Sickle Cell Disease. Sickle cell anemia i s a chronic hemolytic anemia occurring almost exclusively in African-Americans and is characterized by sickle-shaped red blood cells. Sickle cell crisis results from the occlusion of a blood vessel by masses of sickle-shaped red blood cells. Pain is the principle manifestation, and this represents the most common type of crisis. Typical pain occurs in the joints and back. Hepatic, pulmonary, or central nervous system involvement can occur, each with its own group of symptoms. Keep in mind that patients with sickle cell disorder have a high incidence of life-threatening disorders at a very young age.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol 2.1.2**. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox at ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter
4. Offer emotional support

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV lactated Ringer's or Normal Saline. Give a fluid challenge of 500cc then set rate at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.
2. If nausea also present from pain or the pain medication give one of the following;
   a. **Zofran** 4 – 8 mg IV or IM
   b. **Benadryl 25 mg** IV or IM

ALS LEVEL 2: MEDICAL CONTROL

1. Notify medical control of any problems or concerns.

10. If patient shows signs of respiratory distress give; **Albuterol (Ventolin)** 2.5mg mixed with 2.5ml of normal saline nebulizer treatment. May repeat twice PRN
11. May add **Ipratropium Bromide (Atrovent)** 0.5 mg (0.5ml) to the Albuterol nebs (x 3 doses).

2. For pain, use one of the following:
   a. **Fentanyl** 50 – 100 mcg IV/IM/IN
   b. **Morphine** 2 – 10 mg IV or IM

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2.8.5 Alcohol Emergencies

Adult Medical Protocol

Purpose: This protocol is to be used on patients who are suspected of being intoxicated with alcohol. Treat all intoxicated patients with respect even though they may be agitated and potentially violent. Just because you can smell ETOH on or around your patient, you MUST consider other possible causes for a patient's abnormal behavior or altered mental status, such as head injury from trauma, co-ingestion of drugs, low blood sugar, and severe hypoxia (including carbon monoxide poisoning).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol 2.1.2**
3. Attach cardiac monitor and pulse oximeter.
4. Alcoholics with any evidence of head trauma and altered mental status must be considered to have a closed head injury until proven otherwise. Treat them as such including C-spine precautions. Be prepared to roll the backboard (if used) with the patient strapped to it on its side if patient begins to vomit.
5. Notify law enforcement for assistance with any combative or uncooperative alcoholic with an altered mental status.
6. Transport to designated hospital.

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV of lactated Ringer's or normal saline at TKO. If patient is tachycardic and/or hypotensive, give a 250cc bolus then run at 100cc/hr.
2. Determine serum glucose level with Glucometer or Dextrostix
   a. If sugar 60 mg/dl - 80 mg/dl**: SEE DIABETIC EMERGENCY**
3. If history of drug abuse, and patient has constricted pupils or respiratory depression, assist respirations as needed and administer **Narcan** 0.4mg increments up to 2.0mg, titrate for respiratory effort.
4. If patient begins to vomit, give one of the following:
   a. Zofran 4 – 8 mg IV or IM or SL if available
   b. Benadryl 25 mg IV or IM

ALS LEVEL 2: MEDICAL CONTROL

1. **Contact Medical Control or Medical Director for any questions or problems.**

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2.8.6 Dehydration

Adult Medical Protocol

Purpose: This protocol is for patients who have been unable to keep themselves sufficiently hydrated due to a decrease p.o. intake (inadequate intake to keep up with the fluid/metabolic demands of the body) or increase loss of water/electrolytes from the body from such conditions as vomiting, diarrhea, excessive sweating, burns, hyperventilation. Other conditions can lead to dehydration such as DKA (diabetic ketoacidosis), metabolic acidosis, serious infections, high fever, etc. Signs and symptoms may include hot, very dry skin, poor skin turgor, dry mucus membranes, little or no moisture in eyes, sunken appearance of the eyes in the socket, tachycardia, and hypotension.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1.**
2. **Airway Assessment/Management Protocol 2.1.2.**
3. Attach cardiac monitor and pulse oximeter.

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV lactated Ringer's or Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1 liter of IV fluid in 250ml increments until systolic BP > 90 mm Hg Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or respiratory distress develop.
2. Monitor cardiac rhythm and vital signs
3. Determine serum glucose level with Glucometer or DextroStix:
   a. If sugar 60 mg/dl - 80 mg/dl; give; **SEE DIABETIC EMERGENCY**

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

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2.8.7 Motion Sickness

Adult Medical Protocol

Purpose: This protocol is for patients who may become ill with nausea, vomiting and/or dizziness due to motion sickness during a long transport. This may develop or be aggravated by the rear facing position in back of the ambulance or on an aircraft. Inquire if patient has a history of motion sickness.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment 2.1.1**
2. Assure ABCs are stable. Position of comfort
3. **Airway Assessment/Management Protocol 2.1.2.** Oxygen if indicated via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
4. Attach cardiac monitor and pulse oximeter if indicated
5. Provide appropriate comfort measures (i.e. cool cloth to forehead).

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV of lactated Ringer's or NS at 125 ml/hr. Give 250 ml fluid bolus if systolic pressure < 90 mm Hg (20 ml/kg for children).
2. Be alert for dysrhythmias.
3. If patient nauseated or has recently vomited, administer one of the following:
   a. **Zofran** 4 – 8 mg IV or IM or SL if available.
   b. Benadryl 25 mg IV or IM.
4. If patient complains of dizziness or motion sickness, consider administering:
   a. **Versed 2 – 4 mg IV/IO/IM/IN**
   b. **Ativan 2 – 4 mg IV/IO/IM**

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

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2.8.8 Nausea and Vomiting

Adult Medical Protocol

Purpose: Use this protocol for patients who are nauseated and vomiting due to their illness, pain, side effect of medications, etc. If the patient's nausea and vomiting is associated with an altered mental status or a seriously ill appearance, consider the cause to be a decompensation of their medical problem such as DKA (if diabetic)

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol
2. Airway Assessment/Management Protocol. If indicated, Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox at ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter if indicated
4. Provide appropriate comfort measures (i.e. cool cloth to forehead).

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV lactated Ringer's or Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.
2. If patient nauseated or has recently vomited, administer one of the following:
   a. **Zofran** 4 – 8 mg IV or IM (or the ODT Tablet sublingual if available)
   b. **Benadryl** 25 mg IV or IM.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

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2.8.9 Hyperkalemia (Elevated Potassium)

Adult Medical Protocols

Purpose:

This protocol is to be used on patients with dangerously elevated levels of potassium (>7 mmol/L or 6.0-7.0 mmol/L with EKG changes). Potassium is an extremely important electrolyte and is involved in maintaining electrical potential across cell wall membranes. It is essential to the normal function of cardiac cells. Potassium levels can elevate for a variety of reasons, including but not limited to; problems with excretion (renal 90%, GI 10%), potassium distribution (Extracellular 2%, intracellular 98%), increased absorption/intake. Normal serum potassium levels range from 3.5 – 5 mmol/L.

Signs and symptoms of elevated potassium levels include but are not limited to:

1. Weakness that can progress to paralysis,
2. Dyspnea (owing to respiratory muscle weakness)
3. EKG findings of peaked T wave, prolonged PR interval, widening of QRS complex and eventual sinusoidal wave form

If you have concerns that a patient may be hyperkalemic based on the history, lab value (if available), AND the EKG findings, call and discuss with med control before initiating treatment. Transmit copy of EKG if possible.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol (O_2 PRN) 2.1.2**
3. Attach cardiac monitor and pulse oximeter.
4. Transport to designated hospital

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.
2. Perform 12 lead ECG.
   a. Look for peaked T-wave, prolonged P-R interval, Widened QRS complexes, bradycardia (does not have to have peaked T waves in every lead)
   b. As potassium elevates further, EKG may show dropped P waves, very wide QRS (sinusoid wave form)
   c. Transmit 12 Lead ECG to destination hospital, if available. If inferior wall MI is identified (ST segment elevation in leads II, III, and AVF), perform additional 12 Lead ECG with V4R to confirm/rule out concurrent right ventricular MI.
3. If EKG suggest hyperkalemia or patient is very weak (and is a renal patient or taking potassium supplements), measure serum potassium if equipment

available (I-STAT), or obtain value (if it's been within two hours) from record at transferring facility. If level is > 7 mmol/L or 6.0 – 7.0 with EKG changes proceed to next step. If EKG changes suggesting elevated potassium levels after Succinylcholine was administered for RSI, proceed to next step

4. Give one amp (if available) of **Calcium Gluconate (or Calcium Chloride)** IV over 1 – 3 minutes. Give only if EKG changes. ***Avoid if suspect Digoxin toxicity.***
5. Give **Albuterol** (only) via neb x 1
6. Give **Sodium Bicarb** 1 amp IV over 10 minutes
7. Notify the hospital as additional treatment will be needed on arrival such as
   d. Reg Insulin and D50W
   e. Kayexcelate PO
   f. Possible dialysis

ALS LEVEL 2: MEDICAL CONTROL

1. Notify medical control or medical director for any problems or concerns.

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2.8.10 Dystonic Reaction

Adult Medical Protocols

Purpose:

This protocol is to be used to treat patients who are experiencing extra-pyramidal or dystonic reactions related to side effects of certain drugs (phenothiazine, anti-psychotic, neuroleptic). Dystonia is prolonged involuntary muscular contractions that may cause twisting (torsion) of body parts, repetitive movements, and increased muscular tone. Patients head may be twisted to one side due to uncontrolled muscle spasms of the neck. Patient may have abnormal movement or position of tongue due to spasm of the tongue muscle. This may also cause the patient with difficulty speaking. Patient's eyes may also be deviated to one side.

Common medications that can cause acute dystonic reaction:

Generic Name	Trade Name	General Use
Prochlorperazine	Compazine	Antiemetic, migraine headache
Hydroxyzine	Vistaril, Atarax	Antiemetic, antipruritic
Promethazine	Phenergan	Antiemetic, antipsychotic
Haloperidol	Haldol	Antipsychotic, Tourette's syndrome
Thioridazine	Mellaril	Antipsychotic
Alprazolam	Xanax	Antianxiety
Metoclopramide	Reglan	Antiemetic
Droperidol	Inapsine	Antiemetic, antipsychotic
Fluphenazine	Prolixin	Neuralgia, antipsychotic

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Patient Assessment Protocol 2.1.1**
2. **Airway Assessment/Management Protocol (O_2 PRN) 2.1.2**
3. Attach cardiac monitor and pulse oximeter.
4. Transport to designated hospital
5. Keep in mind, until patient is treated, he/she may be able to hear and understand you but will not be able to follow commands.

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV of lactated Ringer's or normal saline at TKO. If patient is tachycardic and/or hypotensive, give a 250cc bolus then run at 100cc/hr.
2. Determine serum glucose level with Glucometer or Dextrostix
   a. If sugar 60 mg/dl - 80 mg/dl; **SEE DIABETIC EMERGENCIES**

3. If patient exhibiting signs and symptoms of dystonic reaction (extrapyramidal side effect) from one of the common medications listed above, give **Benadryl (Diphenhydramine)** 25 – 50 mg IV or IM
4. If history of drug abuse, and patient has constricted pupils or respiratory depression, assist respirations as needed and administer **Narcan** 0.4 mg IV/IO/IM/IN, titrate to effect up to 2.0 mg IV. Repeat PRN

ALS LEVEL 2: MEDICAL CONTROL

1. Contact Medical Control or Medical Director for any questions or problems.

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2.8.11 Adrenal Insufficiency Emergencies

Adult Medical Protocols

Purpose:

This protocol is used for patients with a *known history of Adrenal Insufficiency* (Primary Adrenal Insufficiency aka **Addison's disease**, Secondary Adrenal Insufficiency, Congenital Adrenal Hyperplasia aka CAH) who have or are currently experiencing an episode of high stress such as trauma, infection, or recent surgery. This protocol is to be used to prevent such stressful episodes from possibly causing a life-threatening condition known as an Adrenal Crisis, of which these patients are at extreme risk.

• Adrenal insufficiency or Addison's disease is an endocrine disorder that occurs when the adrenal glands do not produce sufficient amounts of cortisol and other glucocorticoid hormones needed to respond to stress and inflammatory reactions.

• Early signs and symptoms of patients in crisis include pallor, dizziness, headache, weakness/lethargy, abdominal pain, nausea/vomiting and hypoglycemia.

Procedure:

BASIC LEVEL: EMT AND PARAMEDIC

1. Initial Patient Assessment Protocol
2. Airway Assessment/Management Protocol. Oxygen via nasal cannula @ 2-4 LPM to maintain pulse ox ≥ 94% (non-rebreather @ 15 LPM if SpO2 < 90%)
3. Attach cardiac monitor and pulse oximeter

ALS LEVEL 1: PARAMEDIC ONLY

1. If the patient/care-taker is able to provide or is found with his/her own supply of prescribed Solu-Cortef, assist the patient/care-taker to administer the medication.
2. If the patient/care-taker is not able to administer the patient's prescribed **Solu-Cortef, administer the medication IM according to the dosage instructions provided with the Solu-Cortef (Peds dosing 2mg/kg IV/IM/IO) contact Medical Control.**
3. Initiate IV of lactated Ringer's or normal saline at TKO. If patient is tachycardia and/or hypotensive, administer a fluid challenge of normal saline 500 cc IV or IO to maintain SBP of > 90 mmHg, repeat as needed x 1 – 2 liters.
4. If the patient has a known history of Adrenal Insufficiency but does not have his/her own Solu-Cortef, and the possibility of adrenal crisis exists, contact Medical Control for consideration of administering **Dexamethazone** 8-10 mg IM/IO/IV (or 0.25 to 0.5 mg/kg for Peds – Max dose 8mg)
5. If the patient has persistent hypotension, start **Dopamine** 5 – 10 mcg/kg/min (1600 mcg/mL infusion concentration = 15 – 60 gtts/min).
   - Titrate to maintain a minimum systolic BP of 90 mm Hg and maximum BP of 120 mm Hg (maximum dose 20 mcg/kg/min).
6. Determine serum glucose level with Glucometer. If patient is hyperglycemic or hypoglycemic, treat according to **Diabetic Emergencies** protocol.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact Medical Control or Medical Director for any questions or problems.

NOTE:

(a) Adrenal Crisis leading to death usually results from hypotension or cardiac dysrhythmias due to hyperkalemia. Remember that an ECG can provide evidence of hyperkalemia.

(b) In addition to treating with Solu-Cortef, treatment should be based on the clinical presentation and findings.

(c) Be alert for vomiting and have suction ready.

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2.8.12 Sepsis Protocol

Adult Medical Protocol

Purpose: This protocol is to be used on patients suspected of being severely septic. Sepsis is a clinical syndrome that results from the human body's response to infection. While bacteria probably account for most cases, sepsis can also be the result of infection by fungi, viruses and parasites.

Systemic inflammatory response syndrome (SIRS) is defined as an "abnormal, generalized inflammatory reaction remote from the initial insult." Clinically, it is the presence of two or more of the following:

- Temperature less than 96.8°F or greater than 100.4°F;
- Heart rate greater than 90 bpm;
- Respiratory rate greater 20 or a $PaCO_2$ less than 32 mmHg;
- White blood cell count less than 4,500 or greater than 10,000 l/mm.[3]

Sepsis is more likely to occur in several high-risk populations. Have a higher index of suspicion when evaluating the elderly or the very young, patients who are bed-confined or immobile, and patients who have had recent surgeries or invasive medical procedures.[9] Be highly suspicious of patients receiving immunosuppressive treatments like chemotherapy or post-organ transplant medications. Recognize that some disease processes leave the patient naturally immunocompromised. This is the case with diabetes, liver cirrhosis, autoimmune disease and HIV/AIDS populations.[9] Symptoms such as cough, increased work of breathing, stiff neck, ALOC, urinary pain or frequency, abdominal pain-distension-firmness, or inflamed joint may determine suspicion of infection.

Severe Sepsis

- Sepsis + Sepsis-induced organ dysfunction or tissue hypoperfusion
- Organ dysfunction or tissue hypoperfusion defined as either
  - Cardiovascular: Hypotension (Mean Arterial Pressure (MAP) less than 65 mmHg)(a)
  - Metabolic: Lactate greater than or equal to> 4 mg/dL (if available)
  - ETCO2 less than 25 mmHg

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

4. Initial Patient Assessment Protocol 2.1.1
5. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%). If sepsis is suspected, use nasal cannula capable of measuring end tidal CO2.
6. Attach cardiac monitor and pulse oximeter
7. Measure and/or record patient's temperature
8. Assess for possible source of infection: Ask about recent illnesses, surgeries, invasive procedures or trauma. Has the patient had a

respiratory infection or been feeling ill? Ask about symptoms of gastrointestinal or bladder infections, abdominal discomfort and unusual body or joint pain. Also ask about current or past prescriptions for antibiotics, steroids or immunosuppressants.

ALS LEVEL 1: PARAMEDIC ONLY

1. Notify receiving hospital of a possible sepsis patient (**call sepsis alert if applicable**) if patient meets the following criteria:
    a. Suspected infection based on history and physical exam
    b. Two or more of the following (Robsens')
        i. Temp > 38.3^0 C (100.9^0 F) or < 36^0 C (96.8^0 F)
        ii. Respiratory Rate > 20 breaths/min
        iii. Heart Rate > 90 beats/min
        iv. Altered Mental Status
        v. Blood Glucose < 120mg/dL
    b. One or more of the following (BAS)
        i. Systolic Blood Pressure < 90mmHg
        ii. Respiration Rate > 30/min
        iii. SPO2 Sats < 90% FiO2

2. Initiate IV of Normal Saline. If BP Systolic ≤ 90 mm Hg, bolus with 250 ml IV fluid and repeat prn up to 2 liter. Titrate fluid volume to MAP of at least 70 mm Hg
3. Check vital signs and breathe sounds in-between each bolus.
4. If systolic BP remains < 90 mmHg after above IV bolus, start **Dopamine** infusion at 5 – 20 mcg/kg/min and titrate to systolic BP of 100. NOTE: If interfacility transfer, patient may have been stared on Levophed drip (usually 2 – 12 mcg/min) by the sending physician. Maintain patient on Levophed drip (See Levophed IV Drip Chart) according to the sending physician's orders.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact Medical Control or Medical Director for any questions or problems.

NOTE: (a) Mean Arterial Pressure is located on your monitor or can be determined using the following formula

- MAP = [(2 x diastolic) + systolic] / 3

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2.9
Adult Environmental Emergencies

2.9.1 Diving (Scuba) Emergencies/Barotrauma (Decompression Sickness)

Adult Medical Protocol

Purpose: This protocol is for patients who suffer the effects of sudden changes in atmospheric pressure due to diving related activity. Barotrauma and decompression illness is caused by changes in the surrounding atmospheric pressure beyond the body's capacity to compensate for excess gas load. These injuries are most commonly associated with the use of SCUBA (Self-Contained Underwater Breathing Apparatus). SCUBA diving emergencies can occur at any depth with the most serious manifesting symptoms after a dive. It should be understood that if a patient took a breath underwater, from any source of compressed gas (e.g. submerged vehicle, SCUBA, etc) while greater than 3 feet in depth, the patient might be a victim of barotrauma. Barotrauma may cause several injuries to occur including: arterial gas embolism (AGE), pneumothorax, pneumomediastinum, subcutaneous emphysema, and the "squeeze." decompression illnesses may also include decompression sickness ("Bends").

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1.
2. Airway Assessment/Management Protocol 2.1.2. Administer Oxygen via non-rebreather @15 LPM
3. Attach cardiac monitor and pulse oximeter
4. Place the patient in a supine head-down left lateral decubitus position.
5. Complete the Dive Accident Signs and Symptoms Checklist and Rapid Field Neuro Exam Record (see appendix)
6. Start Dive History Profile (see blank forms), if possible (the patient's dive buddy may be helpful in answering many of these questions
7. Protect against hypothermia and hyperthermia.
8. If applicable, have the local legal authority in charge secure all of the victims dive gear with proper chain of custody for testing, analysis, etc.
9. Monitor closely for complications (pneumothorax, shock, seizures) and treat per protocols.
10. Transport to the closest Emergency Department or Trauma Center. If transporting by helicopter, fly below 1000 feet (if traveling by fixed wind, request pilot pressurize the cabin to sea level). If applicable and pre-arranged agreement exists, consider transport to a hyperbaric facility. Provide hyperbaric personnel with a detailed history of the dive (depth and duration, timing and onset of symptoms, complications, and any treatment rendered).
11. **Contact Diver's Alert Network (DAN) at Duke University Medical Center at (919) 684-4326** for assistance as needed for further assistance.
12. Bring Dive Computer to the hospital, if available

ALS LEVEL 1: PARAMEDIC ONLY

1. Start an IV of lactated Ringer's or normal saline TKO.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

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2.9.2 Cold Related Emergencies/Hypothermia / Frostbite

Adult Medical Protocol

Purpose: This protocol is to be used for patients who suffer from hypothermia. Factors that predispose and/or cause a patient to develop hypothermia include: geriatric and pediatric patients, poor nutrition, diabetes, hypothyroidism, brain tumors or head trauma, sepsis, use of alcohol and certain drugs, and prolonged exposure to water or low atmospheric temperature. Hypothermia patients can be divided into three categories: Mild (temperature 94-96 degrees F), Moderate (Temperature 86 – 94), and Severe (Temperature < 86 degrees F). It should be noted that most oral thermometers would not register below 96 degrees F. There are some newer digital thermometers that will register lower temperatures.

Frostbite is local tissue freezing.

Mild to Moderate Hypothermia: Patients will generally present with shivering, lethargy.

Severe Hypothermia: Patients may be disoriented and confused to stupor and coma. Shivering usually stops and physical activity will be uncoordinated. In addition, severe hypothermia will frequently produce an Osborn J wave on an ECG, as well as dysrhythmias (bradycardia, ventricular fibrillation).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter
4. Remove all wet clothes and dry patient.
5. Protect from heat loss and wind chill.
6. Maintain in a horizontal position
7. Check core temperature if possible
8. Frost Bite cases:
    a. Protect injured areas from pressure, trauma, and friction. Bandage with dry sterile dressing if able.
    Do not rub or break blisters.
    b. Do not allow limb to thaw if there is a chance it will re-freeze.
    c. Do not allow patient to ambulate once the limb has started to thaw.
    d. Maintain core temperature by keeping victim warm with blankets.
    e. Warm fluids may be administered orally to conscious patients.
    f. Consider using the pulse oximeter probe to detect peripheral perfusion in affected tissues.

ALS LEVEL 1: PARAMEDIC ONLY

1) If severe pain, give **Morphine** 2-10 mg IM or IV, or **Fentanyl** 50 – 100 mcg IM or IV/IO/IN.

Mild to moderate (86 - 96°): Hx of exposure to cold, altered LOC, shivering, muscle stiffness, stumbling or staggering gait, cool or cold skin, mottled or pale skin;

BASIC LEVEL: EMT and PARAMEDIC

1. Warm humidified oxygen 12-15 L/M by non-re-breathing mask. Maintain pulse ox > 95%
2. Remove wet garments
3. Cover with blankets
4. Gentle handling
5. Warm environment
6. If patient has normal LOC may give warm fluids to drink

ALS LEVEL 1: PARAMEDIC ONLY

1. Large bore IV, warm saline at 75cc/hr
2. If altered mental status, determine serum glucose level with Glucometer or Dextro Stix:
    a. If sugar 60 mg/dl - 80 mg/dl SEE DIABETIC EMERGENCIES

Severe with vital signs present (<86°F): Same as mild to moderate but may not have shivering. Should have altered LOC and difficult to detect but present vital signs:

BASIC LEVEL: EMT and PARAMEDIC

1. Same as above
2. NPO

ALS LEVEL 1: PARAMEDIC ONLY

1. Same as above

Severe with absence of vital signs: Same as above but will be unresponsive with no detectable pulse or respirations:

BASIC LEVEL: EMT and Paramedic

1. Warm humidified oxygen by BVM
2. CPR (CPR only if core temp < 86^0 F)
3. May consider LMA in lieu of intubation for ventilation
4. Gentle handling
5. Warm environment as much as possible

ALS LEVEL 1: PARAMEDIC ONLY

1. Intubate (or insert LMA) and ventilate with warm humidified oxygen, if possible
   Defibrillation and anti-dysrhythmic drugs **should not** be used until the core temp is > 86^0 F (30^0 C). Administration of one set of shocks is reasonable if the core temperature is unknown. Medication therapy may be ineffective due to the decrease in core temperature. Usually meds withheld till core temp warmed to >86°F. Just continue CPR till temp > 86° F. If temp > 86° F, follow appropriate dysrhythmia protocol.
2. Cardiac Monitor: If V-FIB and core temp unknown: defibrillate up to 3 times (360J); If biphasic defibrillator 350J; (Peds = 2J/kg, 4J/kg, 4J/kg). If core temp > 86^0 F, continue via V-fib protocol
3. Large bore IV or IO, warm saline at 75cc/hr

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

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2.9.3 Heat Related Emergencies/Hyperthermia

Adult Medical Protocol

Purpose: This protocol is for patients suffering the effects of hyperthermia. Hyperthermia occurs when the patient is exposed to increased environmental temperature and can manifest as heat cramps, heat exhaustion, or heat stroke. Certain drugs may cause an increase in the body's temperature (e.g. cocaine, ecstasy, certain psychiatric medications, etc.). Heat related injuries can be divided into one of the following;
Heat Cramps: Signs and symptoms include: muscle cramps in extremities and/or abdomen, hot sweaty skin, weakness, dizziness, tachycardia, normal BP, and normal temperature

Heat Exhaustion: Signs and symptoms include: cool and clammy skin, profuse sweating, nausea/vomiting, diarrhea, tachycardia, weakness, dizziness, transient syncope, muscle cramps, headache, positive orthostatic vital signs, normal or slightly elevated temperature.

Heat Stroke: Signs and symptoms include: Hot dry skin (sweating may be present), confusion and disorientation, rapid bounding pulse followed by slow weak pulse, hypotension with low or absent diastolic reading, rapid and shallow respirations (which may later slow), seizures, coma, elevated temperature above 105° F.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter
4. Assess vital signs, including temperature, every 10 minutes.
5. Remove from warm environment and cool patient
6. For mild to moderate heat cramps and heat exhaustion, if patient is conscious and alert, encourage patient to drink water, follow by salt containing fluids (e.g. half-strength Gatorade or 10 K or equivalent drink)
7. If history and findings suggestive of heat stroke:
    a. Remove to cooler environment
    b. Remove the patient's clothing, and wet the patient directly with ice water. Also, turn air-conditioning units and fans on high, and apply ice packs to the patient's head, neck, chest, and groin. Cool with ice packs or moist sheets (must have good ambient air flow)
    c. Stop cooling measures when core body temp is 39° c (102.2° F).

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV lactated Ringer's or Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg.

Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or respiratory distress develop.

2. If altered mental status, determine serum glucose level with Glucometer or DextroStix:
    a. If sugar 60 mg/dl - 80 mg/dl; give; SEE DIABETIC EMERGENCIES.
3. If seizures are present, and suspected to be heat-related:
    a. Protect airway with appropriate airway adjuncts.
    b. **Versed** 2 – 4 mg IV/IO/IN or **Ativan** 2 – 4 mg IV/IO/IN.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

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2.9.4 Near-Drowning

Adult Medical Protocol

Purpose: Near drowning patients are those who have been submerged in fresh or salt water and may or may not be conscious. Patients who ingested and/or aspirated water during the near drowning experience may initially decline to be transported to the hospital if after they have coughed, vomited and/or rested, they are feeling better following the incident. These patients should be strongly encouraged to be transported for evaluation as there are often delayed complications due to pulmonary edema or aspiration pneumonia. The terms wet drowning, dry drowning, active or passive drowning, near-drowning, secondary drowning, and silent drowning should be discarded. The proper terms should be drowning, fatal or drowning, non-fatal.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1. Immobilize cervical spine if trauma suspected
2. Airway Assessment/Management Protocol 2.1.2. If indicated, Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. If in moderate to severe distress, consider CPAP
4. Attach cardiac monitor and pulse oximeter if indicated
5. Determine pertinent history (duration of submersion, depth, water temperature, possible seizure, drug and/or alcohol use).
6. Maintain body temperature. Start passive re-warming i f hypothermic.
7. All non-fatal drowning patients should be transported to the hospital, regardless of how well they may seem to have recovered. Delayed death or complications due to pulmonary edema or aspiration pneumonia are not uncommon.

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV lactated Ringer's or Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.

If apneic:

1. Initiate and maintain mechanical ventilation with 100% oxygen.
2. Advanced airway as needed, i.e. Endotracheal intubation (with in-line cervical immobilization) or deploy a LMA (or other extra-glottic device).
3. Treat any dysrhythmias per appropriate protocol.
4. Transport and contact medical control en route.

If apneic and pulseless:

1. Initiate and maintain mechanical ventilation with 100% oxygen.
2. CPR.

3. Endotracheal intubation (with in-line cervical immobilization), or extra-glottic device (LMA).
4. Treat any dysrhythmias per appropriate protocol.
5. Transport and contact medical control en route.
6. If altered mental status, determine serum glucose level with Glucometer or DextroStix:
    a. If sugar 60 mg/dl - 80 mg/dl; give; SEE DIABETIC EMERGENCIES

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.
2. If BP remains < 90 mm Hg, despite above IV fluid challenge, initiate **Dopamine** drip if patient unresponsive to fluid challenge. Begin infusion at 2.0 µg/kg/min and titrate to maintain systolic BP >90 mm Hg.

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2.9.5 Electrical Emergencies / Lightning Strike

Adult Medical Protocol

Purpose: This protocol is for patients who suffer the effects of an electrical injury. A wide range of injuries can be caused from a lightning strike or contact with electricity. Electrical injury can occur from direct contact, an arc, or a flash of the electricity and a direct hit or splash from lightning. The movement of electrical current through the body can cause violent muscle contractions that can lead to fractures, and therefore, the C-spine should be protected. The thermal energy can cause external burns, but in many cases the majority of thermal damage is internal, with few external signs of injury. Dysrhythmias are also common (e.g. ventricular fibrillation). The rescuer should be sure that the patient is no longer in contact with the electrical current before initiating treatment. **Asystole is a common presentation with lightning strike. These patients should be aggressively resuscitated unless injuries are incompatible with life.** Immense electrical energy enters the body and acts like a massive defibrillation. As with a standard defibrillation, the electrical energy depolarizes the myocardium and produces a period of asystole. Thus, the initial presenting rhythm immediately following the event is asystole. Eventually, the inherent automaticity property of the cardiac conduction system produces electrical impulses and the heart begins to contract. However, the respiratory center in the medulla remains shut off (takes longer for the diaphragm to recover). For a brief period, the patient may have a heartbeat but not be breathing. Due to lack of adequate ventilation, the heart begins to become severely hypoxic and acidotic resulting in a secondary cardiac arrest from ventricular fibrillation. Contrary to the normal thinking in initial rhythms in cardiac arrest, the lightning strike victim may be more viable in the initial asystolic cardiac rhythm. The ventricular fibrillation rhythm may reflect a severely acidic and hypoxic state associated with a secondary cardiac arrest that may be more difficult to resuscitate.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1. C-spine precautions if indicated. Move patient to a protected area (to prevent additional lightning strike).
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @2 - 4 LPM to maintain the pulse ox $\geq$ 94% (non-rebreather @15 LPM if SpO_2 < 90%.
3. Initialte High Quality CPR if patient in cardiac arrest (as soon as patient is safely removed from electrical current).
4. Remove smoldering clothes and assess for trauma. Look for entrance and exit wounds.
5. Treat burns per Burn Protocol 2.10.8
6. Initiate Trauma Alert if applicable and meets criteria
7. Correct any open/sucking chest wound
8. Control hemorrhage
9. Cover burns with dry sterile dressing.
10. Attach cardiac monitor and pulse oximeter
11. Complete bandaging, splinting, packaging PRN. Immobilize injured extremities, making note of pulses, sensation, motor function, and color of distal extremities.

12. Try to determine amps, volts, and duration of contact, if possible

ALS LEVEL 1: PARAMEDIC ONLY

1. If cardiac arrest or dysrhythmias, standard ALS measures (see appropriate protocol 2.3). NOTE: A patient in cardiac arrest from a severe electrocution (i.e. lightning strike) may have a return of their heartbeat before a return of their respirations. Be prepared to treat asystole (immediately after the strike), respiratory arrest only (period when intrinsic heartbeat returns but diaphragm still paralyzed), or v-fib (from secondary arrest as described above).
2. Initiate IV lactated Ringer's or Normal Saline at 125ml/hr. If patient hypotensive (systolic < 90 mm Hg) and/or tachycardic (HR > 110) bolus with 1- 2 liters of IV fluid in 250ml increments until systolic BP > 90 mm Hg (20 ml/kg for children). Recheck vital signs and lung exam in-between each increment. Discontinue bolus if signs of pulmonary edema or development of respiratory distress.
3. Correct any massive flail segment that causes respiratory compromise. Intubate if necessary.
4. Correct any tension pneumothorax (see needle decompression protocol)
5. If altered mental status, determine serum glucose level with Glucometer or DextroStix:
    a. If sugar 60 mg/dl - 80 mg/dl; SEE DIABETIC EMERGENCIES
6. If patient is in severe pain with no evidence of a head injury, chest or abdominal trauma, give one of the following:
    a. **Morphine Sulfate** 2 – 6 mg IV or IM
    b. **Fentanyl** 50 – 100 mcg IV/IO/ IM/IN

ALS LEVEL 2: MEDICAL CONTROL

c. 1**Ketamine** 0.1 – 0.5 mg/kg IV/IO or 0.5 mg/kg IN or 5 mg/kg IM

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2.10
Adult Trauma Emergencies

2.10 Adult Trauma Protocols

These protocols cover specific types of injuries and their treatment. The initial assessment of the trauma patient should include determination of trauma alert criteria (see General Protocol 1.10, Trauma Transport). When the situation demands it (e.g., when Trauma Alert criteria are met), scene time should be limited as much as possible (e.g., 10 minutes) and the patient should be expeditiously transported to a trauma center. Do not delay transport to establish vascular access or bandage and splint every injury. Priority should be given to airway management and rapid preparation for transport (e.g., full immobilization on a backboard) and control of gross hemorrhage.

If a vascular access is obtained and hypovolemia is suspected (e.g., the patient shows signs and symptoms of shock, such as systolic BP less than 90 mm Hg), a fluid challenge of 1-2 L (20 mL/kg) may be administered until a systolic BP of 90 mm Hg is maintained. If the patient is still in shock after receiving 2 L of fluid, an additional 1 L of fluid may be administered (maximum total fluid administration = 3 L). However, administration of large volumes of IV fluids has been found to be deleterious to the survival of patients with uncontrolled hemorrhage, internally or externally. Studies (NEJM, 1994) have shown that maximal fluid resuscitation may increase the bleeding, thereby preventing the formation of a protective thrombus or dislodging it once the intraluminal pressure exceeds the tamponading pressure of the thrombus. For this reason, consult with the physician should be made prior to the administration of large volumes of IV fluids when the transport time is relatively short (e.g., less than 20 minutes).

A female in her second or third trimester (greater than 20 weeks) of pregnancy should be placed on her left side for transport. If the injuries require the use of a backboard, following full immobilization to the backboard, the backboard should be tilted to the left. Failure to follow this practice may cause hypotension due to decreased venous return.

If history, symptoms, or signs of head or spinal injuries are present, manually immobilize the patient's head and neck while maintaining a patent airway using a modified jaw-thrust method. Immobilization of the entire spine is indicated following initial stabilization. Cases involving hangings that do not meet Trauma Alert criteria are not considered Trauma Alert patients (e.g., a "suffocation type" patient without c-spine deformity).

2.10.1 Head and Spine Injuries / Trauma
Adult Medical Protocol

Purpose: This protocol is for patients who are suspected of having a head and/or spinal injury. If history, symptoms, or signs of head or spinal injuries are present, manually immobilize the head and neck while maintaining a patent airway using a modified jaw-thrust method. Immobilization of the entire spine is indicated following initial stabilization. Hangings without Trauma Alert Criteria ARE NOT Trauma Alert Patients (e.g. "suffocation type", patient without C-spine deformity). **NOTE**: protocol **4.35 Spinal Motion Restriction Clearance** should be used on a completely alert and cooperative patient at low risk for c-spine injury to determine if spinal motion restriction is needed.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1.
2. Airway Assessment/Management Protocol 2.1.2. Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Determine if C-spine immobilization is needed via Spinal Motion Restriction Clearance Protocol.
4. Attach cardiac monitor and pulse oximeter
5. If isolated head injury, elevate head of backboard 30 degrees (12 – 18 inches).
6. Determine level of consciousness (AVPU).
7. Assess for and document the Glasgow Coma Scale
8. Complete motor examination (paralysis, weakness, posturing), if possible.
9. Pupillary examination (size, equality).
10. Complete sensory examination, if possible.
11. Open wounds, which expose the brain tissue, should be covered with saline-soaked gauze.
12. If combative, check airway, ensure oxygen delivery, and restrain as needed.

ALS LEVEL 1: PARAMEDIC ONLY

1. Intubation and ventilation with 100% oxygen for markedly decreased LOC, inability to maintain a patient airway, or for GCS <= 8.
2. If signs of brainstem herniation exist (e.g. pupillary dilatation, asymmetric pupillary reaction, or motor posturing), ventilate patient to achieve optimal $ETCO_2$ of 35 – 40 mm Hg.
3. If unresponsive or pulseless, apneic:
    a. Intubate with neck in neutral position (stabilized with traction by second provider).
    b. Ventilate with 100% oxygen.
    c. CPR if pulseless.
4. If BP <90 mm Hg systolic, or signs of shock:
    a. IV 0.9% Normal Saline en route. Bolus with 250 cc increments of IV fluid p.r.n. x 2 liters. Recheck vitals after each bolus
5. If patient has seizures give one of the following:

a. **Versed** 2 – 4 mg IVP/IO/IM/IN for seizures and agitation.
b. **Ativan** 2 – 4 mg IV/IO/IN

6. Consider need or RSI to control airway. See procedure **4.31 RSI**

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

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2.10.2 Eye Injuries
Adult Medical Protocol

Purpose: This protocol covers a variety of injuries to the eye. If other injuries to the body exist, priority of care should be given as appropriate.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. Oxygen if applicable via nasal cannula @2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter as indicated.
4. Remove or ask patient to remove contact lens, if still in affected eye(s).
5. **If Penetrating Trauma:**
   a. Stabilize penetrating object(s) and cover affected eye with an ocular shield or similar rigid device. Cover both eyes to minimize eye movement. Avoid direct pressure on eye or penetrating object.
   b. DO NOT delay transport.
6. **If Blunt Trauma**:
   a. Cover both eyes
   b. Do Not delay transport
7. If eyeball has been forced out of the socket, cover the entire eye area with a rigid container, such as a disposable drinking cup. Avoid contact with the exposed globe. If bleeding, control by direct pressure with a sterile dry dressing.
8. **If Loss of Vision**: (If sudden painless and non-traumatic loss of vision, consider Retinal Artery Occlusion);
   a. Apply cardiac monitor and assess for changes
   b. Apply vigorous pressure using heel of hand to affected eye for 3-5 seconds, then release. (Patient may perform this procedure)
   c. Do Not delay transport
9. **If Chemical Injury:**
   a. Flush immediately with sterile normal saline and continue flushing en route.
   b. Bring chemical container or name of chemical with patient to the emergency department.

ALS LEVEL 1: PARAMEDIC ONLY

1. Initiate IV lactated Ringer's or Normal Saline at KVO PRN if injury seems serious.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

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2.10.3 Chest Trauma /Neck Trauma: Blunt and Penetrating

Purpose: This protocol covers both blunt and penetrating chest trauma and should be part of initial resuscitation if breathing is compromised. Chest pain due to blunt trauma may be an indication of underlying injury. Blunt injuries such as a pulmonary contusion and cardiac contusion may cause respiratory insufficiency and /or myocardial infarction.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol. 2.1.2. Oxygen via nasal cannula @ 4 LPM to maintain pulse ox ≥ 94% (use non-rebreather @15 LPM if SpO_2 < 90%)
3. Attach cardiac monitor and pulse oximeter.
4. If penetrating or sucking chest or upper back wound (look for bubbles, listen for air leaks):
5. Place occlusive dressing (or commercially available covering) on chest or neck during exhalation (tape on 3 sides, for chest, 4 sides for neck) or apply Chest Seal or similar device. Once occluded, monitor for tension pneumothorax, edema and airway compromise.
6. Impaled objects should be stabilized in place. If impaled object is very large or unwieldy, attempt to cut object to no less than six inches from chest.

ALS LEVEL 1: PARAMEDIC ONLY

1. Start two large bore IVs or IOs of lactated Ringer's or normal saline TKO. Bolus as needed with two liters of IV fluid in 250 – 500 ml increments to maintain systolic BP > 90 mm Hg. Check vital signs frequently.
2. Call Trauma Alert if patient meets criteria (see Trauma Alert Criteria)
3. If flail chest (unstable segment that does not expand with the remainder of the chest on inspiration):
    a. If conscious, stabilize flail segment with gauze pad, IV bag, or place the patient's ipsilateral arm in a sling and swathe
    b. If unconscious, immobilize neck and intubate. Ventilate with 100%
4. If tension pneumothorax develops, (unilateral absent breath sounds with or without tracheal deviation or bilaterally absent breath sounds:
    e. Perform needle decompression per protocol.
5. If continued inadequate ventilations and decreasing LOC:
    a. Rapid secondary survey for additional injuries.
    b. Immobilize neck.
    c. Control hemorrhage.
    d. Intubate with cervical stabilization.
    e. NECK INVOLVEMENT: CONSIDER CRICH/NEEDLE CRICH
    f. Ventilate with 100% oxygen via BVM.
    g. Cardiac compressions if pulseless.
6. Treat any dysrhythmias per cardiac dysrhythmia protocols.
7. If patient being transferred to another facility with chest tube(s) already in place:

a. Keep chest tubes tubing from kinking.
b. Check dressing over chest tube site to assure adequately adhered.
c. **Keep pleuravac upright at all times**.
d. Monitor if on suction for intermittent bubbling.
e. If patient with chest tube begins to experience severe respiratory distress:
    1) Rapidly assess ABCs.
    2) Assist ventilations as needed.
    3) Check chest tube tubing for kinks or leaky connections or blood in tube. If so, unkink, seal leak, or milk tubing.
    4) If patient is on board air ambulance, immediately ascertain the cabin altitude pressure. If greater than sea level, have the pilot descend the aircraft to achieve cabin altitude of sea level.

ALS LEVEL 2: MEDICAL CONTROL

1. Medical control or medical director for further orders as needed.
2. Pain management for chest trauma ONLY by medical control orders

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2.10.4 Abdominal / Pelvic Trauma

Adult Medical Protocol

Purpose: This protocol covers blunt and penetrating abdomino-pelvic trauma. Penetrating injuries may also include the chest. Patients who may initially appear normal can rapidly deteriorate and therefore should be closely monitored and have serial exams.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2
3. Attach cardiac monitor and pulse oximeter.
4. If patient pregnant and back boarded, tilt board 30 degrees left
5. Impaled objects should be stabilized in place.
6. Eviscerations should be covered with saline-soaked gauze. Do not attempt to push the organs back into the abdomen.
7. For penetrating injuries cover with an occlusive dressing (e.g. Vaseline gauze).
8. Do not log roll patient with a suspected pelvic fracture (may use scoop stretcher)
9. If pelvic fracture suspected, wrap in sheet splint or commercially available pelvic splint
10. Rapid transport.

ALS LEVEL 1: PARAMEDIC ONLY

1. Establish two large bore IVs of 0.9% Normal Saline to maintain systolic pressure > 90 mm Hg. Run in two liters of IV fluid. Monitor vital signs and lung sounds after each 250cc bolus. Discontinue if signs of pulmonary edema. If systolic pressure still < 90 contact medical control for further IV orders. IF IV access is unavailable, insert one or two EZ-IOs in the appropriate extremities
2. Call a trauma alert on all patients that meet criteria (see trauma alert protocol).

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.
2. Pain management for abdominal pain ONLY by medical control orders

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2.10.5 Extremity Injuries

Adult Medial Protocol

Purpose: This protocol will cover extremity injuries including fractures, crush, lacerations, and amputations. Time is critical if there is any chance of re-implanting the amputated part. Lacerations should be repaired as soon as possible (ideally wounds should be repaired within 6 hours), as the risk of infection increases with each passing hour before repair. Urgently transport any injury with vascular compromise.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2
3. Control bleeding
4. Rinse any grossly contaminated wound with saline and cover with sterile dressing.
5. Attach cardiac monitor and pulse oximeter as indicated for seriously injured patient (may not be necessary for an isolated distal extremity wound or fracture).
6. Trauma Alert patients who meet criteria (see Trauma Alert Criteria)
7. Transport to designated facility.
8. If severe life threatening hemorrhage cannot be controlled by direct pressure or other simple measures, apply a tourniquet as per Tourniquet Protocol or refer to 2.10.11 Prehospital Bleeding/External Hemorrhage Controlr protocol

FRACTURES

1. Any fracture or suspected fracture should be splinted appropriately and if possible, apply ice pack to area.
2. Remove and secure all jewelry on the affected extremity. Have your partner witness the disposition of the jewelry, i.e. given to patient or family member, and document disposition in the chart.
3. Check pulse, sensation, and movement before and after splinting.
4. Closed angulated fractures without distal pulse should be aligned using proximal and distal traction during splinting, except fractures that involve a joint, which should be splinted in position found.
5. Traction splints should be used in cases of closed femur fractures, unless a pelvic fracture is suspected. Hip fractures or pelvic fractures can be treated with sheet splint. Femur fractures can also be treated with HARE Traction Splint or Sager Traction Splint.

AMPUTATIONS

1. The stump should be dressed with bulky dressing
2. Rinse the amputated part with saline to remove loose debris.
3. Wrap amputated part in gauze moistened with saline
4. Placed wrapped part in plastic bag and seal. Label with name, date and time.
5. Place plastic bag on ice for transport.

ALS LEVEL 1: PARAMEDIC ONLY

1. One or two large bore IV(s) of 0.9% Normal Saline solution at appropriate rate to maintain systolic > 90 mm Hg. If intraosseous IV is started, do not use injured extremity. If BP < 90, bolus with 250 ml increments of IV fluid up to 2 liters with vital sign rechecks between each bolus.
2. Treat for shock, if indicated.
3. If patient's blood pressure is stable AND isolated extremity wounds AND patient has no allergies to specific pain medication give one of the following:
    a. **Morphine** IV in 2mg increments, titrate to pain up to 10mg
    b. **Fentanyl** 50 – 100 mcg IV/IM/IO/IN
    c.
4. If nauseated, give one of the following:
    a. **Zofran** 4-8mg IV
    b. **Benadryl 25 mg** IV or IM.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.
2. For IV fluid orders beyond 2 liters if patient remains hypotensive and tachycardic
3. For further pain medication orders beyond the amount allowed in ALS **Ketamine** 0.1 – 0.5 mg/kg IV/IO, or 0.5 mg/kg IN, or 5 mg/kg IM

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2.10.6 Burns
Adult Medial Protocol

Purpose: Burns can be caused by solar, thermal, chemical, and electrical sources. First-degree burns (reddened skin, only the epidermal layer), and second-degree burns (red skin with blisters, extends into the dermis) are painful. Third degree burns (full thickness, charred appearance, All epidermal and dermal structures are destroyed) are painless and leathery. Many burns are associated with inhalation injury. The signs and symptoms of inhalation injury include: nasal and orophyarngeal burns, charring of the tongue or teeth, sooty (blackened) sputum, singed nasal and facial hair, abnormal breath sounds (e.g. stridor, rhonchi, wheezing, etc.), and respiratory distress. In cases of inhalation injury, attention should be given to the patency of the airway. Acute swelling can cause an airway obstruction. The paramedic should consider the need for early intubation to avoid a complete airway obstruction that requires a Cricothyroidotomy.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1.
2. Airway Assessment/Management Protocol 2.1.2.
3. Attach cardiac monitor and pulse oximeter.
4. Extinguish any flames on patient; remove smoldering clothing (leather), and any constricting jewelry. Do not remove or peel off skin or tissue.
5. Stop the burning process:
   - THERMAL BURNS; Lavage small non-blistered burns with tepid water (sterile, if possible) to cool the skin. Do not attempt to wipe off semisolids (grease, tar, wax, etc)
   - CHEMICAL: Flush with water or normal saline. Brush off dry chemicals. Refer to hazmat protocols as indicated.
   - ELECTRICAL: Remove from contact with current source if equipped to do so. (Note any secondary fractures and Exit wounds caused by current.)
6. Assess the extent of the burn using the Rule of Nines and the degree of burn severity. Call trauma alert if patient meets criteria (2° or 3° burns > 20% BSA): (SEE TRAUMA ALERT CRITERIA) (See Burn Rule of Nine Appendix) (see Burn Severity Catagories)
7. Apply dry sterile dressings to burn areas
8. Prevent hypothermia, keep patient warm and insure that all outer layers of dressings are dry
9. If altered LOC and/or signs of head injury (consider carbon monoxide if closed space burn)
10. Transport to designated hospital.

ALS LEVEL 1: PARAMEDIC ONLY

1. 1 or 2 large bore IVs (in non-burned area if possible) with Lactated Ringer's or Normal Saline. Rate should be based on Parkland Formula: **4cc x kg x %TBS area burned**. ½ of this amount will be given over the first 8 hours, so divide the total amount by 2 then again by 8 and this is the cc/hr needed. Example: 70 kg patient with 60% burns to his body.
   4cc x 70kg x 60 (%burned) = 16,800
   16,800 ÷ 2 = 8,400 (amount of fluid need in 8 hours)
   8,400 ÷ 8 = 1050 (amount of IV fluid /hour)
2. If respiratory distress, or airway burns exist, prepare to intubate or support/assist ventilations.
3. If pulseless or apneic, go to Cardiac Arrest Protocol.
4. If additional injuries, go to specific protocol.
5. If patient has isolated burn injuries and no evidence of head injury, altered mental status, chest trauma or abdominal trauma and normal vital signs, CHECK ALLERGIES, give one of the following pain meds for major burns;
   - **Morphine** 2mg increments IV and titrate to pain up to 10mg
   - **Fentanyl** 50 – 100 mcg IV/IM/IO/IN

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control for additional pain medication orders as needed.
2. Consider escharotomy per med control if circumferential burns of the neck, chest, or extremities are interfering with effective ventilations or circulation.
3. **Ketamine** 0.1 – 0.5 mg/kg IV/IO, or 0.5 mg/kg IN, or 5 mg/kg IM
4. Contact medical control or medical director for any questions or problems

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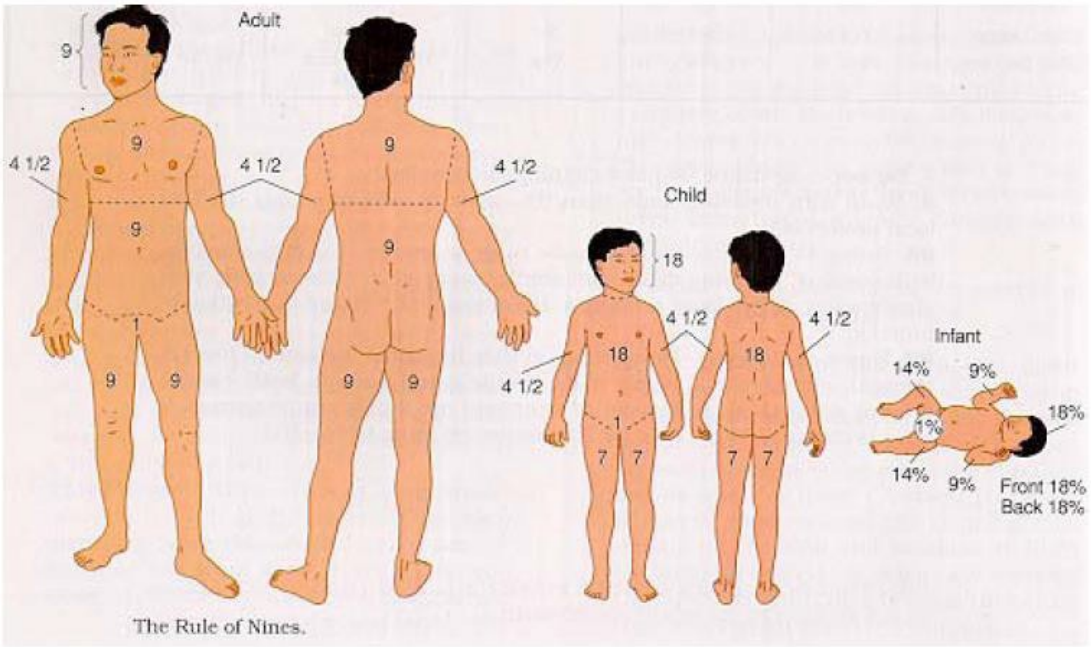
Burn Classification	Characteristics
Minor burn injury	◆1°burn ◆2° burn < 15% BSA in adults ◆2° burn < 5% BSA in children/aged ◆3° burn < 2% BSA
Moderate burn injury	◆2° burn 16-25% BSA in adults ◆2° burn 5-20% BSA in children/aged ◆3° burn 2-10% BSA
Major burn injury	◆2° burn > 25% BSA in adults ◆2° burn > 20% BSA in children/aged ◆3° burn > 10% BSA ◆Burns involving the hands, face, eyes, ear feet, or perineum ◆Most patient with inhalation injury, electric injury, concomitant major trauma, or significant pre-existing diseases



The Rule of Nines.

2.10.7 Dental Trauma /Avulsed Tooth/Teeth

Adult Medical Protocol

Purpose: This protocol can be used for patients who sustained dental trauma. Broken teeth, dentures or partial plates can potentially cause airway obstruction, have high index of suspicion if patient is having any respiratory distress following dental trauma. These should be removed to clear the airway. If a tooth is completely knocked out and is not a primary (baby) tooth, make all possible attempts to locate the tooth. If the tooth can be located, AND the root is not broken (completely intact) follow this protocol to manage the situation.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2 (oxygen PRN)
3. Attach cardiac monitor and pulse oximeter PRN.
4. Transport to designated hospital.
5. If the avulsed tooth (teeth) can be located, pick it up by the crown and avoid touching the root. Inspect the tooth to make sure it is completely intact (not broken and the entire root of the tooth is intact).
6. Rinse in normal saline (DO NOT rub or scrub) and placed in moistened gauze, but there is no need to cool or ice. Transport with patient to the hospital. As an alternative, if re-implantation is NOT feasible and the patient is a fully conscious adult, then the best procedure is to place the tooth in the mouth, either under the tongue or in the buccal vestibule. This is not recommended for children
7. Re-implantation is recommended if possible, at the scene as time is of the essence. The sooner an avulsed tooth can be re-inserted into its original socket, the greater the chance the tooth will survive. The following guidelines pertain to re-implantation at the scene:
    a. Applicable only for permanent teeth (i.e., with patients over 6.5 years of age)
    b. Applicable when only one or two teeth are cleanly avulsed, and the entire root is present
    c. Applicable only to anterior teeth (front 6, upper and lower)
    d. The patient must be conscious, cooperative, and not under the influence of alcohol or drugs.
    e. Should be attempted within the first 30 minutes; the sooner, the greater success rate
    f. Have the patient rinse his/her mouth with saline and spit. Do this several times to rinse the oral cavity.
    g. Rinse the tooth with saline (do not scrub), gently reposition it into the original socket and in as best anatomical position as possible (as even with the adjacent teeth as possible).
    h. Do not force reimplantation. Gentle insertion is all that is necessary. Slight incorrect positioning can be corrected later.

i. Roll a piece of gauze and place between the patient's teeth. Ask the patient to lightly bite down to hold the re-positioned tooth in place with the rolled gauze.

ALS LEVEL 1: PARAMEDIC ONLY

1. Chances are this patient will not need IV fluids. Pain meds can be given IM however at paramedic's discretion, IV access can be established.
2. If this is isolated dental trauma with no signs of head injury, c-spine injury, or airway compromise, you may give one of the following:
   a. **Morphine** 2mg increments IV up to 10 mg or **Morphine** 5mg IM
   b. **Fentanyl** 50 – 100 mcg IV/IM/IO/IN

ALS LEVEL 2: MEDICAL CONTROL

1. Notify medical control or medical director if any problems and/or questions

c. 2. **Ketamine** 0.1 – 0.5 mg/kg IV/IO, or 0.5 mg/kg IN, or 5 mg/kg IM

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2.10.8 Sexual Assault

Adult Medical Protocol

Purpose: This protocol is to be used for patients who are alleged victims of sexual assault. Treat patient with dignity. Be careful what and how you document. Avoid comments that may be construed as fact by an attorney but for which you have no proof. For example, don't write; "patient sustained a large wound on her leg that occurred during the rape". Unless you were there and witnessed the incident, you cannot say for a fact that the wound occurred as the result of the rape. This also implies that you know for a fact that a rape occurred. It is better to use statements such as "the alleged rape" or "the patient states she was raped". Attorneys will back you into a corner and discredit your whole testimony if you make such statements.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. If indicated Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter if indicated
4. Reassure patient and provide emotional support.
5. Perform secondary survey.
6. Treat all injuries appropriately, preferably with a relative present.
7. Protect the scene and preserve evidence. Do not allow the patient to bathe, change clothes, go to the bathroom, or douche. Do not allow patient to place any potential evidence in plastic bags.
8. Notify police if not already informed.
9. Transport to hospital that is equipped to perform sexual assault examinations.

ALS LEVEL 1: PARAMEDIC ONLY

1. Unless patient has serious injuries and/or is hemodynamically unstable, no ALS Level 1 needed
2. Initiate IV only if indicated by seriousness of injury

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

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2.10.9 General Crush Injury

Adult Medical Protocol

Purpose:

This protocol should be considered when the patient has been **entrapped at the scene for more than one hour,** one or more full extremities trapped by an object capable of causing a crush injury, including machinery, dirt, rock, and rubble or there is entrapment of patient with history of previous cardiac or renal disease or dialysis treatment. The damaged muscle tissue produces and releases many toxins that can have detrimental effects on the body. The longer the victim is trapped, the longer the toxins are given to build up distal to the crush site. The crushing force acts as a dam that prevents these toxins from being released into the rest of the body. Once the force is removed, the toxins are allowed to run freely throughout the body, causing a myriad of problems.

Crush *Syndrome* should be suspected in patients with entrapment/compression of greater than one hour, especially when a large muscle mass/group is involved. The initial injury is at the site of the muscle crushed by the mechanical force of an object. The muscle cells die as the result of the following. First, the force of the crushing object ruptures muscle cells. Second, the direct pressure of the object on the limb causes muscle cells to become ischemic. The combination of mechanical force and ischemia can cause muscle death within an hour. Third, the force of the crush injury compresses large vessels, resulting in the loss of blood supply to muscle tissue. Muscles can normally survive circulatory ischemia for up to four hours before the cell death. After four hours, the cells begin to die as a result of the circulatory compromise.

Treatment of the patient at risk for Crush Syndrome ***should begin before the patient is removed when practical.*** After the skeletal muscle injury occurs and the crushing object is removed, the accumulation of cellular toxins (myoglobin) and electrolytes (potassium) are released into the circulation and may cause lethal cardiac arrhythmias, acute renal failure and sudden death. The systemic effects of Acute Crush Syndrome only occur after the object is removed and the injured extremity is re-perfused. Removal of the object causes a massive fluid shift into the injured muscle, resulting in acute hypovolemia and hypotension.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment Protocol 2.1.2. Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox at ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%) (environmental considerations, dust)
3. Spinal Motion Restriction if applicable
4. Confirm entrapment of 1 or more extremities
5. Complete trauma assessment to evaluate for other injuries and treat immediate life threats immediately

6. Hemorrhage control, may require Tourniquet (see Tourniquet Protocol 4.42) or refer to 2.10.11 Prehospital Bleeding/External Hemorrhage Control protocol
7. Place on Cardiac Monitor and pulse oximeter. Take vitals
8. If the extremity is reachable, check for decreased sensation, motor function, skin color changes and diminished distal pulses
9. Rapid transport once extricated
10. Consider Physician Response for possible field, surgical amputation.

ALS LEVEL 1: PARAMEDIC ONLY

PRE-EXTRICATION;

1. Establish two large bore IVs of NS (or LR). 2 liters NS bolus, followed by 500 ml/hr (limit fluid bolus for pediatric (20 ml/kg) and patients with history of cardiac or renal dysfunction
2. Pain control per Pain Protocol 2.1.5. **Fentanyl** is preferred to **Morphine**.
    a. **Fentanyl** 50 – 100 mcg IV/IM/IO/IN
    b. **Morphine** 4 mg initial then 2 mg increments prn up to 10 mg
    c. **Ketamine** 0.1 – 0.5 mg/kg IV/IO; or 0.5 mg/kg IN; or 5 mg/kg IM
3. IMMEDIATELY PRIOR TO EXTRICATION; Give **Sodium Bicarbonate** 1 mEq/kg up to 100 mEq IVP
4. Extrication

POST-EXTRICATION

5. Continue cardiac monitoring and assess for hyperkalemia; i.e. widening of QRS (>0.12 seconds) and peak T waves, hypotension
6. If hyperkalemic changes on monitor, give; **Calcium Chloride** 1 gm IV slow (over 5 minutes)
7. Give an **Albuterol** (only) Neb 2.5 mg
8. Dress/splint wound/extremity
9. Call Trauma Alert if criteria are met

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any questions or problems.

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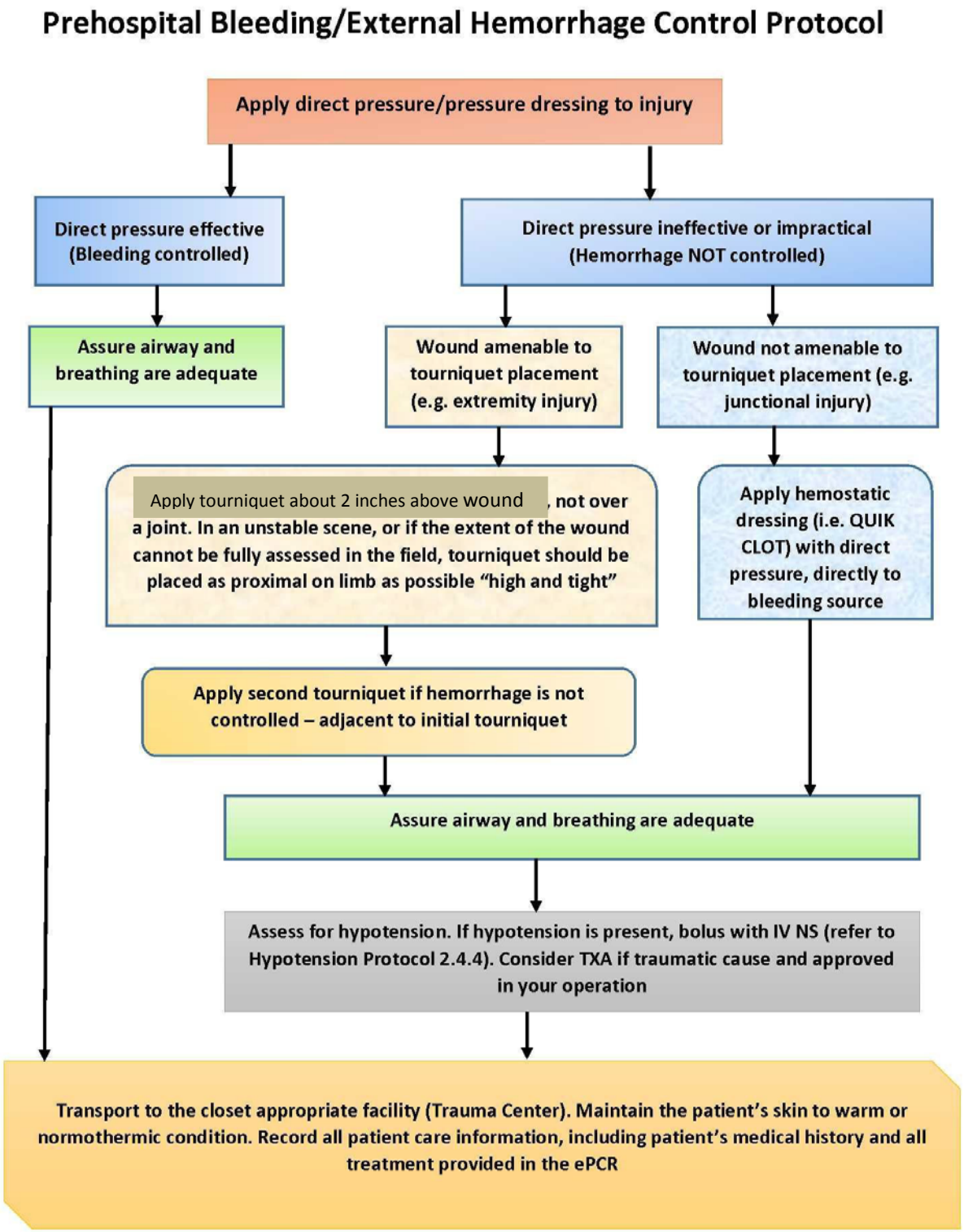
2.10.10 Prehospital Bleeding/External Hemorrhage Control



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2.10.11 Tranexamic Acid (TXA) for Trauma Related Hemorrhagic Shock

Adult Medical Protocols

Purpose: This protocol is to be considered for any patient with symptoms of hemorrhagic shock (sustained BP of < 90 mm Hg, sustained HR > 110/min secondary to blood loss) of less than 3 hours duration who may be in need of massive transfusion (> 10 units PRBCs) upon arrival at the hospital. Hemorrhage could be the result of blunt force or penetrating trauma. Hemorrhage may be internal or external.
NOTE: IF you have a relatively short transport time to the trauma center, do not delay transport to prepare and administer TXA. Start toward the trauma center and consult with the receiving physician to inquire if they want you to start TXA in transit. This protocol is not required in non-911transport operations. 911 service operations can opt out of this protocol if transport time to trauma centers in your coverage area is relatively short (< 35 minutes). In those locations, TXA can be started in the hospital.

Protocol:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol. 2.1.1
2. Airway Assessment/Management Protocol. 2.1.2. Oxygen via nasal cannula @ 4 LPM to maintain pulse ox > 94% (use non-rebreather @15 LPM if SpO2 < 90%)
3. Attach cardiac monitor and pulse oximeter.
4. If penetrating or sucking chest or upper back wound (look for bubbles, listen for air leaks):
5. Place occlusive dressing (or commercially available covering) during exhalation (tape on 3 sides) or apply Chest Seal. Once occluded, monitor for tension pneumothorax.
6. Impaled objects should be stabilized in place. If impaled object is very large or unwieldy, attempt to cut object to no less than six inches from chest.

ALS LEVEL 1: PARAMEDIC ONLY

1. Start two large bore IVs of lactated Ringer's or normal saline TKO. Bolus as needed with one to two liters of IV fluid in 250 – 500 ml increments to maintain systolic BP > 90 mm Hg. Check vital signs frequently.
2. Control obvious source of external hemorrhage with direct pressure, pressure dressing and/or tourniquet.
3. Manage other traumatic injuries as per the specific protocol.
4. Criterial for starting **TXA**:
   i. Hemorrhagic shock < 3 hrs old with suspected need for massive transfusion
   ii. Sustained heart rate of 110 beats per minute or greater
   iii. Sustained hypotension (systolic BP less than 90 mmHg)

secondary to blood loss

5. Mix 1 gram **Tranexamic acid (TXA)** in 100 – 250 ml NS and infuse over 10 minutes. If transport time will exceed 1 hour: Begin a maintenance infusion after the initial bolus.
   ii. **Bolus Dose**:
   Adult: 1 gm tranexamic acid over 10 minutes
   Peds: 20 mg/kg IV over 10 minutes. Do not exceed adult doses
   v. Maintenance:
   Adult: 1 gram mixed in 1 liter (1000 ml) of NS is to be infused at 125 ml/hr IV.
   Peds: 20 mg/kg to be infused over 8 hours. Not to exceed 1000mg over 8 hours.

ALS LEVEL 2: MEDICAL CONTROL

1. Medical control or medical director for further orders as needed.

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2.11
Adults
With Special Health Care Needs

2.11 Adults with Special Healthcare Needs

Adult Medial Protocol

Overview: These protocols cover specific types of special healthcare needs in adult patients. Adults with special healthcare needs are those who have or are at risk for chronic physical, developmental, behavioral, and emotional conditions that necessitate use of health and related services of a type or amount not usually required by typical adults.

The general approach to adults with special healthcare needs includes the following:

1. Priority is given to ABCs.
2. Do not be overwhelmed by the machines
3. Listen to the caregiver.
4. If a nurse is present, rely on their judgment.
5. Remember…the patient's cognitive level of function may be altered.
6. Assume that the patient can understand exactly what you say.
7. Bring all medications and equipment to the hospital.

Obtaining a history includes asking the parent/caregiver the following:

1. Patient's normal vital signs
2. Patient's actual weight.
3. Developmental level of the patient.
4. Patient's allergies- include latex.
5. Pertinent medications/therapies.

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2.11.1 Home Mechanical Ventilators

Adult Medical Protocol

Purpose: This protocol is for patients who are on home ventilators. Home mechanical ventilators may be indicated for chronically ill adult with abnormal respiratory drive, severe chronic lung disease, or severe neuromuscular weakness. Some patients require continuous mechanical ventilation, while others only require intermittent support during sleep or acute illness. Home ventilators may either be volume limited or pressure limited. All are equipped with alarms. Types of ventilator alarms:

- Low pressure or apnea: May be caused by a loose or disconnected circuit or an air leak in the circuit or at the tracheostoma, resulting in inadequate ventilation.
- Low power: caused by a depleted battery.
- High pressure: can be caused by a plugged or obstructed airway or circuit tubing, by coughing, or by bronchospasm.
- Setting error: is caused by ventilator setting outside the capacity of the equipment.
- Power switchover: occurs when the unit switches from alternating-current power to the internal battery.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Patient (if able) or family should be available to assist with operating the patient's home ventilator during transport.
3. Confirm vent setting are correct with patient and/or family.
4. Airway Assessment/Management Protocol 2.1.2. If ventilator-dependant patient is in respiratory distress and the cause is not easily ascertained and corrected, remove the ventilator and provide assisted manual ventilations with a bag-valve device.
5. Suction PRN
6. Attach cardiac monitor and pulse oximeter if indicated
7. Consider need for other protocols

ALS LEVEL 1: PARAMEDIC ONLY

1. None

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any problems or concerns.

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2.11.2 Tracheostomy

Adult Medial Protocol

Purpose: Tracheostomies are indicated for long-term ventilatory support, to bypass an upper airway obstruction, and to aid in the removal of secretions. Tracheostomies come in a variety of sizes and can be either single lumen or double lumen. Special attachments include: tracheostomy nose (filtration device), tracheostomy collar (for oxygen or humidification), and Passy-Muir valve (speaker valve).

Signs of tracheostomy tube obstruction:

- Excess secretions.
- No chest wall movement.
- Cyanosis.
- Accessory muscle use.
- No chest wall rise with bag-valve ventilations.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. If obstruction is present, inject 1-3 ml of normal saline into the tracheostomy tube and suction PRN.
3. If unable to clear obstruction by suctioning, remove tracheostomy tube and insert new tube (same size or one size smaller). DO NOT FORCE TUBE.
4. If unable to insert new tracheostomy tube or if unavailable, insert endotracheal tube of similar size into stoma and ventilate with bag-valve-device PRN.
5. If unable to insert endotracheal tube, ventilate with bag-valve-mask over stoma or over patient's mouth while covering stoma PRN.
6. Attach cardiac monitor and pulse oximeter if indicated.
7. Consider need for other protocols.

ALS LEVEL 1: PARAMEDIC ONLY

1. None

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any problems or concerns

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2.11.3 Central Venous Lines
Adult Medial Protocol

Purpose: Central venous lines are indicated for administration of medications, delivery of chemotherapy, nutritional support, infusion of blood products, and blood draws. Types of central venous lines include: Broviac/Hickman, Port-a-cath/Med-a-port, and percutaneous intravenous catheters (PICC). Central venous line emergencies include: catheter coming completely out, bleeding at the site, catheter broken in half, blood embolus, thrombus, air embolus, and internal bleeding. **Use of SQ ports require special training and should not be used for IV access.**
Signs of blood embolus, thrombus, air embolus and internal bleeding:

- Chest pain
- Cyanosis
- Dyspnea
- Shock

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 2.1.1
2. Airway Assessment/Management Protocol 2.1.2. If indicated Oxygen via nasal cannula @ 2 - 4 LPM to maintain pulse ox at ≥ equal to 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter if indicated
4. If catheter is completely out, apply direct pressure.
5. If there is bleeding at the site, apply direct pressure.
6. If catheter is broken in half, clamp end of remaining tube.
7. If suspect blood embolus, thrombus, or internal bleeding: clamp line.
8. If suspected air embolism, clamp line and place patient on left side.
9. Consider need for other protocols

ALS LEVEL 1: PARAMEDIC ONLY

1 CVP and PICC lines may be used for emergency IV access under sterile conditions

2 If central ports need accessing for emergencies, refer to protocol **4.42 Indwelling Vascular Catheter**

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director for any problems or concerns

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2.11.4 Feeding Tubes

Adult Medial Protocol

Purpose: Feeding tubes are indicated for administration of nutritional supplements and in patients that have an inability to swallow. Types of feeding tubes include: nasogastric tube (temporary) and gastrostomy tubes (G tube). Types of G tubes include those that are surgically placed, percutaneous endoscopic gastrostomy tubes, PEG tubes, and jejunal tubes (J-tube). Complications include leaks, bleeding around the site, and displacement of the tube.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Medical Supportive Care 2.1.3
2. If catheter is completely out, cover site with Vaseline gauze and apply direct pressure to site.
3. Insert flexible suction of similar or same size to maintain opening.
4. If there is bleeding at the site, apply direct pressure.

ALS LEVEL 1: PARAMEDIC ONLY

1. None

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or the medical director for any questions or concerns.

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3.0
PEDIATRIC PROTOCOLS

Pediatric Protocols Overview

3.1 Pediatric Initial Assessment and Management

Introduction:

Protocols in Section 3.1 are designed to guide the EMT or paramedic in his or her initial approach to assessment and management of pediatric patients. The Basic Level care is specified as EMT and Paramedic (BLS) and Level 1 is Paramedic only (ALS). ALS Level 2 designates medical control orders.

Protocol 3.1.1 Initial Assessment should be used on all pediatric patients for initial assessment. During this assessment, if the paramedic determines that there is a need for airway management, Protocol 3.1.2 Airway Management should be used for the management of the pediatric airway. These protocols are frequently referred to by other protocols, which may or may not override them in recommending more specific therapy.

Protocol 3.1.3 Medical Supportive Care presents the basic components of preparation for transport of medical patients. Due to the significant differences in priorities and packaging in the pre-hospital care of trauma and hypovolemia cases, a separate Trauma Supportive Care protocol has been developed. After following Protocol 3.1.1 Initial Assessment, this Medical Supportive Care protocol may be the only protocol used in medical emergency situations where a specific diagnostic impression and choice of additional protocol(s) cannot be made. Judgment must be used in determining whether patients require ALS or BLS level care. This protocol is frequently referred to by other protocols, which may or may not override it in recommending more specific therapy.

Protocol 3.1.4 Trauma Supportive Care presents the basic components of preparation for transport of trauma patients. Due to the significant differences in priorities and packaging in the pre-hospital care of medical cases, a separate Medical Supportive Care protocol has been developed. After following Protocol 3.1.1, this Trauma Supportive Care protocol may be the only protocol used in trauma or hypovolemia situations where a specific diagnostic impression and choice of additional protocol(s) cannot be made. Judgment must be used in determining whether patients require ALS or BLS level care. This protocol is frequently referred to by other protocols, which may or may not override it in recommending more specific therapy.

Paramedics should use protocol 3.1.5. for pain management

Overview of Evaluating and Managing Pediatric Emergencies:

1. Remember that children are not small adults. Treatments vary as do drug dosages and fluid administration rates.
2. Cardiac arrest in children is not a sudden event. It is almost always due to a respiratory problem, which leads to hypoxia, bradycardia, and eventually asystole. Ventricular fibrillation is a rare event in children. Initial treatment should be directed at establishment of an airway, administration of supplemental oxygen, and mechanical ventilation.
3. Extra-glottic devices are available for pediatric patients. The preferred method of airway management is endotracheal intubation. Demand valves should not be used in children because of the tendency to cause barotrauma.
4. The intraosseous route of fluid and medication administration is available in children less than 6 years of age.
5. Blood pressure is a late sign of shock in children. Instead, you should evaluate end-organ perfusion.

Anticipating Cardiopulmonary Arrest

All sick children should undergo a rapid cardiopulmonary assessment. The goal is to answer the question, ***"Does this child have pulmonary or circulatory failure that may lead to cardiopulmonary arrest?"*** Recognition of the physiologically unstable infant is made by physical examination alone. Children who should receive the rapid cardiopulmonary assessment include those with the following conditions.

- Respiratory rate greater than 60
- Heart rate greater than 180 or less than 80 (under 5 years)
- Heart rate greater than 180 or less than 60 (over 5 years)
- Respiratory distress
- Trauma
- Burns
- Cyanosis
- Altered level of consciousness
- Seizures
- Fever with petechiae (small skin hemorrhages)

Rapid Cardiopulmonary Assessment

The rapid cardiopulmonary assessment is designed to assist you in recognizing respiratory failure and shock, thus anticipating cardiopulmonary arrest. The rapid cardiopulmonary assessment follows the new basic ABCs (or CAB) of CPR.

Airway Patency

Inspect the airway and ask yourself the following questions.

- Is the airway patent?
- Is it maintainable with head positioning, suctioning, or airway adjuncts?
- Is the airway unmaintainable? If so, what action is required?

(Endotracheal intubation, removal of a foreign body, and so on)

Breathing

Evaluation of breathing includes assessment of the following conditions.

- Respiratory rate. Tachypnea is often the first manifestation of respiratory distress in infants. An infant breathing at a rapid rate will eventually tire. Thus, a decreasing respiratory rate is not necessarily a sign of improvement. A slow respiratory rate in an acutely ill infant or child is an ominous sign.
- Air entry. Observing for chest rise, breath sounds, stridor, or wheezing can assess the quality of air entry.
- Respiratory mechanics. Nasal flaring and use of the accessory respiratory muscles is evidence of increased work of breathing in the infant and child.
- Color. Cyanosis is a fairly late sign of respiratory failure and is most frequently seen in the mucous membranes of the mouth and the nail beds. Cyanosis of the extremities alone is more likely due to circulatory failure (shock) than respiratory failure.

Circulation

The cardiovascular assessment consists of the following procedures.

- Heart rate. Infants develop sinus tachycardia in response to stress. Thus, any tachycardia in an infant or child requires further evaluation to determine the cause. Bradycardia in a distressed infant or child may indicate hypoxia and is an ominous sign of impending cardiac arrest.
- Blood pressure. Hypotension is a late and often sudden sign of cardiovascular decompensation. Even mild hypotension should be taken seriously and treated quickly and vigorously, since cardiopulmonary arrest is imminent.
- Peripheral circulation. The presence of pulses is a good indicator of the adequacy of end-organ perfusion. The pulse pressure (the difference between the systolic and diastolic blood pressure) narrows as shock develops. Loss of central pulses is an ominous sign.
- End-organ perfusion. The end-organ perfusion is most evident in the skin, kidneys, and brain. Decreased perfusion of the skin is an early sign of shock.

A capillary refill time of greater than 2 seconds is indicative of low cardiac output. Impairment of brain perfusion is usually evidenced by a change in mental status. The child may become confused or lethargic. Seizures may occur. Failure of the child to recognize the parents' faces is often an ominous sign. Urine output is directly related to kidney perfusion. Normal urine output is 1-2 ml/kg/hr. urine flow of less than 1 ml/kg/hr is an indicator of poor renal perfusion.

The rapid cardiopulmonary assessment should be repeated throughout initial assessment and patient transport. This will help you determine whether the patient's condition is deteriorating or improving. Any decompensation or change in the patient's status should be immediately treated.

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3.1.1 Initial Assessment

Pediatric Protocol

Purpose: The initial assessment of the pediatric patient will vary with the age of the patient. However, there are some initial components of assessment that are consistent with all patients, regardless of age. The paramedic or EMT should follow the appropriate approach to patient assessment with respect to the patient's age. In addition to the patient, the parents or caregiver may be needed to gain information needed for a complete assessment of the patient.

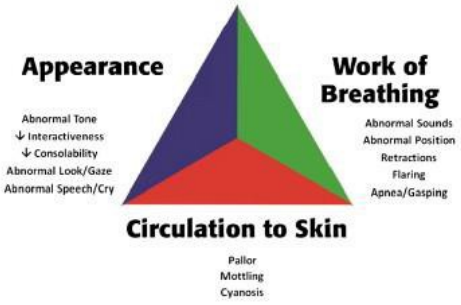
A five-step, systematic approach should be used when assessing the child:

1. Scene size-up
2. General assessment (pediatric assessment triangle [PAT]).
    a. Appearance
    b. Work of breathing
    c. Circulation
3. Primary assessment
    a. ABCDE
    b. Cardiopulmonary function
    c. Neurological function
    d. Vital signs
4. Secondary assessment
    a. SAMPLE
    b. Head-to-toe survey
5. Ongoing assessment

Procedure:

Basic Level: EMT and PARAMEDIC

1. **Scene Size-up.**
    A. Review of Dispatch Information.
    B. Assess Need for Body Substance Isolation.
    C. Assessment of Scene Safety.
    D. Determine Mechanism of Injury.
    E. Determine Number and Location of Patients.
    F. Determine Need for Additional Resources.
    G. Observe Environment of Pediatric Patient.
2. **Pediatric Assessment Triangle - Rapid Cardiopulmonary Assessment.**
    A. Appearance. (Peds Assessment Triangle chart)
        1. Alertness.
        2. Distractibility.
        3. Consolability.
        4. Eye Contact.
        5. Speech/Cry.



6. Spontaneous motor activity.
7. Color.

B. Work of Breathing. (Peds Assessment Triangle chart)

1. Appearance (as above).
2. Use of accessory muscles.
    a. Intercostal and/or supraclavicular retractions.
    b. Diaphragmatic breathing (see-saw type breathing).
3. Respiratory rate.
4. Tidal volume (chest expansion).
5. Other signs of respiratory distress.
    a. Nasal flaring.
    b. Grunting.
    c. Cyanosis.

C. Circulation to Skin. (Peds Assessment Triangle chart)

1. Strength of pulses (central vs. peripheral).
2. Color and temperature of extremities (central vs. peripheral).
3. Capillary refill time.
4. Pulse rate.
5. Blood pressure (may be difficult to assess in infants).

3. **Initial Assessment.**

A. Assess Airway, C-Spine and Initial Level of Consciousness (AVPU).
B. Assess Breathing.
C. Assess Circulation and Presence of Hemorrhage.
D. Assess Disability - Movement of Extremities.
E. Expose and Examine Head, Neck, Chest, Abdomen, and Pelvis (check back when patient is rolled on side).
F. Identify Priority Patients.
G. Assess the vital signs
    1. Blood Pressure (Capillary Refill)
    2. ECG
    3. SpO2

4. **Initial Management** (see Pediatric Protocol 3.1.3 - Medical Supportive Care or 3.1.4 -Trauma Supportive Care).

A. Life-threatening (urgent)
B. Non-Life-threatening (not urgent)

5. **Secondary Assessment.**

A. Conduct a Toe-to-Head Survey.
B. Neurological Assessment.
    1. Pupillary Response.
    2. Pediatric Glasgow Coma Score.
C. Repeat Assessment Triangle - Rapid Cardiopulmonary Assessment (as above).
D. Obtain a Medical History.

1. S - Symptoms - Assessment of Chief Complaint.
2. A - Allergies.
3. M - Medications.
4. P - Past Medical History.
5. L - Last Oral Intake.
6. E - Events Leading to Illness or Injury.

6. **Ongoing Assessment**. Reassess the patient every fifteen (15) minutes, or for critical patients every five (5) minutes.
   A. Continually monitor:
      1. Respiratory effort
      2. Skin color
      3. Mental status
      4. Temperature
      5. Pulse oximetry
   B. Reevaluate vital signs and compare with baseline vital signs.

7. Other Assessment Techniques.
   A. Cardiac Monitoring.
   B. Glucose Determination
   C. Pulse Oximetry
   D. Dealing with the autistic patient (3.10.5 Autistic patients)

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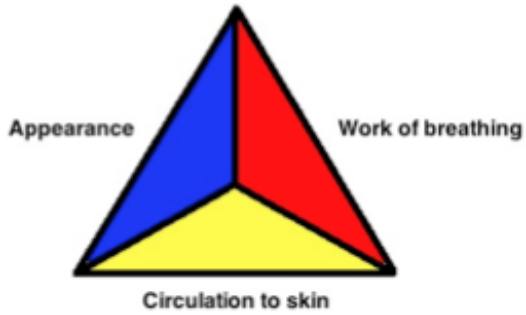
Pediatric Assessment Triangle

Dieckmann R et al. *Pedriatr Emerg Care* 2010. PMID 20386420
ER CAST: http://blog.ercast.org/2010/05/the-toxic-neonate/
(Courtesy of Dr. Michelle Reina & Dr. Rob Bryant)



The PAT functions as a rapid, initial assessment to determine "sick" or "not sick," and should be immediately followed by/not delay the ABCDEs. It can be utilized for serial assessment of patients to track response to therapy.

Appearance: The "Tickles" (TICLS) Mnemonic	
Characteristic	**Normal features**
T one	Move spontaneously, resists examination, sits or stands (age appropriate)
I nteractiveness	Appears alert/engaged with clinician or caregiver, interacts well with people/environment, reaches for objects
C onsolability	Stops crying with holding/comforting by caregiver, has differential response to caregiver vs. examiner
L ook/gaze	Makes eye contact with clinician, tracks visually
S peech/cry	Uses age-appropriate speech

Work of breathing	
Characteristic	**Abnormal features**
Abnormal airway sounds	Snoring, muffled/hoarse speech, stridor, grunting, wheezing
Abnormal positioning	Sniffing position, tripoding, prefers seated posture
Retractions	Supraclavicular, intercostal, or substernal, head bobbing (infants)
Flaring	Flaring of the nares on inspiration

Circulation to skin	
Characteristic	**Abnormal features**
Pallor	White/pale skin or mucous membranes
Mottling	Patchy skin discoloration due to variable vasoconstriction
Cyanosis	Bluish discoloration of skin/mucous membranes

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Components of the PAT and the General Impression

Component	Stable	Resp Distress	Resp Failure	Shock	CNS/Metabolic	Cardiopul Failure
Appearrence	Normal	Normal	Abnormal	Normal/abnormal	Abnormal	Abnormal
Work of Breathing	Normal	Abnormal	Abnormal	Normal	Normal	Abnormal
Circulation of the skin	Normal	Normal	Normal/Abnormal	Abnormal	Normal	Abnormal

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3.1.2 Airway Management
Pediatric Protocol

Purpose: **Airway assessment and management is the most important and first order of business when patient contact is made (immediate removal from unsafe scene may on occasion trump airway management). An algorithm for general airway assessment/management provides a general overview and road map for the EMT/Paramedic to follow if needed. This algorithm will in turn direct the EMT/Paramedic to either a Non-breathing Airway Protocol or a Breathing Patient Airway Protocol. Once the airway is controlled/secured, attention can be given to the other medical/trauma problems and care directed according to the appropriate protocol.**

Procedure:

Basic Level: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. **If spontaneous breathing is present without compromise**:
   - A. Monitor breathing during transport.
   - B. Administer oxygen PRN (Oxygen should only be administered and titrated to the patient that shows signs of respiratory compromise and/or is unable to maintain $SpO_2 \geq 94\%$). Avoid over oxygenation; wean oxygen concentration as tolerated.
     1. Infants via infant mask @ 2-4 L/min.
     2. Small child (1-8 years) via pediatric nasal cannula @ 2 – 4 L/min or pediatric face mask @ 6-8 L/min.
     3. Older child (9-15 years) via nasal cannula @ 2 – 4 L/min, simple mask @4-6 L/min or non-rebreather mask @ 10-15 L/min.
     4. If mask is not tolerated administer via blow-by method.
3. **If spontaneous breathing is present with compromise:**
   - A. Maintain airway (e.g. modified jaw thrust)
   - B. Suction PRN.
   - C. Administer oxygen and titrate to pulse ox of > 94%.
     1. Infants via infant mask @ 2-4 L/min.
     2. Small child (1-8 years) via via pediatric nasal cannula @ 2 – 4 L/min or pediatric mask @ 6-8 L/min.
     3. Older child (9-15 years) via nasal cannula @ 2 – 4 L/min, simple mask @4-6 L/min or non-rebreather mask @ 10-15 L/min.
     4. If mask is not tolerated administer via blow-by method.
   - D. If unable to maintain airway, insert oropharyngeal or nasopharyngeal airway PRN. May consider extra glottic device if available for size of child.
   - E. Assist ventilations with BVM PRN.

F. Pulse oximeter, as soon as possible.

4. **If spontaneous breathing is absent or markedly compromised**: (a)(b)

A. Maintain airway (e.g. modified jaw thrust).

B. Oral and Nasal Suction PRN. (bulb syringe if needed)

C. If unable to maintain airway, insert oropharyngeal or nasopharyngeal airway. May consider extra glottic device if available for size of child.

D. Ventilate with BVM @ 12 – 20 BPM for perfusing rhythm or 8 – 10 BPM when CPR is being performed.

E. Monitor pulse oximetry and capnography or $ETCO_2$ monitoring device, as soon as possible.

ALS Level 1: PARAMEDIC ONLY

A. Perform endotracheal intubation PRN and document the following (The BVM should be initially used for ventilatory support. Endotracheal intubation should only be used when the BVM is ineffective or prolonged ventilatory support is necessary).

(1) Confirm ETT placement (see confirmation protocol). Document at least three.

a. Negative epigastric sounds
b. Positive bilateral breath sounds
c. Condensation in the ET tube
d. Chest rise and fall

(2) Secure ETT with tape and bite block or commercial device.

a. Full spinal immobilization is recommended

(3) Attach end-tidal CO_2 monitoring device.

(4) Monitor SpO_2 with pulse oximeter.

B. If unable to intubate and patient cannot be adequately ventilated by other means, perform needle cricothyroidotomy and transport rapidly to the hospital.

ALS LEVEL 2: MEDICAL CONTROL

A. Insert Nasogastric tube (only if trained) and decompress stomach PRN (when gross gastric distension is noted, an NG tube should be inserted to relieve gastric distension that may be compromising ventilatory effort).

(a) Ineffective ventilations may be evident by poor chest rise, poor lung sounds, and capnography readings failing to improve with ventilations.
(b) Follow the Universal Airway Algorithm on all advanced airways

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3.1.3 MEDICAL SUPPORTIVE CARE
Pediatric Protocol

Purpose: This protocol is used in conjunction with the Initial patient Assessment Protocol.

Procedure:

Basic Level: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Airway Management Protocol 3.1.2.
3. Attach cardiac monitor and pulse oximeter if indicated
4. Keep patient warm, infants cover head. (except if treating heat stroke, cool patient).

ALS LEVEL 1: PARAMEDIC ONLY

1. Monitor ECG PRN.
2. Establish IV (or EZ-IO if critical condition and in need of urgent fluids and/or drugs) of Normal Saline with regular infusion set PRN (a)(b)(c)(d), unless overridden by other specific protocol. EMT and Paramedic
3. Establish hospital contact for notification of incoming patient and obtaining consultation for level 2 orders.

ALS Level 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

Note:
(a) Authorized IV routes include all peripheral venous sites. Intraosseous IV site is the alternative to poor or no peripheral access. A large bore intracath should be used for unstable patients; Other permitted site is the area of anterior foot.
(b) A Buretrol, Volutrol, or Soluset should be used in lieu of a minidrip (60gtt) when starting an IV on patients that are eight years old or less, if available.
(c) An IV lock or medication access point (MAP) may be used in lieu of an IV bag in some patients with intravenous lines, when appropriate
(d) An EMT that has been authorized by their Medical Director may establish and IV.
(e) When unable to establish an IV in the pediatric patient that needs to be resuscitated, an intraosseous line may be used by the paramedic only.

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3.1.4 TRAUMA SUPPORTIVE CARE
Pediatric Protocol

Purpose: **This protocol is used in conjunction with the Initial Assessment Protocol.**

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1. Initiate trauma alert, if applicable.
2. Airway Management Protocol 3.1.2. (manually stabilize c-spine PRN).
3. Correct any open wound/sucking chest wound (occlusive dressing).
4. Control hemorrhage
5. Spinal Motion Restriction of C-spine and secure patient to backboard or Pediatric Immobilizer PRN (a)
6. Attach cardiac monitor and pulse oximeter if indicated
7. Expedite transport
8. The following steps should not delay transport:
    a. Complete bandaging, splinting and packaging PRN
    b. Establish hospital contact for notification of incoming patient and for the Paramedic to obtain consultation for level 2 orders
9. Keep patient warm.

ALS LEVEL 1: PARAMEDIC ONLY

1. Correct any massive flail segment that causes respiratory compromise (intubate)
2. Correct any tension pneumothorax with needle decompression as per protocol
3. Establish IV (or EZ-IO if critical condition and in need of urgent fluids and/or drugs) of Normal Saline with 60gtt infusion set PRN (b)(c)(d), unless overridden by other specific protocol.
4. Monitor ECG PRN.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director if any concerns or questions**.**

Note:
(a) Infants and small children in car seats may be immobilized without removing them from the car seat, as long as it will not interfere with patient assessment and other needed procedures and car seat is intact. If patient is not in car seat on arrival, do not put patient back into car seat to immobilize; use backboard or pediatric immobilizer.
(b) Authorized IV routes include all peripheral venous sites. Two IVs using large bore intracath should be used for unstable patients, avoid sites below the diaphragm. Rapid

transport should not be delayed establishing an IV. Intraosseous access is alternative to poor or no peripheral access.
(c) A Buretrol, Volutrol, or Soluset should be used in lieu of a regular infusion set when starting an IV on patients that are less than eight years old. In not available, use a microdrip set.
(d) When unable to establish an IV in the pediatric patient that needs to be resuscitated, an intraosseous line may be used by the paramedic only.

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3.1.5 PAIN MANAGEMENT

Pediatric Protocol

Purpose: This protocol is to be used for managing pain in pediatric patients with the following conditions:

- Isolated Extremity Fracture
- Acute back strain
- Soft tissue injuries, burns, bites and stings.
- Discomfort related to attached devices or inserted tubes such as a foley catheter, NG tube, chest tube, etc. This will apply to intra-facility transfers.

Do not use this protocol if there is multisystem trauma or hemodynamic instability. For mechanisms or incidents involving a high transfer of energy (i.e. MVA, long falls, etc.), contact medical control prior to administration of pain medication. Keep in mind that severe back pain can sometimes be indicative of a condition that may require emergency surgery such as appendicitis, ruptured or dissecting aneurysm, ruptured ectopic pregnancy, etc. Be sure you do a good abdominal exam on patients complaining of back pain. If any abdominal tenderness is found, do not give pain med until advised by medical control or medical director. If patient has severe enough back pain that you are considering giving pain medication for, be sure the history is consistent with back strain, e.g. lifting heavy material and felt a pull.

, e.g. fractured extremities, serious soft tissue injures**.** If you're not sure, call med control for advice. Kidney stone patients may report a history of kidney stones and may or may not have hematuria (blood in urine). Always monitor respiratory status and pulse ox after administration of a narcotic. Intervene as needed to keep pulse ox ≥ 95 %

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment 3.1.1
2. Medical Supportive Care Protocol 3.1.3

Isolated Extremity Fracture

The purpose of this procedure is to manage pain associated with isolated extremity fractures not associated with multisystem trauma or hemodynamic instability. Injuries from a high mechanism of injury, such as an MVA or long fall should be discussed with med control prior to giving pain meds.

ALS LEVEL 1: PARAMEDIC ONLY

1. Patients should be asked to quantify their pain on an analog pain scale (0=least severe to 10=most severe) or Wong-Baker Faces Scale or Infant Behavior Score (a)(b). This should be documented and used to measure the effectiveness of analgesia.

2. Distal circulation, sensation and movement should be noted and recorded in the injured extremity.
3. The extremity should be immobilized as described in Adult Protocol Extremity Injuries.
4. Extremity fractures should be elevated, if possible, and cold applied.

ALS LEVEL 2: MEDICAL CONTROL

1. If pain persists and systolic BP is adequate (see Appendix - Pediatric Vital Signs), chose one of the following:
   a. **Morphine Sulfate** may be given intravenously in increments every 3 – 5 minutes, titrated to pain to a maximum of 5 mg. Administer at a rate not to exceed 1 mg/min. Pediatric dose:
      - **< 6 months**; 0.05 – 0.2 mg/kg SQ/IM/IV (avoid IM route if possible)
      - **6 months- 12 yrs**; 0.1-0.2 mg/kg IV/IM/SQ.

   b. **Fentanyl (Sublimaze)**
      1-3 yrs old: 1 - 2 mcg/kg **IV slow** or
      1.5 mcg/kg **IN (via atomizer)**
      3 – 12 yrs old: 1 – 2 mcg/kg **IV slow** or
      1.5 mcg/kg **IN (via atomizer)**
      >12 yrs old: 0.5 – 1 mcg/kg **IV slow** or
      1.5 mcg/kg **IN (via atomizer**)
   c. **Ketamine**:0.1 – 0.5 mg/kg **IV/IO**.
      5 mg/kg **IM** dose
      0.5 mg/kg **IN dose: via atomizer**
      - If hypersalivation/coupious brochial secretions, give **Atropine** 0.02 mg/kg IV/IO.

Weight	4kg Grey	6kg Pink	8kg red	10kg purple	12kg yellow	15kg white	19kg blue	24kg orange	30kg green
Morphine IV/IO/IM/SQ	0.04 mg	0.06mg	0.08 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Fentanyl IV/IO	4 mcg	6 mcg	8 mcg	10 mcg	12 mcg	15 mcg	19 mcg	24 mcg	30 mcg
Fentanyl IN	6 mcg	9 mcg	12 mcg	15 mcg	16 mcg	22.5 mcg	28.5 mcg	36 mcg	45 mcg
Ketamine IV/IO/IN	2 mg	3 mg	4 mg	5 mg	6 mg	7.5 mg	9.5 mg	12 mg	15 mg
Atropine	0.08 mg	0.12 mg	0.16 mg	0.2 mg	0.24 mg	0.3 mg	0.38 mg	0.48 mg	0.6 mg
Naloxone (Narcan)	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2 mg	2 mg
Ondansetron (Zofran)	Contact med control			1 mg	1 mg	1 mg	2 mg	2 mg	3 mg

Acute Back Strain, Soft Tissue Injuries, Burns, Bites and Stings

This procedure is used for pain associated with acute back strains, soft tissue injuries, burns, bites and stings not associated with multisystem trauma or hemodynamic instability.

ALS LEVEL 1: PARAMEDIC ONLY

1. Patients should be asked to quantify their pain on an pain scale (0=least severe to 10=most severe). This number should be documented and used to measure the effectiveness of analgesia.

ALS Level 2: MEDICAL CONTROL

1. If pain persists and systolic BP is adequate (see Appendix Pediatric Vital Signs), give one of the following:
   a. **Morphine Sulfate** may be given intravenously in increments every 3 – 5 minutes, titrated to pain to a maximum of 10 mg. Administer at a rate not to exceed 1 mg/min.
   Pediatric dose:
   - **< 6 months**; 0.05 – 0.2 mg/kg SQ/IM/IV (avoid IM route if possible)
   - **6 months- 12 yrs**; 0.1-0.2 mg/kg IV/IM/SQ.

   b. **Fentanyl (Sublimaze)** Pediatric dose:
   1-3 yrs old: 1 - 2 mcg/kg IV slow or
   1.5 mcg/kg IN (via atomizer)
   3 – 12 yrs old: 1 – 2 mcg/kg IV slow or
   1.5 mcg/kg IN (via atomizer)
   >12 yrs old: 0.5 – 1 mcg/kg IV slow or
   1.5 mcg/kg IN (via atomizer)

   c. **Ketamine**:
   IV/IO dose: 0.1 – 0.5 mg/kg
   IM dose: 5 mg/kg
   IN dose: 0.5 mg/kg (via atomizer)

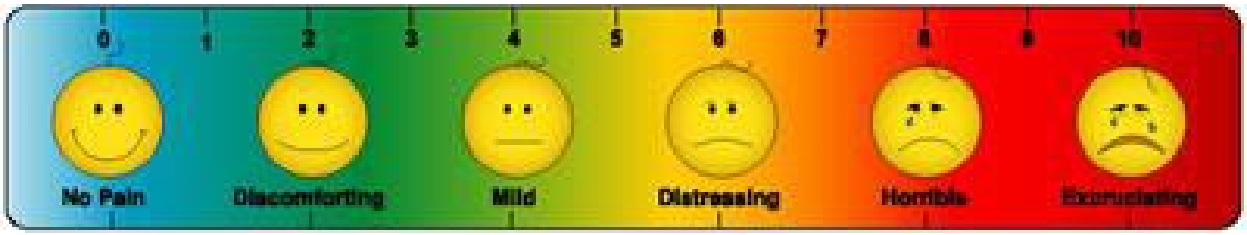
NOTE: If hypersalivation/coupious brochial secretions, give **Atropine** 0.02 mg/kg IV/IO.

Weight	4kg Grey	6kg Pink	8kg red	10kg purple	12kg yellow	15kg white	19kg blue	24kg orange	30kg green

Morphine	**0.04 mg**	**0.06mg**	**0.08 mg**	**1 mg**	**1.2 mg**	**1.5 mg**	**1.9 mg**	**2.4 mg**	**3 mg**
Fentanyl	**8 mcg**	**12 mcg**	**16 mcg**	**20 mcg**	**24 mcg**	**30 mcg**	**38 mcg**	**48 mcg**	**60 mcg**
Ketamine IV/IO/IN	**2 mg**	**3 mg**	**4 mg**	**5 mg**	**6 mg**	**7.5 mg**	**9.5 mg**	**12 mg**	**15 mg**
Ketorolac (Toradol)	If > 2 years of age, **Ketorolac Tromethamine (Toradol)** may be given 0.5 mg/kg (maximum 15mg) IV or 1 mg/kg (maximum 30 mg) IM								
Atropine	**0.08 mg**	**0.12 mg**	**0.16 mg**	**0.2 mg**	**0.24 mg**	**0.3 mg**	**0.38 mg**	**0.48 mg**	**0.6 mg**
Naloxone (Narcan)	**0.4 mg**	**0.6 mg**	**0.8 mg**	**1 mg**	**1.2 mg**	**1.5 mg**	**1.9 mg**	**2 mg**	**2 mg**
Ondansetron (Zofran)	**Contact med control**			**1 mg**	**1 mg**	**1 mg**	**2 mg**	**2 mg**	**3 mg**

Note:

(a) **Wong-Baker Facial Scale**:



(b) Infant Behavior Score

Assessment of Behavior Score:

0 "Relaxed" – Infant comfortable, not distressed

1-2 Some transitory distress caused; returns immediately to "relaxed".

3-4 Transitory distress, likely to respond to consolation

5 Infant experiences pain; if no response to consolation, may require analgesia.

6 "Anguished" and "exaggerated" – infant experiencing acute pain; is unlikely to respond to consolation, will probably benefit from analgesia.

6-8 "Inert"- (no response to traumatic procedure) infant is habituated to pain; will not respond to consolation; systematic pain control by analgesia should be considered.

Infant Behavior Score:

Facial Expression

0 "relaxed"	Smooth muscled; relaxed expression; either in deep sleep or quietly alert.
1 "anxious"	Anxious expressions; frown; REM behind closed lids; wandering gaze; eyes narrowed; lips parted; pursed lip as if "oo" is pronounced.

2 “anguished” Anguished expression/crumped face; brow bulge; eye-squeeze; nasolabial furrow pronounced; square-stretched mouth; cupped tongue; “silent cry”

3 “inert” (Only during or immediately after traumatic procedure) no response to trauma; no crying; rigidity; gaze avoidance; fixed/staring gaze; apathy; diminished alertness

Body Movement

0 “relaxed” Relaxed trunk and limbs; body in tucked position; hands in cupped position or willing to grasp a finger

1 “restless” Moro reflexes; startles; jerky or uncoordinated movement of limbs; flexion/extension of limbs; attempt to withdraw limb from site of injury.

2 “exaggerated” Abnormal position of limbs; limb/neck extension; splaying of fingers and/or toes; flailing or thrashing of limbs; arching of back; side swiping/guarding site of injury

3 “inert” (Only during or immediately after traumatic procedure) no response to trauma; inertia; limpness/rigidity; immobility

Color

0 Normal skin color (depending on skin type)

1 Redness; congestion

2 Pallor; mottling; grey

(c)

Extreme caution should be used with administering Morphine to a patient with an $SpO_2 < 95\%$

(d)

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3.2
PEDIATRIC RESPIRATORY EMERGENCIES

3.2 PEDIATRIC RESPIRATORY EMERGENCIES

Pediatric Protocol

Overview: Most children requiring urgent intervention have primary respiratory problems. 80-90% of all pediatric cardiac arrests originate in the respiratory system. When the child in respiratory distress can no longer compensate, respiratory failure will be followed by cardiac failure. It is crucial to recognize respiratory distress and dysfunction early, so that cardiopulmonary failure may be prevented. Note that the respiratory system is also used to compensate for the hypoxia and acidosis found in primary circulatory failure. Assessment of the pediatric respiratory system should focus not on clinical status, as reflected by general appearance (adequacy of cerebral oxygenation and ventilation) and work of breathing.

Components of Appearance

1. **Alertness**: How responsive and interactive is the child with a stranger or other change in the environment? Is the patient restless, agitated or lethargic?
2. **Distractibility**: How readily does a person, object, or sound draw the child's interest or attention? Will the patient play with a toy or new object?
3. **Consolability** Can the patient be comforted by the caregiver or by the paramedic?
4. **Eye Contact** Does the child maintain eye contact with objects or people? Will the patient fix his/her gaze on a face?
5. **Speech/Cry** Is the speech/cry strong and spontaneous? Weak and muffled? Hoarse?
6. **Spontaneous Motor Activity** Is the patient moving and resisting vigorously and spontaneously? Is there good muscle tone and responsiveness?
7. **Color** Is the patient pink? Or is the patient pale, ashen, blue or mottled? Does the skin coloring of the trunk differ from that of the extremities?

Signs of Work of Breathing

1. **Use of Accessory Muscles** Pediatric patients will use accessory muscles early to compensate for deficiencies in perfusion. Intercostal and supraclavicular retractions, as well as diaphragmatic breathing (see-saw) may be very apparent.
2. **Respiratory Rate** Significant finding if >60/min. or <10-20/min.

3. **Tidal Volume** Inspection of chest wall movement may not be adequate for assessment of tidal volume. It is imperative to auscultate bilateral lung sounds to determine adequacy of tidal volume.
4. **Nasal Flaring** Flaring of the external nares indicates respiratory distress.
5. **Grunting** Grunting is an ominous sign associated with severe distress. It is caused by a premature closure of the glottis on exhalation due to atelectasis. The patient is attempting to maintain a positive end expiratory pressure (PEEP) to allow for better lung inflation.
6. **Cyanosis** Cyanosis is usually a late finding and will initially be visible around the mouth and gums (perioral) and nail beds.
7. **Pulse Oximeter** SpO_2 <90% is suggestive of respiratory insufficiency.
8. **Lung Sounds** Auscultation of bilateral lungs sounds not only assesses tidal volume but may uncover abnormal sounds (eg. wheezing, stridor, rales).

Specific treatments for the different causes of respiratory distress are outlined in the following protocols. When the paramedic is unsure as to which protocol to follow, he or she should follow the protocols in Section 3.1 and contact medical control for further direction.

References: Dieckmann, RA, et al: Pediatric Education for Paramedics, National PEP Task Force, 1995.

American Heart Association/American Academy of Pediatrics: Textbook of Pediatric Advanced Life Support, Dallas, 1994.

American Heart Association: Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care: Supplement to Circulation 102: 8, 2000.

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3.2.1 AIRWAY OBSTRUCTION

Pediatric Protocol

Purpose: Causes of upper airway obstruction include the tongue, foreign bodies, swelling of the upper airway due to angio-neurotic edema (see Pediatric Protocol - Allergic Reactions/Anaphylaxis), trauma to the airway, and infections {see Pediatric Protocol - Upper Airway (Stridor - Croup/Epiglottitis)}. Differentiation of the cause of upper airway obstruction is essential to determining the proper treatment.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3
3. If air exchange is inadequate and there is a reasonable suspicion of foreign body airway obstruction (FBAO), apply abdominal thrust (a). For an infant apply chest compressions and back blows (a)
    a. Child:
        i. If conscious, ask, "Are you choking?"
        ii. If patient unable to speak and/or shakes head yes, give abdominal thrust
        iii. Repeat abdominal thrust until effective or patient become unconscious.
        iv. If patient becomes unconscious, perform a tongue-jaw lift, visualize object and perform a finger sweep to remove object. Do not perform blind finger sweep.
        v. Open airway and attempt to ventilate. If still obstructed, reposition airway and try to ventilate again.
        vi. Give 5 abdominal thrusts
        vii. Repeat steps iv through vi twice.
        viii. If still unrelieved, go to ALS Level 1 Treatment.
    b. Infant:
        i. If conscious, determine airway patency
        ii. If patient is unable to move air or has poor air exchange, give 5 back blows between the shoulder blades and then 5 chest thrusts with patient in a head dependent position
        iii. Repeat back blows and chest thrusts until effective or patient becomes unconscious
        iv. If patient becomes unconscious, perform a tongue-jaw lift and look in the mouth for the object. If object can be seen, remove the object.
        v. Open airway and attempt to ventilate; if still obstructed, reposition airway and try to ventilate again.
        vi. Give 5 back blows and 5 chest thrusts, with patient in a head dependent position.

vii. Repeat steps iv. through vi. twice.
viii. If still unrelieved, go to ALS Level 1 treatment

ALS LEVEL 1: PARAMEDIC ONLY

1. If unable to relieve FBAO, visualize with laryngoscope and extract foreign body with Magill forceps.
2. If obstruction is due to trauma and/or edema, or if uncontrollable bleeding into the airway causes life-threatening ventilatory impairment, perform endotracheal intubation/advanced airway
3. If unable to intubate and patient cannot be adequately ventilated by other means, perform needle cricothyroidotomy.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director if any concerns or questions.

Note:
(a) If air exchange is adequate with a partial airway obstruction, do not interfere and encourage patient to cough up obstruction. Continue to monitor for adequacy of air exchange. If air exchange becomes inadequate continue with protocol.

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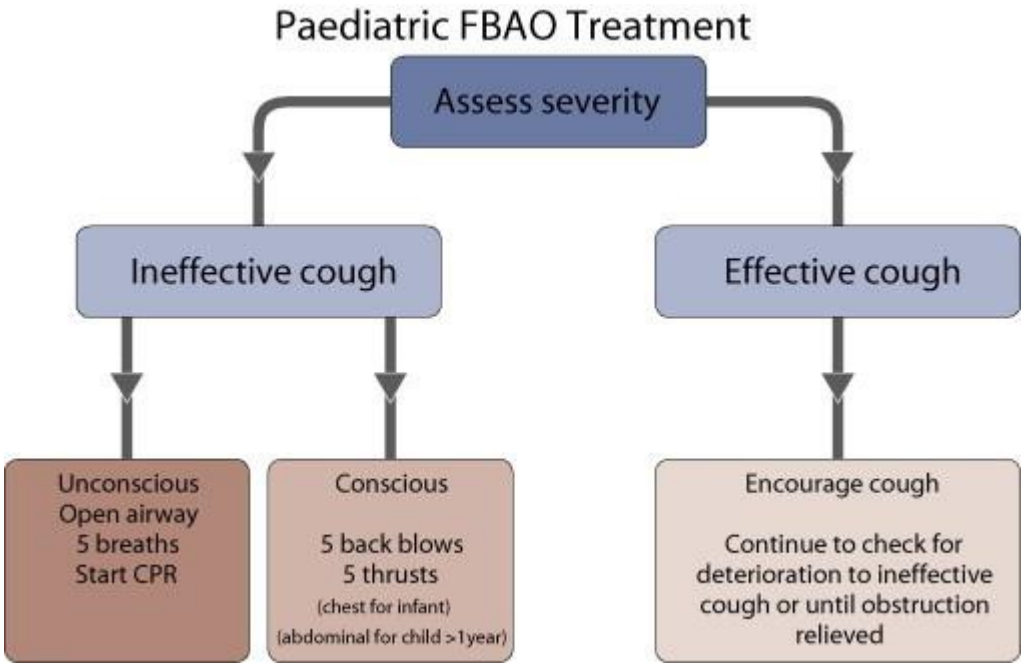
Peds Upper Airway Stridor



3.2.2 UPPER AIRWAY (STRIDOR /CROUP / EPIGLOTTITIS)

Pediatric Protocol

Purpose: **Stridor** is a high pitched "crowing" sounds caused by restriction of the upper airway. In addition to FBAO (see Pediatric Protocol Airway Obstruction), stridor can be caused by croup and epiglottitis.

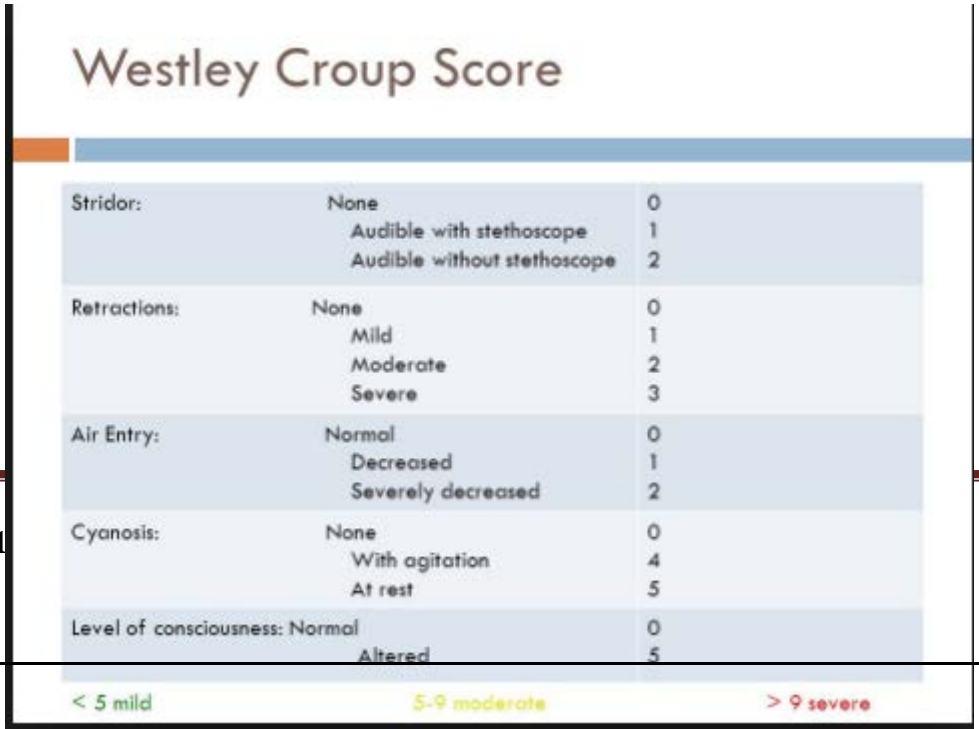
Croup (laryngotracheobronchitis) is a viral infection of the upper airway, which causes edema/ inflammation below the larynx and glottis with a resultant narrowing of the lumen of the airway. Croup most often occurs in children 6 months to 4 years of age. The child with croup will have stridor, as well as, a distinctive barking cough and cold symptoms (low-grade fever (100-101 degrees F), with a gradual onset of respiratory distress.

Epiglottitis is an acute infection and inflammation of the epiglottis that potentially is life threatening. Since the availability of Hemophilus influenza, type B (Hib) vaccine, epiglottitis has markedly decreased, yet it may still occur from other bacterial pathogens. Epiglottitis usually occurs in children 4 years of age and older. The child with epiglottitis will present with stridor, as well as, acute respiratory distress, sore throat, pain upon swallowing which causes the distinctive drooling, high grade fever (102-104 degrees F), and may assume the classic tripod position.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3, including pulse oximeter (avoid IVs in these patients) (a).
3. Avoid agitating the child with suspected epiglottitis. Never examine the epiglottis (a).
4. Administer humidified oxygen. If humidified oxygen is unavailable, use nebulized saline (do not force oxygen mask on pediatric patient - use blow-by technique if necessary) (a).



ALS LEVEL 1: PARAMEDIC ONLY

1

Aerosolized Epinephrine is contraindicated for epiglottitis

ALS LEVEL 2: MEDICAL CONTROL

1. If score is > 3 Call Medical Control for Dexamethasone 0.6mg/kg

Note:

(a) Avoid any procedure that will agitate patient.

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Peds Airway Obstruction

3.2.3 LOWER AIRWAY (WHEEZING ASTHMA / BRONCHIOLITIS)

Pediatric Protocol

Purpose: This protocol for pediatric patients with wheezing. Wheezing is a whistling type breath sound associated with narrowing or spasm of the smaller airways. Wheezing in the child under one year of age is usually the result of **bronchiolitis**, a viral infection of the bronchioles which causes prominent expiratory wheezing, clinically resembling asthma.

Asthma is a chronic inflammatory disease that is triggered by many different factors (e.g. environmental allergens, cold air, exercise, foods, irritants, and certain medications). Asthma has a two-phase response. The first phase is associated with a histamine release, which causes bronchoconstriction and bronchial edema. Early treatment with bronchodilators may reverse the bronchospasm. The second phase consists of inflammation of the bronchioles and additional edema. The second phase will usually not respond to bronchodilators. An anti-inflammatory medication (e.g. corticosteroid) is typically required. Assessment of the asthma patient usually includes a history of asthma with associated medications. The patient will be tachypneic and may have an unproductive cough. Use of accessory muscles is evident and wheezing may be heard, most commonly on expiration. In a severe asthma attack, the patient may not wheeze at all due to a lack of air flow.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3, including pulse oximeter.

ALS LEVEL 1: PARAMEDIC ONLY

1. **Albuterol (Ventolin)** 1 nebulizer treatment. May repeat twice PRN (a).
   a. If <1 year or <10 kg, mix 1.25 mg in 1.5 ml of Normal Saline {0.083%}
   b. If >1 year or >10 kg, mix 2.5 mg in 3 ml of Normal Saline {0.083%}).
2. Add **Ipratropium Bromide (Atrovent):** to each initial neb tx and flow O_2 at 6-8 L/min.
   a. If < 8 years, add 0.25 mg (1.25 ml);
   b. If > 8 years, add 0.5 mg (2.5 ml)
3. Consider need for assisted ventilation and intubation
4. If respiratory distress is severe, **Epinephrine** (1:1000) 0.01mg/kg IM (up to maximum dose of 0.3mg). May be repeated to maximum of 3 doses.
5. If respiratory distress is persistent and severe after several albuterol nebs, give **Dexamethazone** 0.6mg/kg IV or IM (Maximum dose 10 mg).

Weight	4kg Grey	6kg Pink	8kg red	10kg purple	12kg yellow	15kg white	19kg blue	24kg orange	30kg green
Albuterol	**< 1 yr or < 10 kg mix 1.25 mg in 1.5 ml NS**				**> 1 yr or > 10 kg mix 2.5 mg in 3 ml NS**				
Atrovent	**< 8 yrs old mix 0.25 mg (1.25 ml) to 1st Albuterol**				**If > 8 yrs old mix 0.5 mg (2.5 ml) to first Albuterol**				
Dexamethasone	**2.4 mg**	**3.6 mg**	**4.8 mg**	**6 mg**	**7.2 mg**	**9 mg**	**11.4 mg**	**14.4 mg**	**18 mg**
Epinephrine 1:1000 IM	**0.04 mg**	**0.06 mg**	**0.08 mg**	**0.10 mg**	**0.12 mg**	**0.15 mg**	**0.19 mg**	**0.24 mg**	**0.3 mg**
Magnesium	**160 mg**	**240 mg**	**320 mg**	**400 mg**	**480 mg**	**600 mg**	**760 mg**	**960 mg**	**1200 mg**

ALS LEVEL 2: MEDICAL CONTROL

1. Repeat **Epinephrine** (1:1000) 0.01 mg/kg IM (if < 8 years, 0.15 mg up to maximum dose of 0.3 mg; if > 8 years, maximum dose is 0.3 –0.5 mg).
2. Call medical control or medical director if any concerns or questions.
3. For severe dyspnea, consider giving **Magnesium Sulfate;** 40 mg/kg (maximum 2gm) IV (mixed in 50 ml of 0.9%NS given over 30 minutes).

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3.3
PEDIATRIC
CARDIAC DYSRHYTHMIAS

3.3 PEDIATRIC CARDIAC DYSRHYTHMIAS

Pediatric Protocol

Overview:

Cardiac dysrhythmias in pediatric patients are uncommon and are usually due to noncardiac problems, unless the patient is known to have congenital or acquired cardiac disease. Cardiac arrest is usually the end result of hypoxemia and acidosis resulting from respiratory insufficiency or shock. Therefore, attention should be given initially to support of the respiratory system. Pediatric dysrhythmias can be divided into three categories: slow rhythms, fast rhythms, or no rhythm. The most common dysrhythmia is bradycardia, which is the result of hypoxia or acidosis. Tachycardias can be a compensatory mechanism or a result of a reentry mechanism. Ventricular fibrillation, although rare in pediatrics, is usually the result of hypoxia. Asystole is a terminal event, following prolonged, untreated bradycardia.

Automated external defibrillators (AEDs) may be used for children 1 to 8 years of age who have no signs of circulation. Ideally the device should deliver a pediatric dose. The arrhythmia detection algorithm used in the device should demonstrate high specificity for pediatric shockable rhythms, i.e., it will not recommend delivery of a shock for non-shockable rhythms (Class IIb)." These protocols follow the AHA/PALS guidelines. The paramedic should use these protocols to guide him/her through the treatment of cardiac patients with specific dysrhythmias and accompanying signs and symptoms. After stabilization of the patient, the paramedic may need to refer to additional protocols for continued treatment (e.g. other cardiac protocols). Remember to consider the "H's and T's" when assessing for a possible cause.

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3.3.1 ASYSTOLE/PEA (Peds Cardiac Arrest Algorithm)
Pediatric Protocol

Purpose: This protocol is for pediatric patients found to be in asystole.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1.
2. Initial Peds Assessment 3.1.1
3. Medical Supportive Care Protocol 3.1.3, including pulse oximeter.
4. Determine the patient's unresponsiveness and check for CABs.
5. Oxygenate with 15 – 25 L per minute via bag-valve-mask with an appropriate airway adjunct device at 8 – 10 breaths per minute.
6. Begin immediate chest compressions at a rate of 100 - 120/min for 2 minutes while the monitor is being attached.
7. Do not interrupt CPR to check the heart rhythm. Continuous uninterrupted compressions are paramount to patient survival.
8. Check the heart rhythm; confirm asystole in two leads.
9. Resume 2 minutes of continuous compressions at 100 - 120/min; check the heart rhythm.
10. Consider the H's and T's

ALS LEVEL 1: PARAMEDIC ONLY

1. Intubate with ET tube or use other airway adjunct.
2. Confirm airway adjunct placement with electronic EtCO2 and waveform on scene, during transport, and during transfer at the hospital.
3. Establish IV or IO access; give normal saline wide open for fluid challenge at 20ml/kg or 10ml/kg for neonates (infants less than 1 month).
4. **Epinephrine**
   Epi 1:10,000 0.01 mg/kg (0.1 ml/kg) IV/IO (max single dose 1 mg). Repeat every 3-5 minutes.
5. Give 2 minutes of chest compressions; check the heart rhythm.
6. Perform glucose test with finger stick. If glucose is below 60 mg/dL, administer:
   a. Neonates: **10% Dextrose**: 2-5 ml/kg (0.2-0.5 g/kg)

a. Infants: **10% Dextrose**: 5 ml/kg (0.5 g/kg) you are
b. Children: **10% Dextrose**: 5 ml/kg (0.5 g/kg) not to exceed total of 250 ml (25gms) (a).

7. If a pulse is present, begin post-resuscitative care.
8. If narcotic possibly involved, administer Narcan 0.1 mg/kg, IVP may repeat once.
9. Consider the H's and T's.

Possible Cause:	Treatment:
Hypoxia	Ventilate/oxygenate
Hypovolemia	IV Fluid bolus 20ml/kg (10ml/kg neonates), repeat x 1 prn
Hydrogen Ion (Acidosis)	Ventilation; Sodium Bicarb 1 mEq/kg IV/IO
Hypoglycemia	D10W
Hyperkalemia	Calcium Chloride 10% 20mg/kg (0.2 ml/kg) IV/IO (max 1 gm) Sodium Bicarb 1 mEq/kg IV/IO with 20 ml NS flush between.
Hyper/Hypothermia	Cool/Warm the patient
Tension pneumothorax	Needle decompression
Trauma	Load and go, appropriate protocol
Toxins	Appropriate protocol
Tamponade (cardiac)	Load and go
Thrombosis	Load and go

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control **or** medical director if any concerns or questions.

Note

(a) Provide a 15:2 compression to ventilation ratio. Once an advanced airway is in place, provide 1 breath every 6 seconds.

(b) If EtCO2 is less than 10mmHg: Attempt to improve CPR (compressions vs. ventilation).
If EtCO2=12 - 25mm Hg: Goal during resuscitation.
If EtCO2=35 - 45mm Hg: Check for ROSC

(c) If ROSC achieved, wean down oxygen to maintain a SpO2 at greater than or equal to 94%.

(d) To avoid infiltration and resultant tissue necrosis, Dextrose 10% should be given via slow IV with intermittent aspiration of the IV line to confirm IV patency, followed by saline flush.

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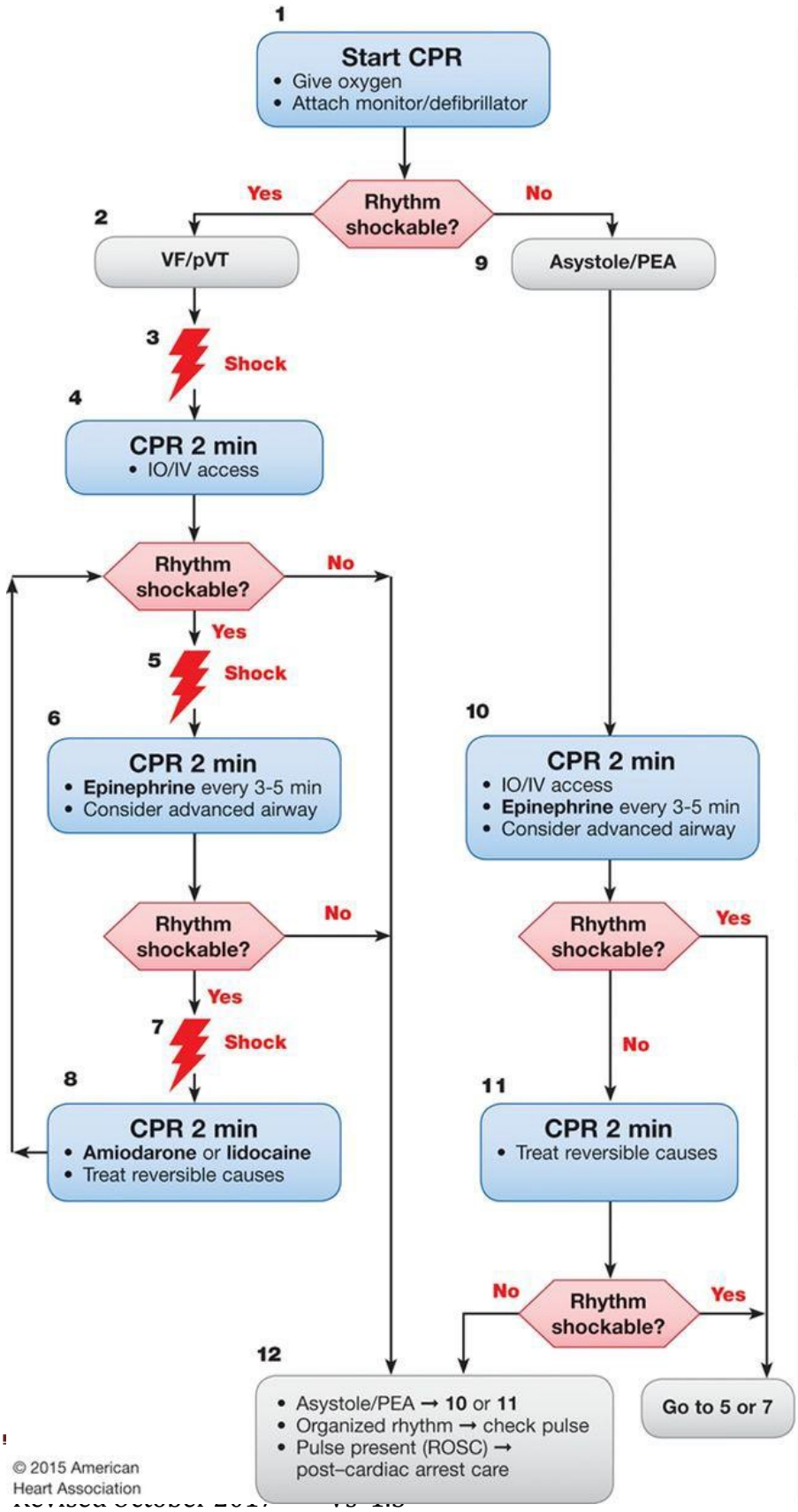
Pediatric Cardiac Arrest Algorithm—2015 Update



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CPR Quality

- Push hard (≥⅓ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Rotate compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 15:2 compression-ventilation ratio.

Shock Energy for Defibrillation

First shock 2 J/kg, second shock 4 J/kg, subsequent shocks ≥4 J/kg, maximum 10 J/kg or adult dose

Drug Therapy

- **Epinephrine IO/IV dose:** 0.01 mg/kg (0.1 mL/kg of 1:10 000 concentration). Repeat every 3-5 minutes.
  If no IO/IV access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of 1:1000 concentration).
- **Amiodarone IO/IV dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 2 times for refractory VF/pulseless VT.
- **Lidocaine IO/IV dose:** Initial: 1 mg/kg loading dose. Maintenance: 20-50 mcg/kg per minute infusion (repeat bolus dose if infusion initiated >15 minutes after initial bolus therapy).

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypoglycemia
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

3.3.2 BRADYCARDIA (Peds Bradycardia Algorithm)

Pediatric Protocol

Purpose: Use this protocol for pediatric patients with bradycardia. Causes of symptomatic bradycardia include hypoxemia, hypothermia, head injury, heart block, heart transplant (special situation), and toxin/poison/drug overdose.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment 3.1.1
2. Medical Supportive Care Protocol 3.1.3, including pulse oximeter.
3. Assure adequate ventilation and oxygenation.
4. If heart rate is <60/min. in infant or child associated with poor systemic perfusion, start chest compressions
5. Consider the H's and T's

ALS LEVEL 1: PARAMEDIC ONLY

1. Start IV/IO, administer a fluid challenge of NS 20 ml/kg IV (10 ml/kg neonate)
2. **Epinephrine** (1:10,000) 0.01 mg/kg (0.1 ml/kg) IV/IO (max dose 1 mg) q 3-5 min.. Repeat every 3-5 minutes at same dose (a).
3. **Atropine** 0.02 mg/kg IV/IO (Minimum single dose 0.1 mg)(a)(b)
   Maximum **single** dose: (child 0.5 mg) (adolescent 1.0 mg)
   Maximum **total** dose: (child 1.0 mg) (adolescent 2.0 mg)
   If unable to establish IV/IO, administer **Atropine** May repeat Atropine once (a).
4. Identify and treat possible causes.
5. If patient remains hypotensive and bradycardic and is conscious and aware of the situation consider pacing and sedation. Consider sedation with one of the following benzodiazepines. Midazolam (Versed) is the preferred benzodiazepine:
   a. **Midazolam (Versed)** 0.1 mg/kg, max single dose 4 mg IV, IO, IM; or 0.2 mg/kg IN (use 10 mg/2ml concentration), max single dose 5 mg; may repeat once if necessary. Max total dose of 10 mg
   b. **Lorazepam (Ativan)** 0.05 mg/kg IV/IO//IN; may repeat once, to maximum dose of 4 mg
6. External pacemaker (see Medical Procedure 4.13).

Weight	4 kg *grey*	6 kg *pink*	8 kg *red*	10 kg *purple*	12 kg *yellow*	15 kg *white*	19 kg *blue*	24 kg *orange*	30 kg *green*
Epinephrine 1 : 10,000 0.01 mg/kg **IV / IO**	**0.04 mg**	**0.06 mg**	**0.08 mg**	**0.1 mg**	**0.12 mg**	**0.15 mg**	**0.19 mg**	**0.24 mg**	**0.3 mg**
Epinephrine 1 : 1,000 0.1 mg/kg **ET**	**0.4 mg**	**0.6 mg**	**0.8 mg**	**1 mg**	**1.2 mg**	**1.5 mg**	**1.9 mg**	**2.4 mg**	**3 mg**
Atropine	**0.1 mg**	**0.12 mg**	**0.16 mg**	**0.2 mg**	**0.24 mg**	**0.3 mg**	**0.38 mg**	**0.48 mg**	**0.6 mg**

Weight	**4 kg Grey**	**6 kg Pink**	**8 kg Red**	**10 kg Purple**	**12 kg Yellow**	**15 kg White**	**19 kg Blue**	**24 kg Orange**	**30 kg Green**
Midazolam (Versed) IV/IO/IM	**0.4 mg**	**0.6 mg**	**0.8 mg**	**1.0 kg**	**1.2 mg**	**1.5 mg**	**1.9 mg**	**2.4 mg**	**3 mg**
Midazolam (Versed) IN	**0.8 mg**	**1.2 mg**	**1.6 mg**	**2 mg**	**2.4 mg**	**3 mg**	**3.8 mg**	**4.8mg**	**5 mg (max)**
Lorazepam (Ativan) IV/IO/IN	**0.2 mg**	**0.3 mg**	**0.4 mg**	**0.5 mg**	**0.6 mg**	**0.75 mg**	**0.95 mg**	**1.2 mg**	**1.5 mg**

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director if any concerns or questions.

Notes

(a) Administer Atropine before Epinephrine for bradycardia due to suspected increased vagal tone or primary AV block.

(b) Small doses of Atropine less than 0.1 mg may produce paradoxical bradycardia.

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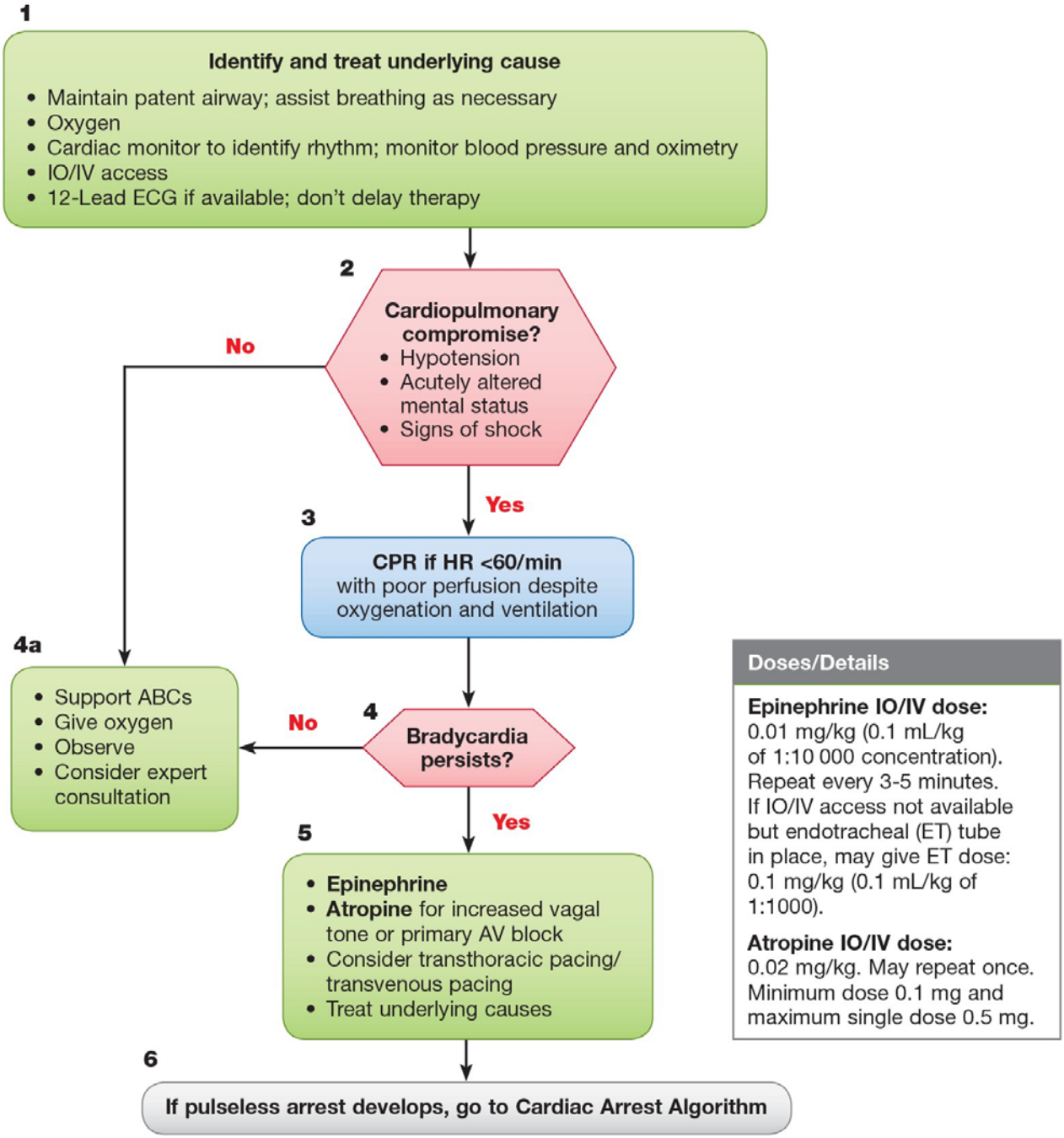
Peds Bradycardia Alogrithm on next page!

Pediatric Bradycardia With a Pulse and Poor Perfusion Algorithm



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3.3.3 NARROW COMPLEX TACHYCARDIA (Peds Tachycardia Algorithm)

Pediatric Protocol

Purpose: Pediatric patients suffering from tachycardia may or may not exhibit symptoms. Narrow complex tachycardia (QRS < 0.08 seconds) is either sinus tachycardia or supraventricular tachycardia. The following rates should be considered:

Sinus tachycardia is greater than normal (see Appendix; Pediatric Vital Signs 7.10) and usually for a child: >180/minute and infant: >220/minute. Rate may vary with sinus tachycardia.

Supraventricular tachycardia is usually >220/minute for infants. If >2 years of age, SVT may be slower (e.g. 180-220/minute). Rate will not vary with SVT.

Wide complex SVTs are rare in children and, therefore, should initially be considered as ventricular in origin, unless proven otherwise (e.g. documented QRS morphology consistent with pre-existing BBB or WPW).

Possible causes of pediatric tachycardia include:

H's	T's
Hypoxemia	**T**amponade
Hypovolemia	**T**ension pneumothorax
Hypo/Hyperthermia	**T**oxins
Hyper/Hypokalemia	**T**hromboembolism
Hydrogen Ion (Acidosis)	**T**rauma
Hypoglycemia	**T**ablets

3.3.3a SINUS TACHYCARDIA with DIMINISHED PERFUSION (Peds Tachycardia Algorithm)

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Peds Assessment 3.1.1**
2. **Medical Supportive Care Protocol 3.1.3**.
3. Check Temp
4. Determine the patient's hemodynamic stability and symptoms
5. Apply SpO2 monitor and administer oxygen to maintain SpO2 at ≥ 94%

ALS LEVEL 1: PARAMEDIC ONLY

1. Fluid challenge Normal Saline 20 ml/kg IV (10 ml/kg neonate). May repeat X 1.
2. Obtain 12 lead EKG

3. Consider other cause (e.g. H's & T's).

Possible Cause:	Treatment:
Hypoxia	Ventilate/oxygenate
Hypovolemia	IV Fluid bolus 20ml/kg (10ml/kg neonates), repeat x 1 prn
Hydrogen Ion (Acidosis)	Ventilation; Sodium Bicarb 1 mEq/kg IV/IO
Hypoglycemia	D10W
Hyperkalemia	Calcium Chloride 10% 20mg/kg (0.2 ml/kg) IV/IO (max 1 gm) Sodium Bicarb 1 mEq/kg IV/IO with 20 ml NS flush between.
Hyper/Hypothermia	Cool/Warm the patient
Tension pneumothorax	Needle decompression
Trauma	Load and go, appropriate protocol
Toxins	Appropriate protocol
Tamponade (cardiac)	Load and go
Thrombosis	Load and go

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director if any concerns or questions.

3.3.3b STABLE SVT (Normal perfusion) (Peds Tachycardia Algorithm)

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Peds Assessment 3.1.1**
2. **Medical Supportive Care Protocol** 3.1.3.
3. Check Temp
4. Determine the patient's hemodynamic stability and symptoms
5. Apply SpO2 monitor and administer oxygen to maintain SpO2 at ≥ 94%

ALS LEVEL 1: PARAMEDIC ONLY

1. Perform **12 lead ECG** (see Medical Procedure 4.38).
2. Consider cause (e.g. H's & T's).
3. Establish IV access; give NS wide open for fluid challenge 20 ml/kg or 10 ml/kg for neonates (infants less than month)

ALS LEVEL 2: MEDICAL CONTROL

1. Vagal maneuvers; begin with ice water (see Medical Procedure **Vagal maneuvers 4.27.2**)
2. **Adenosine Triphosphate (Adenocard)** 0.1 mg/kg (6 mg max.) rapid IVP followed by 10 ml NS flush.
3. Repeat in 2 minutes, **Adenosine Triphosphate (Adenocard)** 0.2 mg/kg (12 mg max.) rapid IVP followed by 10 ml NS flush.

Weight	4 kg *grey*	6 kg *pink*	8 kg *red*	10 kg *purple*	12 kg *yellow*	15 kg *white*	19 kg *blue*	24 kg *orange*	30 kg *green*
Adenosine 0.1 mg/kg – 1st dose	**0.4 mg**	**0.6 mg**	**0.8 mg**	**1 mg**	**1.2 mg**	**1.5 mg**	**1.9 mg**	**2.4 mg**	**3 mg**
Adenosine 0.2 mg/kg – 2nd dose	**0.8 mg**	**1.2 mg**	**1.6 mg**	**2 mg**	**2.4 mg**	**3 mg**	**3.8 mg**	**4.8 mg**	**6 mg**

3.3.3c UNSTABLE SVT (Diminished perfusion) (Peds Tachycardia Algorithm)

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Peds Assessment 3.1.1**
2. **Medical Supportive Care Protocol** 3.1.3.
3. Determine the patient's hemodynamic stability and symptoms
4. Apply SpO2 monitor and administer oxygen to maintain SpO2 at ≥ 94%

ALS LEVEL 1: PARAMEDIC ONLY

1. Consider sinus tachycardia as the underying rhythm, not SVT
2. Consider cause (eg. H's & T's).
3. Obtain 12 lead EKG and record rhythm strip
4. If patient is responsive, **Adenosine Triphosphate (Adenocard)** 0.1 mg/kg (6 mg max.) rapid IVP or IOP followed by 10 ml NS flush (a). If not resolved, repeat in 2 minutes, **Adenosine Triphosphate (Adenocard)** 0.2 mg/kg (12 mg max.) rapid IVP followed by 10 ml NS flush (a).
5. If decision to cardiovert and patient is conscious and aware of situation, consider sedation with one of the following benzodiazepines (versed is the preferred benzodiazepine):
   - **a.** Midazolam (Versed) 0.1 mg/kg, max single dose 4 mg IV, IO, IM; or 0.2 mg/kg IN (use 10 mg/2ml concentration), max single dose 5 mg; may repeat once if necessary. Max total dose of 10 mg.(c)
   - **b.** Lorazepam (Ativan) 0.05 mg/kg IV/IO//IN; may repeat once, to maximum dose of 4 mg (c)
6. If patient is poorly responsive, synchronized cardioversion
   - **a.** @ 0.5 joule/kg. (or equivalent biphasic energy level) if no response (b)
   - **b.** Synchronized cardioversion @ 1 joule/kg (or equivalent biphasic energy level). If no response (b)
   - **c.** Synchronized cardioversion @ 2 joules/kg (or equivalent biphasic energy level). (b)

Weight	4 kg Grey	6 kg Pink	8 kg Red	10 kg Purple	12 kg Yellow	15 kg White	19 kg Blue	24 kg Orange	30 kg Green
Adenosine 0.1 mg/kg – 1st dose	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg`	2.4 mg	3 mg
Adenosine 0.2 mg/kg – 2nd dose	0.8 mg	1.2 mg	1.6 mg	2 mg	2.4 mg	3 mg	3.8 mg	4.8 mg	6 mg
Midazolam (Versed) IV/IO/IM	0.4 mg	0.6 mg	0.8 mg	1.0 kg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Midazolam (Versed) IN	0.8 mg	1.2 mg	1.6 mg	2 mg	2.4 mg	3 mg	3.8 mg	4.8mg	5 mg (max)
Lorazepam (Ativan) IV/IO/IN	0.2 mg	0.3 mg	0.4 mg	0.5 mg	0.6 mg	0.75 mg	0.95 mg	1.2 mg	1.5 mg

ALS LEVEL 2: MEDICAL CONTROL

1. **Amiodarone** 5 mg/kg IV/IO over 20 minutes.

Amiodarone	20 mg	30 mg	40 mg	50 mg	60 mg	75 mg	95 mg	120 mg	150 mg

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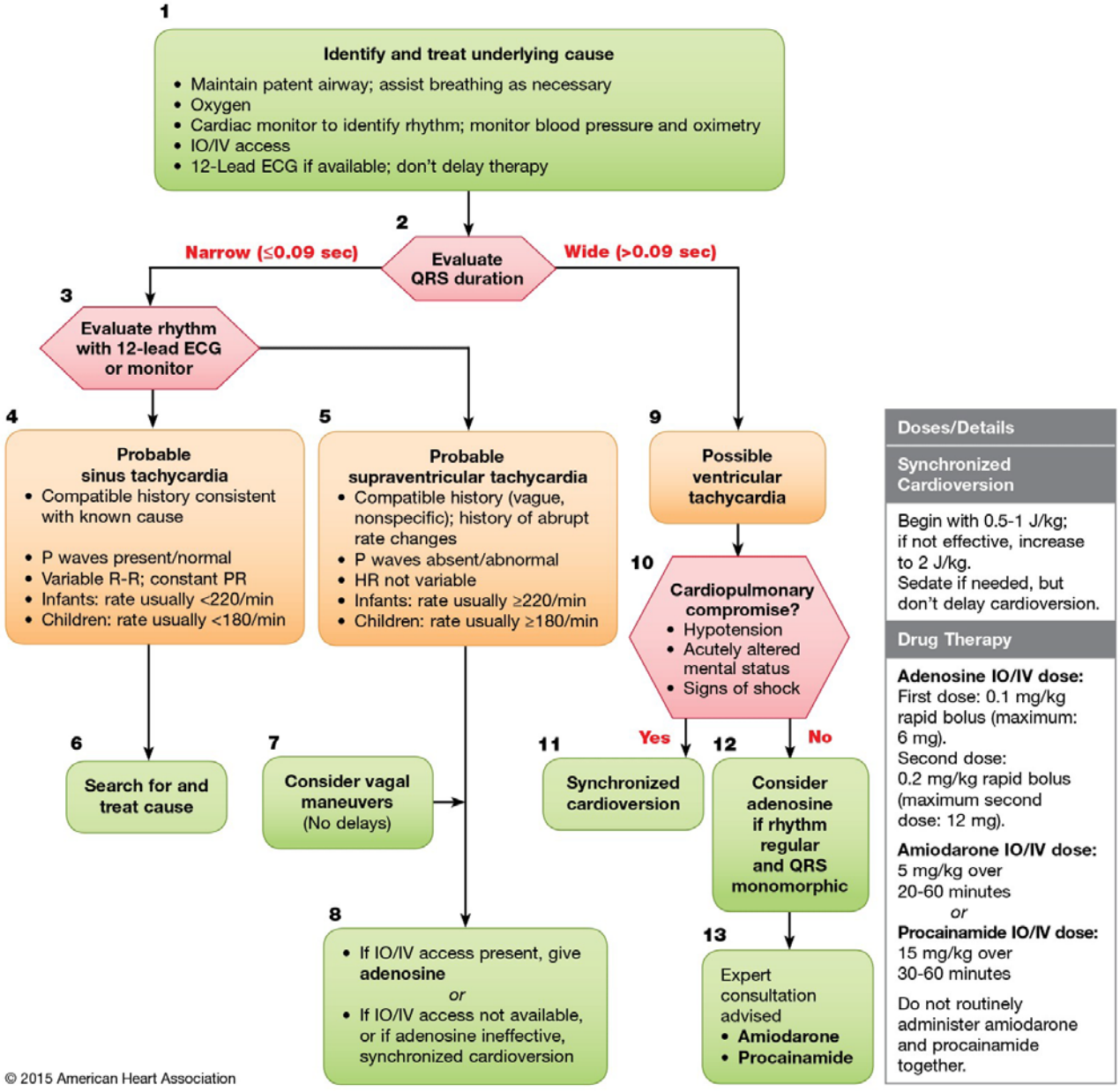
(a)) Record the patient's heart rhythm while attempting to convert the rhythm so as to capture conversion data.
(b) Do not delay synchronized cardioversion to establish an IV for sedation purposes.
(c) Administer Benzodiazepines slowly, titrate to effect, and be aware of associated hypotension.

Peds Tachycardia Algorithm on next page.

Pediatric Tachycardia With a Pulse and Poor Perfusion Algorithm



Return to: Peds Narrow Complex Tachycardia Wide Complex Tachy-Stable
Wide Comlext Tachy-Unstable

3.3.4 PULSELESS ELECTRICAL ACTIVITY (PEA) (Peds Cardiac Arrest Algorithm)

Pediatric Protocol

Purpose: This protocol is used for: electromechanical dissociation (EMD), pseudo-EMD, idioventricular rhythms, bradyasystolic rhythms, post-defibrillation idioventricular rhythms.

Possible causes of pediatric PEA include:

H's	T's
Hypoxemia	**T**amponade
Hypovolemia	**T**ension pneumothorax
Hypo/Hyperthermia	**T**oxins
Hyper/Hypokalemia	**T**hromboembolism
Hydrogen Ion (Acidosis)	**T**rauma
Hypoglycemia	**T**ablets

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Peds Assessment 3.1.1**
2. **Medical Supportive Care Protocol 3.1.3**, including pulse oximeter.
3. Determine the patient's unresponsiveness and check for CABs.
4. Oxygenate with 15 – 25 L per minute via bag-valve-mask with an appropriate airway adjunct device at 8 – 10 breaths per minute.
5. Begin immediate chest compressions at a rate of 100 - 120/min for 2 minutes while the monitor is being attached.
6. Do not interrupt CPR to check the heart rhythm. Continuous uninterrupted compressions are paramount to patient survival.
7. Check the heart rhythm; confirm PEA rhythm.
8. Resume 2 minutes of continuous compressions at 100 - 120/min; check the heart rhythm.

ALS LEVEL 1: PARAMEDIC ONLY

1. Intubate with ETT or use other airway adjunct and ventilate pt.
2. Confirm airway adjunct placement with electronic EtCO2 and waveform on scene, during transport, and during transfer at the hospital.
3. Establish IV or IO access; give normal saline wide open for fluid challenge at 20ml/kg or 10ml/kg for neonates (infants less than 1 month).
4. **Epinephrine**
   Epi 1:10,000 0.01 mg/kg (0.1 ml/kg) IV/IO (max single dose 1 mg). Repeat every 3-5 minutes for duration of pulselessness.
   .

5. Give 2 minutes of chest compressions; check the heart rhythm.
6. Perform glucose test with finger stick. If glucose is below 60 mg/dL, administer:
    a. Neonates: **10% Dextrose**: 2-5 ml/kg (0.2-0.5 g/kg)
    b. Infants: **10% Dextrose**: 5 ml/kg (0.5 g/kg)
    b. Children: **10% Dextrose**: 5 ml/kg (0.5 g/kg) not to exceed total of 250 ml (25gms) (d).

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
D10W	20 ml	30 ml	40 ml	50 ml	60 ml	75 ml	95 ml	120 ml	150 ml

7. If the patient is taking calcium channel blockers or if there a high suspicion for hyperkalemia, administer Calcium Chloride 20 mg/kg IV/IO slowly
8. If a pulse is present, begin post-resuscitative care.
9. If narcotic possibly involved, administer Narcan 0.1 mg/kg, IVP may repeat once.
10. Consider the H's and T's

Possible Cause:	Treatment:
Hypoxia	Ventilate/Oxygenate
Hypovolemia	IV Fluid bolus 20ml/kg (10ml/kg neonates), repeat x 1 prn
Hydrogen Ion (Acidosis)	Ventilation; Sodium Bicarb 1 mEq/kg IV/IO
Hypoglycemia	D10W
Hyperkalemia	Calcium Chloride 10% 20mg/kg (0.2 ml/kg) IV/IO (max 1 gm) Sodium Bicarb 1 mEq/kg IV/IO with 20 ml NS flush between.
Hypo/Hyperthermia	Warm/Cool the patient
Tension pneumothorax	Needle decompression
Trauma	Load and go, appropriate protocol
Toxins	Appropriate protocol
Tamponade (cardiac)	Load and go
Thrombosis	Load and go

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director if any concerns or questions.

Note

(a) Provide a 15:2 compression to ventilation ratio. Once an advanced airway is in place, provide 1 breath every 6 seconds.
(b) If EtCO2 is less than 10mmHg: Attempt to improve CPR (compressions vs. ventilation).
If EtCO2=12 - 25mm Hg: Goal during resuscitation.
If EtCO2=35 - 45mm Hg: Check for ROSC
(c) If ROSC achieved, wean down oxygen to maintain a SpO2 at greater than or equal to 94%.
(d) To avoid infiltration and resultant tissue necrosis, Dextrose 10% should be given via slow IV with intermittent aspiration of the IV line to confirm IV patency, followed by saline flush.

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3.3.5 WIDE COMPLEX TACHYCARDIA WITH A PULSE (VENTRICULAR TACHYCARDIA) (Peds Tachycardia Algorithm)

Pediatric Protocol

STABLE (normal perfusion)

Purpose: This protocol is used in wide complex tachycardia (QRS > 0.08 seconds) with a rate > 150/minute.

Possible causes of pediatric tachycardia include:

H's	T's
Hypoxemia	**T**amponade
Hypovolemia	**T**ension pneumothorax
Hypo/Hyperthermia	**T**oxins
Hyper/Hypokalemia	**T**hromboembolism
Hydrogen Ion (Acidosis)	**T**rauma
Hypoglycemia	**T**ablets

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Peds Assessment 3.1.1**
2. **Medical Supportive Care Protocol** 3.1.3
3. Determine the patient's hemodynamic stability and symptoms
4. Apply SpO2 monitor and administer oxygen to maintain SpO2 at ≥ 94%

ALS LEVEL 1: PARAMEDIC ONLY

1. Administer one of the following antiarrhythmics:
   a. **Amiodarone** 5 mg/kg IV/IO in 50 – 100 ml of D5W over 20 minutes.[FIRST LINE]

Weight	4 kg Grey	6 kg Pink	8 kg Red	10 kg Purple	12 kg Yellow	15 kg White	19 kg Blue	24 kg Orange	30 kg Green
Amiodarone	20 mg	30 mg	40 mg	50 mg	60 mg	75 mg	95 mg	120 mg	150 mg

2. Consider cause (e.g. H's & T's).

Possible Cause:	Treatment:
Hypoxia	Ventilate/Oxygenate
Hypovolemia	IV Fluid bolus 20ml/kg (10ml/kg neonates), repeat x 1 prn
Hydrogen Ion (Acidosis)	Ventilation; Sodium Bicarb 1 mEq/kg IV/IO
Hypoglycemia	D10W
Hyperkalemia	Calcium Chloride 10% 20mg/kg (0.2 ml/kg) IV/IO (max 1 gm) Sodium Bicarb 1 mEq/kg IV/IO with 20 ml NS flush between.
Hypo/Hyperthermia	Warm/Cool the patient
Tension pneumothorax	Needle decompression
Trauma	Load and go, appropriate protocol
Toxins	Appropriate protocol
Tamponade (cardiac)	Load and go
Thrombosis	Load and go

ALS LEVEL 2: MEDICAL CONTROL

1. Use only one antiarrhythmic medication. If rhythm does not convert with maximum dose, treat as unstable (synchronized cardiovert).
2. Call medical control or medical director if any concerns or questions.

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Peds V-Tach w/pulse Stable

UNSTABLE (diminished perfusion)

Purpose: This protocol is used in wide complex tachycardia (QRS > 0.08 seconds) with a rate > 150/minute.

Possible causes of pediatric tachycardia include:

H's	T's
Hypoxemia	**T**amponade
Hypovolemia	**T**ension pneumothorax
Hypo/Hyperthermia	**T**oxins
Hyper/Hypokalemia	**T**hromboembolism
Hydrogen Ion (Acidosis)	**T**rauma
Hypoglycemia	**T**ablets

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Peds Assessment 3.1.1**
2. **Medical Supportive Care Protocol 3.1.3**.
3. Determine the patient's hemodynamic stability and symptoms
4. Apply SpO2 monitor and administer oxygen to maintain SpO2 at ≥ 94%

ALS LEVEL 1: PARAMEDIC ONLY

1. If considering cardioversion and patient is conscious and aware of situation, consider sedation with one of the following benzodiazepines:
   - **a.** Midazolam (Versed) 0.1 mg/kg, max single dose 4 mg IV, IO, IM; or 0.2 mg/kg IN (use 10 mg/2ml concentration), max single dose 5 mg; may repeat once if necessary. Max total dose of 10 mg.(g)
   - **b.** Lorazepam (Ativan) 0.05 mg/kg IV/IO//IN; may repeat once, to maximum dose of 4 mg (g)
2. Synchronized cardioversion @ 0.5 joule/kg (or equivalent biphasic energy) (d).
3. Synchronized cardioversion @ 1 joules/kg (or equivalent biphasic energy) (d).
4. Administer one of the following antiarrhythmics:
   - **a.** **Amiodarone** 5 mg/kg IV/IO in 50 -100 ml of D5W over 20 minutes.

Weight	4 kg Grey	6 kg Pink	8 kg Red	10 kg Purple	12 kg Yellow	15 kg White	19 kg Blue	24 kg Orange	30 kg Green

Midazolam (Versed) IV/IO/IM	**0.4 mg**	**0.6 mg**	**0.8 mg**	**1.0 kg**	**1.2 mg**	**1.5 mg**	**1.9 mg**	**2.4 mg**	**3 mg**
Midazolam (Versed) IN	**0.8 mg**	**1.2 mg**	**1.6 mg**	**2 mg**	**2.4 mg**	**3 mg**	**3.8 mg**	**4.8mg**	**5 mg (max)**
Lorazepam (Ativan) IV/IO/IN	**0.2 mg**	**0.3 mg**	**0.4 mg**	**0.5 mg**	**0.6 mg**	**0.75 mg**	**0.95 mg**	**1.2 mg**	**1.5 mg**

Amiodarone	**20 mg**	**30 mg**	**40 mg**	**50 mg**	**60 mg**	**75 mg**	**95 mg**	**120 mg**	**150 mg**

5. Synchronized cardioversion @ 2 joules/kg (or equivalent biphasic energy) (c).
6. Synchronized cardioversion @ 4 joules/kg (or equivalent biphasic energy).
7. Consider cause (e.g. H's, & T's).

Possible Cause:	**Treatment:**
Hypoxia	Ventilate/Oxygenate
Hypovolemia	IV Fluid bolus 20ml/kg (10ml/kg neonates), repeat x 1 prn
Hydrogen Ion (Acidosis)	Ventilation; Sodium Bicarb 1 mEq/kg IV/IO
Hypoglycemia	D10W
Hyperkalemia	Calcium Chloride 10% 20mg/kg (0.2 ml/kg) IV/IO (max 1 gm) Sodium Bicarb 1 mEq/kg IV/IO with 20 ml NS flush between.
Hypo/Hyperthermia	Warm/Cool the patient
Tension pneumothorax	Needle decompression
Trauma	Load and go, appropriate protocol
Toxins	Appropriate protocol
Tamponade (cardiac)	Load and go
Thrombosis	Load and go

ALS LEVEL 2: MEDICAL CONTROL

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3.3.6 WIDE COMPLEX TACHYCARDIA WITHOUT A PULSE AND VENTRICULAR FIBRILLATION (Peds Cardiac Arrest Algorithm)

Pediatric Protocol

Purpose: This protocol if for pediatric patients in V-Fib and V-tach without a pulse.

Consider and Treat Possible Causes

6 Hs	6 Ts
Hypoxia	**T**ablets
Hypovolemia	**T**amponade
Hypothermia	**T**ension pneumothorax
Hypoglycemia	**T**oxins – poisons, drugs
Hypo/hyperkalemia	**T**hrombosis – coronary **(AMI)** – pulmonary **(PE)**
Hydrogen ion **(acidosis)**	**T**rauma

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. **Initial Peds Assessment 3.1.1**
2. **Medical Supportive Care Protocol 3.1.3.**
3. Determine the patient's unresponsiveness and check for CABs.
4. Oxygenate with 15 – 25 L per minute via bag-valve-mask with an appropriate airway adjunct device at 8 – 10 breaths per minute.
5. Begin immediate chest compressions at a rate of 100 - 120/min for 2 minutes while the monitor is being attached.
6. Perform chest compressions at a ratio of 15:2 unless an advanced airway has been established (supraglottic or ETT)
7. Do not interrupt CPR to check the heart rhythm. Continuous uninterrupted compressions are paramount to patient survival.
8. Check the heart rhythm.
9. Resume 2 minutes of continuous compressions at 100 - 120/min; check the heart rhythm.

ALS LEVEL 1: PARAMEDIC ONLY

1. Insert advanced airway adjunct when feasible.
2. Defibrillate @ 2 joules/kg x1, followed by 5 cycles (or two minutes) of CPR then check rhythm. If arrhythmia still persists, resume CPR while charging defibrillator.
3. Check blood glucose: Below 60 mg/dL, administer:
   a. Neonates: **10% Dextrose**: 2-5 ml/kg (0.2-0.5 g/kg)
   b. Infants: **10% Dextrose**: 5 ml/kg (0.5 g/kg)
   c. Children: **10% Dextrose**: 5 ml/kg (0.5 g/kg) not to exceed total of 250 ml (25gms).

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
D10W	20 ml	30 ml	40 ml	50 ml	60 ml	75 ml	95 ml	120 ml	150 ml

4. Defibrillate @ 4 joules/kg x1, followed by 5 cycles (or two minutes) of CPR then check rhythm. If arrhythmia still persists, resume CPR while charging defibrillator.
5. **Epinephrine**
   - **Epi 1:10,000** 0.01 mg/kg (0.1 ml/kg) IV/IO. Repeat every 3-5 minutes.
6. Defibrillate @ 4 joules/kg x1, followed by 5 cycles (or two minutes) of CPR then check rhythm. If arrhythmia still persists, resume CPR while charging defibrillator. Subsequent energy levels should be at least 4 J/kg, and higher energy levels may be considered, not to exceed 10 J/kg or the adult maximum dose (AHA Class IIb, LOE C).
5. CPR while the defibrillator is charging
6. Administer one of the following antiarrhythmics:
   b. **Amiodarone** 5mg/kg IV/IO (a)
   c. If Torsades de Pointes, **Magnesium Sulfate** 25 – 40 mg/kg (maximum 2gm) IV/IO (mixed in 50 ml of D5W given over 10 – 20 minutes). (a)

Magnesium	160 mg	240 mg	320 mg	400 mg	480 mg	600 mg	760 mg	960 mg	1200 mg

7. Consider and treat possible causes: 6H's and 6T's.

Possible Cause:	Treatment:
Hypoxia	Ventilate/Oxygenate
Hypovolemia	IV Fluid bolus 20ml/kg (10ml/kg neonates), repeat x 1 prn
Hydrogen Ion (Acidosis)	Ventilation; Sodium Bicarb 1 mEq/kg IV/IO
Hypoglycemia	D10W
Hyperkalemia	Calcium Chloride 10% 20mg/kg (0.2 ml/kg) IV/IO (max 1 gm) Sodium Bicarb 1 mEq/kg IV/IO with 20 ml NS flush between.
Hypo/Hyperthermia	Warm/Cool the patient
Tension pneumothorax	Needle decompression
Trauma	Load and go, appropriate protocol
Toxins	Appropriate protocol
Tamponade (cardiac)	Load and go
Thrombosis	Load and go

8. Repeat steps 3 thru 7 for duration of pulselessness.

ALS Level 2: MEDICAL CONTROL

1. Consider termination of resuscitation attempt.
2. Call medical control or medical director if any concerns or questions.

Notes:

(a) Defibrillate @ 4 joules/kg after every drug is circulated for 30 seconds.

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3.4
NEWBORN / INFANT CARDIOPULMONARY ARREST

3.4 NEWBORN / INFANT CARDIOPULMONARY ARREST

Pediatric Protocol

Overview:

Infant and newborn cardiopulmonary arrest is usually a result of prolonged poor oxygenation and\or severe circulatory collapse. Newborns should be resuscitated using Pediatric Protocol 3.4.1.Unless there are obvious signs of death (see Administrative Protocol; DNR / RESUSCITATION CONSIDERATIONS / DOA) the infant in cardiopulmonary arrest should be resuscitated using the protocols in Pediatric Protocol 3.3. Some infants may not appear to be salvageable, where the Paramedic determines a resuscitation attempt is warranted for psychological reasons (e.g. parent's peace of mind). Consideration should also be given to SIDS (see Pediatric Protocol 3.4.2).

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3.4.1 NEWBORN RESUSCITATION (Neonatal Resuscitation Algorithm)

Pediatric Protocol

Purpose: This protocol is to be used for newborns (immediately following delivery) that are in need of resuscitation (all other neonates should be treated as infants, with the exception of Atropine).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Dry and keep baby warm (cover with thermal blanket or dry towel and cover scalp with stocking cap).
2. Position patient to open airway (a).
3. Clear airway - suction mouth and nose with bulb syringe PRN.
4. Paramedic Only: If newborn has signs of thick meconium, after suctioning with bulb syringe, and the newborn is not vigorous and crying, intubate and suction trachea using the meconium aspirator (see below) (b).
5. Stimulate baby (rub baby's back).
6. Never "milk" the cord, after infant delivery wait at least 30 seconds up to 3 minutes or until the cord stops pulsating to clamp/cut the cord.
7. Clamp and cut cord, if not already done. Apply 2 umbilical clamps, 2 inches apart and at least 8 inches from the navel and cut between clamps.
8. Assess skin color, respirations, and heart rate.
9. Administer 100% oxygen via blow-by method to newborns that are breathing but have central cyanosis or have no improvement in respiratory, circulatory, or neurological status within 90 seconds of initial assessment.
10. Ventilate @ 40-60 breaths/minute with 100% oxygen under the following conditions:
    a. Apnea.
    b. Heart rate <100 beats/minute.
    c. Persistent central cyanosis after high-flow oxygen.
11. Newborns who require CPR in the prehospital setting, should receive CPR according to infant guidelines: 2 rescuers provide continuous chest compressions with asynchronous ventilations if an advanced airway is in place and a 15:2 ventilation-to compression ratio if no advanced airway is in place (Class IIb, LOE C).
12. Perform chest compressions at 120/minute using two thumbs side by side (or superimposed one on top of the other) over the mid-sternum just below the nipple line with the fingers encircling the chest and supporting the back, under the following conditions:
    a. Heart rate < 60 beats/minute and not rapidly increasing despite adequate ventilation with 100% oxygen for approximately 30 seconds.

ALS LEVEL 1: PARAMEDIC ONLY

1. Intubate under the following conditions:
   a. Bag-valve-mask ventilation is ineffective after 2 minutes.
   b. Tracheal suctioning is required, especially for thick meconium (b).
   c. Prolonged positive pressure ventilation is needed.
2. **Epinephrine** (1:10,000) 0.01-0.03 mg/kg IV/IO under the following conditions:
   a. Asystole.
   b. Heart rate <60 beats/minute despite adequate ventilation with 100% oxygen and chest compressions.
   c. Repeat every 3-5 minutes, PRN.
3. Fluid challenge Normal Saline 10 ml/kg IV under the following conditions:
   a. Pallor that persists after adequate oxygenation.
   b. Faint pulses with a good heart rate.
   c. Poor response to resuscitation with adequate ventilations.
4. Check blood glucose level on all resuscitations that do not respond to initial therapy. Use heel stick.
   a. If blood glucose is <40 mg/dL, administer D10 5 ml/kg IV/IO (dilute D50 1:4 with Sterile Water or Normal Saline = D10).

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
D10W	20 ml	30 ml	40 ml	50 ml	60 ml	75 ml	95 ml	120 ml	150 ml

5. Perform Pediatric Assessment Triangle - Rapid Cardiopulmonary Assessment (see Pediatric 3.1.1 - Initial Assessment) frequently.

ALS LEVEL 2: MEDICAL CONTROL

1. If neonate continues to have altered mental status with depressed respirations, consider Narcan 0.1 mg/kg (1 mg/ml concentration) IV/IO/IM/IN (c).

Notes

(a) The neonate should be placed on his or her back or side with the neck in a neutral position. To help maintain correct position, a rolled blanket or towel may be placed under the back and shoulders of the supine neonate, to elevate the torso 3/4 or 1 inch off the mattress to extend the neck slightly. If copious secretions are present, the neonate should be placed on his or her side with the neck slightly extended to allow secretions to collect in the mouth rather than in the posterior pharynx.
(b) Tracheal suctioning for thick meconium should be done via the endotracheal tube using a meconium aspirator attached to the 15 mm adaptor of the ETT. The suction unit is then attached and placed on low (no more than 100 mm Hg). Suctioning should be performed until the ETT is clear (maximum 5 seconds). It may be necessary to repeat the intubation and continue suctioning until clear (maximum 3 times).
(c) Avoid the use of Narcan if the mother has a history of drug use/abuse, as Narcan may precipitate seizures in the newborn due to acute withdrawal.

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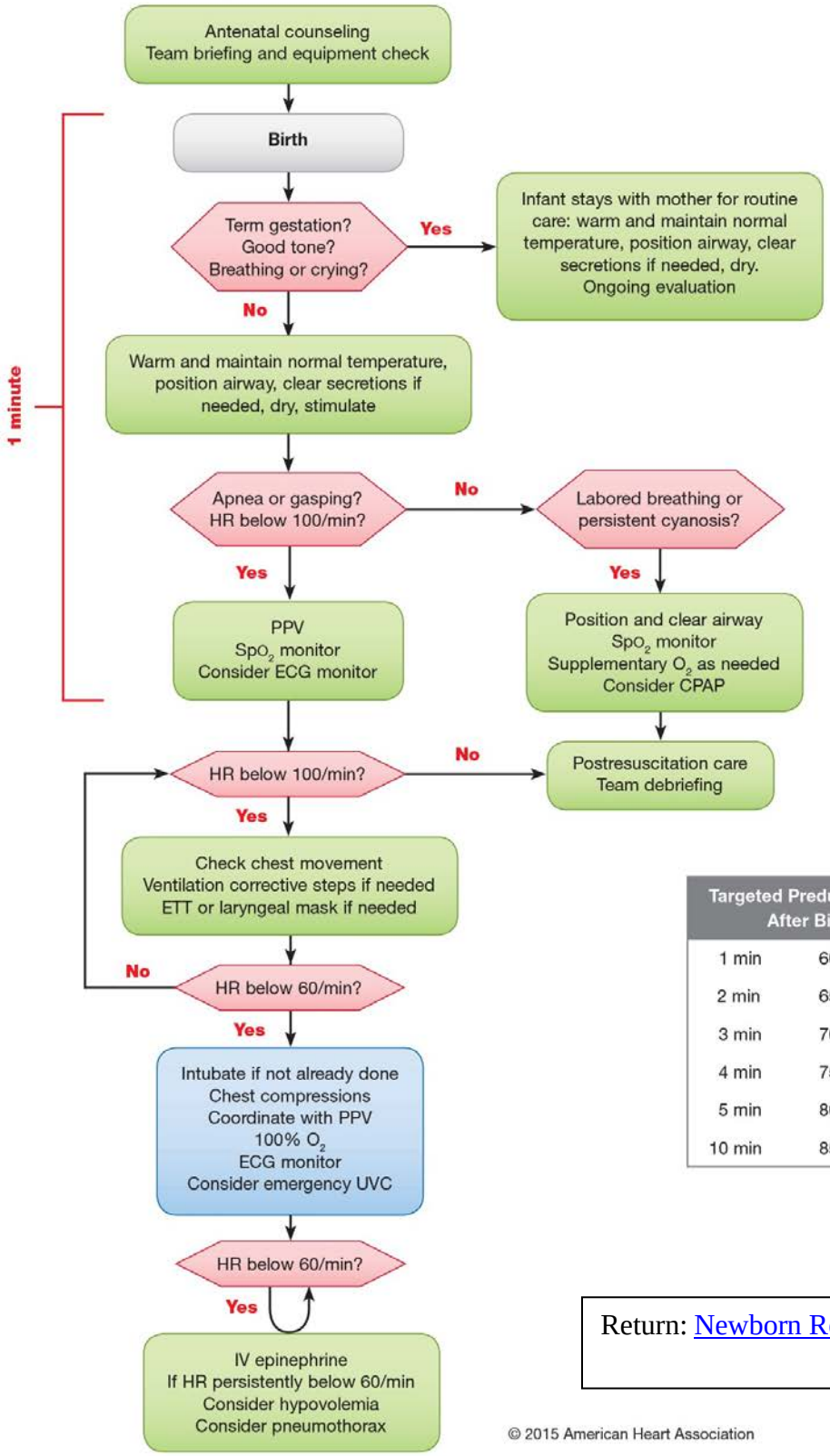
Neonatal Resuscitation Algorithm—2015 Update



Targeted Preductal SpO_2 After Birth	
1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%

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Return: Newborn Resuscitation

3.4.2 SUDDEN INFANT DEATH SYNDROME (SIDS)

Pediatric Protocol

Purpose:

Sudden unexpected infant deaths (SUID) are defined as deaths in infants less than 1 year of age that occur suddenly and unexpectedly, and whose cause of death are not immediately obvious prior to investigation. Each year in the United States, about 4,000 infants die suddenly of no immediately obvious cause. About half of these SUIDs are due to Sudden Infant Death Syndrome (SIDS), the leading cause of SUID and of all deaths among infants aged 1–12 months. The three most frequently reported causes are SIDS, cause unknown, and accidental suffocation and strangulation in bed. Additional information and training material is available at www.cdc.gov/SIDS/

Sudden Infant Death Syndrome, or "crib death," is the sudden and unexpected death of an apparently healthy infant, usually under one year of age, which remains unexplained after a complete medical history, death scene investigation and postmortem examination. SIDS almost always occurs when the infant is asleep or thought to be asleep. See Appendix Sudden Infant Death Syndrome

The majority of SIDS deaths (90%) occur in infants less than six months of age. SIDS is more common in males (60%) then females (40%). SIDS almost always occurs when the infant is asleep or thought to be asleep. SIDS is more prevalent in winter months and in infants with low birth weights. SIDS occurs in all socio-economic, racial and ethnic groups. Occasionally, a mild upper respiratory infection may be present prior to death.

Physical examination of a SIDS infant may reveal lividity or settling of blood, which produces mottled, blue or gray skin. The lividity may give the appearance of "bruising." There may also be froth, blood tinged mucus draining from the infant's mouth and nostrils. In addition, cooling and rigor mortis may be present. The SIDS infant usually appears well developed and does not exhibit any signs of external injury.

SIDS should not be confused with child abuse (see Appendix - Signs of Child Abuse 7.13). Initially it is difficult to distinguish a SIDS death from other causes of death in infants. SIDS is the leading cause of death between one week and one year of age in the United States.

Although there may be obvious signs of death, the Paramedic may attempt resuscitation of the infant for psychological reasons (e.g. parents' peace of mind). There may also be some infants in which the Paramedic determines that a resuscitation attempt is not warranted (see Administrative Protocol - DNR/DOA 1.2.5). In either event, the Paramedic should be prepared for a myriad of grief reactions from the parents and/or caregiver.

It should also be noted, that some SIDS deaths are mistaken for child abuse. If there are possible signs of abuse (see Appendix - Signs of Child Abuse 7.13), the Paramedic should continue as if it were a SIDS death, to avoid any unnecessary grief on the part of the parents and/or caregiver. The Paramedic should not attempt to determine whether or not child abuse has taken place. The scene should be treated as any other death scene, with attention to preservation of potential evidence. Remember, it is more common for an unexpected death of an infant to be SIDS.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. In most instances, resuscitation should be attempted (see appropriate Pediatric Protocols).
2. Assign a crewmember to assist the parents and/or caregiver and to explain the procedures.
3. If time permits, elicit a brief history and perform an environmental check. Document all findings on the EMS run report.
4. Once resuscitation is started, do not stop until directed to do so in the hospital by a physician.

ALS LEVEL 1: PARAMEDIC ONLY

1. As per appropriate protocol

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.5
PEDIATRIC
NEUROLOGIC EMERGENCIES

3.5 PEDIATRIC NEUROLOGIC EMERGENCIES

Pediatric Protocol

Overview:

This section covers the most common pediatric neurologic emergencies, altered mental status and seizures. It is important for the paramedic to understand appropriate behavior for the child/infant's age in order to properly assess level of consciousness (see Appendix - Glasgow Coma Score for pediatric patients). Attention should be given to how the child interacts with parents and the environment and whether or not the patient can make good eye contact. Parents may be invaluable for a baseline comparison of level of consciousness. The parents may simply state that the patient is not acting right. Causes of pediatric altered mental status include: hypoxia, head trauma, intoxication, infection, and hypoglycemia.

Approximately 4-6% of all children will have at least one seizure. Seizures may be due to an underlying disease (e.g. epilepsy) or may simply be a result of fever. Other causes of pediatric seizures include: hypoxia, brain hemorrhage, infection of brain and spinal cord (e.g. meningitis), hypoglycemia, and ingestion/poisoning.

3.5.1 ALTERED LEVEL OF CONSCIOUSNESS (ALTERED MENTAL STATUS)

Pediatric Protocol

Purpose: Use this protocol for pediatric patients with altered mental status. Common signs of altered mental status in pediatric patients include: combative behavior, decreased responsiveness, lethargy, weak cry, moaning, hypotonia, ataxia, and changes in personality. Initial approach should be based on the assumption that the patient is suffering from hypoxia, ischemia, hypoglycemia or dehydration. Secondary considerations should include medications, illicit drugs, plants, trauma, etc.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3, consider need for spinal immobilization.
3. Consider need for ventilatory assistance.
4. Assess for and document the Glasgow Coma Scale

ALS LEVEL 1: PARAMEDIC ONLY

1. If child remains unresponsive and prolonged ventilatory assistance is needed, consider need for advanced airway (a).
2. Perform glucose test with finger stick. If glucose is below 60 mg/dL (< 40mg/dl for newborns), administer:
   a. Neonates: **10% Dextrose**: 2-5 ml/kg (0.2-0.5 g/kg)
   b. Infants: **10% Dextrose**: 5 ml/kg (0.5 g/kg)
   c. Children: **10% Dextrose**: 5 ml/kg (0.5 g/kg) not to exceed total of 250 ml (25gms)
3. If mental status is depressed and signs of dehydration exist, administer fluid challenge of Normal Saline @ 20 ml/kg IV (10 ml/kg for neonates).
4. If mental status and respiratory effort is depressed, administer **Narcan** 0.1 mg/kg (maximum 2 mg) IV/IO/IM/IN. May repeat every 5 minutes PRN.

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
D10W	20 ml	30 ml	40 ml	50 ml	60 ml	75 ml	95 ml	120 ml	150 ml
Narcan	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2 mg	2 mg

6. If toxicology (poisoning) is suspected,

Contact Poison Information Center (1-800-222-1222)

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Notes:

(a) Use appropriate discretion regarding immediate intubation of pediatric patients who may quickly regain consciousness, such as hypoglycemics after D10 or opiate overdose cases after Narcan.

(b) To avoid infiltration and resultant tissue necrosis, Dextrose 10% should be given slow IV with intermittent aspiration of IV/IO line to confirm IV/IO patency followed by saline flush.

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3.5.2 SEIZURE DISORDERS

Pediatric Protocol

Purpose: This protocol should be used when the patient has witnessed continuous convulsions or repeating episodes without regaining consciousness or sufficient respiratory compensation. Consider underlying etiology, such as: fever, hypoxia, head trauma, infection of brain and spinal cord (e.g. meningitis), hypoglycemia, and intoxication.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3.
3. Apply gentle support of the patient's head to avoid trauma and loosen tight fitting clothing.
4. Assess for and document the Glasgow Coma Scale.

ALS LEVEL 1: PARAMEDIC ONLY

2. Perform glucose test with finger stick. If glucose is below 60 mg/dL, administer:
    a. Neonates: **10% Dextrose**: 2-5 ml/kg (0.2-0.5 g/kg)
    b. Infants: **10% Dextrose**: 5 ml/kg (0.5 g/kg)
    c. Children: **10% Dextrose**: 5 ml/kg (0.5 g/kg) not to exceed total of 250 ml (25gms) (a)(b).
    d.
3. If seizure continues, administer one of the following benzodiazepines:
    a. **Midazolam (Versed)** 2 mo – 12 yrs;
    IV/IO: start 0.15 mg/kg x1(Max 4 mg),
    IM: 0.2 mg/kg. Maximum 10 mg
    IN (intranasal): 0.2 mg/kg. Maximum 10 mg (c)

b. **Lorazepam**: *(Not available in all service areas)*
IV/IO: 0.05 – 0.1 mg/kg IV over 2 – 5 minutes; not to exceed 4 mg/dose; repeat 0.05 mg/kg prn q 10 – 15 min
IN (intranasal via atomizer): 0.1 mg/kg (max 5 mg)

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
D10W	20 ml	30 ml	40 ml	50 ml	60 ml	75 ml	95 ml	120 ml	150 ml
Midazolam (Versed) IV/IO	0.6 mg	0.9 mg	1.2 mg	1.5 kg	1.8 mg	2.25 mg	2.85 mg	3.6 mg	4 mg
Midazolam (Versed) IN/IM	0.8 mg	1.2 mg	1.6 mg	2 mg	2.4 mg	3 mg	3.8 mg	4.8mg	6 mg
Lorazepam (Ativan) IV/IO/IN	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3.0 mg

ALS LEVEL 2: MEDICAL CONTROL

1. If seizure continues for 5 minutes, administer one of the following benzodiazepines:
   a. **Midazolam (Versed)** 0.1 mg/kg (maximum 4 mg) IV or 0.2 mg/kg intranasal (maximum 10mg) (c)
   b. **Lorazepam (Ativan):** 0.05 – 0.1 mg/kg IV over 2 – 5 minutes; not to exceed 4 mg/dose; repeat 0.05 mg/kg prn q 10 – 15 min
2. Call medical control or medical director for any questions or concerns.

Notes:

(a) For newborns and infants, perform heel stick. In newborns, if blood glucose is <40 mg/dL, administer D10 5 ml/kg IV/IO (dilute D50 1:4 with Normal Saline = D10).

(b) To avoid infiltration and resultant tissue necrosis, Dextrose 10%, should be given slow IV with intermittent aspiration of IV/IO line to confirm IV/IO patency followed by saline flush.

(c) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device (same as IV dose).

(d) If Diastat (rectal diazepam preparation) is used, administer 2.5 mg.

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3.6
PEDIATRIC
TOXICOLOGIC EMERGENCIES

3.6 PEDIATRIC TOXICOLOGIC EMERGENCIES

Pediatric Protocol

Overview:

This protocol is to be used for those patients suspected of exposure to toxic substances via any route of exposure (e.g. drug overdose, snake bite, etc.). The protocols will give specific considerations for each type of exposure, as well as general treatment guidelines. Additional assistance may be necessary in certain cases (e.g. hazardous materials team for toxic exposure, police for scene control, including violent and/or impaired patient - see Pediatric Protocol 3.7.5).

A history of the events leading to the illness or injury should be obtained from the patient and bystanders to include:

1. What drugs, poisons, or other substances was the patient exposed to? Consider multiple substances, especially on overdoses. Also consider plants and herbal remedies.
2. When and how much?
3. Duration of symptoms?
4. Is patient depressed, suicidal? History of previous overdose? (if applicable).
5. Accidental? Nature of accident?
6. Duration of exposure (if applicable).

Collect all pill bottles, empty or full, and check for "suicide notes" (if applicable). Transport any/all information or items that may assist in the treatment of the patient to the emergency department.

Contact the Poison Information Center (1-800-222-1222) for consultation regarding specific therapy and then contact on-line medical control for confirmation of Level 2 orders.

3.6.1 PEDIATRIC INGESTION (OVERDOSE)

Pediatric Protocol

Purpose: This protocol should be used on most types of ingestion (e.g. acetaminophen, benzodiazepines, narcotics, tricyclic antidepressants, vitamins with iron, etc.). Symptoms vary with the substance involved (also see Pediatric Protocol 3.6.4 - Organophosphate Poisoning).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3.
3. Consider need for ventilatory support
4. Assess for and document the Glasgow Coma Scale

ALS LEVEL 1: PARAMEDIC ONLY

1. Consider need for intubation
2. Perform glucose test with finger stick. If glucose is below 60 mg/dL (< 40 mg/dl newborn), administer:
   a. Neonates: **10% Dextrose**: 2-5 ml/kg (0.2-0.5 g/kg)
   b. Infants: **10% Dextrose**: 5 ml/kg (0.5 g/kg)
   c. Children: **10% Dextrose**: 5 ml/kg (0.5 g/kg) not to exceed total of 250 ml (25gms)
   d. .

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
D10W	20 ml	30 ml	40 ml	50 ml	60 ml	75 ml	95 ml	120 ml	150 ml

3. If any questions, contact **Poison Information Center (1-800-282-3171).**
4. If suspected narcotic overdose in non-neonate, administer **Narcan** 0.1 mg/kg (maximum 2 mg) IV/IO/IM/Intranasal. May repeat every 5 minutes PRN. (c)

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
Narcan	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2 mg	2 mg

5. If suspected tricyclic antidepressant overdose (QRS > 0.10), administer **Sodium Bicarbonate** 1 mEq/kg IV/IO (d).

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
Activated Charcoal PO	4 gm	6 gm	8 gm	10 gm	12 gm	15gm	19 gm	24 gm	30 gm
Naloxone IV/IO/IM/IN	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2 mg	2 mg
Sodium Bicarbonate IV/IO	4 mEq	6 mEq	8 mEq	10 mEq	12 mEq	15 mEq	19 mEq	24 mEq	30 mEq
Calcium Chloride IV/IO	40 mg	60 mg	80 mg	100 mg	120 mg	150 mg	190 mg	240 mg	300 mg
Glucagon IV/IO/IM	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Atropine IV/IO	0.08 mg	0.12 mg	0.16 mg	0.2 mg	0.24 mg	0.3 mg	0.38 mg	0.48 mg	0.5 mg (Max)
Midazolam (Versed) IV/IO	0.6 mg	0.9 mg	1.2 mg	1.5 kg	1.8 mg	2.25 mg	2.85 mg	3.6 mg	4 mg
Midazolam (Versed) IN/IM	0.8 mg	1.2 mg	1.6 mg	2 mg	2.4 mg	3 mg	3.8 mg	4.8 mg	6 mg
Lorazepam (Ativan) IV/IO/IN	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3.0 mg

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Notes:

(a) For newborns and infants, perform heel stick. In newborn, if blood glucose is <40 mg/dL, administer D10 5 ml/kg IV/IO (dilute D50 1:4 with Normal Saline = D10).

(b) To avoid infiltration and resultant tissue necrosis, Dextrose 10% should be given slow IV with intermittent aspiration of IV/IO line to confirm IV/IO patency followed by saline flush.

(c) Intranasal administration of Naloxone requires the use of a mucosal atomization device (same as IV dose).

(d) If patient is seizing, also see Pediatric Protocol Seizures 3.5.2).

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3.6.2 BITES AND STINGS
Pediatric Protocol

Purpose: This protocol includes the treatment for snake and spider bites, dog and cat bites, insect stings, marine animal envenomations and stings. **All bites should be transported to the hospital.** For questions or concerns, contact Poison Information Center (1-800-222-1222).

Procedure:

Snake Bites

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3.
3. Consider need for Pediatric Protocol 3.7.1 – Allergic Reactions/Anaphylaxis.
4. Splint affected area, place patient supine with extremities at a neutral level, keep patient quiet, remove and secure all jewelry.
5. Wash area of bite with copious amounts of water.
6. Attempt to identify snake, if safe to do so.
7. Check temperature and pulse distal to bite on extremity and mark level of swelling and time with pen every 15 minutes.

ALS LEVEL 1: PARAMEDIC ONLY

1. Refer to Pediatric Pain Protocol 3.1.5 for pain management.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Dog and Cat and Wild Animal Bites

BASIC LEVEL:

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3
3. Trauma Supportive Care Protocol 3.1.4 if indicated
4. Wound care - BLS (do not use hydrogen peroxide on deep puncture wounds or wounds exposing fat).
5. Advise dispatch to contact animal control and PD for identification and quarantine of animal.

ALS LEVEL 1: PARAMEDIC ONLY

1. Refer to Pediatric Pain Protocol 3.1.5 for pain management.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Insect Stings (including: Centipedes, Scorpions and Spiders)

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Support Protocol 3.1.3
3. Trauma Supportive Care Protocol 3.1.4, if indicated
4. Consider need for Pediatric Protocol 3.7.1 - Allergic Reactions/ Anaphylaxis.
5. Remove stinger by scraping skin with edge of flat surface (e.g. credit card). Do not attempt to pull stinger out, as this may release more venom.
6. Clean area with soap and water.

ALS LEVEL 1: PARAMEDIC ONLY

1. Refer to Pediatric Pain Protocol 3.1.5 for pain management.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Marine Animal Envenomations -Stingray, Scorpionfish (Lionfish, Zebrafish, Stonefish), Catfish, Weeverfish, Starfish, and Sea Urchin

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3
3. Trauma Supportive Care Protocol 3.1.4, if indicated
4. Consider need for Pediatric Protocol 3.7.1 - Allergic Reactions/ Anaphylaxis.
4. Immerse the punctures in non-scalding hot water to tolerance (110-113 degrees F) to achieve pain relief (30-90 minutes). Transport should not be delayed, immersion in non-scalding hot water may be continued during transport.
5. Remove any visible pieces of the spine(s) or sheath. Gently wash wound with soap and water, then irrigate vigorously with fresh water (avoid scrubbing).

ALS LEVEL 1: PARAMEDIC ONLY

1. Refer to Pediatric Pain Protocol 3.1.5 for pain management.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Marine Animal Stings -Jellyfish, Man-of-War, Sea Nettle, Irukandji, Anemone, Hydroid, Fire Coral

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3
3. Trauma Supportive Care Protocol 3.1.4, if indicated
   Consider need for Pediatric Protocol 3.7.1 - Allergic Reactions/ Anaphylaxis.
4. Rinse the skin with seawater (Do not use fresh water, do not apply ice, do not rub the skin).
5. Apply soaks of acetic acid 5% (vinegar) until pain is relieved.
6. Remove large tentacle fragments using forceps (use gloves to avoid contact with bare hands).
7. Apply a lather of shaving cream (if available) and shave the affected area with edge of flat surface (e.g. credit card).
8. Apply heat pack to area.

ALS LEVEL 1: PARAMEDIC ONLY

1. Refer to Pediatric Pain Protocol 3.1.5 for pain management.

A LS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Human Bites

BASIC LEVEL: EMT and PARAMEDIC

8. Initial Pediatric Assessment Protocol 3.1.1
9. Medical Supportive Care Protocol 3.1.3
10. Trauma Supportive Care Protocol 3.1.4 if indicated.
11. Wound care - BLS (do not use hydrogen peroxide on deep puncture wounds or wounds exposing fat). Clean area with soap and water.
12. Advise dispatch to contact PD for possible domestic violence.

ALS LEVEL 1: PARAMEDIC ONLY

1. Refer to Pediatric Pain Protocol 3.1.5 for pain management.

A LS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.6.3 CARBON MONOXIDE POISONING

Pediatric Protocol

Purpose: Carbon Monoxide poisoning should be suspected when the patient has been exposed to the products of combustion (e.g. smoke, automobile exhaust, exhaust fumes from fuel powered machinery, etc.) and are experiencing symptoms. These symptoms may vary with the level of carbon monoxide exposure. See Hazardous Expsure Chemical Treatment Guideline for more details.

Mild CO exposure signs and symptoms include: headache, nausea/vomiting, poor concentration, irritability, agitation, and anxiety.

Moderate to severe CO exposure signs and symptoms include: altered mental status, chest pain, cardiac dysrhythmias, pale skin, cyanosis, seizures, and rarely cherry red skin.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

13. Initial Pediatric Assessment Protocol 3.1.1
14. Medical Supportive Care Protocol 3.1.3.
15. Remove patient from hazardous area.
16. Administer high-flow oxygen (100%). Ventilatory support as needed/indicated (see Peds Airway Management Protocol)

ALS LEVEL 1: PARAMEDIC ONLY

1. Consider need to intubate.
2. Treat specific dysrhythmias (see Pediatric Cardiac Dysrhythmia Protocol 3.3).
3. Treat seizures according to seizure protocol (see Pediatric Seizure Protocol)

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.6.4 ORGANOPHOSPHATE POISONING

Pediatric Protocol

Purpose: Organophosphate compounds are used as insecticides in residential as well as commercial agriculture. Organophosphates affect both the parasympathetic (muscarinic effects) and the sympathetic (nicotinic effects) nervous systems. Signs and symptoms are described as the classic SLUDGE syndrome (excessive Salivation, Lacrimation, Urination, Diarrhea, Gastrointestinal distress, and Emesis). The patient may have constricted pupils (miosis). Bradycardia is also common; however stimulation of nicotinic receptors will produce tachycardia. Also see Chem Exposure Guideline Green for additional information and management guidelines.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Avoid exposure to patient's sweat, vomit, stool, and vapor emitting from soaked clothes (a).
3. If patient was exposed externally, remove clothing and decontaminate skin.
4. Medical Supportive Care Protocol 3.1.3
5. Airway Management Protocol 3.1.2, administer high-flow oxygen.
6. Contact Poison Information Center (1-800-282-3171) if any questions or concerns.

ALS LEVEL 1: PARAMEDIC ONLY

1. If patient is symptomatic, administer **Atropine**

   < 2 yr old: 0.05 mg/kg (max. 3 mg) IM or 0.02 mg/kg IV/IO, repeat q 5-10 minutes until atropinization occurs. (If nerve agent, Start 0.05 mg/kg IM x 1 for mild/moderate sx. Start 0.1 mg/kg IM for severe sx).

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
Atropine IM	0.2 mg	0.3 mg	0.4 mg	0.5 mg	0.6 mg	0.75 mg	0.95 mg	1.2 mg	1.5 mg
Atropine IV/IO	0.08 mg	0.12 mg	0.16 mg	0.2 mg	0.24 mg	0.3 mg	0.38 mg	0.48 mg	0.6 mg

   2 – 10 yrs: 1 – 2 mg IM/IV/IO q 10 – 30 min prn; Start 1 mg IM/IV x 1. (If nerve agent, Start 1 mg/kg IM x 1 for mild/moderate sx. Start 2 mg/kg IM for severe sx).

> *10 yrs*: 1-2 mg IM/IV/IO q 10 – 30 min prn; Start 2 mg IM/IV x 1. (If nerve agent, Start 2 mg/kg IM x 1 for mild/moderate sx. Start 4 mg/kg IM for severe sx).

2. If seizing, see Pediatric Seizure Protocol 3.5.2.
3. Alert emergency department to prepare for contaminated patient.
4. Do not induce vomiting.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.
2. Repeat **Atropine** 0.05 mg/kg IV/IO (maximum 3 mg) every 5-10 minutes until secretions are inhibited.

Note:
(a) If risk of exposure from fumes is high, call HAZMAT team. Refer to appropriate HAZMAT PPE protocol, as the risk of secondary contamination is very high.

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Peds Ingestion OD Chem Exposure Guideline Green

3.7
OTHER PEDIATRIC MEDICAL EMERGENCIES

3.7 OTHER PEDIATRIC MEDICAL EMERGENCIES

Pediatric Protocol

Overview:

The paramedic should use these protocols to guide him/her through the treatment of patients with other medical emergencies that are exhibiting signs and symptoms. In addition to these protocols, the paramedic may need to refer to additional protocols for continued treatment.

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3.7.1 ALLERGIC REACTIONS/ ANAPHYLAXIS

Pediatric Protocol

Purpose: This protocol should be used for patients exhibiting signs and symptoms consistent with allergic reaction as follows:

Skin - flushing, itching, hives, swelling, cyanosis.

Respiratory - dyspnea, sneezing, coughing, wheezing, stridor, laryngeal edema, laryngospasm, bronchospasm.

Cardiovascular - vasodilation, increased heart rate, decreased blood pressure.

Gastrointestinal - nausea/vomiting, abdominal cramping, diarrhea.

CNS - dizziness, headache, convulsions, tearing.

Treatment is outlined according to the severity of the allergic reaction (mild, moderate, and severe or anaphylaxis).

Procedure:

Mild Reactions - (redness and/or itching, normal perfusion without dyspnea)

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3
3. Trauma Supportive Care Protocol 3.1.4 if indicated

ALS LEVEL 1: PARAMEDIC ONLY

1. For severe itching, administer **Diphenhydramine (Benadryl)** 1-2 mg/kg IM/IV (max. 50 mg IM or 25 mg IV). If administering Benadryl IV dilute amount in 9 ml of normal saline.

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
Diphenhydramine (Benadryl)	4 mg	6 mg	8 mg	10 mg	12 mg	15 mg	19 mg	24 mg	30 mg

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Moderate Reactions - (edema, hives, dyspnea, wheezing, and normal perfusion)

BASIC LEVEL: EMT and PARAMEDIC

1. Medical Supportive Care Protocol 3.1.3
2. Trauma Supportive Care Protocol 3.1.4 if indicated

ALS LEVEL 1: PARAMEDIC ONLY

1. Establish IV/IO. Monitor BP carefully and prepare to bolus with IV fluid if patient becomes hypotensive
2. **Diphenhydramine (Benadryl)** 1-2 mg/kg (maximum 50 mg IM or 25 mg IV) IM/IV. If administering Benadryl IV dilute amount in 9 ml of normal saline.
3. ~~3.~~ **Dexamethasone 0.6mg/kg IV once**
4. **Epinephrine** (1:1000) 0.01 mg/kg (max. 0.3 mg) IM/SQ (a).
5. If patient has signs of respiratory distress, administer **Albuterol (Ventolin)** 1 nebulizer treatment;
    a. If <1 year or <10 kg, mix 1.25 mg in 1.5 ml of Normal Saline (0.083%)
    b. If >1 year or >10 kg, mix 2.5 mg in 3 ml of Normal Saline (0.083%)
    c. May repeat twice (a)
6. If bronchodilator is administered, add **Ipratropium Bromide (Atrovent)** 0.5mg (0.5 ml) to one nebulize treatment.
7. May repeat **Epinephrine** (1:1000) 0.01 mg/kg (max. 0.15) SQ (a).

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
Diphenhydramine (Benadryl)	4 mg	6 mg	8 mg	10 mg	12 mg	15 mg	19 mg	24 mg	30 mg
Zantac	Child must be able to swallow. Older children can be given 2 – 5 mg/kg po. ~75 mg – 150 mg								
Methylprednisolone (Solu-Medrol)	8 mg	12 mg	16 mg	20 mg	24 mg	30 mg	38 mg	48 mg	60 mg
Epinephrine 1:1000 IM	0.04 mg	0.06 mg	0.08 mg	0.10 mg	0.12 mg	0.15 mg	0.19 mg	0.24 mg	0.3 mg
Albuterol	< 1 yr or < 10 kg mix 1.25 mg in 1.5 ml NS				> 1 yr or > 10 kg mix 2.5 mg in 3 ml NS				
Atrovent	< 8 yrs old mix 0.25 mg (1.25 ml) with Albuterol				If > 8 yrs old mix 0.5 mg (2.5 ml) with Albuterol				

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Severe Reactions - (edema, hives, severe dyspnea and wheezing, poor perfusion/hypotension, and possible cyanosis and laryngeal edema)

BASIC LEVEL: EMT and PARAMEDIC

1. Medical Supportive Care Protocol 3.1.3
2. Trauma Supportive Care Protocol 3.1.4 if indicated

ALS LEVEL 1: PARAMEDIC ONLY

1. Establish IV/IO. If patient is hypotensive, bolus with IV NS at 20 ml/kg (10 ml/kg for neonates). May repeat bolus x 1 then contact med control if still hypotensive.
2. **Diphenhydramine (Benadryl)** 1mg/kg (maximum 50 mg IM or 25 mg IV) IM/IV. If administering Benadryl IV dilute amount in 9 ml of normal saline.
3. ~~3.~~ Dexamethasone (Decadron) 0.6mg/kg IV once~~.~~
4. **Epinephrine** (1:1000) 0.01 mg/kg (max. 0.15 mg) SQ (a).
5. If patient shows signs of respiratory distress, administer **Albuterol (Ventolin)** 1 nebulizer treatment;
    a. If <1 year or <10 kg, mix 1.25 mg in 1.5 ml of Normal Saline (0.083%)
    b. If >1 year or >10 kg, mix 2.5 mg in 3 ml of Normal Saline (0.083%)
    c. May repeat twice (a)
6. If bronchodilator is administered, add **Ipratropium Bromide (Atrovent)** 0.5mg (0.5 ml) with one nebulized treatment.
7. May repeat **Epinephrine** (1:1000) 0.01 mg/kg (max. 0.15) SQ (a).

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
Diphenhydramine (Benadryl)	4 mg	6 mg	8 mg	10 mg	12 mg	15 mg	19 mg	24 mg	30 mg
Epinephrine 1:1000 IM	0.04 mg	0.06 mg	0.08 mg	0.10 mg	0.12 mg	0.15 mg	0.19 mg	0.24 mg	0.3 mg
Albuterol	< 1 yr or < 10 kg mix 1.25 mg in 1.5 ml NS				> 1 yr or > 10 kg mix 2.5 mg in 3 ml NS				
Atrovent	< 8 yrs old mix 0.25 mg (1.25 ml) with Albuterol				If > 8 yrs old mix 0.5 mg (2.5 ml) with Albuterol				
IV NS bolus	80 ml	120 ml	160 ml	200 ml	240 ml	300 ml	380 ml	480 ml	600 ml

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Note

(a) The EPI-Jr.® may be used if other means of Epinephrine administration are not available.

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3.7.2 DIABETIC EMERGENCIES

Pediatric Protocol

Purpose: This protocol is to be used for those patients whose blood glucose is below 60 mg/dL (see Pediatric Protocol 3.4.1 for newborn). Consider medication errors, overdoses, accidental ingestions, and other factors related to etiology. Look for pill bottles

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3.
3. If patient is conscious with an intact gag reflex, assist with self- administration of oral glucose, if possible.

ALS LEVEL 1: PARAMEDIC ONLY

1. Perform glucose test with finger stick (heel stick for newborn). If glucose is below 60mg/dL (< 40 mg/dl for newborns), administer:
   a. Neonates: 10% Dextrose: 2-5 ml/kg (0.2-0.5 g/kg)
   b. Infants: 10% Dextrose: 5 ml/kg (0.5 g/kg)
   c. Children: 10% Dextrose: 5ml/kg (0.5 g/kg) not to exceed 250 ml.
2. Repeat glucose test after 15 minutes with finger stick (heel stick for newborn). If glucose is still below 60 mg/dL (< 40 mg/dl in newborn), repeat dosing as above.

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
D10W	20 ml	30 ml	40 ml	50 ml	60 ml	75 ml	95 ml	120 ml	150 ml

3. If blood glucose is >300 mg/dL with signs of dehydration, administer Normal Saline 20 ml/kg IV, unless contraindicated.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Note:

(a) To avoid infiltration and resultant tissue necrosis, Dextrose 10% should be given slow IV with intermittent aspiration of IV line to confirm IV patency followed by saline flush.

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3.7.3 NAUSEA AND VOMITING

Pediatric Protocol

Purpose: Use this protocol for patients who are nauseated and vomiting due to their illness, pain, side effect of medications, etc. If the patient's nausea and vomiting is associated with an altered mental status or a seriously ill appearance, consider the cause to be a decompensation of their medical problem such as DKA (if diabetic)

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol
2. Airway Assessment/Management Protocol. If indicated, Oxygen via nasal cannula @2 - 4 LPM to maintain pulse ox at ≥ 94% (non-rebreather @15 LPM if SpO_2 < 90%).
3. Attach cardiac monitor and pulse oximeter if indicated
4. Provide appropriate comfort measures (i.e. cool cloth to forehead).

ALS LEVEL 1: PARAMEDIC ONLY

1. If child is very ill appearing with nausea and vomiting, initiate IV lactated Ringer's or Normal Saline and bolus with 20 ml/kg for children (10 ml/kg neonates).

2. Administer Zofran (Ondansetron) as follows:

a. **Oral dissolvable tablets** (if available). LESS THAN 20 KG: DO NOTADMINISTER

i. 20 kg - 39 kg (5-11 year): 4 mg oral disintegrating tablet (ODT) placed under the tongue. Dose may not be repeated

ii. 40 kg or more (12 year or older): 4 mg oral disintegrating tablet (ODT) placed under the tongue. May repeat at 10-15 minutes with maximum dose of 8 mg

b. **Injection**

i. Less than 40 kg: 0.1 mg/kg SLOW IV push over 2-3 minutes or IM. Do not repeat.

1. 40 kg or more**:** 4 mg SLOW IV push over 2-3 minutes or IM. May be repeated once if no improvement within 30 minutes. Do not exceed 8 mg total dosage.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact medical control or medical director if any concerns or any questions.

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3.7.4 NON-TRAUMATIC ABDOMINAL PAIN

Pediatric Protocol

Purpose: This protocol should be used for patients that complain of abdominal pain without a history of trauma (refer to Appendix – Signs of Child Abuse).

Assessment should include specific questions pertaining to the GI/GU systems.

Abdominal physical assessment includes:
Ask patient to point to area of pain (palpate this area last).
Gently palpate for tenderness, rebound tenderness, distension, rigidity, guarding, and pulsatile masses. Also palpate flank for CVA (costovertebral) tenderness.

Abdominal history includes:
Hx of pain (OPQRST).
Hx of nausea/vomiting (color, bloody, coffee grounds). Hx of bowel movement (last BM, diarrhea, bloody, tarry). Hx of urine output (painful, dark, bloody).
Hx of abdominal surgery. Hx of medication ingestions
SAMPLE (attention to last meal).

Additional questions should be asked of the female adolescent patient regarding OB/GYN history (see Adult OB/GYN Emergencies).

An acute abdomen can be caused by: appendicitis, diabetic ketoacidosis, incarcerated hernia, intussuception, cholecystitis, cystitis -UTI (bladder inflammation), duodenal ulcer, diverticulitis, abdominal aortic aneurysm, kidney infection - UTI (urinary tract infection), kidney stone, pelvic inflammatory disease - PID (female), pancreatitis (see Appendix - Abdominal Pain Differential 7.1).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care protocol 3.1.3
3. Trauma Supportive Care Protocol 3.1.4, if indicated

ALS LEVEL 1: PARAMEDIC ONLY

1. If decreased perfusion (see Appendix 7.10 - Pediatric Vital signs), administer fluid challenge of Normal Saline 20 ml/kg IV (10 ml/kg for neonates).

ALS LEVEL 2: MEDICAL CONTROL

1. Consider pain control (see Pediatric Pain Protocol 3.1.5 for pain scale and medication dosage-same as isolated extremity fracture pain protocol).
2. Call medical control or medical director for any questions or concerns.

Weight	4kg Grey	6kg Pink	8kg red	10kg purple	12kg yellow	15kg white	19kg blue	24kg orange	30kg green
Morphine IV/IO/IM/SQ	0.04 mg	0.06mg	0.08 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Fentanyl IV/IO	4 mcg	6 mcg	8 mcg	10 mcg	12 mcg	15 mcg	19 mcg	24 mcg	30 mcg
Fentanyl IN	6 mcg	9 mcg	12 mcg	15 mcg	16 mcg	22.5 mcg	28.5 mcg	36 mcg	45 mcg
Ketamine IV/IO/IN	2 mg	3 mg	4 mg	5 mg	6 mg	7.5 mg	9.5 mg	12 mg	15 mg
Atropine	0.08 mg	0.12 mg	0.16 mg	0.2 mg	0.24 mg	0.3 mg	0.38 mg	0.48 mg	0.6 mg
Naloxone (Narcan)	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2 mg	2 mg
Ondansetron (Zofran)	Contact med control			1 mg	1 mg	1 mg	2 mg	2 mg	3 mg

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3.7.5 NON-TRAUMATIC CHEST PAIN UNDIFFERENTIATED

Pediatric Protocol

Purpose: Causes of non-traumatic chest pain in the pediatric patient include: wheezing associated illness, spontaneous pneumothorax, pleurisy, costochondritis, pulmonary embolism, pneumonia, peptic ulcer, drug usage (e.g. stimulants - cocaine), dissecting aortic aneurysm, pericarditis, hiatal hernia, esophageal spasm, cholecystitis, pancreatitis, cervical disk problem, and rarely cardiac problems (see Appendix Chest Pain Differential). Also refer to Appendix – Signs of Child Abuse 7.13.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3.
3. Airway Management Protocol 3.1.2
4. Consider need for other protocols (e.g. Pediatric Protocol 3.2 - Pediatric Respiratory Emergencies).

ALS LEVEL 1: PARAMEDIC ONLY

1. None

ALS LEVEL 2: MEDICAL CONTROL

1. Consider pain control (see Pediatric Pain Protocol 3.1.5 for pain scale and medication dosage-same as isolated extremity fracture pain protocol).
2. Call medical control or medical director for any questions or concerns.

Weight	4kg Grey	6kg Pink	8kg red	10kg purple	12kg yellow	15kg white	19kg blue	24kg orange	30kg green
Morphine IV/IO/IM/SQ	0.04 mg	0.06mg	0.08 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Fentanyl IV/IO	4 mcg	6 mcg	8 mcg	10 mcg	12 mcg	15 mcg	19 mcg	24 mcg	30 mcg
Fentanyl IN	6 mcg	9 mcg	12 mcg	15 mcg	16 mcg	22.5 mcg	28.5 mcg	36 mcg	45 mcg
Atropine	0.08 mg	0.12 mg	0.16 mg	0.2 mg	0.24 mg	0.3 mg	0.38 mg	0.48 mg	0.6 mg
Naloxone (Narcan)	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2 mg	2 mg
Ondansetron (Zofran)	Contact med control			1 mg	1 mg	1 mg	2 mg	2 mg	3 mg

3.7.6 VIOLENT AND/OR IMPAIRED PATIENT

Pediatric Protocol

Purpose: This treatment protocol is used in conjunction with Adult Medical Protocol-Behavioral Violent Psychiatric Emergencies. If patient is violent and an immediate threat to the patient, EMS crew or bystander safety exists, restraint should be used to prevent patient from harming him or herself or others. If patient is not violent, be observant for possibility of violence and avoid provoking patient. Particular caution should be exercised when any "non-lethal" law enforcement device (e.g. pepper spray, taser, etc.) has been employed.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Have patient placed under Baker Act (or equivalent commitment form) when appropriate and refer to Impaired/Incapacitated Persons Act
3. Medical Supportive Care 3.1.3.
4. Airway Management 3.1.2
5. Rule out causes other than psychiatric (e.g. drug overdose, ETOH, head trauma, hypoxia, hypoglycemia).
6. Physically restrain patient when appropriate (see Medical Procedure Physical Restraints 4.28).

ALS LEVEL 1: PARAMEDIC ONLY

1. Perform glucose test with finger stick. If glucose is below 60 mg/dL (< 40mg/dl for newborns), administer:
   a. Neonates: **10% Dextrose**: 2-5 ml/kg (0.2-0.5 g/kg)
   b. Infants: **10% Dextrose**: 5 ml/kg (0.5 g/kg)
   c. Children: **10% Dextrose**: 5 ml/kg (0.5 g/kg) not to exceed total of 250 ml (25gms)
2. Administer one of the following benzodiazepines(< 12 yr old contact med control first):
   a. **Midazolam (Versed)** 0.1mg/kg (maximum 2mg) IM/IV or Intranasal. May repeat once PRN (up to max. 4 mg) (b).
   c. **Lorazepam (Ativan)** 0.05 mg/kg IV/IO//IN; may repeat once, to maximum dose of 4 mg (b).
3. **Diphenhydramine HCL (Benadryl)** 1 mg/kg (maximum 50 mg IM or 25 mg IV) IM or IV (a).

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
D10W	20 ml	30 ml	40 ml	50 ml	60 ml	75 ml	95 ml	120 ml	150 ml
Midazolam (Versed) IV/IO/IM	0.4 mg	0.6 mg	0.8 mg	1.0 kg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Midazolam (Versed) IN	0.8 mg	1.2 mg	1.6 mg	2 mg	2.4 mg	3 mg	3.8 mg	4.8mg	5 mg (max)
Lorazepam (Ativan) IV/IO/IN	0.2 mg	0.3 mg	0.4 mg	0.5 mg	0.6 mg	0.75 mg	0.95 mg	1.2 mg	1.5 mg
Diphenhydramine (Benadryl) IV/IO/IM	4 mg	6 mg	8 mg	10 mg	12 mg	15 mg	19 mg	24 mg	30 mg

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Notes:
(a) In some instances, IV administration may present a safety concern; therefore IM or intranasal administration of sedatives may be the more desirable route.
(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device (same as IV dose).

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3.7.7 SUSPECTED CHILD ABUSE

Pediatric Protocol

Purpose: This protocol should be used when the paramedic suspects that child abuse may have occurred. See Appendix - Signs of Child Abuse 7.13 and Report of Abuse 7.12. Child abuse is when a person intentionally inflicts, or allows to be inflicted, physical or psychological injury to a child, which causes or results in risk of death, disfigurement, or distress. Child neglect is when a child's physical, mental, or emotional condition is impaired or in danger because of failure of the legal guardian to supply basic necessities, including: adequate food, clothing, shelter, education, or medical care.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Support Protocol 3.1.3.
3. Trauma Supportive Care Protocol 3.1.4 if indicated.
4. Advise Police that child abuse is suspected.
5. Protect child from further abuse.
6. Obtain information in a non-judgmental manner.
7. Do not confront caregiver and/or parent.
8. Transport patient to the hospital for evaluation and possible treatment (a).
9. Report suspected child abuse (Florida Child Abuse Hotline:1-800-962-2873) (b).

ALS LEVEL 1: PARAMEDIC ONLY

1. None

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Note

(a) If Parent's refuse to have patient transported to hospital, request police assistance.
(b) Reporting of suspected child abuse is required by law.

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3.7.8 SICKLE CELL ANEMIA

Pediatric Protocol

Purpose: Sickle cell anemia is a chronic hemolytic anemia occurring almost exclusively in African Americans and is characterized by sickle-shaped red blood cells. Sickle cell crisis results from the occlusion of a blood vessel by masses of sickle shaped red blood cells. Pain is the principle manifestation, and this represents the most common type of crisis. Typical pain occurs in the joints and back. Hepatic, pulmonary, or central nervous system involvement can occur, each with its own group of symptoms. Keep in mind that patients with sickle cell disorder have a high incidence of life-threatening disorders at a very young age.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3
3. Provide emotional support

ALS LEVEL 1: PARAMEDIC ONLY

1. IV/IO of normal saline. Give fluid challenge of 20 ml/kg, and then maintain IV at KVO.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.
2. If pain persist and systolic BP is adequate (see Appendix – Pediatric Vital Signs 7.10), choose one of the following pain meds:

   a. **Morphine Sulfate** may be given intravenously in increments every 3 – 5 minutes, titrated to pain to a maximum of 5 mg. Administer at a rate not to exceed 1 mg/min. Pediatric dose:
      - **< 6 months**; 0.05 – 0.2 mg/kg SQ/IM/IV (avoid IM route if possible)
      - **6 months- 12 yrs**; 0.1-0.2 mg/kg IV/IM/SQ.

   b. **Fentanyl (Sublimaze)**
      Pediatric dosage: 1-3 yrs old: 1 - 2 mcg/kg IV slow or 1.5 mcg/kgIN (via atomizer)
      3 – 12 yrs old: 1 – 2 mcg/kg IV slow or 1.5 mcg/kg IN (via atomizer)
      >12 yrs old: 0.5 – 1 mcg/kg IV slow or 1.5 mcg/kg IN (via atomizer)

Weight	4kg Grey	6kg Pink	8kg red	10kg purple	12kg yellow	15kg white	19kg blue	24kg orange	30kg green
Morphine IV/IO/IM	**0.4 mg**	**0.6mg**	**0.8 mg**	**1 mg**	**1.2 mg**	**1.5 mg**	**1.9 mg**	**2.4 mg**	**3 mg**
Fentanyl IV/IO	**4 mcg**	**6 mcg**	**8 mcg**	**10 mcg**	**12 mcg**	**15 mcg**	**19 mcg**	**24 mcg**	**30 mcg**
Fentanyl IN	**6 mcg**	**9 mcg**	**12 mcg**	**15 mcg**	**18 mcg**	**22.5 mcg**	**28.5 mcg**	**36 mcg**	**45 mcg**

Note:

(a) Extreme caution should be used with administering narcotic analgesics to a patient with a $SpO_2 \leq 95\%$ ETCO2 will be utilized with all patient's given analgesics.

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3.7.9 PEDIATRIC FEVER

Pediatric Protocol

Purpose: Use this protocol for pediatric patients who are feverish. Child should be awake and able to swallow with no difficulty. You may allow/assist the parent with administration of any medication. Fever in an infant less than 30 days old is potentially very serious. Child should be transported to an emergency department for a possible septic work up. Should parent or legal guardian decline transport, contact supervisor or medical control prior to accepting a refusal.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

17. Initial Pediatric Assessment Protocol 3.1.1
18. Medical Supportive Care Protocol 3.1.3
19. Obtain a temperature. If the child is less than two years of age this should be done rectally (or with newer thermo-sensing skin thermometers). Inquire if Tylenol has been given in previous four hours. If so, do **NOT** administer more Tylenol.

Weight	4 kg *grey*	6 kg *pink*	8 kg *red*	10 kg *purple*	12 kg *yellow*	15 kg *white*	19 kg *blue*	24 kg *orange*	30 kg *green*
Acetaminophen	**60 mg**	**90 mg**	**120 mg**	**150 mg**	**180 mg**	**225 mg**	**285 mg**	**360 mg**	**450 mg**

20. For a child less than twelve years old who has a temperature greater than 101.5 degrees F. and unimpaired ability to swallow TYLENOL 15mg/kg P0. may be administered once. (The same dose may be administered rectally if parents have suppositories at home.)
21. Consider cooling the child with tepid water applied with a wet cloth to head, axillary, and groin regions.
22. If transport time is greater than thirty minutes a follow-up temperature should be taken.

ALS LEVEL 1: PARAMEDIC ONLY

1. Should patient experience a febrile seizure, treat according to Pediatric Seizure Protocol.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Note:

Due to the inability to determine the origin of the fever in the field; this Patient Order Set can only be used when the patient is transported to an Emergency Department.

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3.7.10 Pediatric Hyperkalemia

Pediatric Protocol

Purpose: This protocol is to be used on pediatric patients found to be in a state of hyperkalemia. Hyperkalemia is a serum potassium level of > 5.5 mEq/L. Hyperkalemia in children can be caused by renal failure, rhabdomyolysis, the use of potassium- sparing diuretics, and adrenal cortical insufficiency.Metabolic acidosis can result in hyperkalemia due to the hydrogen-potassium shift. In the pre-hospital setting, hyperkalemia may be an unintentional adverse consequence of rapid sequence intubation using Succinylcholine. It is important for the paramedic to recognize the developing EKG signs of hyperkalemia following RSI of child in order to initiate immediate therapy. EKG evidence of hyperkalemia includes sudden change in the apprearence of the EKG from a NSR to sudden peaked T-waves followed by prolongation of the PR interval as well as widening of the QRS complex. Eventually the P wave drops, the QRS becomes very wide and blends in with the peaked T wave giving the appearance of a sinusoid wave.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Patient Assessment Protocol 3.1.1
2. Pediatric Airway Management 3.1.2
3. Medical Supportive Care Protocol 3.1.3
4. Attach cardiac monitor and pulse oximeter if indicated
5. Keep patient warm (except if treating heat stroke, cool patient).

ALS LEVEL 1: PARAMEDIC ONLY

1. Establish IV with NS at KVO
2. Perform 12 lead EKG and confirm changes in EKG from baseline, suggestive of hyperkalemia
    a. Peaked T-wave
    b. Prolonged PR interval
    c. Widening of QRS
3. If iSTAT available, run potassium level on sample of blood. If K+ found to be > 5.5 mEq/Liter AND EKG changes as above, proceed with treatment below.
4. If there is strong evidence to suggest hyperkalemia (elevated K+ level and/or definite EKG changes) and an you are unable to start an IV, place an IO in patient.
5. Give **Albuterol 0.5% solution**; give 2.5mg via nebulizer (DO NOT use Atrovent with the Albuterol when treating hyperkalemia).
6. Give **Sodium Bicarb;** 1 mEq/kg initially IV/IO (1ml/kg of 8.4% solution). In neonates and infants, dilute the 8.4% solution 1:1 with

sterile water (not saline) making a 4.2% solutiuon to reduce the hyperosmolarity of the solution.

7. **Calcium Chloride 20 mg/kg IV/IO** q 10 min prn
8. Notify hospital staff ASAP as child will need additional Rx upon arrival (Regular Insulin, Kayexcelate)

Weight	4 kg Grey	6 kg Pink	8 kg red	10 kg purple	12 kg yellow	15 kg white	19 kg blue	24 kg orange	30 kg green
Albuterol	< 1 yr or < 10 kg mix 1.25 mg in 1.5 ml NS				> 1 yr or > 10 kg mix 2.5 mg in 3 ml NS				
Sodium Bicarb	4 mEq	6 mEq	8 mEq	10 mEq	12 mEq	15 mEq	19 mEq	24 mEq	30 mEq
Calcium Chloride	80 mg	120 mg	160 mg	200 mg	240 mg	600 mg	380 mg	480 mg	600 mg

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.7.11 Peds Adrenal Insufficiency

Pediatric Protocols

Purpose

This protocol is used for pediatric patients with a *known history of Adrenal Insufficiency* (Primary Adrenal Insufficiency aka Addison's disease, Secondary Adrenal Insufficiency, Congenital Adrenal Hyperplasia aka CAH) who have or are currently experiencing an episode of high stress such as trauma, infection, or recent surgery. This protocol is to be used to prevent such stressful episodes from possibly causing a life-threatening condition known as an Adrenal Crisis, of which these patients are at extreme risk.

• Adrenal insufficiency or Addison's disease is an endocrine disorder that occurs when the adrenal glands do not produce sufficient amounts of cortisol and other glucocorticoid hormones needed to respond to stress and inflammatory reactions.

• Early signs and symptoms of patients in crisis include pallor, dizziness, headache, weakness/lethargy, abdominal pain, nausea/vomiting and hypoglycemia.

Procedure:

BASIC LEVEL: EMT AND PARAMEDIC

4. Initial Patient Assessment Protocol
5. Airway Assessment/Management Protocol. Oxygen via nasal cannula @ 2-4 LPM to maintain pulse ox ≥ 94%
6. Attach cardiac monitor and pulse oximeter

ALS LEVEL 1: PARAMEDIC ONLY

7. If the patient/care-taker is able to provide or is found with his/her own supply of prescribed Solu-Cortef, assist the patient/care-taker to administer the medication.
8. If the patient/care-taker is not able to administer the patient's prescribed Solu-Cortef, administer the medication IM according to the dosage instructions provided with the Solu-Cortef (Peds dosing 2mg/kg IV/IM/IO) or contact Medical Control.
9. Initiate IV of lactated Ringer's or normal saline at TKO. If patient is tachycardia and/or hypotensive, administer a fluid challenge of normal saline 20 ml/kg (10 ml/kg for neonates) IV or IO to maintain SBP of > 90 mmHg, repeat as needed x 2
10. If the patient has a known history of Adrenal Insufficiency but does not have his/her own Solu-Cortef, and the possibility of adrenal crisis exists, contact Medical Control for consideration of administering **Dexamethazone** 0.6 mg/kg IM/IO/IV (Max dose 10 mg)
11. If the patient has persistent hypotension, start **Dopamine** 5 – 10 mcg/kg/min (1600 mcg/mL infusion concentration = 15 – 60 gtts/min). Mix 400 mg in 250 ml D5W
    - Titrate to maintain a minimum systolic BP of 90 mm Hg and maximum BP of 120 mm Hg (maximum dose 20 mcg/kg/min).
    - Incr 1 – 4 mcg/kg/min q 10 – 30 min
    -

12. Determine serum glucose level with Glucometer. If patient is hyperglycemic or hypoglycemic, treat according to **Diabetic Emergencies** protocol.

ALS LEVEL 2: MEDICAL CONTROL

1. Contact Medical Control or Medical Director for any questions or problems.

NOTE:

(d) Adrenal Crisis leading to death usually results from hypotension or cardiac dysrhythmias due to hyperkalemia. Remember that an ECG can provide evidence of hyperkalemia.

~~(e) In addition to treating with Solu-Cortef, treatment should be based on the clinical presentation and findings.~~

(f) Be alert for vomiting and have suction ready.

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Dopamine (Intropin) 2 - 20 mcg/kg/min

A mixture of 400 mg Dopamine in 250 ml = 1,600 mcg/ml

mcg/kg/ minute	Patient's Weight in Kilograms											
	2.5	5	10	20	30	40	50	60	70	80	90	100
2 mcg	-	-	1	2	2	3	4	5	5	6	7	8
5 mcg	-	1	2	4	6	8	9	11	13	15	17	19
10 mcg	1	2	4	8	11	15	19	23	26	30	34	38
15 mcg	1	3	6	11	17	23	28	34	39	45	51	56
20 mcg	2	4	8	15	23	30	38	45	53	60	68	75

With a 60 drop per ml drip set this is the number of drops/minute (or ml/hr)

Observe for extravasation - swelling, pallor, pain, etc. at IV site.

3.8
PEDIATRIC ENVIRONMENTAL EMERGENCIES

3.8 PEDIATRIC ENVIRONMENTAL EMERGENCIES

Pediatric Protocol

Overview: The following protocols cover a range of problems due to the environment, including: trauma due to changes in atmospheric pressure, exposure to heat and cold extremes, water submersion, and exposure to electricity. Initial efforts should focus on removing the patient from the harmful environment.

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3.8.1 NEAR DROWNING

Pediatric Protocol

Purpose: Near drowning patients are those that have been submerged in fresh or salt water and may or may not be conscious. If the patient is still in open water on arrival of EMS, a Dive Rescue Team should be utilized to remove the patient from the water whenever possible. Additional protocols may be needed for treatment decisions (e.g. Pediatric Barotrauma Protocol 3.8.4 -).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Trauma Supportive Care Protocol 3.1.4 (protect C-spine) .
3. Determine pertinent history (duration of submersion, depth, water temperature, possible seizure, drug and/or alcohol use, possible trauma).
4. Maintain body temperature, dry and warm patient.
5. All near drowning patients should be transported to the hospital, regardless of how well they may seem to have recovered. Delayed death or complications due to pulmonary edema or aspiration pneumonia are not uncommon. The most devastating injury is due to asphyxia.

ALS LEVEL 1: PARAMEDIC ONLY

1. Treat dysrhythmias per specific protocol (see Pediatric Dysrhythmia Protocol 3.3).

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.
2. Consider Nasogastric Tube (see Medical Procedure NG Insertion 4.4.6) (b)

Notes

(a) The routine use of abdominal thrusts for near-drowning victims is not recommended. This maneuver should only be used in cases of FBAO (see Medical Procedure 4.15 – Foreign Body Obstructed Airway).
(b) Any near-drowning patient with a decreased ability to protect their airway, with gross abdominal distension, or who requires ventilatory assistance needs an NG tube.

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3.8.2 HEAT RELATED EMERGENCIES

Pediatric Protocol

Purpose: Hyperthermia occurs when the patient is exposed to increased environmental temperature and can manifest as heat cramps, heat exhaustion, or heat stroke. Certain drugs may cause an increase in temperature (e.g. cocaine, ecstacy, etc.)

Some tympanic thermometers (Braun Thermoscan™ Pro-1 and Pro 3000) will register from 68 – 108 degrees F (tympanic thermometers should not be used in infants (<1yr)).

Heat Cramps	Signs and symptoms include: muscle cramps of the fingers, arms, legs, or abdomen, hot sweaty skin, weakness, dizziness, tachycardia, normal BP, and normal temperature.
Heat Exhaustion	Signs and symptoms include: cold and clammy skin, profuse sweating, nausea/vomiting, diarrhea, tachycardia, weakness, dizziness, transient syncope, muscle cramps, headache, positive orthostatic vital signs, normal or slightly elevated temperature.
Heat Stroke	Signs and symptoms include: hot dry skin (sweating may be present), confusion and disorientation, rapid bounding pulse followed by slow weak pulse, hypotension with low or absent diastolic reading, rapid and shallow respirations (which may later slow), seizures, coma, elevated temperature above 105 degrees F.

Procedure:

Heat Cramps and Heat Exhaustion

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3
3. Trauma Supportive Care Protocol 3.1.4 if indicated.
4. Remove from warm environment and cool patient.
5. Monitor temperature.
6. For mild to moderate heat cramps and heat exhaustion, if patient is conscious, encourage patient to drink salt containing fluids (e.g. half-strength Gatorade® or 10K®).

ALS LEVEL 1: PARAMEDIC ONLY

1. If heat cramps are severe or patient's level of consciousness is diminished, administer fluid challenge of Normal Saline 20 ml/kg IV (10 ml/kg for neonates). Repeat x1 prn with vital sign check and reassess lung sounds between each bolus.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Heat Stroke

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3
3. Trauma Supportive Care Protocol 3.1.4 if indicated
4. Remove from warm environment and aggressively cool patient. Remove patient's clothing and cover patient with wet sheets. Also, turn A/C and fans on high and apply ice packs to head, neck, chest and groin.
5. Monitor temperature. Cool patient to 102 degrees F, then remove wet sheets, ice packs, and turn off fans (avoid lowering temperature too much).

ALS LEVEL 1: PARAMEDIC ONLY

1. Treat hypotension with a bolus of IV/IO fluid at 20 mg/kg (10 mg/ml in neonates). May repeat x 1. **Avoid using vasopressors and anticholinergic drugs** (may potentiate heat stroke by inhibiting sweating).
2. Treat seizures as per Pediatric Seizure Protocol

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.8.3 COLD RELATED EMERGENCIES

Pediatric Protocol

Purpose: Factors that predispose and/or cause a patient to develop hypothermia include: geriatric and pediatric patients, poor nutrition, diabetes, hypothyroidism, brain tumors or head trauma, sepsis, use of alcohol and certain drugs, and prolonged exposure to water or low atmospheric temperature.

Hypothermia patients can be divided into three categories:

- Mild (temperature 94-97 degrees F),
- Moderate (temperature 86-94 degrees F),
- Severe (temperature <86 degrees F).

It should be noted that most oral thermometers will not register below 96 degrees F. However, some tympanic thermometers (Braun Thermoscan™ Pro-1 and Pro 3000) will register from 68 – 108 degrees F (tympanic thermometers should not be used in infants).

Mild to Moderate hypothermia	Patients will generally present with shivering, lethargy, and stiff, uncoordinated muscles.
Severe hypothermia	Patients may have altered mental status, ranging from confusion to lethargy or coma. Shivering will usually stop and physical activity will be uncoordinated. In addition, severe hypothermia will frequently produce an Osborn wave or J wave on the ECG, as well as dysrhythmias (bradycardia, ventricular fibrillation).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3 (d)
3. Trauma Supportive Care Protocol 3.1.4 if indicated (a).
4. Remove all wet clothes and dry patient.
5. Protect from heat loss and wind chill.
6. Maintain horizontal position.
7. Avoid rough movement and excess activity (careful gentle handling) (b) (c)) (d).
8. Monitor temperature.
9. Add heat to patient's head, neck, chest, and groin.
10. For severe hypothermia, warm IV fluids, if possible.

For Severe Hypothermic Cardiac Arrest:

11. Start CPR(c).

ALS LEVEL 1: PARAMEDIC ONLY

1. For VF or pulseless VT, defibrillate x 1 @ 2 J/kg and immediately resume CPR for 5 cycles (or two minutes) before checking rhythm (e).
2. Intubate and ventilate with warm humidified oxygen, if possible.
3. Establish IV with warm Normal Saline.
4. Determine blood glucose and treat as per Peds Hypoglycemic Protocol.

If temperature is above 86 degrees F:

4. If patient's core temperature ≥ 30°C (86°F), follow appropriate dysrhythmia treatment (see Pediatric Cardiac Dysrhythmia Protocol 3.3) (d) (e).

If temperature is below 86 degrees F:

5. Continue CPR and transport immediately. Do not treat dysrhythmias in severe hypothermia (warm patient prior to treatment) (e).

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Note:

(a) Cases of frostbite should be bandaged with dry sterile dressings and transported without attempting rewarming in the prehospital setting.

(b) Manipulation can precipitate ventricular fibrillation in the irritable hypothermic myocardium

(c) To avoid inappropriate chest compressions, a patient who is unmonitored or in a "non-arrested rhythm" (a rhythm other than ventricular fibrillation or asystole, such as sinus bradycardia or atrial fibrillation) should be examined carefully for respiratory activity and pulses. 30 to 45 seconds should be spent attempting to do detect respiratory activity and palpate a pulse. If none detected, CPR should be initiated.

(d) Although dysrhythmias in hypothermic patient may represent an immediate threat to life, most rhythm disturbances (e.g., Sinus bradycardia, atrial fibrillation or flutter) require no therapy and revert spontaneously with rewarming.

(e) Ventricular fibrillation may be refractory to therapy until the patient is rewarmed. The hypothermic heart is relatively resistant to atropine, pacing, and counter shock. The American Heart Association suggests a single defibrillation attempt. If this is unsuccessful, CPR should be instituted and rapidly rewarming begun. Defibrillation should be reattempted when the core temperature reaches 30°C (86°F).

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3.8.4 BAROTRAUMA / DECOMPRESSION ILLNESS - DIVE INJURIES

Pediatric Protocol

Purpose: Barotrauma and decompression illness is caused by changes in the surrounding atmospheric pressure beyond the body's capacity to compensate for excess gas load. These injuries are most commonly associated with the use of SCUBA (Self-Contained Underwater Breathing Apparatus). SCUBA diving emergencies can occur at any depth with the most serious injuries manifesting symptoms after a dive. It should be understood that if a patient took a breath underwater, from any source of compressed gas (e.g. submerged vehicle, SCUBA, etc) while greater than three (3) feet in depth then ascended to the surface, the patient may be a victim of barotrauma. Barotrauma may cause several injuries to occur including: arterial gas embolism (AGE), pneumothorax, pneumomediastinum, subcutaneous emphysema, and the "squeeze". Decompression illnesses may also include decompression sickness ("Bends").

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Trauma Supportive Care Protocol 3.1.4,
3. High-flow O_2.
4. Place patient supine. Vomiting patient s should be placed in the left lateral decubitus position to prevent aspiration. (c).
5. Complete the Dive Ac Adent Signs and Symptoms Checklist (see Forms Section).
6. Start Dive History Profile (see Forms Section), if possible (the patient's dive buddy maybe helpful in answering many of these questions).
7. Start Rapid Neuro Field Exam Record (see Forms Section).
8. Whenever possible, have the legal authority in charge (e.g. police, Florida Marine Patrol, U.S. Coast Guard, etc.) secure all of the victims dive gear with proper chain of custody for testing, analysis, etc.
9. Manage patient according to appropriate protocol(s).
10. Transport to closest Emergency Department or Trauma Center.
11. If using air transport for diving accident patient; cabin altitude must be below 1000 feet.
12. Contact Diver's Alert Network (DAN) at Duke University Medical Center collect at (919) 684-4326 or (919) 648-8111 for further assistance (a).

ALS LEVEL 1: PARAMEDIC ONLY

1. None .

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

NOTE:

(a) DAN may be contacted while on scene or after arrival at the hospital. If at hospital, give name of ED physician and ED phone number.

(b) The two most serious dive related accidents are **Air Embolism** (arterial gas embolism), and **Decompression Sickness** (venous gas embolism)

(c) According to the U.S. Navy Diving Manual, dive accident victims should be transported lying flat. Although most of the diving community teaches that victims should be transported with the victim on his left side, head lower than the rest of the body. When placing a victim in the Dive Accident Management Position lay him flat on a backboard. The only time a victim should be placed on his side is if a pneumothorax exists, or there is a possibility of regurgitation. If the patient has a pneumothorax, place him on the affected side otherwise, left lateral decubitus if vomiting.

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Peds Near Drowning

3.8.5 ELECTRICAL EMERGENCIES

Pediatric Protocol

Purpose: A wide range of injuries can be caused from a lightning strike or contact with electricity. Electrical injury can occur from direct contact, an arc, or a flash of the electricity and a direct hit or a splash from lightning. The movement of electrical current through the body can cause violent muscle contractions that can lead to fractures, and therefore, the C-spine should be protected. The thermal energy can cause external burns, but in many cases the majority of thermal damage is internal, with few external signs of injury. Dysrhythmias are also common (e.g. ventricular fibrillation). The rescuer should be sure that the patient is no longer in contact with the electrical current before initiating treatment.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Pediatric Assessment Protocol 3.1.1
2. Trauma Supportive Care Protocol 3.1.4 (protect C-spine).
3. Treat burns per Pediatric Burn Protocol 3.9.7.
4. Consider need to transport to a trauma center
5. Try to determine the amps, volts, and duration of contact with the electricity, if possible. (500 volts or more should be categorized as high voltage)

ALS LEVEL 1: PARAMEDIC ONLY

1. Treat dysrhythmias per specific protocol (see Pediatric Cardiac Dysrhythmida Protocol 3.3).

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.9
PEDIATRIC
TRAUMA EMERGENCIES

3.9 PEDIATRIC TRAUMA EMERGENCIES

Pediatric Protocol

Overview: These protocols cover specific types of injuries and their treatment. The initial assessment of the trauma patient should include determination of trauma alert criteria (see appendix for trauma alert criteria). When the situation demands (e.g. trauma alert criteria is met), scene time should be limited as much as possible (e.g.10 minutes) and the patient should be expeditiously transported to a trauma center. Do not delay transport to establish vascular access or bandage and splint every injury. Priority should be given to airway management, rapid preparation for transport (e.g. full immobilization on a backboard) and control of gross hemorrhage.

If a vascular access is obtained and hypovolemia is suspected (e.g. signs and symptoms of shock), a fluid challenge of 20 ml/kg should be administered. If the patient is still in shock, repeat fluid challenge at 20 ml/kg until a maximum of 60 ml/kg is administered. However, administration of large volumes of IV fluids has been found to be deleterious to the survival of patients with uncontrolled hemorrhage, internally or externally. In recent studies (NEJM 1994), it has been shown that maximal fluid resuscitation may increase the bleeding, preventing the formation of a protective thrombus or dislodging it once the intraluminal pressure exceeds the tamponading pressure of the thrombus. Therefore, **consult with the physician should be made prior to the administration of large volumes of IV fluids when the transport time is relatively short (e.g. < 20 minutes).**

Avoid the use of vasopressors agents (e.g. Dopamine) in trauma patients that are hypotensive (see appendix- pediatric vital signs)

The pregnant adolescent female in her third trimester should be placed on her left side for transport. If the injuries require the use of a backboard, following full immobilization to the backboard, said board should be tilted to the left. Failure to follow this practice may cause hypotension due to decreased venous return.

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3.9.1 HEAD AND SPINE INJURIES

Pediatric Protocol

Purpose: If history, symptoms, or signs of head or spinal injuries are present, manually immobilize the head and neck while maintaining a patent airway using a modified jaw-thrust method. Immobilization of the entire spine is indicated following initial stabilization.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Trauma Supportive Care Protocol 3.1.4. with appropriate C-Spine precautions
2. If not hypotensive (see Appendix 7.10 - Pediatric Vital Signs), elevate head of backboard 30 degrees (12-18 inches).
3. If child is asleep upon arrival, gently arouse him/her to assess the level of consciousness or irritability. If the child is upset, allow some time for the child to settle down before continuing with the exam.
4. Perform a through head-to-toe assessment for trauma, including an age-appropriate neurologic exam and musculoskeletal exam.
5. Assess for and document a Glasgow Coma Scale
6. Apply a hemostatic gauze on severe wounds to the head, neck, face, axilla, or buttocks that cannot be controlled by other means (direct pressure)

ALS LEVEL 1: PARAMEDIC ONLY

1: If signs of brainstem herniation exist (e.g. pupillary dilation, asymmetric pupillary reactivity, or motor posturing), consider intubation and ventilate @ 20/minute for child and 30/minute for infant. Keep the end tidal CO_2 between 35 and 40.

2. If patient is seizing, see Pediatric Seizure Protocol 3.5.2 (avoid glucose containing solutions and medications).

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.9.2 EYE INJURIES
Pediatric Protocol

Purpose: This protocol covers a variety of injuries to the eye. If other injuries to the body exist, priority of care should be given as appropriate.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Trauma Supportive Care Protocol 3.1.4 (establish IV PRN).
3. Remove or ask to the patient to remove contact lenses, if still in the affected eye(s).
4. For penetrating object, stabilize object and cover affected eye with an ocular shield or similar rigid device. Cover both eyes to minimize eye movement. Avoid direct pressure on eye or penetrating object.
5. If eyeball has been forced out of the socket, cover the entire eye area with a rigid container, such as a disposable drinking cup. Avoid contact with the exposed globe. If bleeding, control by direct pressure with a sterile dry dressing.
6. If there are signs and symptoms or suspicion of ocular exposure to chemicals or foreign body, without obvious or suspected penetrating injury or laceration of the cornea or globe, irrigate with Normal Saline IV solution.

ALS LEVEL 1: PARAMEDIC ONLY

1. none

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.
2. Contact med control for pain medication order if needed.

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3.9.3 CHEST INJURIES

Purpose: This protocol covers both blunt and penetrating chest trauma and should be part of initial resuscitation if breathing is compromised.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Trauma Supportive Care Protocol 3.1.4.
3. Penetrating injuries to the chest or upper back should be covered immediately with an occlusive dressing (e.g. Vaseline gauze).
4. Do not attempt to remove an impaled object (stabilize with bulky dressing, etc.). If impaled object is very large or unwieldy, attempt to cut object to no less than six inches from chest.

ALS LEVEL 1: PARAMEDIC ONLY

1. Do not delay transport to establish vascular access or bandage and splint every injury
2. For tension-pneumothorax, with evidence of respiratory and circulatory compromise, decompress chest on affected side (see Medical Procedure Needle Decompression 4.26).
3. For massive flail chest with severe respiratory compromise, intubate and ventilate @ 20/minute for child and 30/minute for infant. If flail chest does not cause severe respiratory compromise, stabilize externally using ipsilateral arm in sling and swathe.
2. For crush injury, establish two large bore IVs. If crushing object is still on patient, infuse a minimum of 20 ml/kg of fluid before attempting to lift object off of patient.
6. For traumatic asphyxia with entrapment > 20 minutes**, Sodium Bicarbonate (8.4%)** 1 mEq/kg IV (a).
7. If a vascular access is obtained (IV or IO) and hypovolemia is suspected (e.g. signs and symptoms of shock), a fluid challenge of 20 ml/kg should be administered. If the patient is still in shock, repeat fluid challenge at 20 ml/kg until a maximum of 60 ml/kg is administered.
8. Avoid the use of vasopressors agents (e.g. Dopamine) in trauma patients that are hypotensive

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.
2. Consult with the physician should be made prior to the administration of large volumes of IV fluids when the transport time is relatively short (e.g. < 20 minutes).

Note:

(a) Sodium Bicarbonate (4.2%) 1 mEq/kg IV/IO should be administered to

infants (dilute 8.4% 1:1 with Normal Saline to make 4.2%).

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3.9.4 ABDOMINO-PELVIC INJURIES

Pediatric Protocol

Purpose: This protocol covers blunt and penetrating abdomino-pelvic trauma. Penetrating injuries may also include the chest (see Pediatric Protocol 3.9.3 - Chest Injuries). Also refer to Appendix – Signs of Child Abuse.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Trauma Supportive Care Protocol 3.1.4. (CALL TRAUMA ALERT IF APPROPRIATE)
3. For penetrating injuries, cover with an occlusive dressing (e.g. Vaseline gauze).
4. For evisceration, cover organs with saline soaked sterile dressing and then cover with an occlusive dressing (e.g. foil). Do not attempt to put organs back into abdomen.
5. Do not log roll patient with suspected pelvic fracture (may use scoop stretcher if appropriate to patient size).

ALS LEVEL 1: PARAMEDIC ONLY

1. Do not delay transport to establish vascular access or bandage and splint every injury
2. If a vascular access is obtained and hypovolemia is suspected (e.g. signs and symptoms of shock), a fluid challenge of 20 ml/kg should be administered. If the patient is still in shock, repeat fluid challenge at 20 ml/kg until a maximum of 60 ml/kg is administered.
3. Avoid the use of vasopressors agents (e.g. Dopamine) in trauma patients that are hypotensive

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.
2. Consult with the physician should be made prior to the administration of large volumes of IV fluids when the transport time is relatively short (e.g. < 20 minutes).

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3.9.5 EXTREMITY INJURIES
Pediatric Protocol

Purpose: This protocol covers open and closed injuries to the extremities, including amputation.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Trauma Supportive Care Protocol 3.1.4 (establish IV PRN).
3. Any fracture or suspected fracture should be splinted appropriately with ice to area. Remove and secure all jewelry. Check and document distal neurovascular status pre and post splinting.
4. Angulated fractures should be aligned using proximal and distal traction during splinting, except in fractures that involve a joint, which should be splinted in the position found.
5. Traction splints should be used in cases of femur fractures, unless a pelvic fracture is suspected. Sheet splint suspected pelvic fractures.
6. Amputations should be dressed with bulky dressings and amputated part should be wrapped in moistened sterile gauze and placed in plastic bag and then the bag placed on ice for transportation to the hospital.
7. Do not delay transport to establish vascular access or bandage and splint every injury
8. Apply direct pressure for hemorrhage control. If direct pressure does not stop the hemorrhage apply a trauma tourniquet.
9. Apply a hemostatic gauze on severe wounds (head, neck, face, axilla or buttocks) that cannot be controlled by other means (direct pressure/tourniquet)

ALS LEVEL 1: PARAMEDIC ONLY

1. See Pediatric Pain Protocol 3.1.5 for pain management.
2. If a vascular access is obtained and hypovolemia is suspected (e.g. signs and symptoms of shock), a fluid challenge of 20 ml/kg should be administered. If the patient is still in shock, repeat fluid challenge at 20 ml/kg until a maximum of 60 ml/kg is administered.

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.
2. Consult with the physician should be made prior to the administration of large volumes of IV fluids when the transport time is relatively short (e.g. < 20 minutes).

Weight	4kg Grey	6kg Pink	8kg red	10kg purple	12kg yellow	15kg white	19kg blue	24kg orange	30kg green
Morphine IV/IO/IM/SQ	0.4 mg	0.6mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Fentanyl IV/IO	4 mcg	6 mcg	8 mcg	10 mcg	12 mcg	15 mcg	19 mcg	24 mcg	30 mcg
Fentanyl IN	6 mcg	9 mcg	12 mcg	15 mcg	16 mcg	22.5 mcg	28.5 mcg	36 mcg	45 mcg
Atropine	0.08 mg	0.12 mg	0.16 mg	0.2 mg	0.24 mg	0.3 mg	0.38 mg	0.48 mg	0.6 mg
Naloxone (Narcan)	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2 mg	2 mg
Ondansetron (Zofran)	Contact med control			1 mg	1 mg	1 mg	2 mg	2 mg	3 mg

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3.9.6 TRAUMATIC ARREST

Pediatric Protocol

Purpose: The decision to attempt resuscitation of a traumatic arrest should be based on the paramedic's judgment as to the possibility of survival and/or the possibility of organ harvest. There are instances where resuscitation of a traumatic arrest is not warranted (see Administrative Guidelines-1.2.5 DNR/Resuscitation Considerations/DOA).

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Trauma Supportive Care Protocol 3.1.4.
3. Rapidly prepare patient for transport and then expeditiously transport patient to the trauma center.

ALS LEVEL 1: PARAMEDIC ONLY

1. If IV(s)or IO(s) can be established, infuse Normal Saline 20 ml/kg up to 60 ml/kg IV/IO.
2. Avoid use of vasopressors in cases of suspected hypovolemia.
4. Call Trauma Alert if applicable

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.9.7 BURN INJURIES
Pediatric Protocol

Purpose: Burns can be caused by thermal, chemical, and electrical sources. If an electrical burn is suspected, also see **Pediatric Protocol 3.8.5 - Electrical Emergencies**. Remember that burn patients are volume depleted. However, burns do not bleed; therefore, look for other sources of bleeding. Assume that any patient with compromised perfusion has other injuries and treat accordingly. Many burn injuries are associated with inhalation injury. The signs and symptoms of inhalation injury include nasal and oropharyngeal burns, charring of the tongue or teeth, sooty (blackened), sputum, singed nasal and facial hair, abnormal breath sounds (e.g. stridor, rhonchi, wheezing, etc.), and respiratory distress. In cases of inhalation injury, attention should be given to the patency of the airway. Acute swelling can cause an airway obstruction. The Paramedic should consider the need for early intubation to avoid a complete airway obstruction that requires a cricothyroidotomy.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Trauma Supportive Care Protocol 3.1.4.
3. Stop the burning process, if necessary (do not cause hypothermia):

Thermal Burns: Lavage simple non-blistered burned area with tepid water

(sterile, if possible) to cool skin. Do not attempt to wipe off semisolids (grease, tar, wax, etc.).

Dry Chemical Burns: Brush off dry powder, then lavage with copious amounts of tepid water (sterile, if possible) for 15 minutes.

Liquid Chemical Burns: Lavage the burned area with copious amounts of tepid water (sterile, if possible) for 15 minutes. (When Phenol has caused the burn, flush with copious amounts of tepid water and then apply vegetable oil to area, if available. Isopropyl alcohol may be used for very small areas.)

3. Remove clothing from around burned area, but do not remove/peel off skin or tissue.
4. Remove and secure all jewelry and tight-fitting clothing.
6. Assess the extent of the burn using the Modified Rule of Nines and the degree of burn severity (see **Appendix - Burn Severity Categorization**

and **Appendix - Rule of Nines**). An additional method is to use the palmar surface of the patient as 1% BSA.

7. Apply dressing to burn area as follows:
    a. If there is ≥ 20% 2nd degree or 5% 3rd degree burns, cover burned areas with dry sterile dressings.
    b. If there is < 20% 2nd degree and 5% 3rd degree burns, apply wet sterile dressings to burned areas for 15 minutes to aid in pain control.
8. Prevent hypothermia, keep patient warm and insure that all outer layers of dressings are dry.

ALS LEVEL 1: PARAMEDIC ONLY

1. If respiratory distress, or airway burns exist, prepare to intubate (**RSI** if indicated) or support/assist ventilations.
2. Establish IV (may start IO for severe burns) of Lactated Ringers or Normal Saline. IV fluid administration based on the
    a. **Parkland formula**: % body surface burned X wt (in kg) X 4 cc/kg. One half of this total is given in the first 8 hours from time of burn (if burn occurred 2 hours before you start treatment, then the first half of the amount needs to be given over the next 6 hours).
3. If pulseless or apneic, go to Cardiac Arrest Protocol 3.3.6.
4. If additional injuries, go to specific protocol.
5. For pain management, (see **Pediatric Pain Management Protocol** 3.1.5).

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

Weight	4kg Grey	6kg Pink	8kg red	10kg purple	12kg yellow	15kg white	19kg blue	24kg orange	30kg green
Morphine IV/IO/IM/SQ	0.4 mg	0.6mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Fentanyl IV/IO	4 mcg	6 mcg	8 mcg	10 mcg	12 mcg	15 mcg	19 mcg	24 mcg	30 mcg
Fentanyl IN	6 mcg	9 mcg	12 mcg	15 mcg	16 mcg	22.5 mcg	28.5 mcg	36 mcg	45 mcg
Atropine	0.08 mg	0.12 mg	0.16 mg	0.2 mg	0.24 mg	0.3 mg	0.38 mg	0.48 mg	0.6 mg
Naloxone (Narcan)	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2 mg	2 mg
Ondansetron (Zofran)	Contact med control			1 mg	1 mg	1 mg	2 mg	2 mg	3 mg

Burn Classification	Characteristics
Minor burn injury	◆1°burn ◆2° burn < 15% BSA in adults ◆2° burn < 5% BSA in children/aged ◆3° burn < 2% BSA
Moderate burn injury	◆2° burn 16-25% BSA in adults ◆2° burn 5-20% BSA in children/aged ◆3° burn 2-10% BSA
Major burn injury	◆2° burn > 25% BSA in adults ◆2° burn > 20% BSA in children/aged ◆3° burn > 10% BSA ◆Burns involving the hands, face, eyes, ear feet, or perineum ◆Most patient with inhalation injury, electric injury, concomitant major trauma, or significant pre-existing diseases

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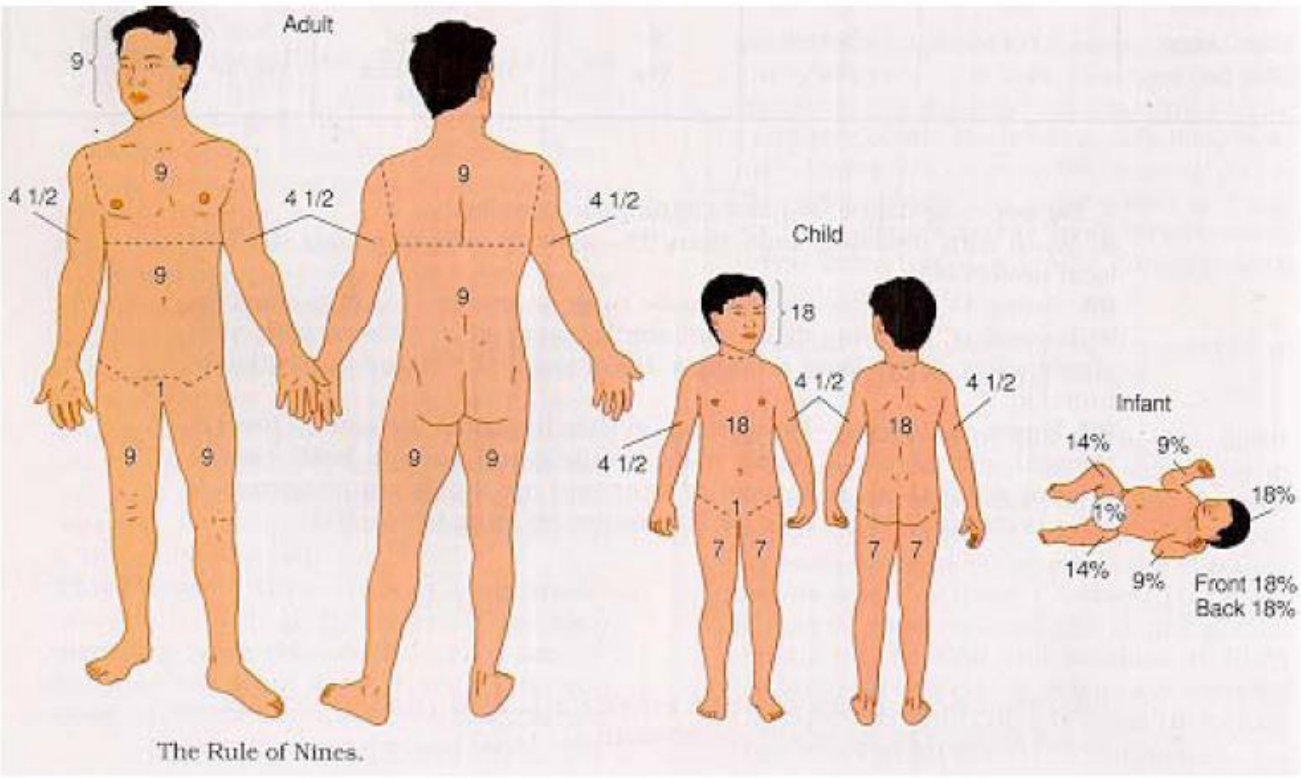

The Rule of Nines.

3.9.8 Peds Crush Injury/Compartment Syndrome

Pediatric Protocol

Purpose: Crush injuries are rarely seen in pre-hospital medicine but are common in times of disaster, both natural and manmade. Early and aggressive treatment of victims suspected of having a crush injury is paramount. Without aggressive pre-hospital treatment, the victim may die during extrication or weeks later from complications of the injury.

In the crush injury syndrome, the initial injury is at the site of the muscle crushed by the mechanical force of an object. The muscle cells die as the result of the following. First, the force of the crushing object ruptures muscle cells. Second, the direct pressure of the object on the limb causes muscle cells to become ischemic. The combination of mechanical force and ischemia can cause muscle death within an hour. Third, the force of the crush injury compresses large vessels, resulting in the loss of blood supply to muscle tissue. Muscles can normally survive circulatory ischemia for up to four hours before the cell death. After four hours, the cells begin to die as a result of the circulatory compromise.

The damaged muscle tissue produces and releases many toxins that can have detrimental effects on the body. The longer the victim is trapped, the longer the toxins are given to build up distal to the crush site. The crushing force acts as a dam that prevents these toxins from being released into the rest of the body. Once the force is removed, the toxins are allowed to run freely throughout the body, causing a myriad of problems. Along with the release of toxins after extrication, the victim can become severely hypovolemic from the third spacing of fluid, and the rapid swelling of the injured area can cause acute compartment syndrome

Toxins Released by Damaged Muscle Tissue	
Toxin	**Effect**
Histamine	Vasodilatation and Bronchoconstriction
Lactic Acid	Acidosis and dysrhythmias
Nitric Oxide	Vasodilatation
Potassium	Hyperkalemia
Thromboplastin	DIC

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

5. Initial Peds Assessment Protocol 3.1.1
6. Trauma Supportive Care Protocol 3.1.4.
7. Spinal motion restriction if indicated
8. Apply cardiac monitor: Document rhythm
9. Administer oxygen according to following criteria:

- SpO2 94% or above do not administer O2.
- SpO2 less than 94% administer O2 by nasal cannula at 2 L/min.

10. Rapidly prepare patient for transport and then expeditiously transport patient to the trauma center.

ALS LEVEL 1: PARAMEDIC ONLY

CRUSH INJURY or COMPARTMENT SYNDROME

3. Establish IV access; give Normal Saline 1 Liter.
4. Pain management: If patient is normotensive (systolic BP greater than 90 mm Hg), administer
   d. **Morphine Sulfate** may be given intravenously in increments every 3 – 5 minutes, titrated to pain to a maximum of 5 mg. Administer at a rate not to exceed 1 mg/min. Pediatric dose:
      - **< 6 months**; 0.05 – 0.2 mg/kg SQ/IM/IV (avoid IM route if possible)
      - **6 months- 12 yrs**; 0.1-0.2 mg/kg IV/IM/SQ.

   e. Fentanyl (Sublimaze)
   1-3 yrs old: 1 - 2 mcg/kg **IV slow** or
   1.5 mcg/kg **IN (via atomizer)**
   3 – 12 yrs old: 1 – 2 mcg/kg **IV slow** or
   1.5 mcg/kg **IN (via atomizer)**
   >12 yrs old: 0.5 – 1 mcg/kg **IV slow** or
   1.5 mcg/kg **IN (via atomizer**)

   f. **Ketamine**:0.1 – 0.5 mg/kg **IV/IO**.
   5 mg/kg **IM** dose
   0.5 mg/kg **IN dose: via atomizer**
      - If hypersalivation or copious bronchial secretions, give **Atropine** 0.02 mg/kg IV/IO.

5. For crush injury release compression and extricate patient

CRUSH SYNDROME; if unable to release compression and situation progresses to CRUSH SYNDROME, that is, entrapment with compression lasting longer than 4 hours OR on the thorax for 20 minutes.

e

6. If suspicion of hyperkalemia (Peaked T-waves, absent P waves or widened QRS).
   a. Establish IV access, 2 large bore IVs recommended in order to separate CaCL and Bicarb;
   b. Pain management as noted in #2 above

c. **Calcium Chloride** 20mg/kg into 50 mL bag of normal saline and administer SLOW IV over 10 minutes (follow with minimum of 20 mL flush).
d. **Sodium Bicarbonate** and Normal Saline –Add Sodium Bicarbonate 50 mEq to 1 L of Normal Saline (or alternatively sodium bicarbonate 25 mEq added into 500 ML of normal saline). Infuse via IV wide-open just prior to extrication. May repeat x 1 for prolonged extrication.

7. Recommended in second line.
   a. Continue IV fluids at 500 mL/hr
8. Administer Albuterol (Ventolin): one nebulizer treatment containing 2.5 mg of Albuterol premixed with 2.5 mL normal saline
9. Call Trauma Alert if applicable

ALS LEVEL 2: MEDICAL CONTROL

2. Call medical control or medical director for any questions or concerns.

Weight	4kg Grey	6kg Pink	8kg red	10kg purple	12kg yellow	15kg white	19kg blue	24kg orange	30kg green
Morphine IV/IO/IM/SQ	0.4 mg	0.6mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Fentanyl IV/IO	4 mcg	6 mcg	8 mcg	10 mcg	12 mcg	15 mcg	19 mcg	24 mcg	30 mcg
Fentanyl IN	6 mcg	9 mcg	12 mcg	15 mcg	16 mcg	22.5 mcg	28.5 mcg	36 mcg	45 mcg
Atropine	0.08 mg	0.12 mg	0.16 mg	0.2 mg	0.24 mg	0.3 mg	0.38 mg	0.48 mg	0.6 mg
Naloxone (Narcan)	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2 mg	2 mg
Ondansetron (Zofran)	Contact med control			1 mg	1 mg	1 mg	2 mg	2 mg	3 mg

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3.10
CHILDREN WITH SPECIAL HEALTHCARE NEEDS

3.10 CHILDREN WITH SPECIAL HEALTHCARE NEEDS:
Pediatric Protocols

Overview: These protocols cover specific types of special healthcare needs in pediatric patients. "Children with special healthcare needs are those who have or are at risk for chronic physical, developmental, behavioral, and emotional conditions that necessitate use of health and related services of a type or amount not usually required by typically developing children."

The general approach to children with special healthcare needs includes the following:

1. Priority is given to the ABCs.
2. Do not be overwhelmed by the machines.
3. Listen to the caregiver.
4. If a nurse is present, rely on their judgment.
5. Remember…the child's cognitive level of function may be altered.
6. Assume that the child can understand exactly what you say.
7. Bring all medications and equipment to the hospital.

Obtaining a history includes asking the parent/caregiver the following:
1. Child's normal vital signs.
2. Child's actual weight.
3. Developmental level of the child.
4. Child's allergies – include latex.
5. Pertinent medications/therapies.

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3.10.1 HOME MECHANICAL VENTILATORS

Pediatric Protocol

Purpose: Home mechanical ventilators may be indicated for chronically ill children with abnormal respiratory drive, severe chronic lung disease, or severe neuromuscular weakness. Some children require continuous mechanical ventilation, while others only require intermittent support during sleep or acute illness. Home ventilators may either be volume limited or pressure limited. All are equipped with alarms.

Types of ventilator alarms:

1. Low pressure or apnea – may be caused by a loose or disconnected circuit or an air leak in the circuit or at the tracheostoma, resulting in inadequate ventilation.

2. Low power – caused by a depleted battery.

3. High pressure – can be caused by a plugged or obstructed airway or circuit tubing, by coughing, or by bronchospasm.

4. Setting error – is caused by ventilator settings outside the capacity of the equipment.

5. Power switchover – occurs when the unit switches from alternating-current power to the internal battery.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3.
3. Patient (if able) or family should be available to assist with operating the patient's home ventilator during transport.
4. Confirm vent setting are correct with patient and/or family.
5. If ventilator-dependant child is in respiratory distress and the cause is not easily ascertained and corrected, remove the ventilator and provide assisted manual ventilations with a bag-valve device.
6. Consider need for other protocols (e.g. Pediatric Protocol 3.2 - Pediatric Respiratory Emergencies).
7. Don't hesitate to ask the parents or caregiver for help managing the home ventilator since they are likely well versed on its use.

ALS LEVEL 1: PARAMEDIC ONLY

1. None

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.10.2 TRACHEOSTOMY
Pediatric Protocol

Purpose: Tracheostomies are indicated for long-term ventilatory support, to bypass an upper airway obstruction, and to aid in the removal of secretions. Tracheostomies come in neonatal, pediatric, and adult sizes and can be either single lumen or double lumen. Special attachments include: tracheostomy nose (filtration device), tracheostomy collar (for oxygen or humidification), and Passymuir valve (speaker valve).

Signs of tracheostomy tube obstruction:

1. Excess secretions.
2. No chest wall movement.
3. Cyanosis.
4. Accessory muscle use.
5. No chest wall rise with bag-valve ventilations.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3.
3. If obstruction is present, inject 1-3 ml of Normal Saline into the tracheostomy tube and suction PRN (set suction at 100 mm Hg or less).
4. If unable to clear obstruction by suctioning, remove tracheostomy tube and insert new tube (same size or one size smaller). DO NOT FORCE TUBE. If long term trach patient, parent and/or caregiver usually familiar with this procedure so allow them to assist if they offer.
5. If unable to insert new tracheostomy tube or if unavailable, insert endotracheal tube of similar size into stoma and ventilate with bag-valve-device PRN.
6. If unable to insert endotracheal tube, ventilate with bag-valve-mask over stoma or over patient's mouth while covering stoma PRN.
7. Consider need for other protocols (e.g. Pediatric Protocol 3.2 - Pediatric Respiratory Emergencies).

ALS Level 1: PARAMEDIC ONLY

1. None

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.10.3 CENTRAL VENOUS LINES
Pediatric Protocol

Purpose: Central venous lines are indicated for administration of medications, delivery of chemotherapy, nutritional support, infusion of blood products, and blood draws. Types of central venous lines include: Broviac/Hickman, Port-a-cath/Med-a-port, and percutaneous intravenous catheters (PIC). Central venous line emergencies include: catheter coming completely out, bleeding at the site, catheter broken in half, blood embolus, thrombus, air embolus, and internal bleeding. The uses of SQ ports require special training and should not be used for IV access unless you have been trained and signed off to do so by medical director.

Signs of blood embolus, thrombus, air embolus, and internal bleeding:

1. Chest pain.
2. Cyanosis.
3. Dyspnea.
4. Shock.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3.
3. If catheter is completely out, apply direct pressure to site.
4. If there is bleeding at the site, apply direct pressure.
5. If catheter is broken in half, clamp end of remaining tube.
6. If suspected blood embolus, thrombus, or internal bleeding: clamp line.
7. If suspected air embolism, clamp line and place patient on left side.
8. Consider need for other protocols (e.g. Pediatric Protocol 3.2 - Pediatric Respiratory Emergencies).

ALS Level 1: PARAMEDIC ONLY

1. None

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.10.4 FEEDING TUBES
Pediatric Protocol

Purpose: Feeding tubes are indicated for administration of nutritional supplements and in patients that have an inability to swallow. Types of feeding tubes include: nasogastric tube (temporary) and gastrostomy tubes (G tube). Types of G tubes include those that are surgically placed, percutaneous endoscopic gastrostomy tubes, PEG tubes, and jejunal tubes (J-tube). Complications include: leaks, bleeding around the site, and displacement of the tube.

Procedure:

BASIC LEVEL: EMT and PARAMEDIC

1. Initial Peds Assessment Protocol 3.1.1
2. Medical Supportive Care Protocol 3.1.3.
3. If catheter is completely out, apply direct pressure to site.
4. If there is bleeding at the site, apply direct pressure.
5. Place flexible suction catheter of similar size in hole to keep ostomy open

ALS LEVEL 1: PARAMEDIC ONLY

1. None

ALS LEVEL 2: MEDICAL CONTROL

1. Call medical control or medical director for any questions or concerns.

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3.10.5 Autistic Patient

Pediatric protocols

PURPOSE: This protocol is intended to assist emergency personnel in dealing with the special challenges that they face when encountering an autistic patient.

Signs of Autism

Many parents are in denial or do not realize the possibility that their child is autistic. It is for this reason that careful consideration should be made before inquiring whether a child is autistic. Doing so may prompt the parent to "shut down" or become defensive, which could hamper the process of acquiring patient information.

Signs of autism that the emergency care provider may recognize include these:

- Has not "babbled" or "cooed" by the age of 1 year.
- Has not gestured, pointed, or waved by 1 year.
- Has not spoken a single word by 16 months.
- Has not spoken a two-word phrase by 2 years.

Special Considerations

When dealing with an autistic patient, special accommodations must be made during the encounter to achieve a positive outcome. Conditions that may affect the encounter include these:

- Autistic patients may respond aggressively to an unwanted touch.
- Autistic patients may appear to have a hearing impairment.
    - This may affect your assessment of the patient's level of consciousness and the Glasgow Coma Scale score.
    - It may also prevent the patient from coming to you if called, such as in motor vehicle accidents, fires, and evacuations (a).
- During stressful times, autistic persons may "bolt" or run away from the situation even if they are hurt. These patients will not respond to someone calling their name to stop! This behavior may result in the person running into traffic or other hazardous areas (b).
- Autistic patients cannot tell or describe what is hurt or what they want (c).
- Autistic patients will likely not follow any directions. This will present a great challenge during the patient assessment (c).
- Autistic children do not play with toys appropriately.
- Autistic patients have poor eye contact, which may affect the evaluation of pupils.
    - The autistic patient usually directs his/her eyes up, down, or away. This factor should be considered when head injuries are suspected.
- Autistic patients appear to be in their own world. This could pose a concern if a patient is in danger and is not aware of it.
- Autistic patients have odd movement patterns.

    - These movements may include hand flapping, hand washing motions, spinning motions, head slapping, and covering of the ears or eyes
- Autistic patients exhibit an unusual attachment to toys or other objects.
    - To gain the trust of an autistic patient, provide him/her with a favorite object, which may not necessarily be a toy. Ask the parent/caregiver to assist you.
- Autistic patients often demonstrate repetitive behaviors.
    - Autistic persons feel compelled to complete certain tasks, such as lining up their toys.
    - Before allowing an intrusion, such as emergency workers examining them, autistic patients may feel compelled to complete a certain task such as lining up toys, opening a door, or going through a certain routine.
- Autistic patients do not adjust well to a change in their surroundings or routines.
    - These patients are usually set in a certain routine and are extremely comfortable in their known surroundings. Any changes could result in an aggressive response.
- Autistic patients may walk on "tippy toes."
- Autistic patients may have an increased level of pain tolerance.
    - This may be a major consideration during the physical exam. A thorough physical exam is required, especially with suspected abdominal pain, fractures/sprains, and head/neck injuries.
- Autistic patients have an extreme sensitivity to touches and textures (i.e., smooth, rough, sticky, hot/cold, wet/dry).
    - Consideration should be given to this factor when applying dressings and bandages. The simplest of procedures, such as applying a Band-Aid or irrigating a wound, could result in a "meltdown."
- Autistic patients are extremely sensitive to having things on their heads or around their necks.
    - This factor should be considered when applying dressings to head injuries, as well as when utilizing a sling to secure an extremity.

"Meltdowns and Refocus Periods"

Children with autism can have frequent "meltdowns" (tantrums) due to any one of the factors mentioned in the "Special Considerations" section of this protocol. These meltdowns may also occur for no apparent reason and may result in aggressive behavior. After a meltdown, autistic children will likely go through what is known as a "refocus" period. They will suddenly become quiet; they may crouch down and cover their ears or eyes. Typically, they will look for a quiet, darkened, "sheltered" area. During this period, patients are trying to "refocus" their world; this is their time. The refocus period can last a few minutes to possibly 30 minutes or longer. If there is an attempt to rush this period, another meltdown may occur, to be followed by another refocus period; this process could become a vicious cycle.

If you encounter a parent/caregiver who is aware of the autism, ask him/her for advice on how to handle the patient. Parents of autistic children are usually very actively involved with their children and understand their "quirks." Their help should enhance your treatment and be a major factor in lessening the stress level in an already stressful situation.

Note: Clues that may indicate that you are dealing with an autistic patient may include car magnet "puzzle piece" ribbons on vehicles involved in motor vehicle accidents as well as window stickers on homes indicating the presence of a special needs person.

(a) Autistic patients are not aware of any present dangers. To safely secure the patient, reduce the risk of danger before encountering the patient. Ask the parent/caregiver to assist you during your interview.

(b) If possible, ask the parent/caregiver to assist with "refocusing" the patient. If such a person is not available, try clapping your hands to get the patient's attention if the situation is urgent.

(c) Be aware of a possibly aggressive response to an unwanted touch.

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4. PROCEDURAL PROTOCOLS

4.1.1. Automated External Defibrillator (AED)

Level of training: EMT-(B-I-A), EMT-P, First Responders

Introduction:

1. AED Use General Considerations:
    A) Take body substance isolation precautions en route to the scene
    B) Initiate immediate ALS backup as appropriate
    C) Preparation for transport of patient should begin immediately as staffing allows.
    D) The patient should be transported when one of the following has occurred:
        1. The patient regains a pulse
        2. Two (2) shocks have been delivered by EMS staff
        3. Per medical control recommendation
    E) All contact with the patient must be avoided during analysis of rhythm and delivery of shock(s)
    F) **Do not apply AED in children under 1 year of age**. Begin CPR and transport. Contact medical control for further instructions.
    G) A pediatric capable AED is preferred for age 1-8 years. However, a standard AED may be used if it is the only one available.
    H) 2005 AHA guidelines do not restrict AED use in a moving vehicle.
    I) It is acceptable to continue using the public access defibrillator (PAD) if it has already been applied so as not to interrupt CPR to apply EMS AED.

Indications:

1. For the patient in non-traumatic cardiac arrest when a defibrillator is not immediately available. Keep in mind; many public buildings now have AED stations. Also, many law enforcement agencies carry AEDs in their patrol vehicles.

Contraindications: None

Procedure: (FOLLOW THE VERBAL DIRECTIONS AS PER THE AED DEVICE)

1. In general there are **four general steps** to operate the A.E.D.
    a. **Push the "power" button** and turn on the AED
    b. **Attach the defibrillator pads** to the patient
    c. **Push the "analyze" button** (this may be automatically done when the power is turned on)

d. **Push the "shock" button** to deliver shock, if indicated and safe (this is automatically done by a fully automatic AED

2. AED Application by age
    a. Age 1 through 8 years
        i. Perform CPR for 5 cycles (about 2 minutes) before undertaking other actions
        ii. Apply AED, using a pediatric capable AED if available
            1. If PAD is the only pediatric capable AED available, continue using it
            2. If only standard AED available, it may be applied. It is recommended to place the patches in anterior-posterior positions to avoid arcing.
    b. Age > 8 years
        i. Apply standard AED

1. Resuscitation (EMS Provider)
    a. Arrive on scene and perform initial assessment
    b. Stop CPR if in progress for as minimal a period as possible
    c. Verify pulselessness and apnea
    d. If no CPR (or poor quality CPR) performed prior to your arrival and response interval from time of collapse is:
        i. Less than 5 minutes, the immediate priority is defibrillation
        ii. More than 5 minutes, perform two (2) minutes of CPR prior to defibrillation.
    e. If three or more shocks have been given by PAD and patient remains pulseless, consider one additional shock if indicated and begin immediate transport.
    f. AED Activation and Use
        i. Attach and activate defibrillator
        ii. Stop CPR
        iii. Clear patient
        iv. Initiate analysis of rhythm
            1. If AED advises shock:
                a. Deliver shock
                b. Immediately begin CPR and prepare for immediate transport
                    i. After 2 minutes, stop CPR assess ABC's
                    ii. If no return of carotid pulse, allow AED to re-analyze
                    iii. If shock advised, deliver shock and perform two minutes of CPR
                    iv. The sequence of two (2) minutes of CPR followed by one shock may be repeated a maximum of three times.

v. After two shocks no delay should be made remaining on the scene. This may require the third shock being performed in the ambulance.

c. If after shock patient exhibits signs of life (spontaneous respirations, purposeful motor activity) stop CPR and assess ABC's.

i. If breathing adequately, give high concentration oxygen by non-re-breather mask and transport promptly

ii. If not breathing adequately, artificially ventilate with high concentration oxygen, transport promptly (consider insertion of advanced airway here).

2. If AED advises no shock:

a. Resume CPR and begin immediate transport

b. After two minutes of CPR allow re-analysis

i. If shock advised, deliver shock.

ii. If no shock advised for the second time, resume CPR and begin immediate transport.

v. Consider insertion of an advanced airway when appropriate

1. Airway should be inserted while chest compressions continue

2. Once airway is in place, ventilations should be made at the rate of 8-10 per minute and CPR should be performed for two minutes between re-analyzing or pulse check.

vi. If at any time during transport pulses are lost, restart protocol.

vii. Medical Control should be contacted as soon as possible to discuss further treatment option including termination of resuscitation.

viii. If ambulance not at scene continue the sequence of two minutes CPR followed by analysis for as long as shockable rhythm persists or until transport becomes possible.

Document

- Clinical assessment
- Whether arrest was witnessed or un-witnessed
- Presence of by-stander CPR
- Defibrillator use including PAD
- Resuscitative measures and response
- Communication with medical control

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4.1.2. Cardiopulmonary Resuscitation (CPR)

Level: First Responder, EMT- (B-I-A), EMT-P

Adult

1. Establish unresponsiveness (call for backup as needed).
2. **C**: Assess circulation via carotid pulse (5-10 seconds). If a pulse is absent, start chest compressions (push hard, push fast). Administer compressions at a rate of 100 - 120 per minute (place the heel of hand on the sternum between the nipples and compress to a depth of 2 inches but not greater than 2.4 inches). The goal is to achieve a (CCF) Chest Compression Fraction of 60 – 80%
3. **A**: Open the airway using an appropriate method.
4. **B:** Assess breathing (5-10 seconds). If breathing is absent, give two breaths.
5. Administer 30 compressions and then 2 ventilations
6. If an advanced airway is in place and there are two rescuers, administer continuous compressions and unsynchronized ventilations at a rate of 1 breath every 6 seconds or 1 breath every 10 compressions.
7. Continue compressions and ventilations until the return of a pulse is noted. Intermittently check for the return of a spontaneous pulse.

Child

1. Establish unresponsiveness (call for backup as needed).
2. **C**: Assess circulation via carotid pulse (5-10 seconds). If a pulse is absent, start chest compressions. Administer compressions at a rate of 100 -120 per minute (place the heel of hand on the mid sternum and compress at a depth of 2 inches but no greater than 2.4 inches). The goal is to achieve a (CCF) Chest Compression Fraction of 60 – 80%
3. **A:** Open the airway using an appropriate method.
4. **B**: Assess breathing (5-10 seconds). If breathing is absent, give two breaths to make the chest rise.
5. For one rescuer, administer 30 compressions and then 2 ventilations; for two rescuers, administer 15 compressions and then 2 ventilations.
6. If an advanced airway is in place and there are two rescuers, administer continuous compressions and unsynchronized ventilations at a rate of 1 breath every 6 seconds or 1 breath every 10 compressions.
7. Continue compressions and ventilations until the return of a pulse is noted. Intermittently check for the return of a spontaneous pulse.

Infant

1. Establish unresponsiveness (call for backup as needed).
2. C: Assess circulation via brachial pulse (5-10 seconds).
    - For one rescuer, use two fingers on the sternum, one finger width below the nipple line; administer at least 100- 120 compressions per minute, at one-third the depth of the chest.

- For two rescuers, use two thumbs side by side at the center of breast bone just below the nipple line. Squeeze the infant's posterior chest with the encircled fingers and administer at least 100 - 120 compressions per minute at a depth of $1^1/_2$ inches of the chest.

3. A: Open the airway using an appropriate method.
4. B: Assess breathing (5-10 seconds). If breathing is absent, give two breaths to make the chest rise.
5. For one rescuer, administer 30 compressions and then 2 ventilations, for two rescuers, administer 15 compressions and then 2 ventilations.
6. If an advanced airway is in place and there are two rescuers, administer continuous compressions and unsynchronized ventilations at a rate of 1 breath every 6 seconds or 1 breath every 10 compressions.
7. Continue compressions and ventilations until the return of a pulse is noted. Intermittently check for the return of a spontaneous pulse.

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4.1.3. Head Tilt – Chin Lift

1. Place one hand on the patient's forehead and push with your palm to tilt the head back.
2. Place the fingers of the other hand under the bony part of the patient's lower jaw near the chin. Do not press deeply into the soft tissue under the chin because it might obstruct the airway.
3. Lift the jaw to bring the chin forward.

4.1.4. Jaw Thrust

1. Place a hand on each side of the patient's face.
2. Grasp the angles of the patient's mandible and lift upward.
3. If there are not enough responders to maintain the jaw thrust or if the jaw thrust is not successful in opening the airway, proceed to the head tilt-chin lift maneuver.

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4.1.5. Rescue Breathing w/ Bag-Valve-Mask

Level of training: EMT-(B, I, A), EMT-P,

Procedure:

1. Attach high flow oxygen to the bag
2. Have suction available since vomiting may occur
3. Use an appropriate size airway adjunct with BVM
4. Use an appropriate size mask to avoid pressure over the eyes (pediatric patient), which may cause vagal stimulation.

One Person

1. Position yourself directly above the patient's head.
2. Place the mask on the patient's face, using the bridge of the nose as a guide for correct positioning. Dentures left in place will help the mask make a better seal.
3. Use the E-C clamp technique to hold the mask in place while you lift the patient's jaw to hold the airway open.
   - Perform a head tilt.
   - Use the thumb and index finger of one hand to make a "C," pressing the edges of the mask to the face.
   - Use the remaining fingers to lift the angles of the jaw (three fingers form an "E") and open the airway.
4. Squeeze the bag to achieve chest rise. The delivery of breaths is the same whether you do or do not use supplementary oxygen.
   For perfusing rhythm:
   - Adult: 10-12 breaths/min.
   - Pediatric: 12-20 breaths/min.

   When CPR is being performed or if an Advanced Airway is in place:
   - Adult and pediatric: 8-10 breaths/min (1 breath every 6 seconds).
5. Insert an oral or nasal airway.

Two Persons

1. Rescuer one:
   - Take a position directly above the patient's head.
   - Place the mask on the patient's face, using the bridge of the nose as a guide for correct positioning.
   - Use the E-C clamp technique to hold the mask in place with both hands.
   - Use the thumb and index finger of one hand to make a "C," pressing the edges of the mask to the face.
   - Use the remaining three fingers to form an "E" to lift the angles of the jaw.
2. Rescuer two:
   - Squeeze the bag for 1 second, while watching for chest rise.
   - Apply continuous cricoid pressure.
3. Squeeze the bag to achieve chest rise. The delivery of breaths is the same whether you do or do not use supplementary oxygen.

For perfusing rhythm:

- Adult: 10-12 breaths/min.
- Pediatric: 12-20 breaths/min.

When CPR is being performed or if an advanced airway is in place:

- Adult and pediatric: 8-10 breaths/min. (1 breath every 6 seconds).

4. Insert an oral or nasal airway

Note: a) Avoid aggressive squeezing of the bag. It takes 25 cm of water pressure to open the esophagus.

b) If patient does not have adequate chest rise and breath sounds with BVM, consider the following interventions:

- Reposition the head
- Check for airway obstruction
- Suction the airway
- Disable the pressure pop-off valve to increase the delivery of air into the patient
- Use a larger bag to increase the volume of air delivered into the patient

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4.1.6. Suspected Foreign Body Airway Obstruction (FBAO)

Adult

1. If the patient is conscious, ask, “Are you choking?”
2. If the patient is unable to speak and/or nods his/her head “yes,” give abdominal thrusts, or chest thrusts if the patient is pregnant or obese.
3. Repeat the abdominal thrusts until they are effective or the patient becomes unconscious.

If the patient becomes unconscious, continue with the following steps:

4. Open the airway. If able to visualize the obstruction, perform a finger sweep to remove the object.
5. Attempt to ventilate; if the airway is still obstructed, reposition the airway and try to ventilate again.
6. Give 30 chest compressions.
7. Repeat Steps 4 through 6 until the FBAO is relieved.

Child

1. If the patient is conscious, ask, “Are you choking?”
2. If the patient is unable to speak and/or nods his/her head “yes,” give abdominal thrusts.
3. Repeat the abdominal thrusts until they are effective or the patient becomes unconscious.

If the patient becomes unconscious, continue with the following steps:

1. Open the airway. If able to visualize the obstruction, perform a finger sweep to remove the object.
2. Attempt to ventilate; if the airway is still obstructed, reposition the airway and try to ventilate again.
3. Give 30 chest compressions.
4. Repeat Steps 4 through 6 until the FBAO is relieved.

Infant

1. If the patient is conscious, determine airway patency.
2. If the patient is unable to move air or has poor air exchange, give 5 back slaps between the shoulder blades and then 5 chest thrusts with the patient in a head-dependent position.

3. Repeat the back slaps and chest thrusts until they are effective, or the patient becomes unconscious.

If the patient becomes unconscious, continue with the following steps:

1. Open the airway. If able to visualize the obstruction, perform a finger sweep to remove the object.
2. Attempt to ventilate; if the airway is still obstructed, reposition the airway and try to ventilate again.
3. Give 30 chest compressions.
4. Repeat Steps 4 through 6 until the FBAO is relieved.

Indications for using the Magill Forceps:

1. Upper airway obstruction due to a foreign body that has not resolved with 5 abdominal thrust
2. Patient must be unconscious
3. Patient must be placed supine

Contraindications: None

Adverse Effects/Complications: Trauma to the oropharynx, vocal cords, esophagus, or trachea.

Precautions: It is important to distinguish the foreign body from the portions of the patient's anatomy.

Procedure: Use the Magill Forceps to grasp objects while using the laryngoscope to visualize the cords and upper airway

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4.2. Airway Adjuncts

4.2.1. Nasopharyngeal Airway Insertion (NPA)

This procedure should not be performed in the presence of frontal head or midfacial trauma where the cribriform plate may be fractured.

1. Determine the proper size of tube (measure from the nostril to the earlobe).
2. Lubricate with a water-soluble lubricant (optional: lidocaine gel).
3. Position the patient's head in a neutral position, inspect the nose, and select the larger nostril.
4. Insert the nasopharyngeal tube with the bevel facing the nasal septum.
5. Gently insert the tube until the flange rests against the nostril.
   - If resistance is met, insert with a twisting motion.
   - If there continues to be resistance, attempt insertion in the other nostril.
6. Ventilation with a bag-valve device.

4.2.2. Oropharyngeal Airway Insertion (OPA)

1. Determine the proper size of tube (measure from the corner of the mouth to the earlobe).
2. Open the patient's mouth by tongue/jaw-lift maneuver.
3. Insert the oropharyngeal tube with the tip toward the side of the mouth.
   - Prior to complete insertion; start to rotate the tube 90 degrees so that the flange rests on e lips.
   - If the patient has an intact gag reflex, perform a nasopharyngeal insertion.
4. Ventilate with a bag-valve device.

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4.3. Airway Suctioning

4.3.1. Flexible Suctioning

1. Wear protective eyewear, gloves, and face mask.
2. Preoxygenate the patient.
3. Turn on the suction unit.
4. Insert the catheter to an appropriate depth, place your thumb over the suction control orifice, and rotate the catheter between your fingertips while withdrawing catheter. (Caution: Do not suction for more than 10 seconds.)
5. Monitor the patient's heart rate, pulse, oxygen saturation, and clinical appearance during suctioning. If bradycardia occurs or the clinical appearance deteriorates, administer high-flow oxygen until the rate and clinical appearance return to normal.
6. Maintain ventilatory support with 100% oxygen

4.3.2. Rigid Suctioning

1. Wear protective eyewear, gloves, and face mask.
2. Preoxygenate the patient.
3. Turn on the suction unit.
4. Measure the depth of catheter insertion from the patient's earlobe to the corner of the mouth.
5. Insert the catheter to an appropriate depth, place your thumb over the suction control orifice, and suction the oropharynx. (Caution: Do not suction for more than 10 seconds.)
6. Monitor the patient's heart rate, pulse, oxygen saturation, and clinical appearance during suctioning. If bradycardia occurs or the clinical appearance deteriorates, administer high flow oxygen until the rate and clinical appearance return to normal.
7. Maintain ventilatory support with 100% oxygen.

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4.4. Advanced Airways

For **all** advanced airways/supraglottic airway devices (SGA)

- Assure a patent airway and ventilate with 100% O2 before attempting placement of the any advanced airway. Do not hyperventilate the patient
- Monitor SpO2 with a pulse oximeter and provide 100% O2 via a BVM
- Select the proper size tube
- Assemble and check the necessary equipment
- Confirm the SGA placement with an end-tidal CO2 monitoring device and additional confirmation methods such as negative epigastric sounds and positive bilateral breath sounds.
- Secure the SGA with tape or a commercially available device.
- Continually monitor the pulse oximeter and the end-tidal CO2 levels. Provide ventilations at a rate to keep the ETCO2 between 35-45.

4.4.1. Laryngeal Mask Airway (LMA)

1. Tightly deflate the cuff so that it forms a smooth "spoon shape." Lubricate the posterior surface of the mask with a water-soluble lubricant.
2. Hyperextend the patient's neck (unless cervical spine injury is suspected).
3. Carefully flatten the laryngeal mask tip against the hard palate.
4. Advance the mask until definite resistance is felt at the base of the hypopharynx.
5. Without holding the tube, inflate the cuff to the recommended volume of air for the tube size.

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4.4.2. AIRTRAQ SP™

The AIRTRAQ is a disposable optical laryngoscope visual guiding system for routine and complex airway use.

INDICATIONS

Adjunct for Endotracheal Intubation

CONTRAINDICATIONS

The AIRTRAQ should not be used w/< 7mm or >8.5mm ET Tubes.

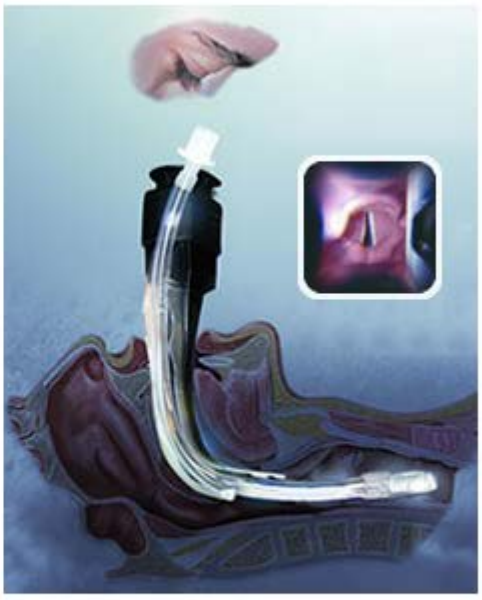
INSERTION STEPS

1. Turn the light on 30 seconds prior to use to allow lens to warm for de-fogging.
2. Lubricate and install the endotracheal tube in the lateral channel.
3. Insert the AIRTRAQ into the mouth, sliding it along the midline.

4. Look through the eyepiece as insertion is continued, to identify airway structures.
5. Identify the epiglottis and place the tip of the AIRTRAQ into the vallecula.
6. Gently lift and maneuver the AIRTRAQ to center the vocal cords into view.
7. Advance the endotracheal tube, watching the tip and cuff pass through the vocal cords.
8. Inflate cuff prior to removal of Endotracheal Tube from Airtraq .

REMOVAL STEPS

After endotracheal tube cuff inflation, separate the AIRTRAQ from the endotracheal tube and remove it while holding the endotracheal tube in place




AIRTRAQ
OPTICAL LARYNGOSCOPE
Anatomically-shaped laryngoscope with two separate channels. The Optical Channel contains a high definition optical system. The Guiding Channel holds the endotracheal tube and directs it towards the vocal cords.
Built-in Anti-Fog System and light source.
AIRTRAQ
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Regular ATQ-011 Blue
Small ATQ-031 Green
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Part No ATQ-033
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AIRTRAQ®
OPTICAL LARYNGOSCOPE

*Refer to full IFU for detailed information and user tips.

Insertion steps

- Turn the light on.
- Lubricate and install the endotracheal tube in the lateral channel.
- Insert the AIRTRAQ into the mouth, sliding it along the midline (Fig 1).
- Look through the eyepiece as insertion is continued, to identify airway structures (Fig 2).
- Identify the epiglottis and place the tip of the AIRTRAQ into the vallecula.
- Gently lift and maneuver the AIRTRAQ to center the vocal cords into view (Fig 3).
- Advance the endotracheal tube, watching the tip and cuff pass through the vocal cords (Fig 4).

removal steps

- After endotracheal tube cuff inflation, separate the AIRTRAQ from the endotracheal tube and remove it while holding the endotracheal tube in place (Fig 5).

- OVER -

Airtraq

A-390 WI-FI CAMERA

Airtraq CAM

Download on the App Store

GET IT ON Google Play

Rev 1.6 Apr 2019

Instructions For Use

ENGLISH

Please visit www.airtraq.com/downloads to verify you have the most up to date instructions

To check for latest software versions available connect A-390 to 'Airtraq Cam' application on PC or visit www.airtraq.com

1. A-390 BASIC INFORMATION

Code: A-390
Description: Airtraq Wi-Fi Camera

The A-390 has been specially designed to work only as an accessory for the Airtraq Video Laryngoscope. It is compatible with all Airtraq blade model.
The A-390 provides full color, real-time images on its 2.8 inch integrated touch screen.
Image can be electronically rotated 180 degrees when necessary.
The A-390 can record and playback videos and capture Snapshots which are stored on its internal memory.
Videos and Snapshots can be downloaded to a PC (Windows or Mac) through a USB – Micro USB cable, using the application "Airtraq Cam for PC", available at www.airtraq.com (downloads section).
The A-390 can be connected via Wi-Fi to PC, tablet or smartphone according to IEEE 802.11 standard. A-390 does not use any existing Wi-Fi network but creates a proprietary one. An optional password guarantees that only authorized devices are allowed to receive video signal (follow your institution procedures and regulations if using these mobile devices).
A-390 is powered by an internal rechargeable 3.7 V Li-Po battery and does not work while connected to a battery charger.

2. A-390 COMPONENTS

2.1. A-390 Camera

CMOS video camera with integrated touch screen and rechargeable Li-Po Battery.

2.2. USB – micro USB cable

To be used to connect the A-390 to a PC for video downloading or for camera's settings administration.

May also be used to charge the A390 directly from a USB power source.

2.3. Silicon protective case

Provides additional protection against shocks. It can be easily installed onto or removed from the camera.

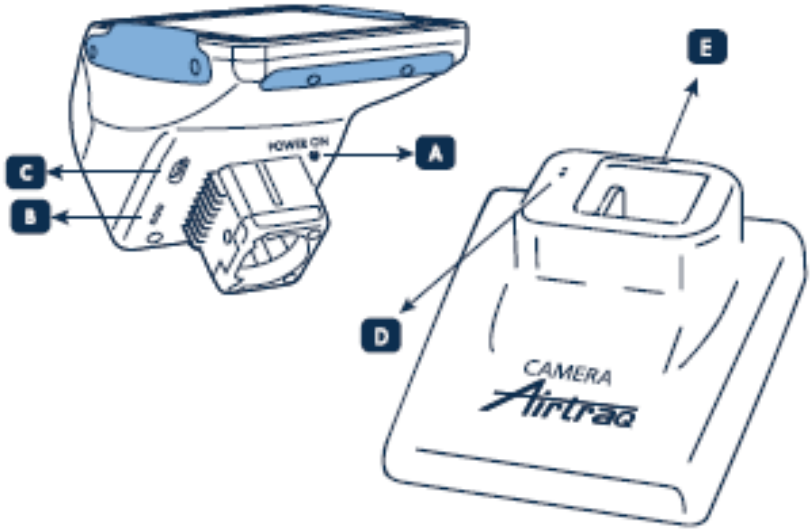
2.4. Battery charger
Must be connected to mains supply to charge the 3.7 volts, Li-Po Battery.

2.5. Docking station
Accessory to facilitate charge of A-390.
Docking Station can also be used to charge the A-360 Airtraq Wi-Fi Camera.
The mains power supply is connected to the Docking Station through its micro USB connector.

2.6. Neoprene pouch
Can be used to store some of the A-390 accessories.

2.7. Storage case (two sizes)
Can be used to store all or some of the above items. It is recommended that the A-390 be stored and transported inside the storage case to protect the camera while not in use. A-390 can be charged when it is inside the larger black storage case. Pass the battery charger cable to the inside of the larger storage case through the hole on its lateral side and connect the Micro USB directly to the A-390.

3. A-390 SWITCHES, INDICATORS AND CONNECTORS



A. Automatic power button: This button is automatically pushed when the A-390 is inserted onto any Airtraq. It can also be pushed manually to turn on the A-390. To turn off the A-390 press the corresponding icon on the menu.
B. Battery charge connector: Brass surface connectors that connect to docking station for battery charge.
C. Micro USB female connector: to connect to PC or to a battery charger.
D. Battery charge connector: Brass surface connectors that connect to Camera for battery charge.
E. Micro USB female connector: to connect to mains power supply.

4. A-390 BATTERY CHARGE AND CHARGE STATUS CHECKING

The A-390 DOES NOT WORK WHEN IT IS BEING CHARGED. IT SHOULD BE CHARGED AT LEAST 1.8 M AWAY FROM THE PATIENT USING THE DOCKING STATION.
It is recommended to perform a full charge/discharge cycle of the battery before starting to use the A-390 for clinical purposes.
After a full charge, the A-390 can operate for 240 minutes when Wi-Fi is deactivated and for 180 minutes when Wi-Fi is activated. Recharging takes approximately 110 minutes.
Without use, the battery will discharge at a rate of less than 2% per day.
If the A-390 can be turned on, then a minimum of 10 minutes of operating time is guaranteed.
When the A-390 is turned on, a battery charge status icon and available minutes of operating time appear on the screen.
To charge battery:

1. Connect the battery charger to Docking Station and to mains electrical supply.
2. Place A-390 onto docking station.
3. A-390 can also be charged via the USB cable directly connected to camera and a power source.

Upon starting to charge battery the A-390 will automatically turn Off .
When battery is actively being charged and less than 240 mins the charge status will display in the header of the screen. Also, touching the screen while charging or when

fully charged will show available minutes of operating time and a battery icon.
When in use, if the battery falls below 20 minutes of its capacity the battery charge indicator on the header of the screen will become blinking orange.

Service life for the rechargeable battery depends upon the number of charge-discharge cycles performed. The A-390's battery is a service replaceable part, if its capacity falls below the acceptable levels please contact your supplier. The A-390 should never be opened by unauthorized personnel.

5. MOUNTING THE A-390 ONTO THE AIRTRAQ

To mount the A-390 onto the Airtraq:

- Remove eyecup from Airtraq.
- Place A-390 onto Airtraq's proximal end. Make sure the A-390 is fully inserted.
- A-390 will automatically turn on and start in Live Video mode.
- When using with a pediatric Airtraq blade, in most cases, the A-390 will automatically detect it and the 'Start Pediatric' icon (located in the main menu) will blink to advise the user to manually press in order to change the camera settings to pediatric mode. Upon pressing the 'Start Pediatric' icon a message saying "Pediatrics Mode On" will appear on the screen
- If during intubation, A-390 accidentally becomes partially dislodged from the Airtraq blade, a warning message will appear on the screen indicating "Blade Detached". This is to notify the user that the camera is not fully seated on the Airtraq blade. If A-390 accidentally becomes partially dislodged and A-390 is recording video, and within five seconds the user re-attaches the A-390 securely to the blade, then recording will restart automatically maintaining the same video file. If the user does not correct the "Blade Detached" condition within 5 seconds then the recording will be stopped.
- Depending on intubation position, the user can rotate the image 180 degrees to correct the glottis orientation by pressing the rotate icon .

To remove A-390 from the Airtraq once intubation is finished lift up and pull A-390 away from Airtraq.

6. TURN ON/OFF

A-390 can be started in two different ways, in both methods it will start in "Live Video" mode:

- Automatically by sliding A-390 onto an Airtraq blade.
- Pressing the automatic power button.

Boot up will take approximately ~3 seconds.

To turn off the A-390 press the "Power off" icon on the main menu. The unit will show a message to the user and a "cancel" icon will appear and it will automatically shut down in 3 seconds unless the user cancels the action.

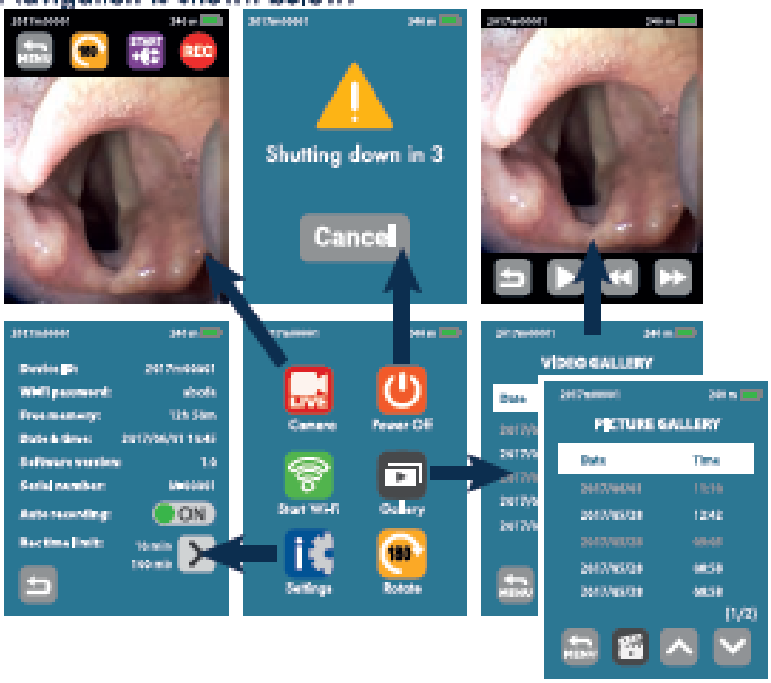
A-390 automatically shuts off when there is no action from the user for 30 minutes when inserted onto an Airtraq blade or 5 minutes if not. The A-390 will show a shutdown message and the user has 3 seconds to cancel the process if wished.

7. TOUCH PANEL AND MENUS

Press the action icons on the screen to select an action (touch panel also works when icons are pressed using gloves).

When in Live Video, pressing the 'Back' icon will make A-390 to return to the main menu.

Navigation is shown below:



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4.4.3. Oral Tracheal Intubation by Direct Laryngoscopy

Level: EMT-P (credentialed AEMT or EMT-I)

Indications:

1. Risk of failure of oxygenation or ventilation
2. Airway maintenance or protection.
3. Worsening clinical course expected.

Contraindications: Upper airway obstruction due to foreign objects

Adverse Effects/Complications:

1. Hypoxia during prolonged attempts at intubation
2. Intubation of the esophagus
3. Trauma to the oropharynx, vocal cords, esophagus, or trachea
4. Right mainstem bronchus intubation
5. Vomiting
6. Increased intracranial pressure as a result of increased vagal stimulation
7. Pneumothorax or a tension pneumothorax from high-pressure ventilation or underlying pre-existing trauma.

Procedure: 8 Ps

1. Prepare
    a. Suction
    b. Intubation kit
    c. Bag valve mask
    d. Extra-glottic Device (AIRTRAQ™ or LMA)
    e. Cricothyroidotomy equipment
    f. CO_2 detection devices (or if available, Esophageal Detection Device)
2. Predict difficult airway (LEMONS, MOANS, RODS, SHORT/SMART)
    a. Obesity or very small patient
    b. Short muscular neck
    c. Buck teeth
    d. Receding jaw
    e. Burns
    f. Facial trauma
    g. S/S of anaphylaxis
    h. Strider
    i. Evaluate the 3-3-2 rule
        1. Mouth opening < 3 fingers
        2. Hyoid-chin distance < 3 fingers
        3. Thyroid cartilage-mouth floor distance < 2 fingers
    j. Obstruction pathology
        1. Peri-tonsillar abscess
        2. Epiglottitis
        3. Retro-pharyngeal abscess
3. Preoxygenate with 100% oxygen x 3 minutes

a. Assist with BVM as needed or 8 full tidal breaths

4. Pre-medicate
    a. Lidocaine 1.5 mg/kg IV over 30 – 60 seconds if head trauma suspected or severe asthmatic/reactive airway disease
    b. Fentanyl 3 mcg/kg (~200 mcg for average 70 kg adult) for head injury or need to block sympathetic response
    c. Atropine: 0.02 mg/kg IVP for age < 12 months to prevent bradycardia secondary to airway maneuvers
5. Position
    a. Sniff position aligns the axes of the oropharynx, pharynx, and larynx (Contraindicated in suspected spinal injuries). Do not elevate the head of children
    b. If suspected cervical spine injury, apply manual in-line cervical spine stabilization by second caregiver.
6. Placement: Perform Intubation (5 step)
    a. Open the mouth: with the thumb and middle finger of the right hand, use the scissor technique to open the patient's mouth.
    b. Control the tongue: holding the laryngoscope in the left hand and the ETT in the right, insert the blade into the right side of the mouth and sweep the tongue to the left.
    c. Recognize landmarks: Use the blade to lift the tongue and recognize the epiglottis and pharyngeal landmarks. Do not use the patient's teeth as a fulcrum.
    d. Control the epiglottis: Expose the glottic opening: posterior cartilages of the larynx, inter-arytenoid notch, and the true vocal cords.
    e. Placement of the endotracheal tube: insert the tube down the right side (midline obscures the view) just anterior to the inter-arytenoid notch and through the vocal cords to the 21cm (23 cm for males) mark at the incisors for females. Remove the stylet and inflate the cuff with 5 – 10 cc of air (until no cuff leak).
7. Placement: Confirm Intubation: Document at least three
    a. Visualization of the ETT passing through the vocal cords. Advance the tube through the glottic opening until the proximal end of the cuff disappears past the vocal cords.
    b. End tidal CO_2 detection/change
    c. Condensation on inside of ET tube during ventilation
    d. Auscultation of all lung fields to confirm breath sounds (and over the epigastrium for absence of gurgling sounds)
    e. Bilateral, symmetrical expansion of the thorax.
    f. If available; Esophageal detection device- EDD (tube check)
8. Post-intubation Management
    a. Secure tube
    b. Document: tube size, tube depth at lips, tube confirmation methods, post intubation pulse ox.
    c. Reconfirm tube placement:

1. Once the patient is prepared for transport
2. Anytime the patient is moved
3. Anytime dislodgement of the tube is suspected
4. Any change in the patient's condition
5. When responsibility for care is transferred to another provider.

d. Contact medical control for any problems and for orders to sedate patients if needed.
e. Attach and monitor end-tidal CO2
f. Monitor vital signs and pulse ox

Pediatric orotracheal intubation considerations:

1. The endotracheal tube can be sized by several methods, to include the Broselow Tape or Hantevy System or size of the nares or pinky finger, or the formula 4+ (age in years/4 for uncuffed tube and age in years/3 for cuffed tube). Once the proper size is determined, that ET tube as well as the next size smaller and next size larger (0.5 mm) should be made available for the Paramedic performing the intubation. (This is especially important in smaller children when the uncuffed tube is utilized, which relies on an anatomical seal.)
2. The anatomy of the airway is different than the adult patient and very apparent vocal cords may not be seen. Due to the over-abundance of tissue in the posterior pharynx, in infants, the tracheal opening may simply present as the anterior opening found in the subglottic region.
3. Anytime the pediatric patient is intubated, or prolonged bag-valve-mask ventilation (>3 minutes) occurs, a nasogastric (5 - 8 fr.) tube should be inserted (see NG Tube Procedure). (This procedure will insure that gastric distention is relieved and maximum ventilatory support is achieved.)
4. The endotracheal tube (ETT) will be secured as soon as correct placement is assured by auscultation of lung sounds. Do not let go of the ET during this process! Tape should be applied to the maxillary region of the face only! (Tape applied to the mandibular region may cause extubation if the mouth opens during transport, etc.) A properly sized ETT lock device may also be used.
5. The most experienced crew members should be charged with airway control. In addition, great care should be exercised when moving the patient from one surface to another, to assure that accidental extubation does not occur.
6. Continuous monitoring of ETT placement should be based on the following:
    a. Auscultation for positive bilateral breath sounds and negative epigastric sounds.
    b. Positive CO_2 reading (color change) on End-Tidal CO_2 Detector or continuous monitoring of $ETCO_2$ with a reading between 35 -45 mm Hg on monitor (see Medical Procedure 4.10).
    c. Improving and/or normal SaO_2 level on Pulse Oximeter (See Pulse Oximeter Procedure).
    d. Improvement in patient's status.

7. When assessing the child for intubation complications (bradycardia, cyanosis, etc.) remember to assess in order of the following causes:
    a. Equipment failure (02 supply, BVM reservoir, etc.)
    b. Blocked ET (kinked, secretions in the tube, etc.)
    c. Displaced ET (right mainstem, esophagus, etc.)
    d. Pneumothorax (spontaneous, trauma, etc.)

4.4.5.1. Airway Intubation with Eschmann Catheter, Tracheal Tube Introducer or Gum Elastic Bougie

Technique

1. Perform direct laryngoscopy after thorough pre-oxygenation.
2. Insert bougie under direct visualization (grade II) or semi blind (grade III) using epiglottis as a guide. Maintain midline bent end facing anteriorly.
3. With the tip directed anteriorly guide the bougie toward the epiglottis.
4. Advance the bougie posterior to the epiglottis and into the glottic opening.
5. Cricoid pressure may facilitate correct placement (when the tip of the introducer passes the cricoid cartilage and enters the trachea it also may be palpable at the anatomic location).
6. The operator may be able to feel the bougie "click" or "bump" over the anterior tracheal rings ("wash boarding or railroading")
7. Use the laryngoscope to elevate the pharyngeal soft tissue.
8. Subtle maneuvering may be required to traverse the vocal cords.
9. Advance to the carina (resistance to passage) to verify placement (approximately 45 cm). Once advanced to the carina, further insertion causes the bougie to rotate on entrance into a bronchus as an additional criterion to confirm correct placement. Failure to meet resistance after inserting nearly the full length of the bougie indicates esophageal placement. Withdraw and align the black "lip-line marker" with the lips (1 cm band located 40 cm (4 stripes) from proximal end).
10. Pass endotracheal tube (larger than 6.0 mm) over the bougie.
11. If the endotracheal tube catches on the arytenoid or aryepiglottic folds, withdraw the tube slightly and rotate it 90^0 counterclockwise and advance it forward (allows beveled end to pass).
12. For optimal passage of the tube over the bougie into the trachea, the laryngoscope may be left in place as the endotracheal tube is advanced with the bevel facing posteriorly.
13. Secure the tube (remove bougie) and verify tube placement.

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4.4.4. Nasogastric (NG) tube

Level of training: EMT-P

Purpose: Nasogastric Tube insertion is indicated to relieve gastric distention in the ventilated patient who meet the following criteria:

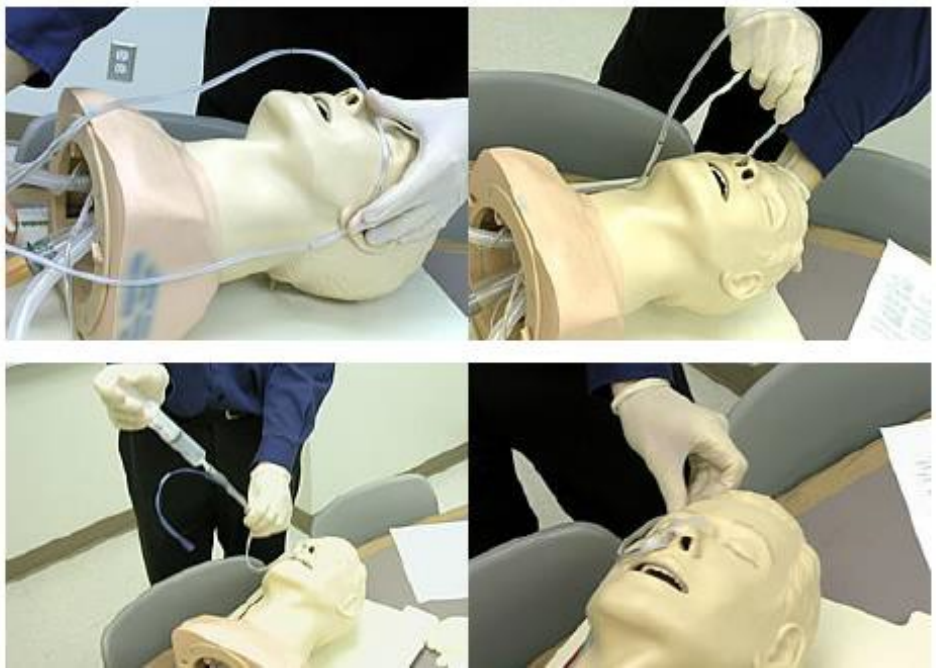
1. The adult patient with noticeable gastric distention that interferes with ventilatory support.
2. Any pediatric patient that is intubated or receives long term (>3 minutes) ventilation by Bag Valve Mask.

Cautions:

1. This procedure should **not** be performed in the presence of frontal head or mid-facial trauma where the cribriform plate may be fractured.
2. **DO NOT FORCE THE NG TUBE**. If resistance is felt, withdraw slightly and gently reinsert using a twisting motion to avoid the turbinates in the nose.
3. The NG tube should be passed in a horizontal position.

Procedure:

1. Ready the proper size tube (adult 16 French/pediatric as per the Broselow Tape 6 - 16 French), 60 cc syringe, water soluble lubricant, and tape.
2. Measure the tube by placing over the stomach region and extend to the ear and then to the nose. (Note tube mark at this time.)
3. Coil the tip of the tube around your index finger and stretch the tube to create a curvature at the tip. This will assist in navigating the posterior nasopharynx.
3. Lubricate the end of the tube with Lidocaine gel and insert into the largest nares, advancing until the tube mark noted above is at the nares opening. (The conscious patient can assist while swallowing during insertion.)
4. Verify placement by auscultating epigastric sounds while inserting 20-30 cc's of air.
5. Tape in place and note depth of tube on the run report.



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4.4.5. Rapid Sequence Intubation (RSI)

4.4.7 Rapid Sequence Intubation Procedure; USE ONLY IF YOU HAVE COMPLETED MEDICAL DIRECTORS ADVANCED AIRWAY COURSE.

PURPOSE:

Indications:

- Any medical, traumatic, or neurologic condition, acute or chronic in which there is failure to protect the airway.
- Significant altered mental status (GCS ≤ 8) with airway compromise
- Risk for impending/actual airway compromise is suspected or anticipated, such as acute burn injury or acute severe angioedema of the airway.
- Any condition where there is failure to oxygenate and/or failure to ventilate and patient has an intact gag reflex

Relative Contraindications

- Concern for difficult intubation until assessed via LEMON, MOANS, RODS, SHORT/SMART
- Hypersensitivity to any of the drugs involved
- Unfamiliar with medications used and or the procedure itself
- Contraindications to succinylcholine (consider using Rocuronium or Vecuronium instead)
    - Patients with or at risk for hyperkalemia
        - History of **neuromuscular disease** (ALS, MS, muscular dystrophy, myasthenia gravis)
        - **Renal Failure** patient with evidence of hyperkalemia on EKG
        - Known **Hyperkalemia** (potassium > 5.5 mEq/liter)
        - **Burn** patient – between 5 days old until healed
        - **Crush injury** patients – between 5 days old until healed
        - **Stroke** patients and **spinal cord injury** patients – between 5 days until approximately six months
        - **Intra-Abdominal sepsis** – between 5 days unto resolved
    - Malignant Hyperthermia
    - Unstable Fractures

Complications:

- Increased intragastric pressure (emesis).
- Bradycardia/asystole (especially in children less than 1 yr not pre-medicated with Atropine.)
- Malignant hyperthermia.
- Prolonged apnea.
- Inability to intubate/ventilate after paralytic administration.
- Hypotension.
- Aspiration.

- Increased intraocular pressure.
- Dysrhythmias.
- Fasciculations.
- Histamine flush
- Tachycardia.
- Hyperkalemia.
- Inability to recognize decreased neurologic status.
- Bronchospasm

PROCEDURE:

Preparation:

- During your preparation, refer to the **UNIVERSAL AIRWAY ALGORITHM** below
- If patient is found to be in cardia or respiratory arrest or has agonal breathing, **GO TO THE CRASH AIRWAY ALGORITHM BELOW**
    - Assign or begin BLS airway measures including use of BVM
    - If after three attempts to intubate, you are unable to intubate the patient, go to **FAILED AIRWAY ALGORITHM** below
- Assemble necessary equipment and personnel (suction, B-V-M with correct sized mask, **working suction equipment**, appropriate sized ET tubes, working laryngoscope, gum bougie, appropriate drugs drawn up in syringes, pulse oximeter, end-tidal CO_2, cardiac monitor, extra-glottic airway and/or cricothyroidotomy equipment)
- One or two patent IVs
- Prepare to position patient in sniffing position or use in-line stabilization if indicated.
- Assure at least one secure well running IV line.
- Connect patient to cardiac monitor and pulse oximeter.
- Assign specific duties to personnel on scene (i.e., assistance with bagging, pushing of medications, ETC.)
- Assess patient for possible difficult intubation via LEMON, MOANS, RODS, and SHORT/ SMART.
    - Check and document Mallampati
    - Test the 3-3-2 rule
    - If patient is found to be a potential difficult airway case, **GO TO THE DIFFICULT AIRWAY ALGORITHM BELOW**
        - Sedate patient with one of the following
            - Etomidate – ½ the induction dose
            - Ketamine – 1 – 2 mg/kg IV
            - Versed 2- 4 mg IV then titrate 1 mg increments prn till adequate sedation
        - If unable to intubate the patient, go to **FAILED AIRWAY ALGORITHM** below
- If patient is neither a CRASH AIRWAY nor a DIFFICULT AIRWAY, proceed below with RSI

Pre-Oxygenation:

- The goal of rapid sequence induction is to facilitate a controlled intubation. (An adequately pre-oxygenated patient can remain apneic for 2 to 3 minutes without serious hypoxia).
- It is ideal to **allow the patient to spontaneously breathe 100% oxygen for 4 - 5 minutes** to "wash out" the nitrogen reservoir and establish an oxygen reservoir.
- If the patient is not breathing adequately, give 100% oxygen via B-V-M for 3 minutes.
- In addition to above, place patient on continuous oxygen via nasal cannula at 6 L per minute. Once the patient is sedated and/or paralyzed, increase the flow rate to 15 lpm via nasal cannula. Continue nasal oxygen throughout your intubation attempt while patient is paralyzed. Once intubated, discontinue the nasal oxygen.

Quick Look:

- After sedative is administered, use a quick look to see if patient can be intubated without the need for a paralytic agent.
- Intubate if possible, otherwise continue to the next step

Paralysis with induction: (virtual simultaneous administration)

- Induction agents (use one)
  - **Etomidate** 0.3mg/kg
  - **Ketamine** 1.5 mg/kg (preferred for hypotensive, septic, hypovolemic, reactive airway)
- Paralytic
  - **Succinylcholine** 1.5 mg/kg – depolarizing agent
  - **Rocuronium** 1 mg/kg – non-depolarizing agent

Protection and position

- Watch for apnea and have suction ready if needed
- Maintain head in sniffing position

Placement and Proof

- Pass ET tube and confirm placement
  - ETCO2
  - Breath sounds
  - Misting in tube
  - Chest rise and fall
  - Absent breath sounds over epigastrium
- If unable to pass tube;
  - Go to **FAILED AIRWAY ALGORITHM.** See below
    - Attempt LMA or other extra-glottic device
    - Attempt to ventilate with BVM to maintain pulse ox > 91%
    - Consider Cricothyroidotomy or needle cric as last resort

Post intubation management:

- Secure tube with tube tamer or other measures
- Apply C-collar
- Monitor end tidal CO2
- Recheck vital signs
- Sedation as needed (may use any one of the following. OK to combine a narcotic with a benzo. Ketamine works as a stand-alone drug)
    - **Versed** 2.5 – 5 mg IV then 1 mg increments prn (watch BP and administer bolus if it drops)
    - **Morphine** 2 - 5 mg IV then 1 mg increments prn
    - **Fentanyl** 50 mcg IV then 25 mcg increments IV prn
    - **Ketamine** 0.25 – 0.5 mg/kg IV every 5 – 10 min (Med control may order a Ketamine infusion: 2 – 4 mg/kg/hr continuous infusion)
    - Continue paralysis with **Rocuronium** only per med control

KEY POINTS/PEARLS:

1. **Note**: the benefit of obtaining airway control must always be weighed against the risk of complications in these patients
2. Maintain spinal motion restriction if indicated.
3. **HAVE SUCTION EQUIPMENT READY TO USE**
4. Perform baseline neurological exam prior to paralyzing patient.
5. Assess and record vital signs, cardiac rhythm, and pupillary exam at least every 5 minutes.
6. **Remain in constant attendance with the patient at all times.**
7. Provide emotional support and orientation to the environment.
8. **Paralytic Agents DO NOT provide analgesia not sedation**!
9. Document all medications and reactions (i.e. paralysis achieved.) also, document reasons for repeat doses (i.e. increased difficulty ventilating or increased movement).
10. Notify medical control if after you administered Succinylcholine, you patient develops changes on the EKG suggestive of hyperkalemia (Peaked T waves, prolonged PR, prolonged QRS). Initiate the Hyperkalemia treatment

Airway Algorithms

Rapid Sequence Intubation

Induction Agents

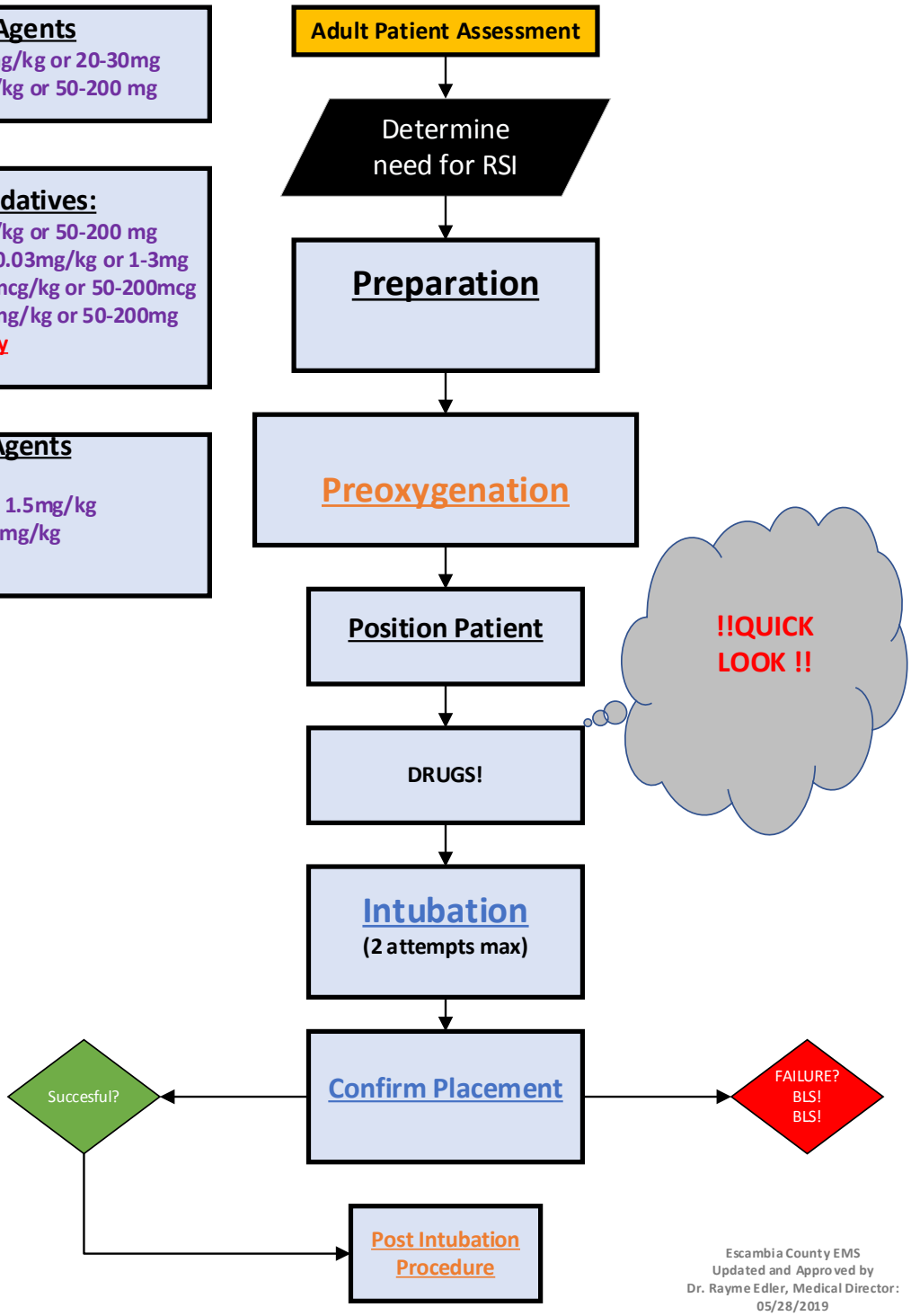
Etomidate (Amidate):0.3 mg/kg or 20-30mg
Ketamine (Ketalar): 0.5mg/kg or 50-200 mg

Hypnotic/Sedatives:

Ketamine (Ketalar): 0.5mg/kg or 50-200 mg
Midazolam (Versed): 0.01-0.03mg/kg or 1-3mg
Fentanyl (Sublimaze): 1-2 mcg/kg or 50-200mcg
*Propofol (Diprivan) 0.5-2mg/kg or 50-200mg
*Critical Care Transfers only

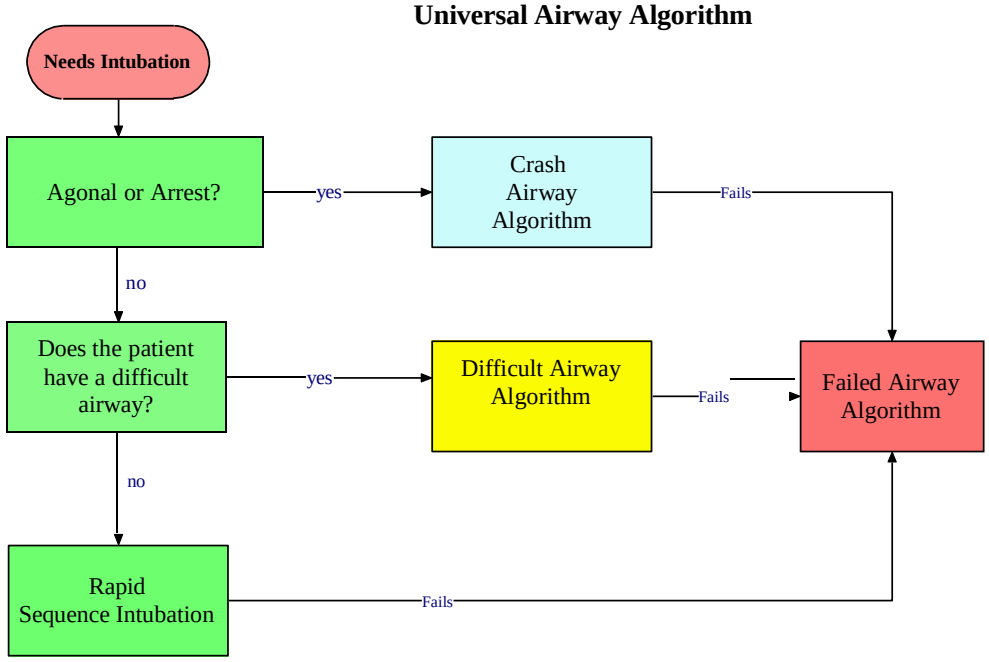
Paralytic Agents

Succinylcholine (Anectine): 1.5mg/kg
*Rocuronium (Zemuron): 1mg/kg
* Supervisors only



Escambia County EMS
Updated and Approved by
Dr. Rayme Edler, Medical Director:
05/28/2019

Universal Airway Algorithm



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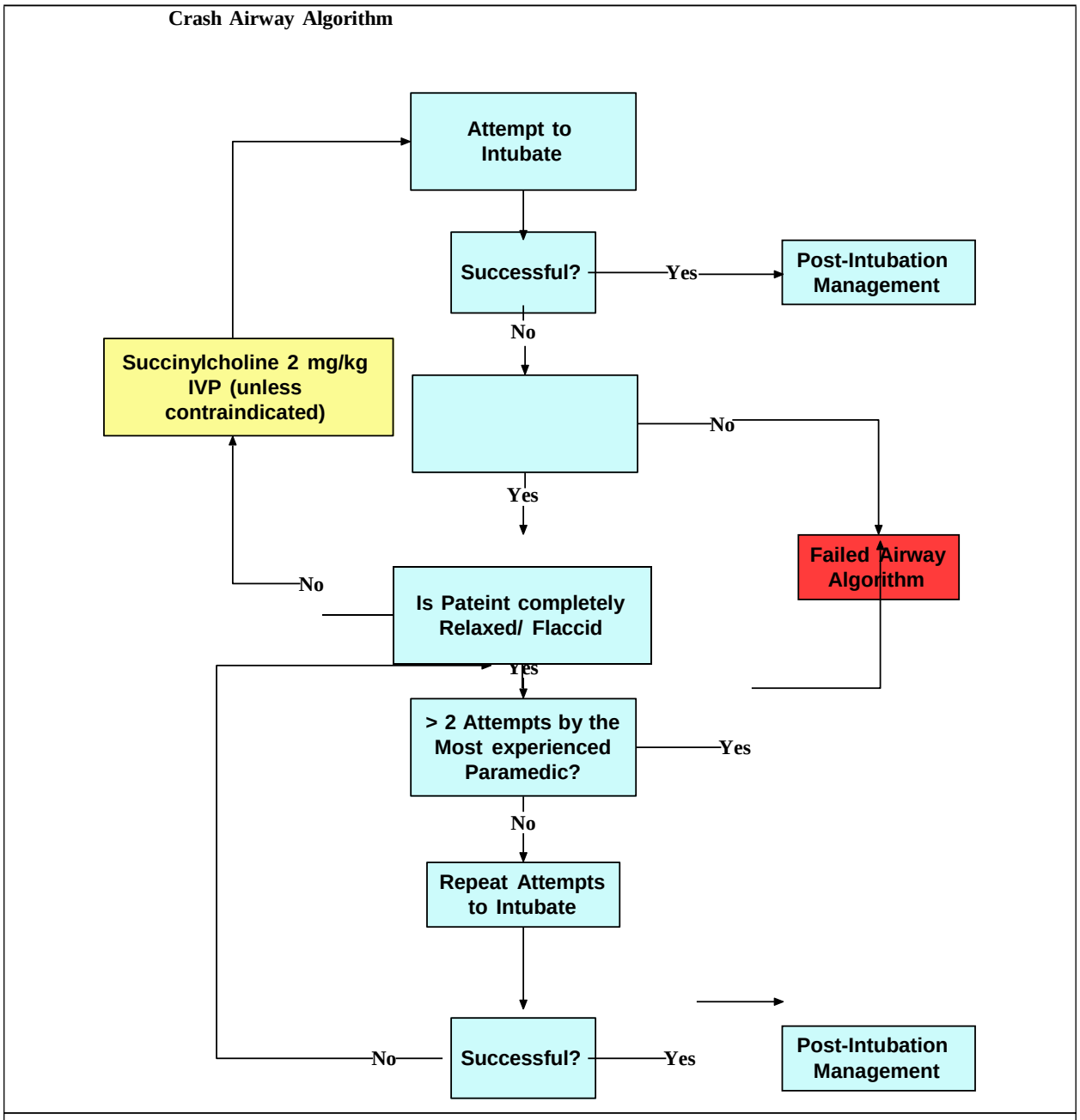

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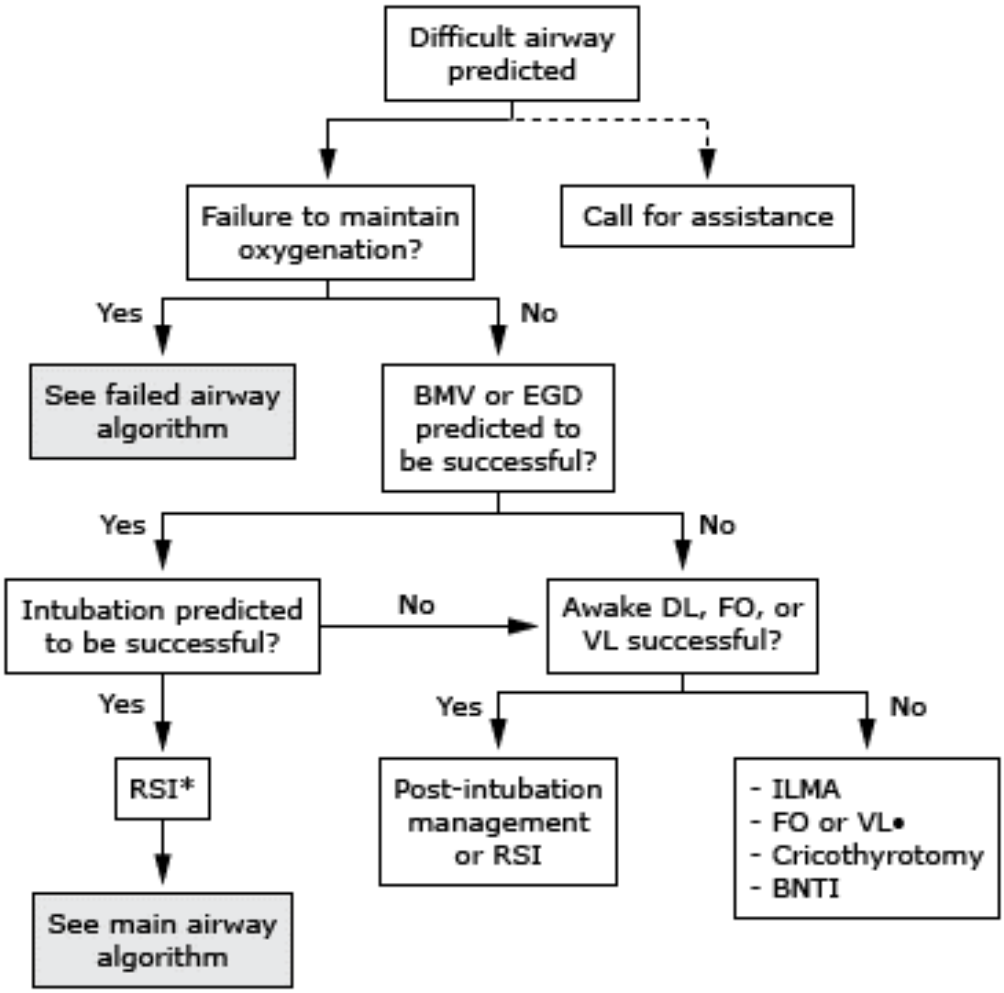

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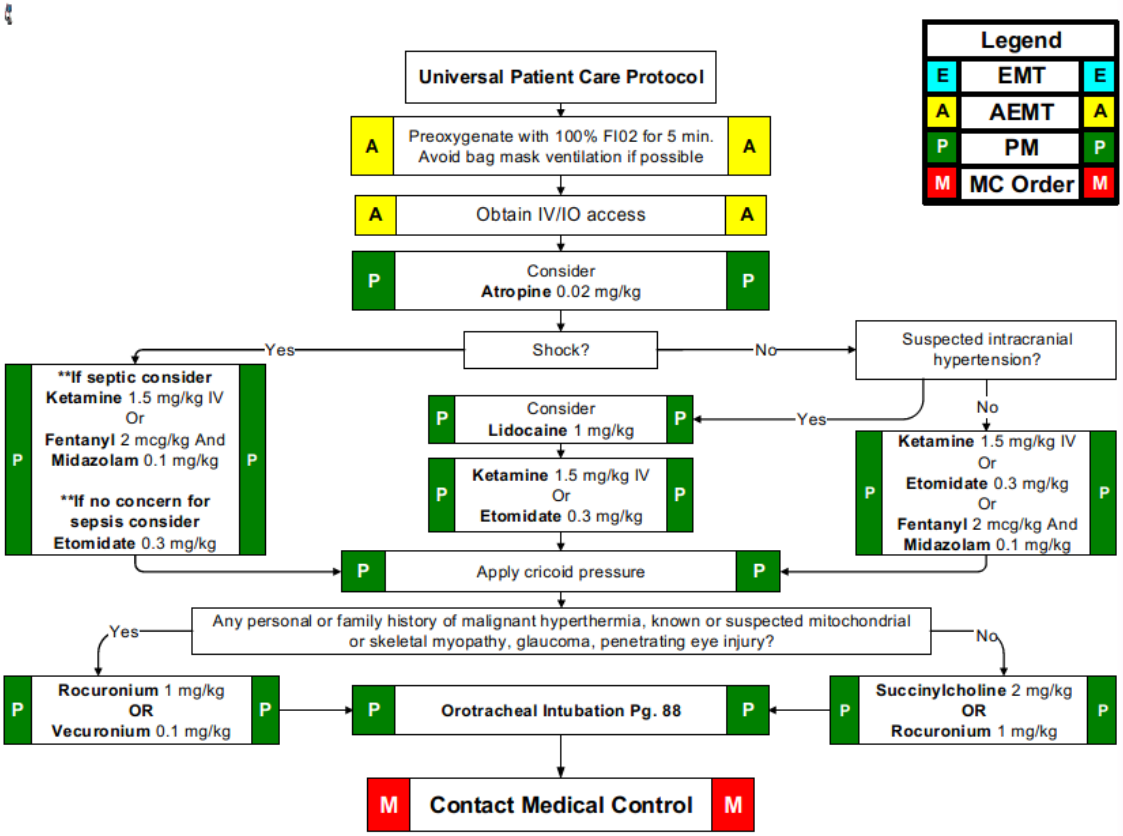
Pediatric Rapid Sequence Intubation



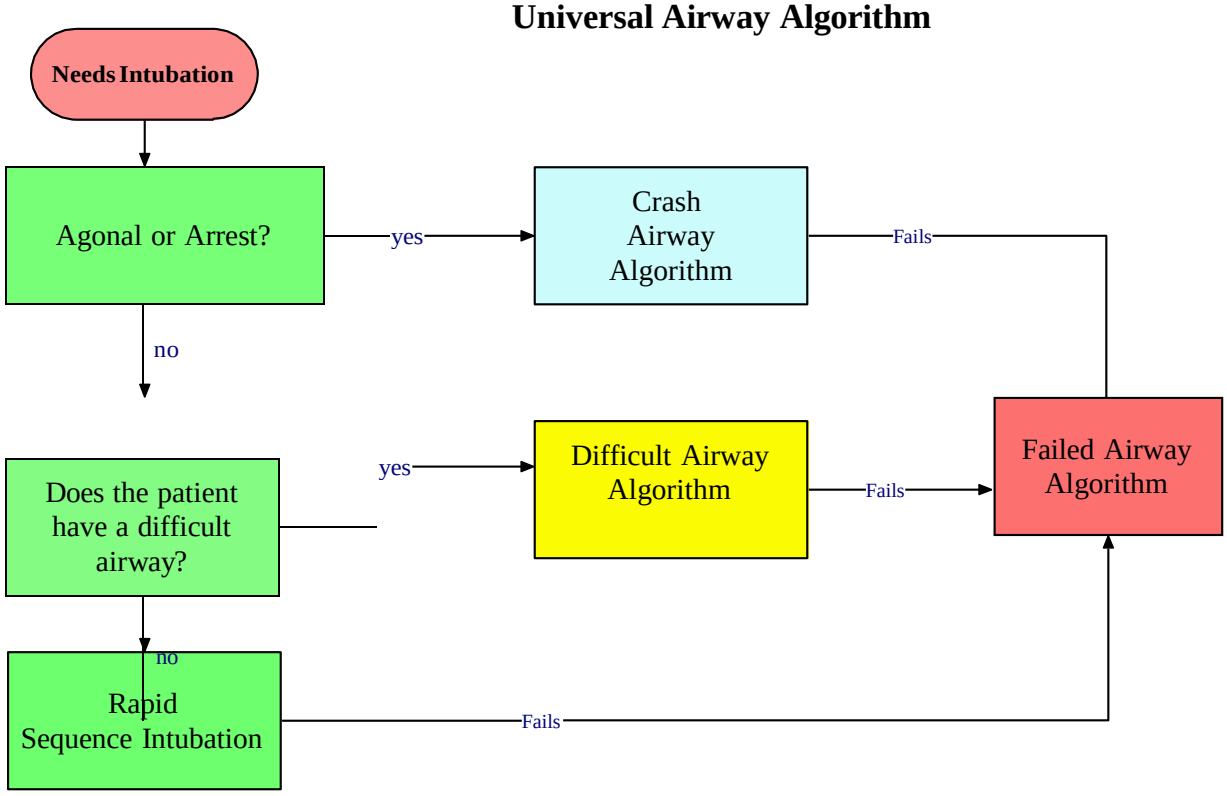
Weight	4 kg *grey*	6 kg *pink*	8 kg *red*	10 kg *purple*	12 kg *yellow*	15 kg *white*	19 kg *blue*	24 kg *orange*	30 kg *green*
Atropine	0.1 mg	0.12 mg	0.16 mg	0.2 mg	0.24 mg	0.30 mg	0.38 mg	0.48 mg	0.60 mg
Ketamine	6 mg	9 mg	12 mg	15 mg	18 mg	22.5 mg	28.5 mg	36 mg	45 mg
Etomidate	1.2 mg	1.8 mg	2.4 mg	3 mg	3.6 mg	4.5 mg	5.7 mg	7.2 mg	9 mg
Lidocaine	4 mg	6 mg	8 mg	10 mg	12 mg	15 mg	19 mg	24 mg	30 mg
Fentanyl	8 mcg	12 mcg	16 mcg	20 mcg	24 mcg	30 mcg	38 mcg	48 mcg	60 mcg
Midazolam	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Succinylcholine	8 mg	12 mg	16 mg	20 mg	24 mg	30 mg	38 mg	48 mg	60 mg
Vecuronium	0.4 mg	0.6 mg	0.8 mg	1 mg	1.2 mg	1.5 mg	1.9 mg	2.4 mg	3 mg
Rocuronium	4 mg	6 mg	8 mg	10 mg	12 mg	15 mg	19 mg	24 mg	30 mg

Level: Specially trained EMT-P, RN

4.4.7.1. SMART AIRWAY MANAGEMENT

Purpose: The SMART Airway Management approach should be used on all patients requiring advanced airway management. The Universal Airway Algorithm outlines the basis for using this procedure.

Universal Airway Algorithm



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Procedure:

Crash Airway Algorithm

This algorithm is intended for use when faced with a need for a rapid airway in the setting of an uncomplicated clinical condition. Examples include cardiac arrest, respiratory arrest and unconscious patients with agonal respirations in need of active airway assistance.

1. Assess the patient for a probable difficult airway. Use LEMONS, MOANS, RODS, and SHORT. Examples include:
    a. Thick beard
    b. Overjet (Buck teeth)
    c. Mallampati of 3 or 4
    d. Less than 2 fingerbreadths space between the patient's teeth
    e. Thryromental distance less the 3 fingerbreadths
    f. Decreased neck mobility
    g. Decreased jaw mobility
    h. Wired jaw
2. Ensure the patient is appropriately ventilated with 100% oxygen via a bag-valve-mask or similar device. An OPA or NPA should be in place.
3. Attempt to orotracheally intubate the patient (see medical procedure 4.27)
4. If successful, perform post-intubation management procedures including:
    a. Verification of proper placement via at least three independent measures (see Adult Medical Protocol 2.1.2)
    b. Note the centimeter marking of the ET tube adjacent to the teeth
    c. Secure the ET tube with a commercial device
    d. Place a cervical collar to prevent accidental dislodgement
5. If unsuccessful, maintain the SpO_2 > 91% via bag-valve-mask or similar device. If you feel the reason you were unsuccessful was due to lack of sufficient muscle relaxation of the jaw, administer one time dose of **Succinylcholine 2 mg/kg.** Attempt to intubate two more times by most experienced medic. If these interventions fail, proceed to the failed airway algorithm/protocol.

SEE Diagram Below

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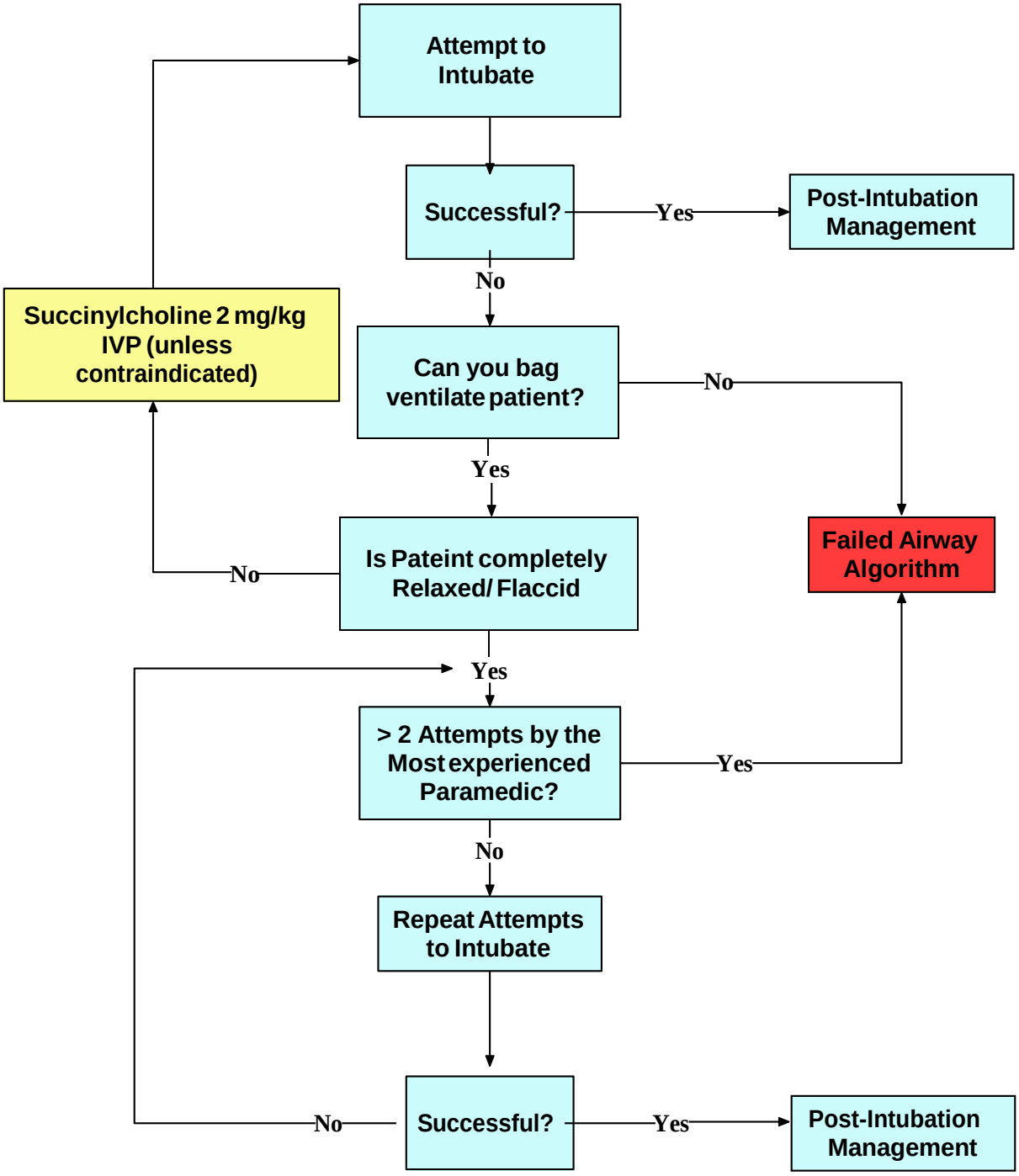
Crash Airway Algorithm



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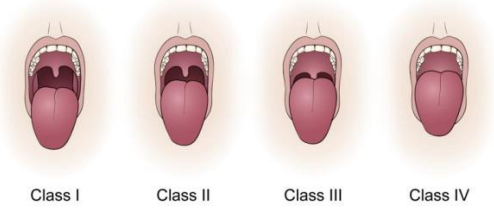
Difficult Airway Algorithm

1. When faced with a predicted or known difficult airway, call for assistance.
2. Assess per:
    A. LEMONS,
        a. **L**ook externally (gastalt)
        b. **E**valuate 3-3-2 rule

        c. **M**allampati



        d. **O**bstruction/**O**besity
        e. **N**eck mobility
    B. MOANS,
        a. **M**ask Seal
        b. **O**bese
        c. **A**ged (> 55 years old)
        d. **N**o teeth
        e. **S**tiff (increased ventilatory pressures, e.g. asthma, COPD, ARDS, term pregnancy)
    C. RODS,
        a. **R**estricted mouth opening
        b. **O**bese
        c. **D**istorted airway
        d. **S**tiff (as for MOANS)
    D. SHORT
        a. **S**urgery
        b. **H**ematoma or infection
        c. **O**bese
        d. **R**adiation
        e. **T**umor

3. Maintain the SpO_2 > 91% via non-rebreather mask, bag-valve-mask or similar device. If difficulty is encountered, assign a second rescuer to assist with

ventilations and insert additional basic airway devices (2 NPA's and 1 OPA should be in place). If these interventions fail, proceed to the failed airway algorithm/protocol.

4. If SpO_2 remains > 91%, and patient spontaneously breathing, consider nasotracheal intubation. If successful, perform post-intubation management procedures including:
    a. Verification of proper placement via at least three independent measures (See Adult Medical Protocol 2.1.2)
    b. Note the centimeter marking of the ET tube adjacent to the teeth
    c. Secure the ET tube with a commercial device
    d. Place a cervical collar to prevent accidental dislodgement
5. If nasotracheal intubation is unsuccessful or not attempted, decide if bag-valve-mask ventilations or using an extra-glottic airway will be successful. If yes, decide if endotracheal intubation is predicted to be successful. If yes, providers may consider employing the RSI algorithm/protocol but should do so with extreme caution.
6. If bag-valve-mask ventilations or using an extra-glottic airway is predicted to successful but it is questionable if endotracheal intubation will be successful, proceed with a sedation look.
    ~~a. Apply **1 – 4% Lidocaine** local anesthesia with atomizer to posterior pharynx (5 – 6 ml)~~
    b. Sedate patient with **one** of the following:
        1. Start with ½ the induction dose of **Etomidate** (induction dose is 0.3 mg/kg) then titrate the remaining induction dose till adequate sedation achieved
        2. Start with 2 – 4 mg of **Versed** then if needed, titrate 1 mg increments till adequate sedation is achieved.
7. Attempt to visualize the vocal cords with laryngoscope, AirTraq or video laryngoscope. Look for grade 1 or 2 on Cormak-Lehane classification scale. See illustration below.

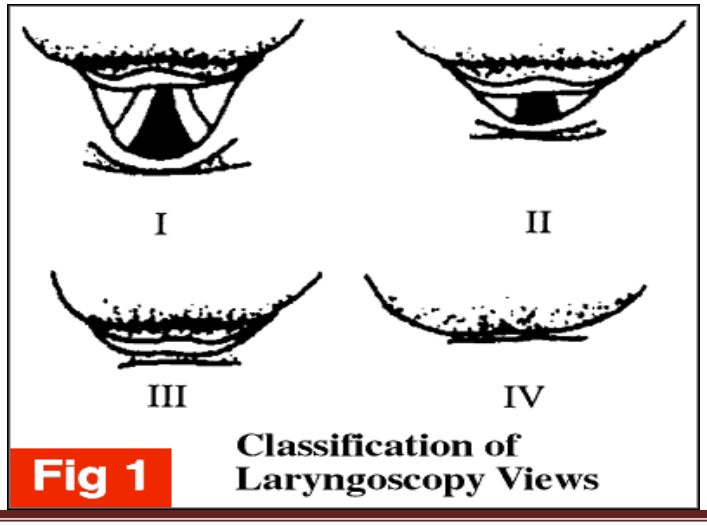
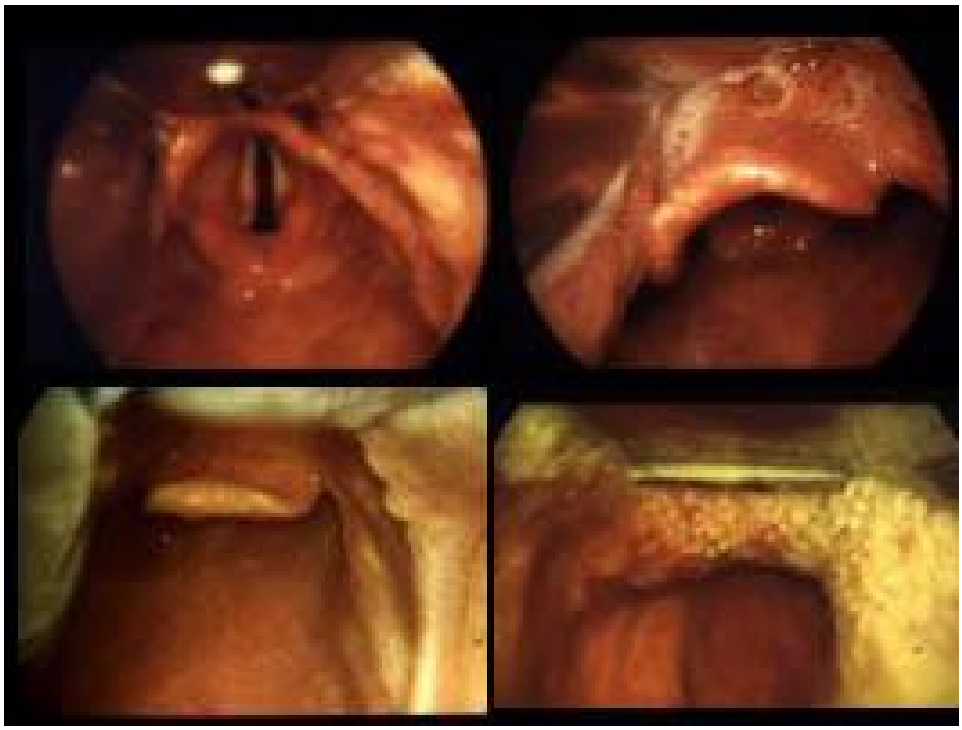


Fig 1 **Classification of Laryngoscopy Views**



8. If you can visualize the cords easily, two choices
    A. Proceed with passing the endotracheal tube while you have the cords in good view, or
    B. Back out and proceed with RSI
        a. Give the remaining dose of **Etomidate** followed by the paralytic (**Succinylcholine 1.5mg/kg**)
9. If successful, proceed to post intubation management
    A. Secure tube
    B. Sedate patient as needed
        a. **Versed 2 – 4 mg** IV initial then titrate 1 mg increments prn
        b. **Morphine 2-5 mg** IV then titrate 2 mg increments prn
        c. **Fentanyl** 50 mcg IV then 25 mcg increments IV prn
        d. **Ketamine** 0.25 – 0.5 mg/kg IV every 5 – 10 min (Med control may order a Ketamine infusion: 2 – 4 mg/kg/hr continuous infusion)
        e. Continue paralysis with **Rocuronium** only per med control
    C. Apply C-collar
    D. Monitor end tial CO2
10. If unsuccessful, proceed to failed airway algorithm

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4.4.6. Post Intubation Management

A. Secure tube
B. Apply C-Collar
C. Recheck vital signs frequently
    a. Heart rate
    b. Blood pressure
    c. Pulse oximetry
D. Monitor End-Tidal CO_2
E. Keep patient sedated with any one of the following, or a combination of a benzodiazepine (a or b) and narcotic (c or d).
    a. Versed 2 – 4 mg IV initial then titrate 1 mg increments prn
    b. Morphine 2-5 mg IV then titrate 2 mg increments prn

    c. Fentanyl 50 – 100 mcg IV slow. May repeat every 15 minutes up to 200 mcg
    d. Ketamine 0.25-0.5 mg/kg IVP every 5-10 minutes. Contraindicated in patients with suspected of head trauma or increase in ICP
    e. Continue paralysis with Rocuronium only per med control
F. Reassess for proper tube position (follow end tidal CO2 and other confirmation protocols) each time patient is moved.

4.5. Surgical and Non-Surgical Airways

4.5.1. Needle Cricothyroidotomy for Pediatrics

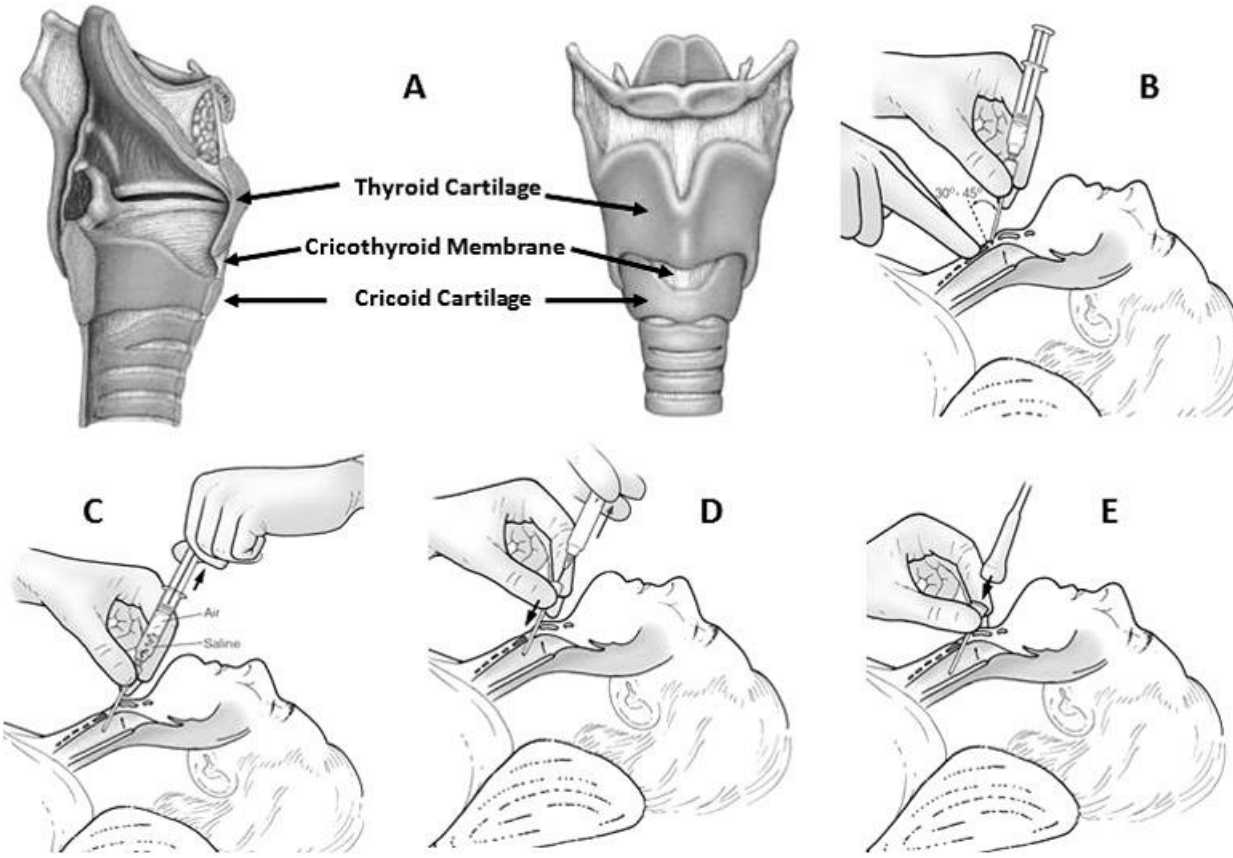
Level: EMT-P

Indications:

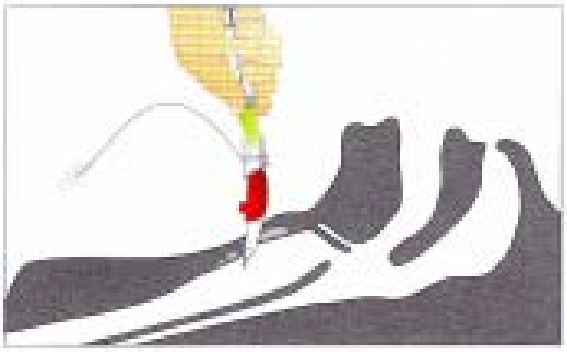
1. A patient in respiratory arrest or near arrest in whom an airway cannot be secured with intubation.
2. Situations in which standard endotracheal intubations cannot be done such as:
    a. Excessive oropharyngeal hemorrhage.
    b. Massive traumatic or congenital deformities.
    c. Complete airway obstruction precluding ET tube placement.
3. Cervical spine fracture with respiratory embarrassment in patients who cannot be endotracheally intubated.
4. Unsuccessful attempts by EMT-P or RN at endotracheal intubation in situations where delays would result in hypoxic injury.

Procedure:

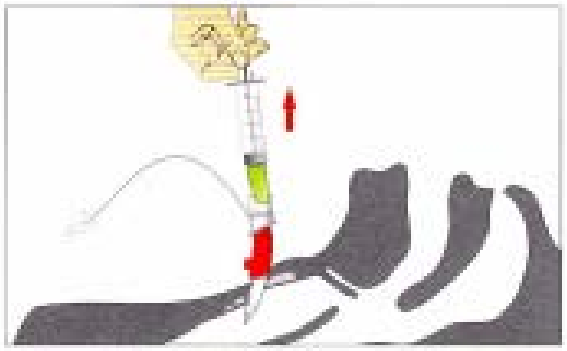
1. Prepare the necessary equipment:
    - 14-gauge, over-the-catheter needle
    - 10-cc syringe
    - 15-mm adaptor from 3.0 or 3.5 intubation tube
2. Have suction supplies available and ready
3. Place the patient in the supine position.
4. Palpate the cricothyroid membrane between the thyroid and cricoid cartilages. For children < 10 yrs old the cricothyroid membrane is not sufficiently developed, just cannulate the trachea like you would a vein.
5. Prep the area.
6. Attach a #14 gauge 2inch IV needle to a 10cc syringe.
7. Puncture the skin midline, directly over the cricothyroid membrane.
8. Direct the needle at a 45°degree angle caudally. When the needle penetrates the trachea, a “pop” will be felt.
9. Carefully insert the needle through the lower half of the membrane, aspirating as the needle is advanced.
10. Aspiration of air signified entry into the tracheal lumen.
11. Advance the catheter over the needle into the trachea.
12. Attach catheter needle hub to a 3.0 mm pediatric endotracheal tube adapter and oxygenate with 100% oxygen via a B-V-M.
13. Ventilate for 1 second and allow 2 seconds for exhalation
14. Observe lung inflations and auscultate for adequate ventilation.
15. Secure apparatus to neck.
16. Document and record response.
17. Monitor pulse ox.


A
Thyroid Cartilage
Cricothyroid Membrane
Cricoid Cartilage
B
30°-45°
C
Air
Saline
D
E

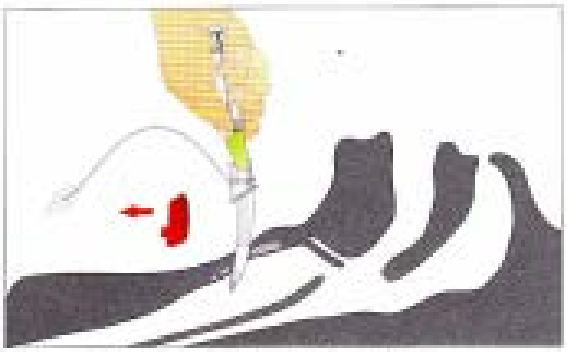
RUSCH® QUICKTRACH®.



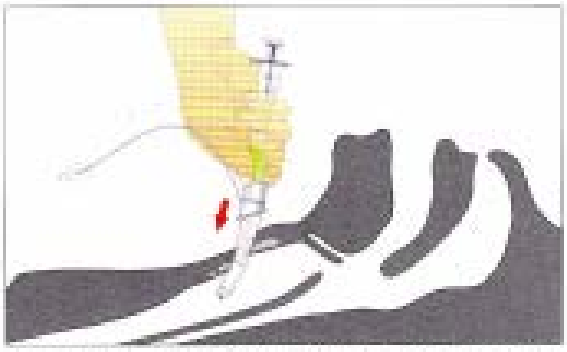
Hyperextend the head. Evacuate the cuff completely. Locate the cricothyroid membrane by palpation of the depression between the thyroid and cricoid cartilage and puncture. Because of the sharp tip and conical shape of the needle, an incision is not necessary. The opening of the trachea is obtained by dilating the skin which reduces the risk of bleeding.
Insert the Quicktrach II further towards the trachea up to the stopper. The stopper prevents the needle from being inserted too deep and therefore avoids perforation of the posterior tracheal wall.



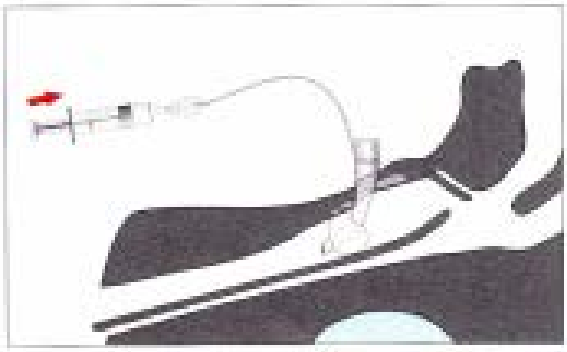
Aspirate air with the syringe to determine the position of the cannula. If this is possible, the needle is in the trachea.



Remove the stopper from the plastic cannula.



Push the plastic cannula forward with the thumb until the safety clip audibly clicks into position. This indicates that the tip of the metal needle is covered by the plastic cannula to prevent trauma. Further insert the Quicktrach II until the flange rests on the neck. The metal needle can now be removed.



Inflate the cuff with the prepared syringe (10ml).

Secure the plastic cannula with the foam necktape. Ventilate the patient via the 15mm standard connector.

Complications:

1. Exsanguinating hematoma.
2. Subcutaneous and/or mediastinal emphysema.
3. Inadequate ventilations resulting in hypoxia and death.

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4.5.2. Surgical Airway (Cricothyroidotomy)

Level: Specially trained EMT-P

Procedure:

1. Place patient in the supine position with the neck in a neutral position. Palpate the cricothyroid membrane between the thyroid and cricoid membranes for orientation.
2. Prep the area.
3. Stabilize the thyroid cartilage with non-dominant hand.
4. With #15 scalpel blade, make a vertical skin incision.
5. Bluntly dissect down to the cricothyroid membrane (use the back end of the scalpel or pair of hemostats).
6. Make a horizontal incision through the membrane. Carry the incision in each direction until the total length is approximately 1.5 to 2.0 cm. NOTE: hold the scalpel between the thumb and index finger so that only the tip of the blade can enter the trachea during the initial stab incision.
7. DO NOT REMOVE THE BLADE FROM THE OPENING IN THE TRACHEA UNTIL A HEMOSTAT OR STYLET OR BOUGIE HAS BEEN PLACED IN THE TRACHEA PRIOR TO REMOVING THE SCALPEL BLADE.
8. Insert the scalpel handle and rotate 90° to the incision, use a curved hemostat, or your index finger to open the airway.
9. Insert an appropriately sized (preferably 5 - 7 mm) cuffed ET tube or tracheostomy tube into the airway, directing the tube distally into the trachea.
10. Inflate cuff and ventilate the patient.
11. Observe lung inflations and auscultate chest for adequate ventilation.
12. Secure tube to prevent inadvertent dislodging.
13. Document and record responses.
14. This procedure is not recommended in children under age 12.

Complications:

1. Creation of false passage.
2. Hemorrhage or hematoma formation.
3. Laceration of the esophagus.

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4.6. Autistic Patient

This protocol is intended to assist emergency personnel in dealing with the special challenges that they face when encountering an autistic patient.

Signs of Autism

Many parents are in denial or do not realize the possibility that their child is autistic. It is for this reason that careful consideration should be made before inquiring whether a child is autistic.

Doing so may prompt the parent to "shut down" or become defensive, which could hamper the process of acquiring patient information. Signs of autism that the emergency care provider may recognize include these:

- Has not "babbled" or "cooed" by the age of 1 year.
- Has not gestured, pointed, or waved by 1 year.
- Has not spoken a single word by 16 months.
- Has not spoken a two-word phrase by 2 years.

Special Considerations

When dealing with an autistic patient, special accommodations must be made during the encounter to achieve a positive outcome. Conditions that may affect the encounter include these:

- Autistic patients may respond aggressively to an unwanted touch.
- Autistic patients may appear to have a hearing impairment.
  - This may affect your assessment of the patient's level of consciousness and the Glasgow Coma Scale score.
  - It may also prevent the patient from coming to you if called, such as in motor vehicle accidents, fires, and evacuations (a).
- During stressful times, autistic persons may "bolt" or run away from the situation even if they are hurt. These patients will not respond to someone calling their name to stop! This behavior may result in the person running into traffic or other hazardous areas (b).
- Autistic patients cannot tell or describe what is hurt or what they want (c).
- Autistic patients will likely not follow any directions. This will present a great challenge during the patient assessment (c).
- Autistic children do not play with toys appropriately.
- Autistic patients have poor eye contact, which may affect the evaluation of pupils.

    - The autistic patient usually directs his/her eyes up, down, or away. This factor should be considered when head injuries are suspected.
- Autistic patients appear to be in their own world. This could pose a concern if a patient is in danger and is not aware of it (d).
- Autistic patients have odd movement patterns.
    - These movements may include hand flapping, hand washing motions, spinning motions, head slapping, and covering of the ears or eyes
- Autistic patients exhibit an unusual attachment to toys or other objects.
    - To gain the trust of an autistic patient, provide him/her with a favorite object, which may not necessarily be a toy. Ask the parent/caregiver to assist you.
- Autistic patients often demonstrate repetitive behaviors.
    - Autistic persons feel compelled to complete certain tasks, such as lining up their toys.
    - Before allowing an intrusion, such as emergency workers examining them, autistic patients may feel compelled to complete a certain task such as lining up toys, opening a door, or going through a certain routine.
- Autistic patients do not adjust well to a change in their surroundings or routines.
    - These patients are usually set in a certain routine and are extremely comfortable in their known surroundings. Any changes could result in an aggressive response.
- Autistic patients may walk on "tippy toes."
- Autistic patients may have an increased level of pain tolerance.
    - This may be a major consideration during the physical exam. A thorough physical exam is required, especially with suspected abdominal pain, fractures/sprains, and head/neck injuries.
- Autistic patients have an extreme sensitivity to touches and textures (i.e., smooth, rough, sticky, hot/cold, wet/dry).
    - Consideration should be given to this factor when applying dressings and bandages. The simplest of procedures, such as applying a Band-Aid or irrigating a wound, could result in a "meltdown."
- Autistic patients are extremely sensitive to having things on their heads or around their necks.
    - This factor should be considered when applying dressings to head injuries, as well as when utilizing a sling to secure an extremity.

"Meltdowns and Refocus Periods"

Children with autism can have frequent “meltdowns” (tantrums) due to any one of the factors mentioned in the “Special Considerations” section of this protocol. These meltdowns may also occur for no apparent reason and may result in aggressive behavior. After a meltdown, autistic children will likely go through what is known as a “refocus” period. They will suddenly become quiet; they may crouch down and cover their ears or eyes. Typically, they will look for a quiet, darkened, “sheltered” area. During this period, patients are trying to “refocus” their world; this is their time. The refocus period can last a few minutes to possibly 30 minutes or longer. If there is an attempt to rush this period, another meltdown may occur, to be followed by another refocus period; this process could become a vicious cycle.

If you encounter a parent/caregiver who is aware of the autism, ask him/her for advice on how to handle the patient. Parents of autistic children are usually very actively involved with their children and understand their “quirks.” Their help should enhance your treatment and be a major factor in lessening the stress level in an already stressful situation.

Note: Clues that may indicate that you are dealing with an autistic patient may include car magnet “puzzle piece” ribbons on vehicles involved in motor vehicle accidents as well as window stickers on homes indicating the presence of a special needs person.

(a) Autistic patients are not aware of any present dangers. To safely secure the patient, reduce the risk of danger before encountering the patient. Ask the parent/caregiver to assist you during your interview.

(b) If possible, ask the parent/caregiver to assist with “refocusing” the patient. If such a person is not available, try clapping your hands to get the patient’s attention if the situation is urgent.

(c) Be aware of a possibly aggressive response to an unwanted touch.

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4.7. Blood Alcohol Sampling

4.8.

FS Chapter 316.1932(2)(f)(2)

"Only a physician, or certified paramedic, acting at the request of a law enforcement officer, may withdraw blood for the purpose of determining the alcoholic content thereof or the presence of chemical substances or controlled substances therein...."

Drawing a blood alcohol sample SHOULD NOT DELAY TREATMENT OR TRANSPORT of the critical patient.

The patient has the right to refuse this procedure and should not be forced to have it performed.

OBTAINING A BLOOD ALCOHOL SAMPLE

1. The EMS run report shall contain the following information:

    a. A blood alcohol kit was used.

    b. Betadine (povidone-iodine) solution (or hydrogen peroxide/acetone if allergic to iodine) was used for the skin preparation.

    c. Name of the law enforcement officer requesting blood sample.

    d. Time of draw.

    e. If paramedic drawing sample is different from the one signing the report, that paramedic will sign under the above information.

2. All blood samples taken shall be surrendered to the requesting law enforcement officer.

3. The paramedic:

    a. May be required to obtain multiple samples.

    b. Shall obtain a minimum of two samples per person/per draw.

    c. Shall render emergency medical service or treatment as necessary prior to the drawing of blood and alcohol samples.

    d. Shall obtain blood alcohol samples only at the request of a law enforcement officer, either in the field or upon arrival in the Emergency Department.

Blood Specimen Collection Instructions

1. The blood specimen must be drawn by a paramedic. The blood draw must be at the request of a law enforcement officer, and observed by that officer.

2. The officer will remove the parts of the kit and hand them to the paramedic drawing the blood as needed. Two vials from the kit will be filled with blood.

   Note: The tube marked **CONTROL** will remain in the kit at all times. It will not be used for the collection of blood.

3. The paramedic drawing the blood should use the pad provided in the kit to clean the area where the needle is going to be inserted. If the provided pad is not used, make sure that a non-alcoholic solution is used. The foil envelope that the swab came in should be placed back in the **BIOLOGICAL SPECIMENS** box. The swab may be disposed of by the paramedic drawing the blood.

4. The paramedic drawing the blood should hand the vials back to the officer as they are filled. The officer should gently rock the vials (**AT LEAST TEN (10) TIMES**) to mix the anticoagulant with the blood. **Do not shake them vigorously!**

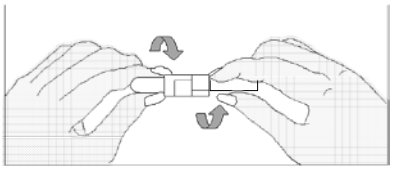
5. The paramedic drawing the blood may now dispose of the needle and holder along with any other contaminated parts not needed as evidence.

6. The paramedic that drew the blood must sign the **BLOOD COLLECTION FORM** (SECTION THREE: CERTIFICATION OF BLOOD WITHDRAWAL).

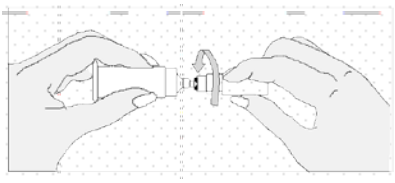
7. The officer is responsible to complete steps 7-10 as noted on the instruction form included in the kit.

Procedure

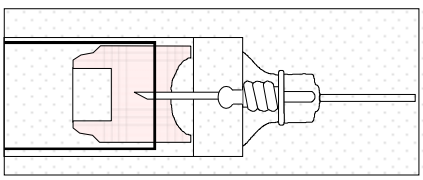
Open needle cartridge. Twist to break the tamper-evident seal. Remove cap, exposing the back portion of the needle and threaded hub. Do not remove front needle cover.



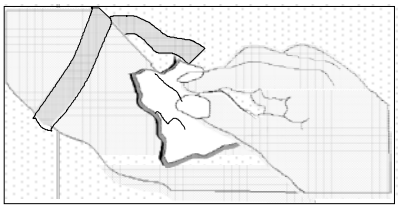
Assemble needle to holder. Thread needle into holder until firmly seated.



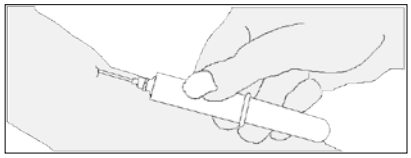
Insert VACUTAINER tube into holder. Push straight onto needle, no further than the guideline on the holder.



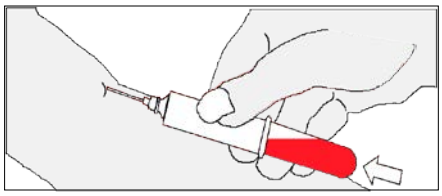
Apply tourniquet, **prepare venipuncture site using only the non-alcoholic antiseptic pad provided in this kit.** Position the arm in a downward or lowered altitude.



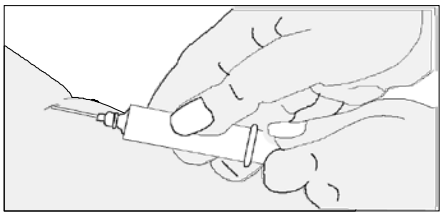
Remove needle cover; perform venipuncture in the usual manner, keeping the tube in an upward position with the stopper upper-most.



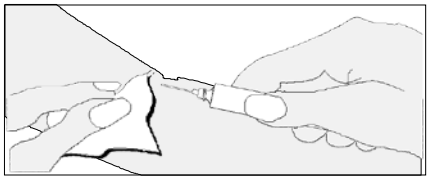
Push VACUTAINER tube forward to end of holder, piercing the rubber stopper. When blood flows into tube, REMOVE TOURNIQUET AS SOON AS BLOOD BEGINS TO FILL TUBE. DURING THIS PROCEDURE, DO NOT ALLOW CONTENTS OF VACUTAINER TUBE TO CONTACT STOPPER. SPECIAL ATTENTION SHOULD BE GIVEN TO ARM POSITION, TUBE POSITION IN ORDER TO PREVENT POSSIBLE BACKFLOW FROM THE TUBE AND ITS ATTENDANT POSSIBILITY OF ADVERSE REACTION TO THE PATIENT.



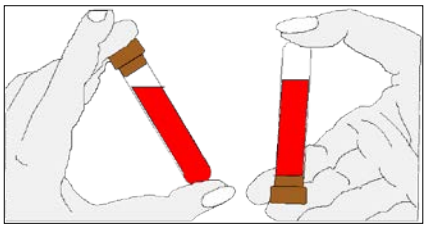
When the tube fill is complete and blood ceases to flow, remove the tube from the holder. Insert the second VACUTAINER tube straight into the holder until blood flows.



When sampling is completed immediately remove the needle/holder assembly with the last VACUTAINER, then remove the tube from the assembly: Apply and hold a dry sterile compress to the venipuncture site. Elevate the arm.



To assure proper mixing with anticoagulant powder, slowly invert the tubes at least five times immediately after blood collection. DO NOT SHAKE VIGOROUSLY!



4.9. Chest Compression Devices

4.9.1. AUTOPULSE

Level of training: EMT-(B-I-A), EMT-P,

Purpose: The AutoPulse will be used for all patients 18 years of age and older in non-traumatic cardiac arrest, where CPR would other wise be used. In case of mechanical malfunction of the AutoPulse the EMS responder will resort back to manual CPR for patient care.

Contraindications:

- Traumatic cardiac arrest
- Patients under the age of 18
- Persons whose weight is >300 lbs or 136 kg

Precautions

- Always minimize any interruptions to compressions when using the AutoPulse.
- Deployment of AutoPulse should not postpone initiation of manual compressions.
- Do not place or position the patient on the AutoPulse in either a face down orientation or on the patient's side.
- Check that the patient is correctly aligned on the AutoPulse platform and that the LifeBand Load-distributing Band (LDB) is correctly positioned at the patient's armpit); otherwise injury may result. Check alignment prior to turning on the device, periodically during use, after moving the patient to a different surface, and frequently during transport.
- Press the STOP/CANCEL button prior to realigning the patient.
- Do not place any straps or restraints across (or otherwise constrain) the LifeBand during active operation.
- Do not use the AutoPulse platform alone to carry a patient. Instead use the AutoPulse platform in conjunction with the Reeves stretcher or secure AutoPulse platform to the top of a backboard or stretcher used to carry or transport the patient.
- If a System Error occurs during active operation, immediately revert to manual CPR.
- Do not touch the patient while the AutoPulse Platform is analyzing the patient's size.
- Check vents during operation to ensure that they are not obstructed by sheets or patient clothes.
- Do not place hands under the LifeBand while the AutoPulse is analyzing the patient's size or during active operation.
- Use of the AutoPulse for a prolonged period of time may result in minor skin irritation to the patient. With large patients, check the skin at the sides under the life Band.
- Do not use a LifeBand if it has any apparent cuts or tears.
- Ensure that the battery is securely latched (snaps into place) before moving the AutoPulse or initiating chest compressions.

- When inserting the battery into the AutoPulse™ platform or the charger, do not slam it into position but rather slide carefully so the connectors are not damaged; ensure that the battery locks into place.
- Do not remove a battery from the Battery Charger during the Test Cycle.

Complications:

- Care should be used when moving patients with a large abdomen (shifting of excess flesh may cause the LifeBand™ to move or break)
- If disruption or malfunction of the LifeBand™ occurs **Revert Back to Manual**

CPR. **Technique / Procedure:**

1. Initiate CPR.
2. Maintain high-quality compressions.
3. Power up the Auto-Pulse by pressing the ON/OFF button at the top of the device.
4. Remove the clothing on the patient's torso:
    - Sit the patient up and perform a single cut down the back of the patient's clothing. Then slide the Auto-Pulse platform into position behind the sitting patient, and have the patient lie down on the platform.

    or

    - Log-roll the patient to one side and perform a single cut down the back of the patient's clothing. Then log-roll the patient onto the Auto-Pulse platform.
5. Align the patient on the platform. The patient's armpit should be positioned on the "yellow" indicator line on the Auto-Pulse platform.
6. Close the LifeBand™ over the patient's chest.
    - Therapy electrodes or defibrillation pads should be in place before applying the LifeBand™.
    - Make sure the LifeBand™ is not twisted.
    - The LifeBand™ is secure when the mating slot is placed over the alignment tab and the bands are pressed together to engage the Velcro.
    - Center the LifeBand™ on the patient's chest.
7. Begin compressions by pressing the **green** Start/Continue button once. The Auto-Pulse device will automatically adjust the bands on the chest.
8. The Auto-Pulse unit will pause for 3 seconds to allow for a check of proper alignment.
    - If patient is not aligned correctly, push the orange Stop/Cancel button.
    - Realign the LifeBand™ and press the green Start/Continue button.
9. Select the desired mode of compressions by pushing the gray Menu/Mode button.
    - 30:2 mode: 30 compressions and a pause for 2 ventilations.
      or
    - Continuous mode: uninterrupted compressions.
10. Complete the process of securing the patient for transport.

- Clip the straps for the shoulder restraint to the Auto-Pulse platform and tighten them.
- Secure the patient's head to the Auto-Pulse platform with the manufacturer's head immobilizer or tape applied across the patient's forehead.

11. After successful resuscitation or termination of activities, press the orange Stop/Cancel button.

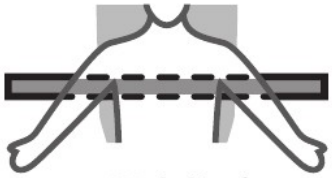
Documentation:

- Document the use of AutoPulse™ on PPCR and steps performed.
- Time AutoPulse™ was turned on.
- Time AutoPulse™ was turned off.
- Initial rhythm at time of onset.
- Whether the arrest was witnessed or not.
- Whether bystander CPR was performed.
- Total compressions, active time, and pause time from AutoPulse™
- Problems with device operation.
- Patient complications related to use of the device.
- Deficiencies in provider competency when using the device.
- Document femoral pulses every two minutes.

AutoPulse® Quick Reference Guide

For Adult (≥18 years) Non-Traumatic Cardiac Arrest

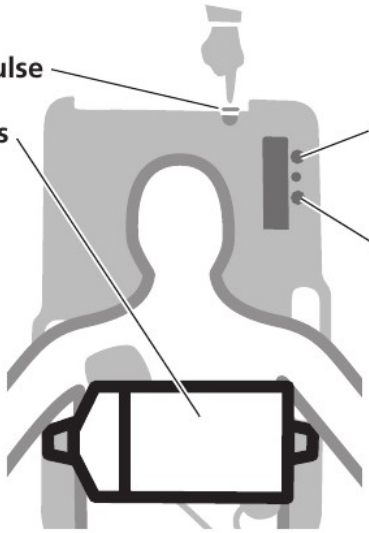
Maximum Patient Weight 300 lbs.



- Remove ALL clothing from torso (both front and back) to ensure skin-to-platform contact
- Align armpits onto yellow line on Platform

Do not twist the chest bands

Maintain chest bands at 90 degrees to Platform and free of obstructions



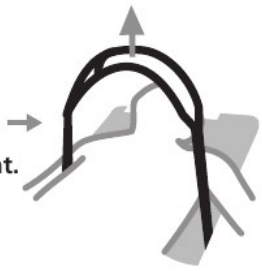
1. Power up AutoPulse
2. Close chest bands
3. Press CONTINUE (green button)
4. Press START (green button) to begin compressions

To pause or stop operation press STOP (orange button)

Follow all local protocols and procedures.

Review User Guides and complete in-service training.

Troubleshooting



For **Fault/User Advisory**

- **Lift up and fully extend both chest bands.**
- Check both lateral and vertical patient alignment.
- Verify that chest bands are not twisted, are 90 degrees to the Platform and are free of obstructions.
- **Press RESTART** (green button) and follow on-screen instructions to begin compressions.

If you cannot rectify problem immediately open chest bands and revert to manual CPR.

← LifeBand® instructions on other side

ZOLL®
P/N 10596-001 Rev. 10

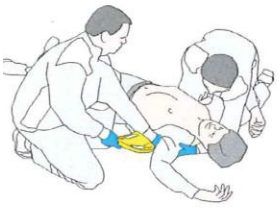
4.9.2. Lucas Chest Compression System

Level of training; EMT-(B-I-A), EMT-P

Confirm cardiac arrest and start manual CPR with a minimum of interruptions until LUCAS is applied and ready.

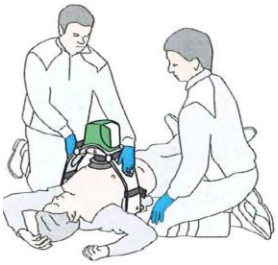
1 Activate (A)

- Push **ON/OFF** for 1 second to start self-test and power up LUCAS



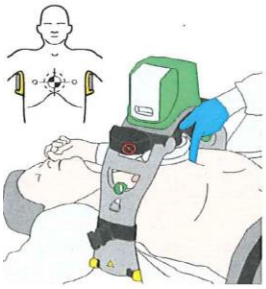
2 Back Plate (B)

- Pause manual CPR
- Carefully put Back Plate under the patient, below armpits
- Resume manual CPR



3 Compressor (C)

- Pull release rings once; claw locks open. Then let go of the release rings
- Attach to Back Plate; listen for "click"
- Pull up once to ensure attachment

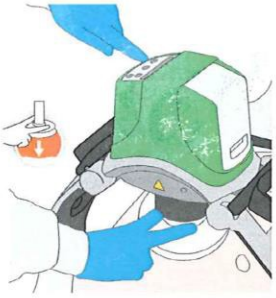


4 Position the Suction Cup

- Center the Suction Cup over the chest
- The lower edge of Suction Cup should be immediately above the end of the sternum

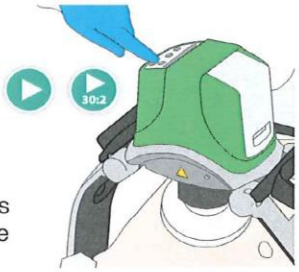
5 Push down the Suction Cup

- Push the Suction Cup down with two fingers (make sure it is in the **ADJUST** mode)
- Pressure pad inside Suction Cup should touch patient's chest. If the pad does not touch or fit properly, continue manual compressions
- Push **PAUSE** to lock Start Position – then remove your fingers from the Suction Cup



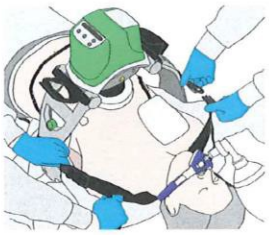
6 Start compressions

- Check for proper position. Adjust if necessary
- Push **ACTIVE (continuous)** or **ACTIVE (30:2)**
- LUCAS provides compressions with a rate of 100 per minute and 1.5 to 2 inches depth



7 LUCAS Stabilization Strap

- Attach the LUCAS Stabilization Strap



Always follow local and/or international guidelines for CPR when you use LUCAS.

Lucas Chest Compression System:

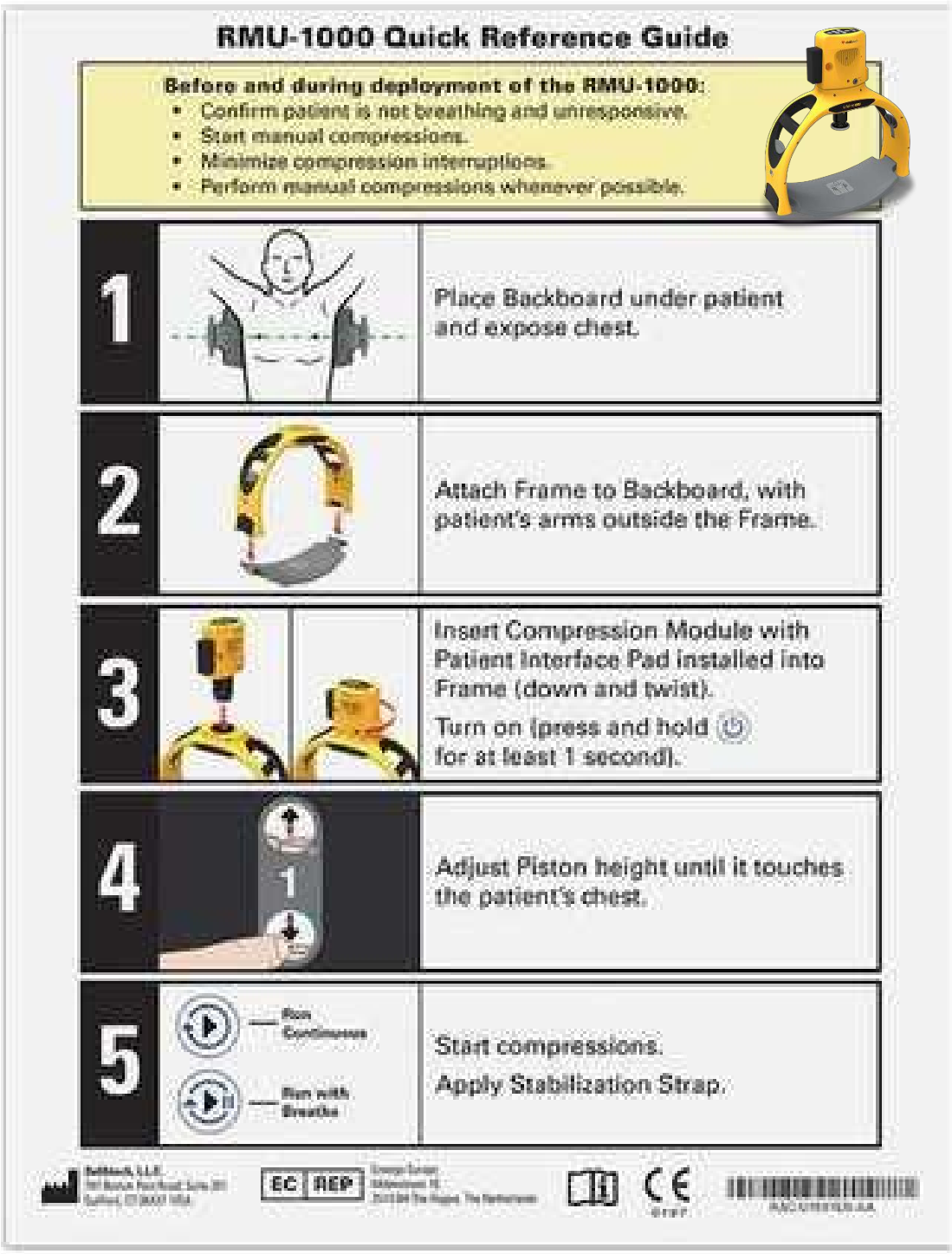
1. Initiate CPR, Maintain high-quality compressions.
2. Open the LUCAS® carrying bag to expose the unit.
3. Make certain the On/Off knob is in the "adjust" position.
4. Connect the high-pressure airline to the regulator on the air source.
5. Take the back plate out of the bag. With one rescuer on each side of patient, grab the patient's arm to lift the upper body. One person should lift the patient and support the head, and the other person should lift the patient and slide the back plate below the armpits.
6. Continue manual compressions.
7. Take the upper part of the LUCAS® unit out of the bag. Hold the LUCAS® device by the handles on the support legs and make sure the support legs have reached their outer position.
8. Pull up once on the release rings to check that the claw locks are open.
9. Interrupt manual chest compressions and place the upper part of the LUCAS® unit over the patient's chest. The claw locks at the end of each support leg should be aligned with the back plate to lock the components together.
10. Check by pulling upward that both support legs are locked into the back plate.
11. Lower the suction cup with the height adjustment handles until the pressure pad inside the suction cup touches the patient's chest without compressing the chest.
12. Turn the ON/OFF knob to activate the chest compressions.
13. Attach the neck pad by raising the patient's head slightly. Clip the pad into each buckle attached to the support arms. Pull the excess slack out of each strap by pulling gently and simultaneously until the pad positions itself into place.
14. Attach the wrist straps to each of the patient's wrists to assist with securing the arms during movement/transportation. Use caution to determine that the intravenous site is not compromised due to a slight bend that will occur in the patient's arm. If this does occur, release the arm and secure the unit by other means.
15. After successful resuscitation or termination of activities, turn the ON/OFF knob to the "Off" position.

LUCAS 2® Chest Compression System

1. Initiate CPR, Maintain high-quality compressions.
2. Pull red handle on bag to open
3. To activate, push ON/OFF button for one second to start self-test and power up
4. The green LED adjacent to ADJUST illuminates
5. Take the back plate out of the bag. Pause manual CPR. With one rescuer on each side of patient, grab the patient's arm to lift the upper body. One person should lift the patient and support the head, and the other person should lift the patient and slide the back plate below the armpits.
6. Continue manual compressions.
7. Take the upper part of the LUCAS 2 unit out of the bag. Hold the LUCAS 2® device by them handles on the support legs and make sure the support legs have reached their outer position.
8. Check that the release rings on claw locks are open.
9. Interrupt manual chest compressions and place the upper part of the LUCAS 2® unit over the patient's chest. The claw locks at the end of each support leg should be aligned

with the back plate to lock the components together. Listen for the CLICK when attached.

4.9.3. Lifeline ARM Device



4.9.4. The CardioPump ACD-CPR Device

Protocol pending implementation and
Acquisition of device

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4.10. Chest Decompression

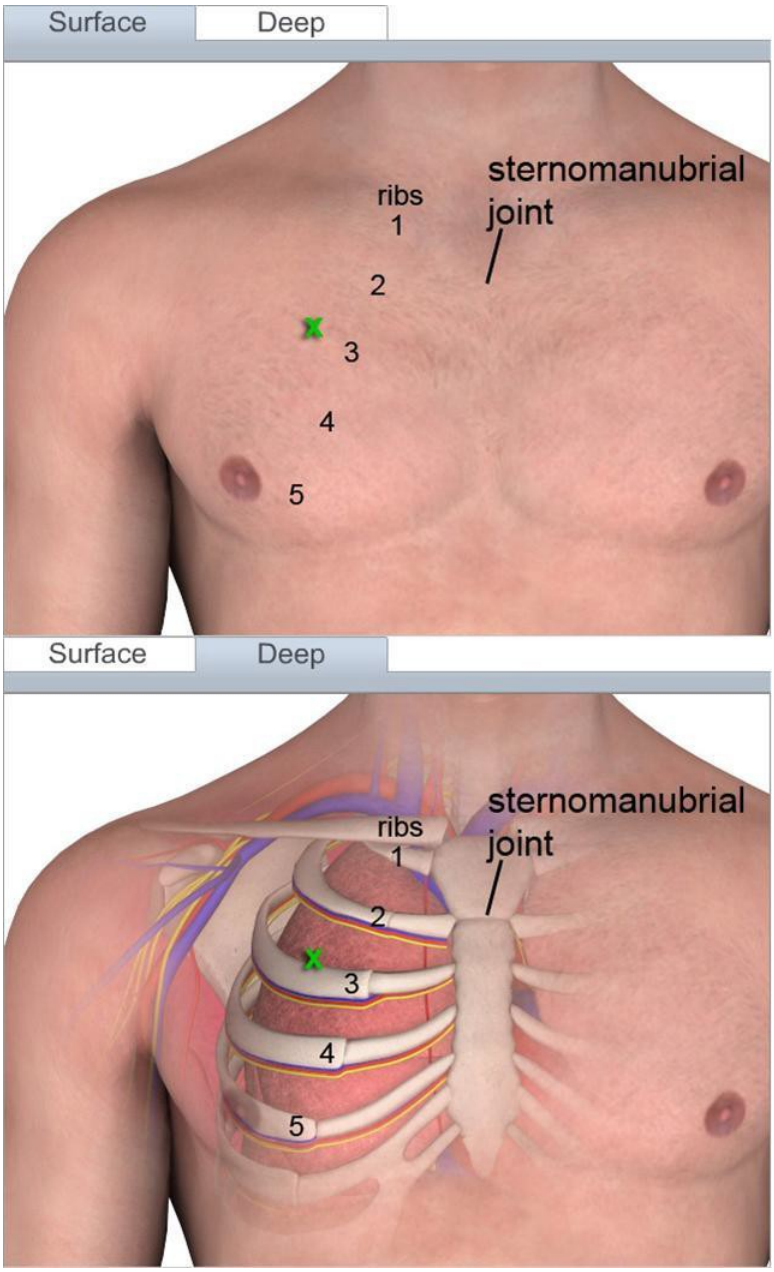
Level: EMT-P

Indications:

1. Tension pneumothorax.
2. Trauma CPR patients may require bilateral chest decompression.

Procedure:

1. Assess the patient to make sure that his/her condition is due to a tension pneumothorax:
    - Mechanism of injury
    - Absent or decreased breath sounds on the affected side.
    - Poor ventilation despite an open airway.
    - Tracheal deviation away from the side of the injury (may not always be present).
    - Neck vein distention (may not be present if there is associated severe hemorrhage).
    - Tympani (hyper-resonance) to percussion on the affected side.
    - Shock.
    - Decreased SpO2/end-tidal CO2.
2. Assess chest and respiratory excursion.
3. Apply oxygen per nonrebreather mask or with 100% with B-V-M.
4. Identify second intercostal space, midclavicular line on the affected side.
5. Prep the area. (Locally anesthetize the area if patient conscious or if time permits).
6. Snugly attach a 14 or 16 gauge, 3 – 3½-inch, over the needle IV catheter to a 10 ml syringe (or use arrow kit) or use a decompression device (ThoraQuik).
7. If no Heimlich Valve is available, construct a flutter valve using the finger of a latex glove. Push the needle through the inside of the latex finger such that the needle comes out through the tip. Advance till the hub of the needle comes to rest inside the tip of the finger.
8. Insert the needle into the skin and over the rib into the 2nd or 3rd intercostal space in mid-clavicular line.
9. Puncture the parietal pleura.
10. Aspirate air as necessary to relieve patient's symptoms.
11. Leave the plastic catheter remaining but remove the needle.
12. Secure the catheter to the chest.
13. Connect the catheter to a one-way valve such as a Heimlich Valve or use the Asherman Chest Seal or equivalent.
14. Reassess ventilatory status, jugular veins, tracheal position, pulse, and blood pressure.
15. Document procedure and responses.



Complications:

1. Pneumothorax.

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4.9.1.

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4.11. CO2 monitoring devices

4.11.1. Electronic Waveform CO2 Detection

Electronic End-Tidal CO_2 ($ETCO_2$) Monitor Definition: The End-Tidal CO_2 ($ETCO_2$) Monitor electronically measures the amount of carbon dioxide (CO_2) in the airway at the end of each breath. $ETCO_2$ monitors display this information in the manner (depending on the make and manufacturer):

1. Capnometer = number ($ETCO_2$)
2. Capnogram = tracing (Waveform)
3. Capnograph = Number and tracing

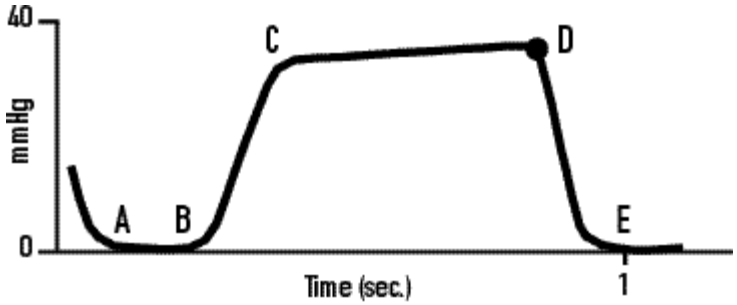
Electronic $ETCO_2$ Monitor Applications: Capnography is an objective monitoring tool for patients in respiratory distress and patients undergoing procedural sedation. It may be used to confirm, monitor and document ET tube intubation. A nasal-oral cannula is used to assess, monitor and document the respiratory status of the non- intubated patient.

Application on Intubated Patients:

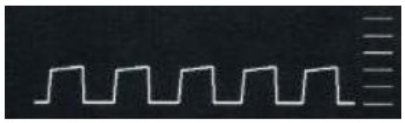
1. Verification of ET tube placement
2. Monitoring and detection of ET tube dislodgement
3. Loss of circulatory function
4. Determination of adequate CPR compression
5. Confirmation of return of spontaneous circulation (ROSC)

Application on NON-Intubated Patients

1. Assessment of asthma and COPD
2. As a marker for sepsis
3. Documented monitoring during procedural sedation
4. Detection of apnea or inadequate breathing
5. Measurement of hypoventilation
6. Evaluation of hyperventilation



A: End of inhalation; B: Beginning of exhalation; B–D: Exhalation of alveolar gas; D: End exhalation and point of maximal or highest CO2 concentration {end-tidal CO2 (EtCO2)}; D–E: Inhalation.

NORMAL: "Square box" waveform; baseline CO2 = 0; ETCO2 = 35-45 mm Hg Management: Monitor	
DISLODGED ETT / ESOPHAGEAL INTUBATION: Loss of waveform, Loss of ETCO2 reading Management: Replace ETT	
"SHARKFIN" with/without prolonged expiration = Bronchospasm (asthma, COPD, allergic reaction): Management: Bronchodilators (Albuterol, Atrovent, or epinephrine)	
RISING BASELINE = Patient is rebreathing CO2: Management: Check equipment for adequate oxygen inflow Allow intubated patient more time to exhale	
HYPERVENTILATION: Rapid RR; shortened waveform; baseline ETCO2 = 0; ETCO2 < 35 mm Hg Management: Biofeedback if conscious, decrease assisted ventilation rate if unconscious/intubated	
PATIENT BREATHING AROUND ET TUBE: angled, sloping down stroke on waveform Broken cuff or tube is too small Management: Assess patient, oxygenation, ventilation; may need to re-intubate	

****Important: Severe metabolic acidosis (DKA, sepsis, salicylate poisoning, acute renal failure, methanol ingestion. Tricyclic overdose) will cause tachypnea, but ETCO2 will be HIGH.**

THIS IS NOT NORMAL

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4.12. CPAP

Overview: Continuous Positive Airway Pressure (CPAP) is a non-invasive mechanically assisted delivery system designed to administer oxygenation of several respirational pathologies. CPAP is not a replacement for any medication or procedure, but a tool which can provide a high level of ventilatory support without the need for RSI or intubation. CPAP is approved for patients 18 years of age and older, with moderate to severe respiratory distress.

Indications:

1. Severe dyspnea/hypoxia secondary to CHF and Acute Cardiogenic Pulmonary Edema.
2. Severe dyspnea/hypoxia associated with COPD (asthma, bronchitis, emphysema), pneumonia.
3. Patient MUST be:
    a. Spontaneously breathing
    b. Is awake, oriented and able to cooperate
    c. Has ability to maintain an open airway (GCS >10)
    d. Has a systolic BP > 90 mm Hg

Contraindications:

1. Respiratory arrest
2. Agonal breathing
3. Patient is suspected of having a pneumothorax
4. Patient has a tracheostomy
5. Unconscious or severely impaired level of consciousness
6. Shock/Hypotension (BP < 90)
7. Penetrating chest trauma
8. Persistent nausea and vomiting
9. Facial anomalies/trauma
10. Active upper GI bleeding
11. History of recent gastric surgery

Procedure:

1. Make sure patient does not have a pneumothorax
2. **Explain the procedure to the patient**
3. **Have suction equipment available and ready to use**
4. **Have advanced airway equipment available for any unexpected problem/deterioration**
5. Place patient in a sitting position (fowlers or semi-fowlers)
6. Assess vital signs and SpO_2 q 5 min
7. Attach heart monitor and pulse oximeter
8. If BP < 100 systolic, contact medical control prior to beginning CPAP
9. Frequently reassure your patient as they may become very anxious

10. Ensure adequate oxygen supply to ventilate device, Be sure oxygen is turned on
11. Place the mask over the mouth and nose (It may help relieve anxiety if you allow the patient to help hold the mask in place while you apply the retaining straps)
12. Secure Mask
13. Start CPAP at ambient pressure ('O' cmH_2O) or the lowest pressure setting available.
14. Instruct patient to breathe in through nose slowly and exhale through their mouth as long as possible
15. If Patient is having exacerbation of asthma, have in-line nebulized treatment attached and ready to use on the first breath.
16. Explain to patient that you will begin to slowly increase the pressure and to continue exhaling out against the pressure as long as possible before inhaling
17. Slowly titrate the pressure (adjust the flow meter until desired pressure is obtain. Flow of 12 – 14 L per minute is required to reach CPAP pressure of 8.5 – 10 cm of H_2O) to one of the following levels:
    a. CHF/ ACPE 10 cm H_2O (some patients will improve with a slightly lower pressure, titrate to effect)
    b. All other SOB/Dyspnea ~5 cm H_2O
18. Check for air leaks and readjust mask/straps as needed
19. Monitor patient closely for improvement or deterioration
20. IF RESPIRATORY STATUS DETERIORATES, REMOVE CPAP MASK, CONSIDER BAG VALVE MASK VENTILATION AND/OR ENDOTRACHEAL INTUBATION
21. If patient tolerating CPAP, continue and monitor closely and transport to hospital with CPAP. Transfer the CPAP mask tubing to the hospital flow meter and maintain the same flow rate as you were providing.
22. Documentation should include:
    a. CPAP level (10cm H_2O or 5 cm H_2O)
    b. FiO_2 (100%)
    c. SpO_2 q 5 minutes
    d. Vital signs q 5 minutes
    e. Response to treatment
    f. Any adverse reactions

Special Notes

1. Watch patient for gastric distention which may lead to vomiting
2. Use nitroglycerine tablets to avoid nitroglycerine spray from being dispersed on patient/ EMS crew OR use spray before applying CPAP equipment
3. Do not remove CPAP until hospital therapy is ready to be placed on patient
4. Most patients will improve in 5 – 10 minutes
5. Periodically monitor the airway pressure gauge. The pressure should remain nearly constant (variation of +/- 2 cm H_2O or less) while the patient is breathing. As the patient breathes, larger changes in pressure show that CPAP is not being effectively delivered.

6. Excessive pressure variation during CPAP treatment can cause fatigue and respiratory failure
7. Potential side effects of continuous positive airway pressure may include:
    a. Fluid retention
    b. Pneumothorax
    c. Decrease cardiac output (hypotension)
    d. Gastric distention

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Chem Expos Tx Guideline

4.13. Cardiac Monitor 12 Lead

4.13.1. Twelve (12) Lead Application

Level: EMT-B or higher

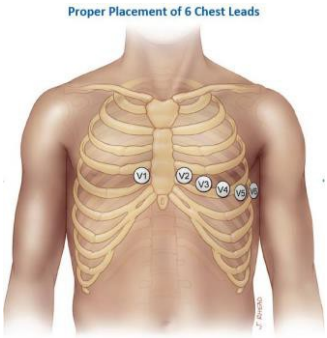
Purpose: Early detection and notification of acute myocardial infraction

Indications:

1. Chest pain or anginal equivalents (dyspnea, syncope, near syncope, weakness, DKA, diaphoresis disproportionate to the environment, palpitations, etc.)
2. Electrical injuries
3. Suspected stroke
4. Syncope
5. Altered mental status, unknown cause
6. Pre and Post cardioversion of stable patients
7. Post cardioversion of unstable patients (including post arrest)
8. Suspected electrolyte disturbances
9. Overdose (unknown or suspected anti-depressant)
10. Blunt chest trauma (only after transport or more urgent care)
11. Dysrhythmia (to aid in the cause and diagnosis of the dysrhythmia)
12. Respiratory failure
13. Ventricular failure (CHF)

Procedure:

1. Assess patient and monitor cardiac status.
2. Administer oxygen as patient condition warrants.
3. If patient is unstable, definitive treatment is the priority. If patient is stable or stabilized after treatment, perform 12 lead EKG.
4. Prepare EKG monitor and connect patient cable with electrodes.
5. Enter required patient information into the monitor.
6. Expose chest and prep as necessary. Modesty of the patient should be respected.
7. Apply chest leads and extremity leads using the following landmarks:
    - RA---right arm
    - LA---left arm
    - RL---right leg
    - LL---left leg
    - V1---4th intercostal space at right of sternal border
    - V2---4th intercostal space at left of sternal border
    - V3---directly between V2 and V4
    - V4---5th intercostal space at midclavicular line
    - V5---level of V4 at left anterior axillary line
    - V6---level of V5 at the left mid-axillary line



8. Alternatively, apply Unilead electrodes.
9. Instruct patient to remain still.
10. Press the appropriate button to acquire the 12 lead EKG.

11. If the monitor detects signal noise (such as patient motion or a disconnected electrode), the 12 lead acquisition will be interrupted or may yield base line artifact until the noise is removed.
12. Once acquired, transmit to the hospital if possible, otherwise when report is called, report the findings on the EKG.
13. Monitor the patient while continuing with the treatment protocol.
14. Document the procedure, time, and results with the medical record.
15. Leave a copy of the EKG and run report at the hospital and turn a copy of the EKG with your report into the office.

I Lateral	aVR	V1 Septal	V4 Anterior
II Inferior	aVL Lateral	V2 Septal	V5 Lateral
III Inferior	aVF Inferior	V3 Anterior	V6 Lateral

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3.13.3.1. Dual Sequential Defibrilation

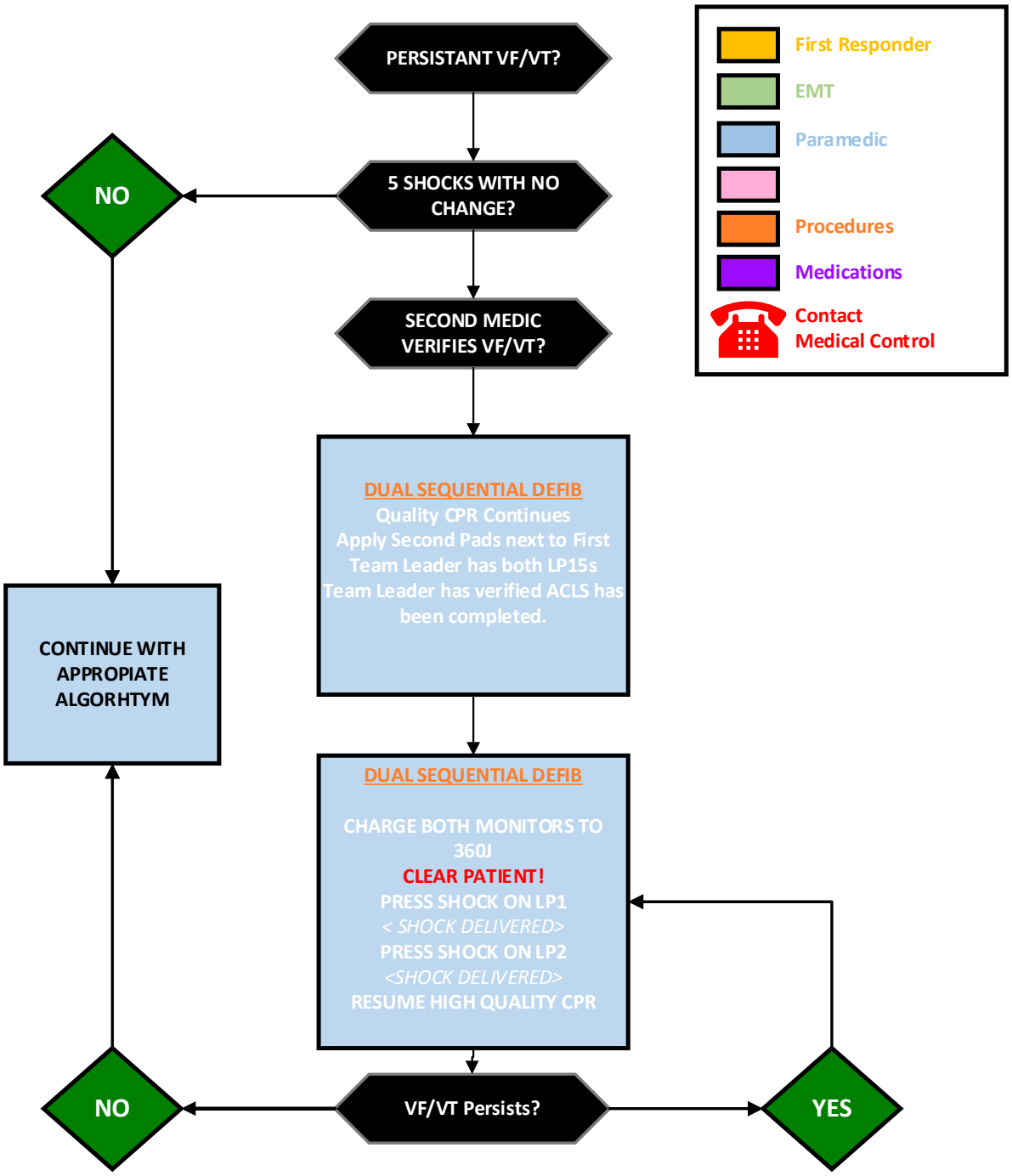
INDICATIONS:[i]

- Any adult patient who had persisted in pulseless ventricular fibrillation/tachycardia, without even transient interruption of fibrillation, despite at least 5 external countershocks.
- At least one of the 5 shocks was delivered using a different pad or pad location applied so as to produce a different current vector than the first set, and all other indicated treatment modalities have been implemented.
- An approved Escambia County Paramedic (EMS, ECFR, Corrections, PFD) has verified the persistence of the arrhythmia immediately post shock.

PROCEDURE:

1. Ensure quality of CPR is not compromised during prolonged efforts
2. Prepare the sites for attachment of an additional set of external defibrillation pads by drying the drying the sites and minimizing interference or hair or other obstacles to obtain good pad contact.
3. Apply a new set of external defibrillation pads adjacent to, but not touching the current set of external defibrillation pads in use.
4. Assure that the controls of the second cardiac monitor are accessible to the Most Experienced paramedic.
5. The MOST Experienced Provider will review with team that ACLS guidelines have been fully executed.
6. On rhythm check, The Most Experienced paramedic (Team Leader) will confirm the rhythm.
    a. If a shockable rhythm is detected, CPR will resume immediately. The Team Leader will verify that both monitor/defibrillators are attached to the patient, that all pads are secured to the patient, and direct both defibrillators be **charged to 360J**. The Team Leader will verify and declare the patient is CLEAR! At the 2 minute mark, The Team Leader will identify the presence of VF/pulseless VT, and will press both shock buttons **sequentially - one shock is delivered by defibrillator 1, and immediately after the shock is delivered and witnessed, the shock button on defibrillator 2 will be pressed.** Resume CPR (if using a mechanical compressor like the LUCUS2, CPR should be continuous through the shocks). Continue with CPR, rhythm check and if rhythm purists, repeat the duel sequential defibrillation as indicated. If rhythm change, follow that algorhythm.

Dual-Sequential Defibrillation



Escambia County EMS
Updated and Approved by
Dr. Rayme Edler, Medical Director:
2/21/2019

4.13.3.2. External Pacing

Level: EMT-P

Indications: External pacing can be used in the following settings:

14. **Symptomatic bradycardia with pulse:** In patients with symptoms (significant hypotension, altered mentation, chest pain) due to any form of bradycardia, treatment should include supplemental oxygen, ventilatory support as needed, and establishment of IV access and placement of pacer on the patient. Pacing should be started if the patient does not respond to atropine, IV access cannot be obtained, if symptoms are so severe that waiting for a response to atropine would be dangerous or in lieu of atropine. Sedation should be given to patients who are aware of their situation before pacing is started. Sedation may include **Midazolam (Versed)** 1-2 mg IV or ~~**Diazepam (Valium)** 5-10mg IV~~. If patient experiencing pain, you can administer **Fentanyl** 25 – 50 mcg IV slow. Repeat q 5 minutes up to 100 mcg then contact med control for additional dosing. 16 In patients with severe bradycardia but no symptoms, the external pacer should be put in place, but not turned on unless the patient's status deteriorates.
2. The treatment of hemodynamically compromised patients in settings where cardiac output is compromised due either to the complete failure of cardiac rhythm or to an insufficient rate of the patient's intrinsic pacemaker;
    a. Bradycardia. (ECG other than second-degree Mobitz type II or third-degree AV block)
    b. Second-degree Mobitz type II and third-degree AV block with a systolic BP of < 80 mm Hg (or 80 – 100 mm HG with shock-like signs and symptoms)
3. Pediatric patients (40kg or less) with profound symptomatic bradycardia unresponsive to optimal airway management, oxygenation, epinephrine, and atropine.

Contraindications:
1. Open wounds or burns to chest wall
2. Wet environment

Adverse Effects/Complications:
1. Patient may experience mild to moderate discomfort
2. Musculoskeletal twitching in upper torso may occur during pacing, this is normal

Precautions:
1. When properly applied, chest compressions can be performed directly over the insulated electrodes while the pacer is operating.

External Pacing Procedure:

Operation: Several different external pacers are available. While control panels may look different, they have several features in common. The pace switch should be kept in the off position until all connections and settings are completed.

THE FOLLOWING STEPS ARE NEEDED TO INITIATE PACING:

1. **Set pacer mode to demand or fixed rate pacing**: Most prehospital pacers (Medtronic LP 10, LP 11, LP 12, Zoll; HP) are preset in the demand mode. Demand pacers are able to monitor the patient's rhythm (either with their own monitors or attached to a defibrillator monitor), sensing each beat and firing only when the patient's heart rate is too slow. Most demand pacers have an adjustment for sensitivity, which sets a threshold amount of electrical activity needed from the patient's heart to be recognized as a beat. There may be some pacers that only have the fixed rate ("asynchronous") mode, where the pacer will fire repeatedly at the selected rate, regardless of the patient's own rhythm. However, fixed rate pacers are usually not used prehospital.
2. Evaluate the patient:
    - Medication patches: Remove the patches.
    - Patient located on wet surface: Relocate the patient to a dry area.
    - Patient with fluid on chest or back area: Dry with a towel.
3. Attach monitoring electrodes and cables. This is needed for pacers that set demand mode.
4. Attach pacing electrodes and cables. One electrode is placed anteriorly over the heart, and the other is placed posteriorly. Alternately one is placed on the anterior right chest (sternum) and the other is placed on the lateral left chest (apex).Record a strip of the patient's rhytym prior to initiating pacing
5. Set desired heart rate: usually 70 beats per minute.
6. Set desired energy level: Start with 40 mA.
7. To initiate pacing, turn on the pacing switch and look for pacer spikes on the monitor. If not present, recheck patient's rhythm (may be fast enough to inhibit **pacer**) and equipment.

To Assess the Effectiveness of the Pacer:

1. **Check for pulse.** The pacer will make chest and back muscles twitch at the same rate as the heart, so palpation of the left carotid or left femoral artery can be misleading. Check for a right carotid, right femoral or either brachial pulse.
2. **Pulse present with pacer spikes: Measure BP**. If adequate, transport the patient and monitor frequently. If BP is inadequate, consider increasing the pacer rate to 80 beats per minute. If still hypotensive, consider a fluid challenge and /or dopamine. Record a strip of the pacer rhythm for documentation.
3. No pulse with pacer spikes: Check EKG for "capture". A T-wave should follow each pacer spike if the pacer is stimulating the heart muscle.

a. **Capture present but no pulse with pacer spike**: Continue treatment as if Pulseless Electrical Activity (PEA) - intravenous fluids and/or dopamine. Increasing the pacer's energy setting won't help.
b. **No capture present**: Increase the pacer's energy setting stepwise to maximize, checking for a pulse with each change. If still no pulse, no capture, then recheck all settings, cables, battery charge, and electrode placement. Recheck the patient's own rhythm – it may be ventricular fibrillation which must be immediately defibrillated.
c. Continue all other supportive measures (CPR, oxygen, ventilation, drugs, etc.)

Note: Conscious patients may be alarmed by the muscle twitching and will need reassurance. Patients who complain of intolerable pain from the pacer will require analgesics. To minimize the pain, use the lowest energy setting that will produce a pulse. External pacers are very safe to use. There is no risk of electrical shock from touching the patient or from performing other procedures during pacing.

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4.13.2. Cardioversion

Level: EMT-P,

Purpose: Electrical cardioversion has been the treatment of choice for unstable tachycardia and is gaining emphasis as the treatment of choice for stable tachycardia.

Indications:

1. The treatment of unstable tachycardia due to cardiac conduction disturbances with serious signs and symptoms. These may include chest pain, shortness heart failure and pulmonary edema may also cause unstable tachycardia but are better treated by correcting the underlying cause.

Contraindications: None in pre-hospital emergent setting

Complications: May result in ventricular fibrillation

Precautions: If calculated pediatric dose is less than the lowest setting, use the lowest setting.

Procedure:

Adult:

1. Monitor, O_2, IV access in place
2. Must have monitoring electrodes in place in order to synchronize
3. **TURN ON SYNCH BUTTON**
4. Suction and Airway/ Intubation equipment at patient bedside
5. Pre-medicate if possible: **Midazolam (Versed) 1- 2 mg** IVP or ~~**Diazepam (Valium)**~~ **5 – 10 mg** IV or **Morphine 2 - 4 mg** IV or Fentanyl **25 – 50 mcg**
6. Assure that R wave is being detected by synchronizer circuit: Choose lead II for tall upright R waves, adjust gain if needed
7. Hands Free: Smooth pad with good contact
8. Monitor shows Atrial Flutter: Start with 50 J DC cardioversion
9. Monitor shows Polymorphic VT: Start with 200 J DC cardioversion
10. All other unstable tachycardia: start with 100 J DC cardioversion
11. "Clear" patient- all hands off patient
12. Hold discharge button down until it fires
13. If patient converts: Go to appropriate treatment algorithm. If any indication of continued ventricular irritability (PVCs or runs of V-tach) give:
    a. **Amiodarone** 150 mg IV/IO over 10 minutes, then 1mg/min IV/IO x 6 hrs. If Amiodarone is unavailable, give;
    b. Use **Lidocaine bolus** 1.5 mg/kg initial bolus, followed by a **Lidocaine drip** at an appropriate rate and ½ initial bolus in 15 minutes
14. No change in rhythm: Increase power if needed and re-apply the Synch circuit

Pediatric

1. Adult paddles/pads A/P or conventional (12 months or over 15 kg.)
2. Pediatric paddles/Pads less than 15 kg
3. 0.5 J/kg initial
4. 1 J/kg repeat shocks to max 360 J

Return to: Contents at top Admin Guidelines Procedure Protocol List Adult Med Protocols Peds Med Protocols Narrow complex tachycard unstable Wide complex tach w/pulse

4.14. Eye Washing for Chemicals and Small Foreign Body

1. Remove the patient from the contaminated area.
2. Attempt to identify the chemical and notify the receiving facility.
3. Remove the patient's clothing (if necessary) and decontaminate with copious amounts of water.
4. Remove contact lenses (if present) to ensure that chemicals are not trapped under the lenses.
5. To ensure adequate rinsing behind the eyelid, hold the lid with your thumb and index finger, as it is normal for the eye to close when splashed.
6. Flush the eye away from the nose to avoid contamination of the other eye for a minimum of 20 minutes. Do not delay transport to complete the irrigation process.
7. Use any of these methods:
    - Flush using a faucet spray from a sink or shower.
    - Flush using a bottle of normal saline or sterile water.
    - Flush using a basin filled with water.
    - Flush using nasal cannula tubing.

4.14.1. Morgan Therapeutic Lens – if available and prior training

Level of training: EMT-(B-I-A), EMT-P

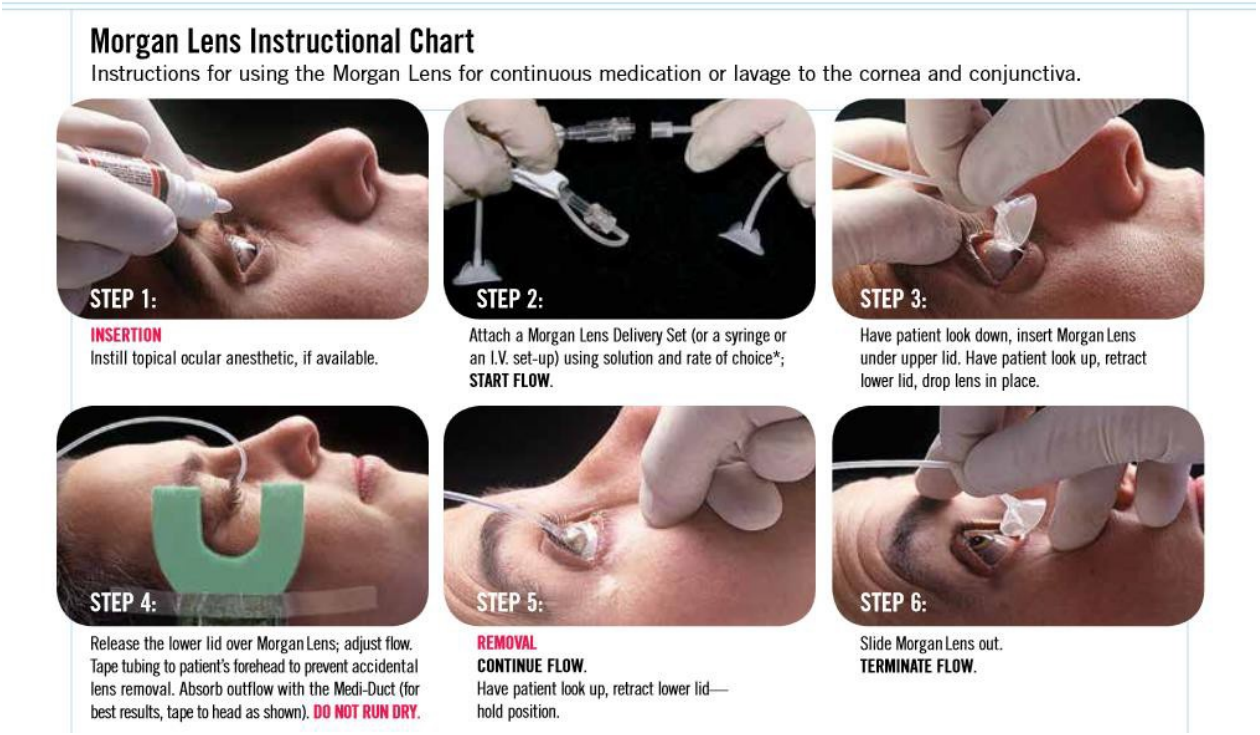
Purpose:

The Morgan Therapeutic Lens is indicated for flushing of the eye to remove contaminates (e.g. chemicals). It should not be used for patients with penetrating eye trauma or in cases where foreign material may be imbedded in the eye (e.g. broken glass, sand, etc.).

Procedure:

1. Remove contact lenses.
2. Instill topical local anesthetic (Tetracaine HCI 0.5% Eye Drops—one drop in each eye) to the affected eye(s). Lavage with Sodium Chloride and set for high continuous flow.
3. Have the patient look down, insert edge of the lens under the upper lid. Have the patient look up, retract the lower lid.
4. Release lower lid over the lens and continue flow. Tape tube and adaptor to patient's forehead to prevent accidental lens removal. Absorb outflow with towels.

5. Removal: Have patient look up. Retract lower lid behind interior border of the lens. Hold position. Have patient look down, retract upper lid and slide lens out.



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4.15. Football Helmet/Other Helmet-Removal /Face Mask Removal/

Level of training: EMT-(B-I-A), EMT-P

Purpose: A patient with a suspected spinal injury based upon a physical assessment and/or mechanism of injury, who is wearing a helmet.

Football Helmets: Indications for football helmet removal

- When a patient is wearing a helmet and not the shoulder pads.
- In the presence of head and or facial trauma.
- Patients requiring advanced airway management when removal of the facemask is not sufficient.
- When the helmet is loose on the patient's head.
- In the presence of cardiopulmonary arrest. (The shoulder pads must also be removed.)

When the helmet and shoulder pads are both on, the spine is kept in neutral alignment. If you can access the airway by removing the face mask, leave the helmet and shoulder pads on as this can be used to help stabilize the C-spine.

Note:
If the patient is wearing only the helmet or the shoulder pads, neutral alignment must be maintained. Either remove the other piece of equipment or pad under the missing piece.

All Other Helmets
Due to the absence of offsetting padding as in football shoulder pads, all other helmets must be removed in order to maintain spinal alignment. These include but are not limited to motorcycle helmets, bicycle helmets, roller blading helmets and skiing helmets.

Procedure:

4.15.1. To remove Face Shield on Football Helmet:

1. Identify if the face shield is attached to the helmet by screws or quick release pins. If the face shield has a plastic loop that is screwed in, quickly cut the plastic loop holding face shield to helmet (unscrew the lateral plastic brackets only if nothing available to cut the plastic loop). You can then lift up the face shield using the upper/anterior brackets (at top of face shield) as hinge. Cut the upper plastic loops as needed and if needed to remove the face shield (again, unscrew the top brackets if nothing available to cut the plastic loop or use bolt cutters if available). The Inter-Association Task Force recommends that all loop-straps of the face mask be cut and that the face mask be removed from the helmet, rather than being retracted.
2. If face shield is attached to helmet by quick release pins, simply apply pressure in the center of the quick release pin with firm pointed object. If the face shield is held

exclusively by the quick release pins, simply remove the face shield after pressing each release pin in the center.

3. If Face Shield is held by combination of quick release pins on the lateral side and screwed in brackets on the anterior/top (above the forehead), push the center of both the quick release pins on the side and life the face shield using the forehead brackets as a hinge.

4.15.2. To Remove Football helmet:

1. One person should stabilize the head, neck, and helmet (apply manual in-line stabilization) while another person cuts the chin strap
2. Accessible internal helmet padding, such as cheek pads, should be removed, and air padding should be deflated before removal of the helmet, while a second assistant manually stabilizes the chin and back of the neck, in a cephalad direction, making sure to maintain the athlete's position.
    a. A. The pads are removed through the insertion of a tongue depressor or a similar stiff, flat-bladed object between the snaps and helmet shell to pry the cheek pads away from their snap attachment.
    b. If an air cell--padding system is present, deflate the air inflation system by releasing the air at the external port with an inflation needle or large-gauge hypodermic needle.
3. The helmet should slide off the occiput with slight forward rotation of the helmet. In the event the helmet does not move, slight traction can be applied to the helmet which can then be gently maneuvered anteriorly and posteriorly, although the head/neck unit must not be allowed to move. **The helmet should not be spread apart by the ear holes as this maneuver only serves to tighten the helmet on the forehead and occiput region.**
4. Transfer manual in-line stabilization to the second rescuer by placing one hand on the patient's mandible (thumb on one side and fingers on the other side) and the other hand under the patient's head at the occipital area.
5. Laterally move the helmet to clear the patient's ears.
6. Tilt the helmet backward to raise it over the patient's nose and remove it.
7. Apply a cervical collar.
8. If the patient has a chest pad on, it is important to apply padding under the head so the cervical spine is maintained in a neutral position on the spinal board.
9. Secure the patient to a long spine board.
10. Perform cervical spine motion restriction with a commercial cervical immobilization device.

NOTE: In general, any athletic helmet should be removed on the field only under any of the following circumstances:

- If after a reasonable period of time, the face mask cannot be removed to gain access to the airway
- If the design of the helmet and chin strap is such that even after removal of the face mask, the airway cannot be controlled or ventilation provided
- If the helmet and chin straps do not hold the head securely such that immobilization of the helmet does not also immobilize the head
- If the helmet prevents immobilization for transport in an appropriate position

4.15.2.1 To remove the shoulder pads:

When to Remove the Shoulder Pads. The padded plastic shell of a football player's shoulder pads is of sufficient thickness that the pads elevate the torso of the supine player to the same height as the helmeted head. Spinal motion restriction must be maintained while the helmet is removed; therefore, during helmet removal, the shoulder pads must be removed simultaneously. The helmet/shoulder pad unit should be thought of as an all-or-none scenario with regard to spinal motion restriction. Studies have shown excess movement in the cervical spine when helmet or shoulder pads are removed alone.

Possible situations in which removal of shoulder pads would be necessary before transport to an emergency facility may include, but are not limited to, the following situations:

1. The helmet is removed
2. Multiple injuries require full access to shoulder area
3. Ill-fitting shoulder pads caused the inability to maintain spinal motion restriction

How to Remove the Shoulder Pads. The Inter-Association Task Force recommends that shoulder pads be removed only in conjunction with the athlete's helmet and only when removal is warranted (see *When to Remove the Shoulder Pads*). Whenever the decision is made to remove the shoulder pads, it is favorable to follow the following steps:

1. Cut jersey and all other shirts from neck to waist and from the midline to the end of each arm sleeve.
2. Cut all straps used to secure the shoulder pads to the torso. Attempts to unbuckle or unsnap any fasteners should be avoided due to the potential for unnecessary movement.
3. Cut all straps used to secure the shoulder pads (and extenders) to the arms.
4. Cut laces or straps over the sternum. A consistent manufactured characteristic of shoulder pads is the mechanism to attach the two halves of the shoulder pad unit on the anterior aspect. This lace or strap system allows for quick and efficient access to the anterior portion of the chest.
5. Cut and/or remove any and all accessories such as neck rolls or collars, so they can be removed simultaneously with the shoulder pads. The shoulder pads can now be released with full access to chest, face, neck, and arms. The

posterior portion of the shoulder pads helps to maintain spinal alignment when the helmet and shoulder pads are in place.

6. A primary responder maintains cervical stabilization in a cephalad direction by placing his or her forearms on the athlete's chest while holding the maxilla and occiput. This is a skilled position that requires personnel who are practiced in this technique.
7. With responders at each side of the patient, their hands are placed directly against the skin in the thoracic region of the back.
8. Additional support is placed at strategic locations down the body as deemed appropriate in consideration of the size of the patient.
9. While the patient is lifted, the individual who was in charge of head/shoulder stabilization should remove the helmet and then immediately remove the shoulder pads by spreading apart the front panels and pulling them around the head.
10. All shirts, jerseys, neck rolls, extenders, and so on should be removed at this time.
11. The patient is lowered.

4.15.3. To remove Motorcycle Helmet:

1. The first rescuer kneels above the patient's head. With the palms pressed on the sides of the helmet and his/her fingertips curled over its lower margin, he/she immobilizes the helmeted head in as close to a neutral in-line position as the helmet allows. The first rescuer performs manual immobilization of the head and neck.
2. The second rescuer kneels alongside the patient's torso and opens (or removes) the face shield, checks the airway and breathing, and undoes (or cuts, if necessary) the chinstrap.
3. The second rescuer places one hand so that the mandible is grasped between the thumb at the angle of the mandible on one side and the first two fingers at the angle on the other side. He/she then places his/her other hand under the neck on the occiput of the skull and takes over the in-line immobilization of the head and neck.
4. The first rescuer now releases his/her hold on the sides of the helmet. He/she pulls the sides of the helmet slightly apart, away from the sides of the head. As the helmet is pulled apart from the sides, the helmet is rotated so that the lower end of the face piece rotates toward the first rescuer and is elevated, clearing the patient's nose.
5. The first rescuer then carefully pulls the helmet in a straight line off the patient's head, stopping before he/she pulls the helmet completely out from under the patient's head or before the curved back of the helmet starts to elevate the patient's occiput to flexion.
6. The second rescuer maintains head and neck immobilization while the first rescuer begins to remove the helmet
7. Each time the first rescuer stops the movement of the helmet, he/she again takes over the in-line immobilization by squeezing the sides of the helmet against the head. The second rescuer now moves his/her hand, which is under the head superiorly, until it is further under the head and again is touching the inferior margin of the helmet.

8. The second rescuer's lower hand will support the head and keep it from dropping when the helmet is finally withdrawn. His/her upper hand should be moved so that the thumb and first fingers grasp the maxilla at each side of the nose, in the maxillary notch. Once his/her hands are securely in place, he/she retakes the manual in-line immobilization.
9. The first rescuer is now ready to remove the helmet completely. The helmet is rotated about 30 degrees following the curve of the head. This causes the posterior lower margin of the helmet to point caudally rather than anteriorly. Now the helmet can be safely removed in a straight line toward the first rescuer's abdomen.
10. Once the helmet has been fully removed, the first rescuer again takes hold of the head and provides manual in-line immobilization from that position. The assessment is continued and the second rescuer applies the cervical collar.
    NOTE: Two key elements are involved in removing a helmet.
    a. While one rescuer provides immobilization, the other moves. Both rescuers never move their hands at the same time.
    b. The helmet must be rotated in different directions: to first clear the nose, and then the back of the head.

4.15.4. To remove other helmets:

Helmets that should be removed include:
1. Motorcycle helmets
2. Bicycle helmets
3. Skateboard/Ski helmets
4. Roller blading helmets
5. Lacrosse helmets

Steps for Helmet Removal

1. Stabilize the helmet in the neutral in-line position and have a second individual remove the chin strap.
2. The individual that removed the chin strap will then support the occiput and mandible while the helmet is gently slipped up and forward.
3. Once the helmet is removed, standard c-spine control will take place and an appropriate sized cervical collar applied.

Note: If the helmet is too snug or you encounter significant resistance during the removal attempt, then leave the helmet in place and pad the body. Make sure you can access the airway.

Always check the helmet for damage to help assess mechanism of injury. Transport the helmet with the patient if possible.

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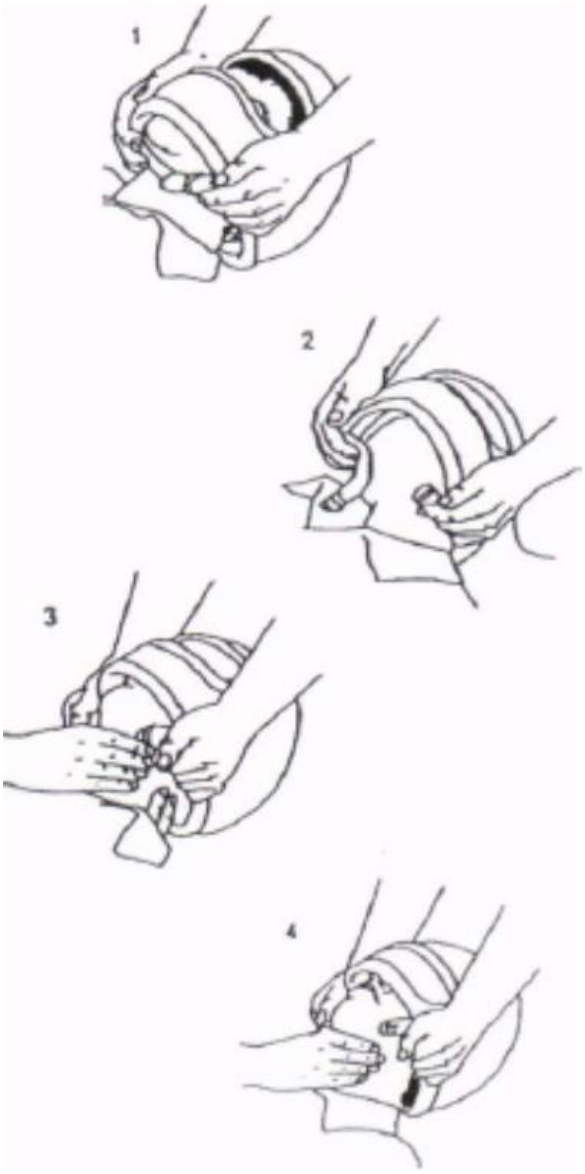
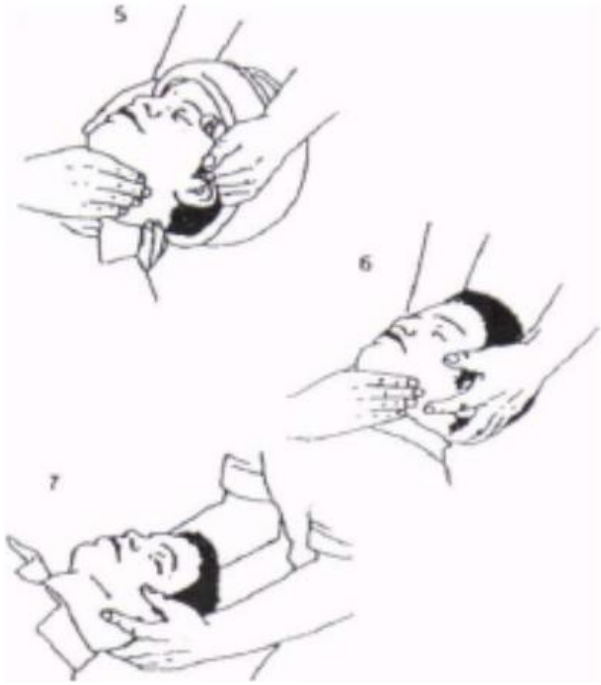
Motorcycle Helmet Removal





4.16. Glucometer

Level: EMT-(B-I-A), EMT-P,

Purpose: The glucometer is designed to be used to test capillary blood for the level of glucose. This information can be used to determine if hyper or hypoglycemia is present. Several types of glucometers are available. The paramedic should refer to the user's manual for his/her specific type for further information.

Indications:

1. Any patient presenting with an altered mental status
2. Diabetic related emergencies
3. Unresponsive (unknown etiology)
4. Seizure
5. Alcohol related emergencies

Procedure:

1. Gather and assemble necessary equipment
2. Open sterile 4 X 4 for use
3. Turn on CBG monitor and pre-load with test strip
4. Open alcohol prep
5. Clean the side of the tip of one finger with the alcohol prep
6. Wipe the same area with the sterile 4 x 4 to remove excess alcohol. Allow the remainder to dry before proceeding. (Failure to do this can dilute blood and render a low reading)
7. Place the extremity being used lower than the level of the heart to allow for venous pooling
8. Apply pressure to the prepared site with the lancet device to assure a deep enough penetration and trigger the device to activate.
9. Place all sharps in the appropriate container
10. Wipe the area again with the sterile 4 x 4 and allow a drop of blood to form
11. Place the test strip in close proximity to the blood droplet to allow the blood to be absorbed by the strip. Saturate the entire area on the strip
12. Place a pressure bandage on the puncture site
13. Record the results.

Note: Alternatively, blood sample can be taken from the IV needle after starting an IV. There is usually enough blood left in the needle after an IV stick to use for glucose reading. Simply hold the needle upright over the strip to allow gravity to draw the blood drop down onto the strip.

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4.17. LVAD EMS Field Guide

EMS Guide

January 2013

MECHANICAL

CIRCULATORY

SUPPORT

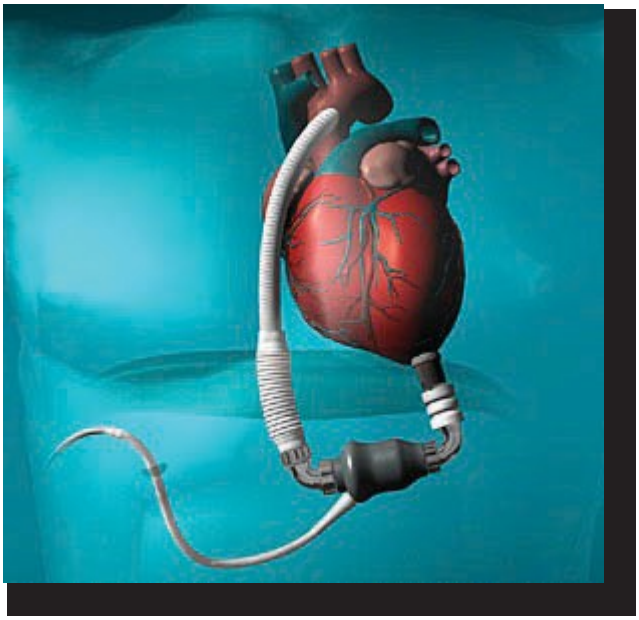
ORGANIZATION

This guide is produce by MCSO –
The Mechanical Circulatory Support Organization
It is produced by VAD Coordinators from some of the largest and most successful VAD implantation hospitals in the US. It has been vetted by experts on VADS in Air Medical Transport and EMS. It should not replace the operator manual as the

Questions and Answers

What is a Ventricular Assist Device (VAD)?

A ventricular assist device (VAD) is a mechanical pump that's used to support heart function and blood flow in people who have weakened hearts.



How does a VAD work?

The device takes blood from a lower chamber of the heart and helps pump it to the body and vital organs, just as a healthy heart would.

What are the parts of a VAD?

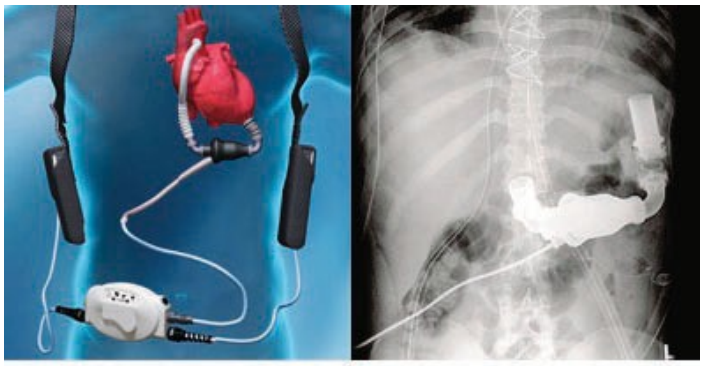
The basic parts of a VAD include: a small tube that carries blood out of your heart into a pump; another tube that carries blood from the pump to your blood vessels, which deliver the blood to your body; and a power source.

What is the power source?

The power source is either batteries or AC power. The power source is connected to a control unit that monitors the VAD's functions. The batteries are carried in a case usually located in a holster in a vest wrapped around the patients shoulders.

What does the control unit or controller do?

The control unit gives warnings, or alarms, if the power is low or if it senses that the device isn't working right. It is a computer.



The portability of the HeartMate II enables patients to resume many of their normal daily activities.

Color Coding System

MOST **patients have a tag located on the controller around their waist that says what type of device it is, what institution put it in and a number to call. Most importantly is the color of the tag – it matches this EMS Field Guide and allows you to quickly locate the device you are caring for.**

HEARTMATE II

HEARTWARE

JARVIK 2000

HEARTMATE XVE

THORATEC PVAD/IVAD

FREEDOM DRIVER
Total Artificial Heart

DURAHEART

Patient Management

1. **Assess the patients airway and intervene per your protocol.**

2. **Auscultate Heart Sounds to determine if the device is functioning and what type of device it is. If it is continuous flow device, you should hear a "whirling sound".**

3. **Assess the device for any alarms.**

4. **Look on controller usually found around the waist of the patient and to see what color tag and device it is.**

5. **Match the color on the device tag to the EMS Guide.**

6. **Intervene appropriately based on the type of alarm, tag (device) and EMS Guide.**

7. **Start Large Bore IV.**

8. **Assess vital signs – Use Mean BP with Doppler – with the first sound you hear is the Mean Arterial Pressure (MAP).**

9. **If no Doppler, use the Mean on the non invasive blood pressure machine.**

10. **Transport to closest VAD center. Call the number on the device to get advice.**

11. **Bring all of the patients equipment.**

12. **Bring the significant other if possible to act as a expert on the device in the absence of consciousness in the patient.**

HeartMate II®

1. **Can I do external CPR?**
   Only if absolutely necessary
2. **If not, is there a "hand pump" or external device to use?**
   No.
3. **If the device slows down (low flow state), what alarms will go off?**
   A red heart alarm light indicator and steady audio alarm will sound if less than 2.5 lmp. Can give a bolus of normal saline and transport to an LVAD center.
4. **How can I speed up the rate of the device?**
   No, it is a fixed speed.
5. **Do I need to heparinize the patient if it slows down?**
   Usually no, but you will need to check with implanting center.
6. **Can the patient be defibrillated while connected to the device?**
   Yes.
7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No.
8. **Does the patient have a pulse with this device?**
   May have weak pulse or lack of palpable pulse.
9. **What are acceptable vital sign parameters?**
   MAP 70 - 90 mm Hg with a narrow pulse pressure
10. **Can this patient be externally paced?**
    Yes.

FAQs

- May not be able to obtain cuff pressure (continuos flow pump).
- Pump connected to electric line exiting patient's abdominal area and is attached to computer which runs the pump.
- Pump does not affect EKG
- All ACLS drugs may be given.
- No hand pump is available.
- A set of black batteries last approximately 3 hours, gray batteries last 8-10 hours.
- Any emergency mode of transportation is ok. These patients are permitted to fly.
- Be sure to bring **ALL** of the patient's equipment with them.

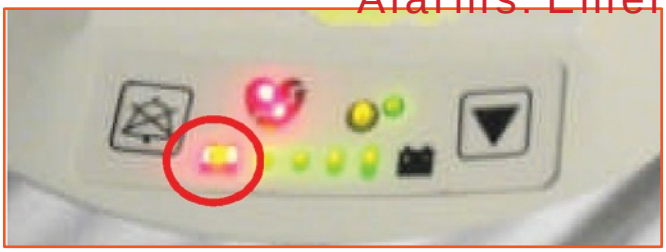
Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press.

Trouble Shooting HeartMate II®

When the Pump Has Stopped

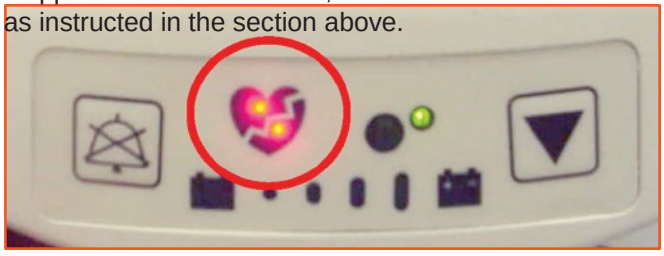
- Be sure to bring ALL of the patient's equipment with them.
- Fix any loose connection(s) to restart the pump.
- If the pump does not restart and the patient is connected to batteries replace the current batteries with a new, fully-charged pair. *(see changing batteries section on next page)*
- If pump does not restart, change controllers. *(see changing controllers section on next page)*

Alarms: Emergency Procedures



Yellow or Red Battery Alarm: Need to Change Batteries. See changing batteries section on next page.

Red Heart Flashing Alarm: This may indicate a Low Flow Hazard. Check patient--the flow may be too low. If patient is hypovolemic, give volume. If patient is in right heart failure-- treat per protocol. If the pump has stopped check connections, batteries and controllers as instructed in the section above.



JANUARY 2012

Trouble Shooting HeartMate II®

Changing Batteries

WARNING: At least one power lead must be connected to a power source AT ALL TIMES. Do not remove both batteries at the same time or the pump will stop.

- Obtain two charged batteries from patient's accessory bag or battery charger. The charge level of each gray battery can be assessed by pressing the battery button on the battery. (Figures 3 and 4)
- Remove only **ONE** battery from the clip by pressing the button on the grey clip to unlock the battery. (Figure 1)
- Controller will start beeping and flashing green signals.
- Replace with new battery by lining up **RED** arrows on battery and clip. (Figure 2)
- Slide a new, fully-charged battery (Figure 4) into the empty battery clip by aligning the **RED** arrows. The battery will click into the clip. Gently tug at battery to ensure connection. If battery is properly secured, the beeping and green flashing will stop.
- Repeat previous steps with the second battery and battery clip.

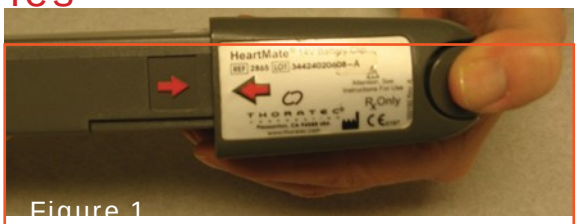


Figure 1


Figure 2


Figure 3


Figure 4

Changing Controllers

- Place the replacement Controller within easy reach, along with the batteries/battery clips. The spare Controller is usually found in the [illegible]
- Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.
- Attach the battery clips to the spare controller by lining up the half moons and gently pushing together and attach the batteries to the spare controller by aligning the **RED** arrows. **ALARMS WILL SOUND-THIS IS OK.**

- Depress the silence alarm button (upside-down bell with circle) until the alarm is silenced on the new, replacement Controller.
- Rotate the perc lock on the replacement controller in the direction of the "unlocked" icon until the perc lock clicks into the fully- unlocked position. Repeat this same step for the original Controller until the perc lock clicks into the unlocked position.

- Disconnect the perc lead/driveline from the original controller by pressing the metal release tab on the connector socket. The pump will stop and an alarm will sound.

Note: The alarm will continue until power is removed from the original Controller. ***Getting the replacement Controller connected and the pump restarted is the first priority.***

- Connect the replacement Controller by aligning the BLACK LINES on the driveline and replacement Controller and gently pushing the driveline into the replacement Controller. The pump should restart, if not complete the following steps:

Step 1. Firmly press the Silence Alarm or Test Select Button to restart the pump.

Step 2. Check the powersource to assure that power is going to the controller.

Step 3. Assure the perc lead is fully inserted into the socket by gently tugging on the metal end. **DO NOT** pull the lead.

- After the pump restarts, rotate the perc lock on the new controller in the direction of the "locked" icon until the perc lock clicks into the fully-locked position. If unable to engage perc lock to the locked position, gently push the driveline into the controller to assure a proper connection. Retry to engage perc lock.
- Disconnect power from the original Controller. The original Controller will stop alarming once power is removed.

HeartWare® Ventricular Assist System

1. **Can I do external CPR?**

   Chest compressions may pose a risk of dislodgment – use clinical judgment. If chest compressions are administered, confirm function and positioning of the pump.

2. **If not, is there a "hand pump" or external device to use?**

   No.

3. **If the device slows down (low flow state), what alarms will go off?**

   The device runs at a fixed speed. If a low flow state occurs, an alarm will be heard, and the controller display will show a yellow triangle and "Low Flow – Call" message.

4. **How can I speed up the rate of the device?**

   It is not possible to adjust the pump speed in the prehospital setting. Okay to give IV fluids.

5. **Do I need to heparinize the patient if it slows down?**

   Call the accepting VAD facility for guidance.

6. **Can the patient be defibrillated while connected to the device?**

   Yes.

7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**

   No, defibrillate per protocol.

8. **Does the patient have a pulse with this device?**

   The patient may not have a palpable pulse. Depending on the patient's own heart function, you may be able to feel a thready pulse.

9. **What are acceptable vital sign parameters?**

   Goal Mean Arterial Pressure (MAP) is 75 to 90 mmHg. Use a Doppler as the first option to assess blood pressure. If that is not available, use a non-invasive BP (NIBP). If you are using a doppler, place the blood pressure cuff on the patient arm. As you release the pressure in the blood pressure cuff, the first sound you hear with the Doppler is the MAP.

10. **Can this patient be externally paced?**

    Yes

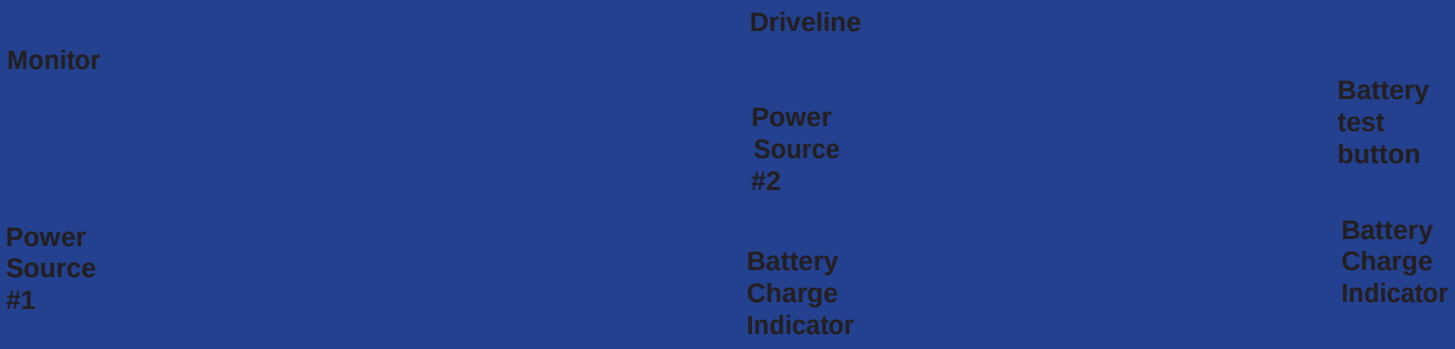
FAQs

- May not be able to obtain cuff pressure (continuous flow pump)
- Pump connected to electric line (driveline) exiting patient's abdominal area and is attached to computer (controller) which runs the pump.
- Pump does not affect EKG
- All ACLS drugs may be given.
- No hand pump is available. This is a rotary (continuous flow) pump with typical speed ranges of 2400 – 3200 RPMs.
- The controller draws power from one battery at a time. A fully charged battery will provide 4-6 hours of power. Both the battery and controller have status lights to indicate the amount of power remaining.
- Transport by ground to implanting facility if possible.
- Be sure to bring **ALL** of the patient's equipment with them.

Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press.

DARK BLUE DARK BLUE DARK BLUE DARK BLUE

HeartWare® Ventricular Assist System
Emergency operation



ALARm ADAPtER

- **Used to silence the internal NO POWER ALARM.**
- **Should only be used on a controller that is NOT connected to a patient's pump.**
- **Must be inserted into the blue connector of the original controller after a controller exchange BUT before the power sources are disconnected or the NO Power alarm will sound for up to two hours.**

DRiVELinE ConnECtion

To Connect to Controller:

- Align the two red marks and push together. An audible click will be heard confirming proper connection. (Figure A)
- The Driveline Cover must completely cover the Controller's silver driveline connector to protect against static discharge. (Figure B)
- NOTE: an audible click should be heard when connecting the Driveline or Driveline extension to the controller. Failure to use the Driveline Cover may cause an Electrical Fault Alarm.

Figure A

Figure B

to DiSConnECt A DEPLEtED BAttERy

- Make sure there is a fully charged battery available to replace the depleted one.
- Disconnect the depleted battery by turning the connector sleeve counterclockwise until it stops.
- Pull the connector straight out from the controller.

ConnECting PoWER to ContRoLLER

To Connect a Charged Battery:

- Grasp the cable of the charged battery at the back end of the connector (leaving front end of connector free to rotate)
- Line up the solid white arrow on the connector with the white dot on the Controller.
- Gently push (but DO NOT twist) the battery cable into the Controller until it naturally locks into place; you should hear an audible click.
- Confirm that the battery cable is properly locked on the controller by gently pulling the cable near the controller power connector.
- DO NOT force the battery cable into the controller connector without correct alignment as it may result in damaged connectors .

Controller

JANUARY 2012

DARK BLUE DARK BLUE DARK BLUE DARK BLUE

BLUE DARK BLUE DARK BLUE DARK BLUE
DARK BLUE DARK BLUE DARK BLUE DARK BLUE

HeartWare® Ventricular Assist System
Emergency operation

StEPS to ExCHAngE tHE ContRoLLER

Step 1: Have the patient sit or lie down.

Step 2: Place the new controller within easy reach.

Step 3: Connect back-up power sources (batteries or AC Power) to the new controller.

- Confirm that the power cables are properly locked on the controller by gently pulling on the cable near the connector.
- A "Power Disconnect" alarm will activate if a second power source is not connected to the new controller within 20 seconds of controller power up
- A "VAD Stopped" alarm will activate if the pump driveline is not connected to the new controller within 10 seconds - this alarm will resolve once the pump driveline is connected

Step 4: Pull back the white driveline cover from the original controller's silver connector.

Step 5: Disconnect the driveline from the original controller by pulling the silver connector away from the controller. Do not disconnect by pulling on the driveline cable. A "VAD Stopped" alarm may activate. Don't panic. You can silence the alarm after restarting the pump, which is the priority.

Step 6: Connect the driveline to the new controller (align the two red marks and push together). If the "VAD Stopped" alarm was active on the new controller, it will now resolve.

Step 7: The pump should restart. Verify the pump is working (RPM, L/min, Watts).

Step 8: IF THE PUMP DOES NOT RESTART, CALL FOR MEDICAL ASSISTANCE IMMEDIATELY.

Step 9: Insert the Alarm Adapter into the blue connector on the original controller.

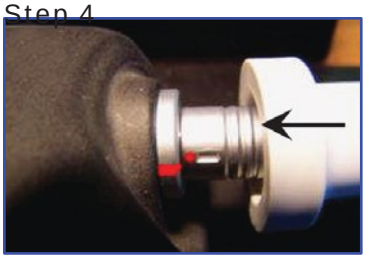
- Disconnect both power sources from the original controller.
- The controller will be turned off and all alarms silenced.

Step 10: Slide the white driveline cover up to cover new controller's silver connector.

Step 11: Contact the VAD Center or Implanting hospital for a new backup controller.

Step 3

Step 4



Step 6

Step 9

Step 10

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HeartWare® Ventricular Assist System troubleshooting

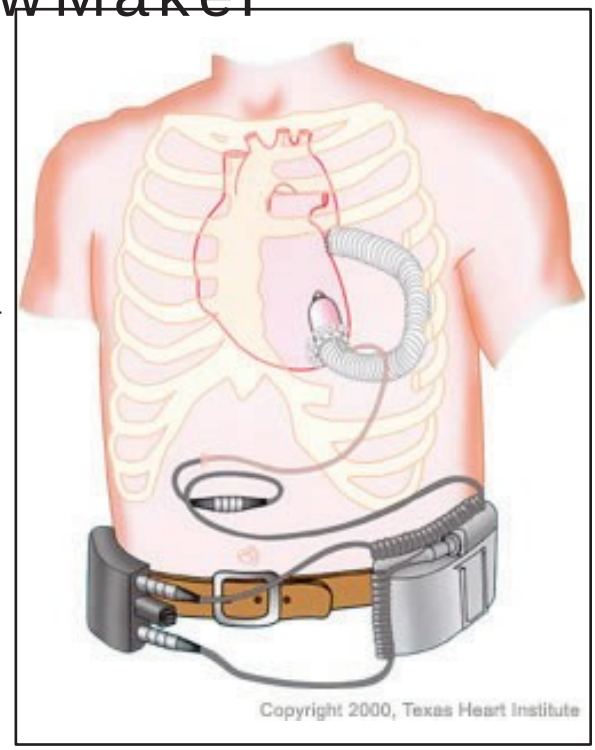
ALARM TYPE	ALARM DISPLAY (Line 1)	ACTION (Line 2)
High - Critical (FLASHING RED)	VAD STOPPED	CONNECT DRIVELINE
	VAD STOPPED	CHANGE CONTROLLER
	CRITICAL BATTERY 1	REPLACE BATTERY 1
	CRITICAL BATTERY 2	REPLACE BATTERY 2
	CONTROLLER FAILED	CHANGE CONTROLLER
MEDIUM (FLASHING YELLOW)	CONTROLLER FAULT	CALL ACCEPTING VAD HOSPITAL
	CONTROLLER FAULT	CALL: ALARMS OFF
	HIGH WATTS	CALL ACCEPTING VAD HOSPITAL
	ELECTRICAL FAULT	CALL ACCEPTING VAD HOSPITAL
	LOW FLOW	CALL ACCEPTING VAD HOSPITAL
	SUCTION	CALL ACCEPTING VAD HOSPITAL
LOW (SOLID YELLOW)	LOW BATTERY 1	REPLACE BATTERY 1
	LOW BATTERY 2	REPLACE BATTERY 2
	POWER DISCONNECT	RECONNECT POWER 1
	POWER DISCONNECT	RECONNECT POWER 2

Jarvik 2000 FlowMaker®

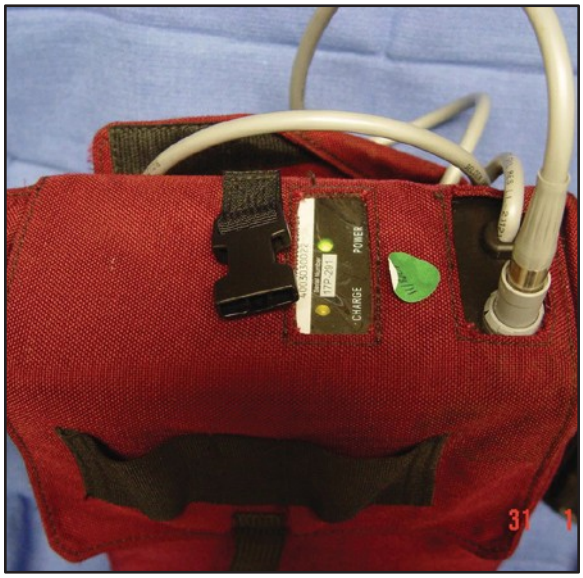
1. **Can I do external CPR?**
   Yes.
2. **If not, is there a "hand pump" or external device to use?**
   No.
3. **If the device slows down (low flow state), what alarms will go off?**
   The Underspeed indicator light. If the pump is stopped you will hear a steady alarm and the pump stopped symbol will light up red. This symbol is shaped like a stop sign with a bell in it.. See next page for symbols and locations. Change to a fully charged battery or change from the reserve battery to the L-ion battery.
4. **How can I speed up the rate of the device?**
   Jarvik has an indicator dial usually at a speed set at 3.
5. **Do I need to heparinize the patient if it slows down?**
   No.
6. **Can the patient be defibrillated while connected to the device?**
   Yes.
7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No.
8. **Does the patient have a pulse with this device?**
   Yes. Palpable pulse depends on ventricular contractility, preload and afterload.
9. **What are acceptable vital sign parameters?**
   Jarvik suggest MAP 65 - 75mm Hg.
10. **Can this patient be externally paced?**
    Yes.

•• All ACLS medications can be administered.
•• The Li-Ion battery can provide up to 10 hours of power when fully charged.
•• When switching to the reserve battery be sure to follow the color coding of the cables

Controller attached to the protable Li-ion battery.



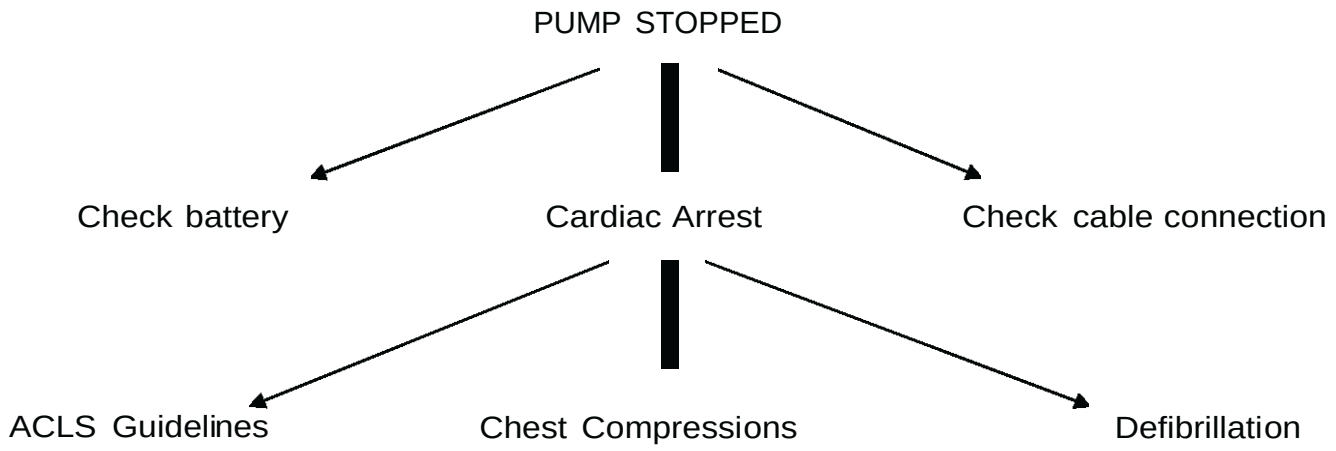
Jarvik 2000 FlowMaker® system



Reserve Battery Pack

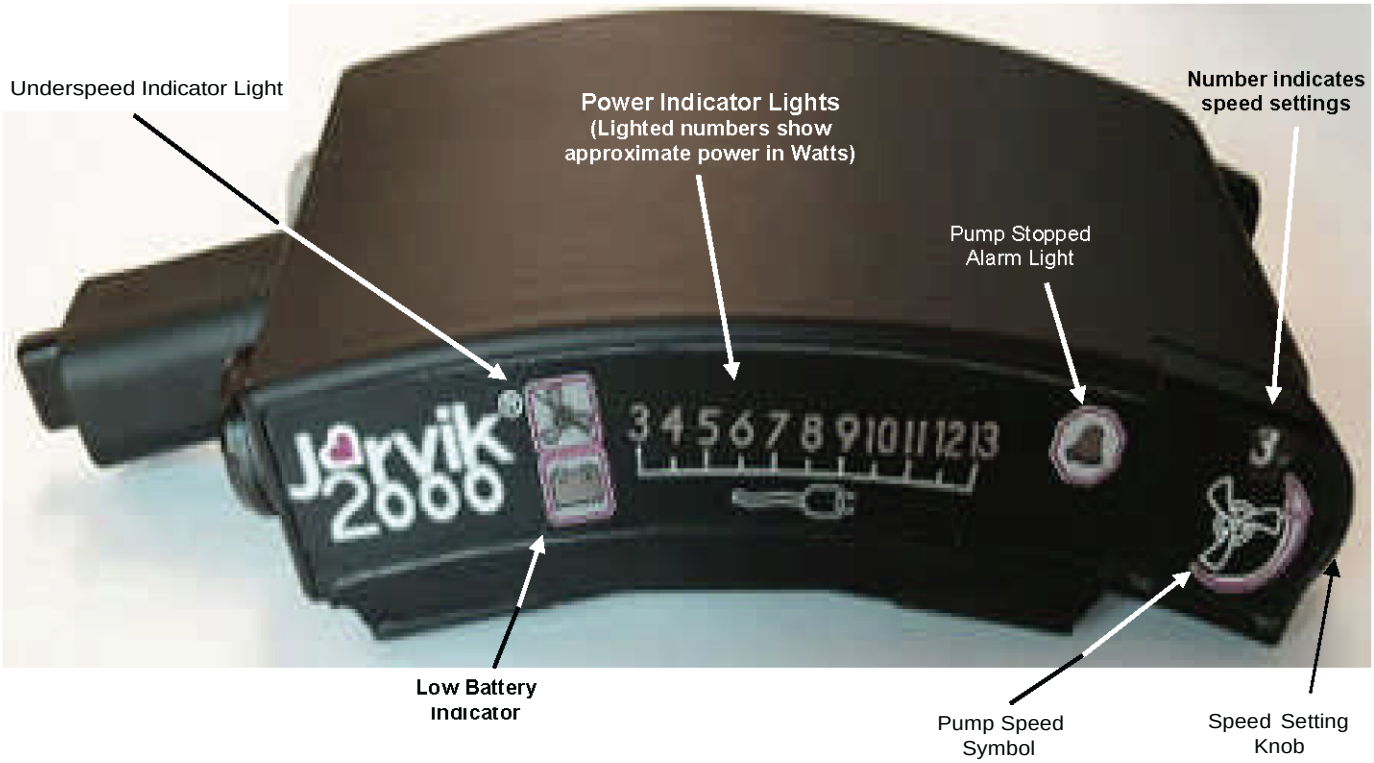
Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press. This guide does not supersede manufacturer instructions. Copy with permission only. March 2009 Jarvik 2000 FlowMaker®

Jarvik 2000 FlowMaker®
Emergency Response Algorithm



If a patient does present with V-tach IV-fib, they are often conscious, but very weak and upon assessment have the classic low output signs.

Jarvik 2000 FlowMaker Controller
Indicators and Troubleshooting



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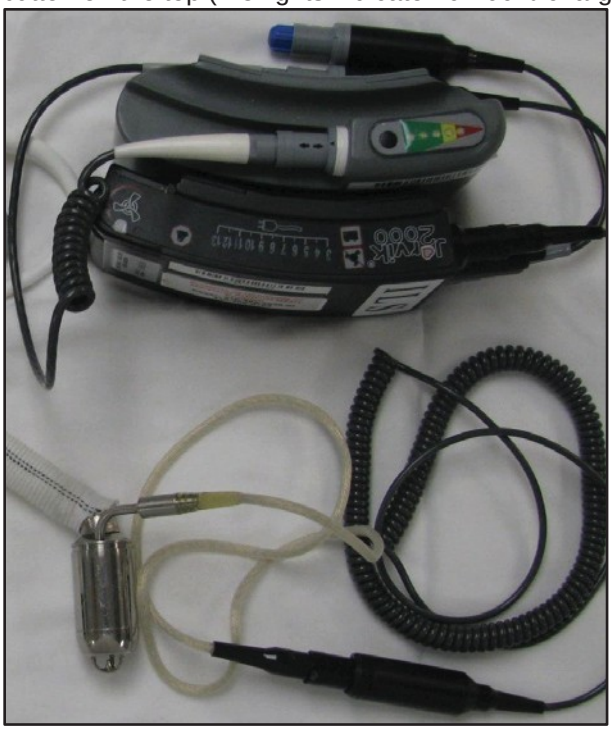
Jarvik 2000 FlowMaker®

The Jarvik 2000 runs ONLY on battery power (no AC adapter or console). Except during battery changes, only one battery is connected to the controller.

Dial Setting	Speed Rpm	Flow L/min	Power Watts
1	8,000	1-2	3-4
2	9,000	2-4	4-5
3	10,000	3-5	5-6-7
4	11,000	4-6	7-8-9
5	12,000	5-7	8-9-10

The only monitored parameters are pump power (in Watts) and pump speed (setting 1-5). Both are displayed on the controller. Normal ranges by speed are in the table to the left. Power > 1-2W above normal is concerning for pump thrombosis. (*see chart to the left*)

Two different battery types are used. The large Reserve battery will power the pump for at least 24 hrs; its charge status cannot be checked. The small Li-Ion battery will power it for 8-12 hrs; its charge status can be checked by pressing the black button on the top (1-5 lights indicate 20-100% charge; *see photo to the left*)



Controller attached to the protable Li-ion battery.

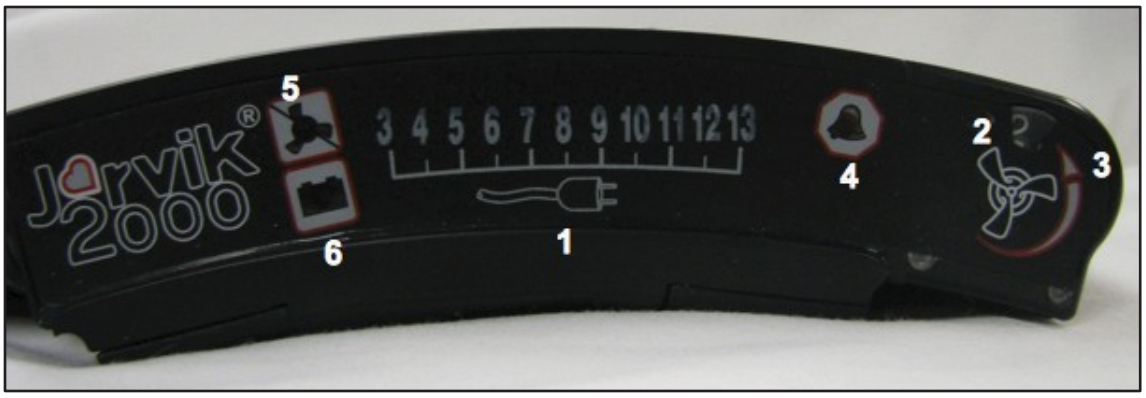
Cables are uniquely color-coded and keyed so that they cannot be mis-connected. Abdominal cable (driveline) connectors are black; power connections are gray or white.

Jarvik 2000 speed is manually adjustable via a dial on the controller. The dial reads from 1 to 5, which corresponds to 8,000 (setting 1) to 12,000 (setting 5) RPM. Most patients are on setting 3 or 4.

The ILS Controller has a white “ILS” sticker on the front. On the ILS controller, the pump speed will decrease to 7,500 RPM for 8 secs every minute. During this period the pulse pressure may widen with a decreased MAP, and the pump power will decrease to 3-4 W.

Jarvik 2000 FlowMaker Controller:

1. Pump power display
2. Speed setting display
3. Speed adjustment dial (on side of controller)
4. Pump-stop alarm indicator
5. Underspeed alert indicator
6. Low battery alarm indicator.



Jarvik 2000 FlowMaker® Controller

Jarvik 2000 FlowMaker® Troubleshooting

If unsure whether pump is working, listen near apex with stethoscope (should hear high-pitched buzz/hum).

A. Low Battery Alarm *(intermittent beep): 5-10 min on Li-Ion; >=15 min on Reserve.*

To change battery, remove blue/gray cap from unused Y-cable port.

Insert end of new battery cable into open port on Y-cable.

Disconnect old battery & put blue cap on open port.

B. Pump Stopped Alarm *(continuous alarm): Pump not connected or running < 5,000 RPM.*

1. Change to a fresh, fully charged battery;

2. If not resolved, check all cables for proper connection & for damage, including the portion of the abdominal cable that connects to the percutaneous lead at the patient's abdomen. If damaged cable, replace with backup (usually attached to patient's spare contoller);

3. If not resolved, change controller & all cables. Spare controller should have back-up Y-cable & abdominal cable attached to it. If not attached & pt symptomatic, do not worry about finding them.

4. Disconnect old abdominal cable (black) from percutaneous lead at patient's abdomen. Set old system, including battery, aside. It will continue to alarm.

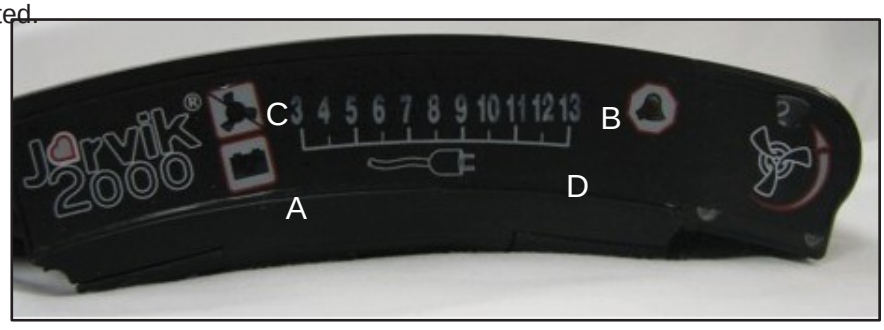
5. Connect new battery to Y-cable (gray to gray; or connect battery directly to gray port on spare controller if unable to locate spare Y-cable). New controller will begin to alarm.

6. Connect new controller's abdominal cable to percutaneous lead at abdomen, or connect percutaneous lead directly to black port on controller if unable to find spare abdo cable. New controller should cease alarming and pump power should be > 3W.

7. If controller continues to alarm, check all connections again. If unresolved, attempt to manipulate percutaneous lead & connector (may be lead damage). If still unresolved, transport emergently; contact implanting center to see if IV anticoagulation & inotropes are indicated.

C. Underspeed Alarm *(no audible alarm): pump running below set speed.*

If no other alarms are present, not an emergency. Change to a fully charged Li Ion battery. If unresolved, contact implanting center.



D. High Power Alarm

(13W light will be amber w/audible alarm): Power too high for any speed.Auscultate pump to check for operation.

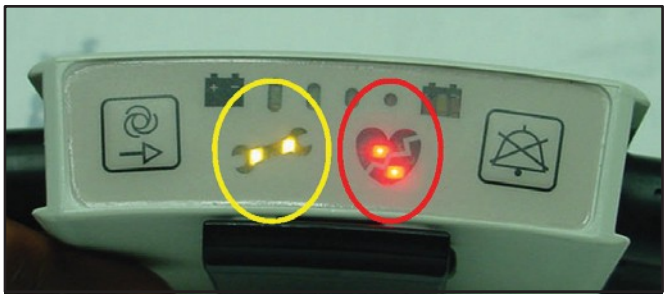
Change all cables & controller as above. If unresolved, transport emergently. Contact implanting center to see if IV anticoagulation/inotropes are indicated. Most likely cause is pump thrombosis.

JANUARY 2012

HeartMate® XVE

1. **Can I do external CPR?**
   No.
2. **If not, is there a "hand pump" or external device to use?**
   Yes. Pump at a rate of 60 -90 beats per minute.
3. **If the device slows down (low flow state), what alarms will go off?**
   A red heart alarm light indicator and steady audio alarm will sound if less than 1.5 lpm. Check for hypovolemia or right heart failure and treat if red heart alarm persist after treatment consider performing a controller exchange.
4. **How can I speed up the rate of the device?**
   Give volume of IV fluids.
5. **Do I need to heparinize the patient if it slows down?**
   Please check with the accepting hospital.
6. **Can the patient be defibrillated while connected to the device?**
   No.
7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   Yes, disconnect from power/batteries first, initiate hand pumping, disconnect controller from driveline, defibrillate the patient, remove hand pump, reattach driveline to controller, and then reattach the power source.
8. **Does the patient have a pulse with this device?**
   Yes, the device produces a Pulsatile flow. Heart rate is independent of pump rate.
9. **What are acceptable vital sign parameters?**
   The BP will vary. 110/80 -140/80. If greater, call the accepting hospital.
10. **Can this patient be externally paced?**
    Yes, keep MA less than 40.

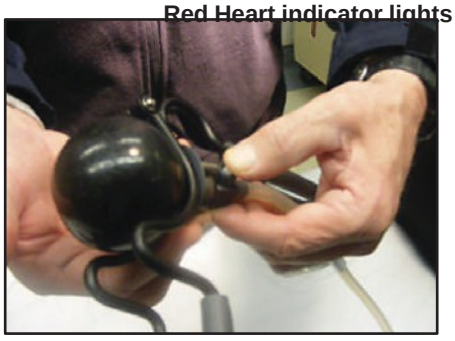
Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press.



Heartmate XVE Controller showing Yellow Wrench & Red Heart indicator lights

Hand pump & white purge valve

Hand PuMPing PrOcEdurE



Press the black ball while holding down the white purge valve.

Push in white purge valve

Release purge valve.

Count to 10, push white purge valve & black bulb should re-inflate.

JANUARY 2012

HeartMate® XVE

Steps To Exchange controller

Step 1: Place new System Controller within easy reach. Have Hand Pump nearby.

Step 2: Disconnect Power source (Batteries, PBU, or EPP) from System Controller. The System Controller will alarm and the pump will stop.
(Figure 2A and Figure 2B)

Figure 2A

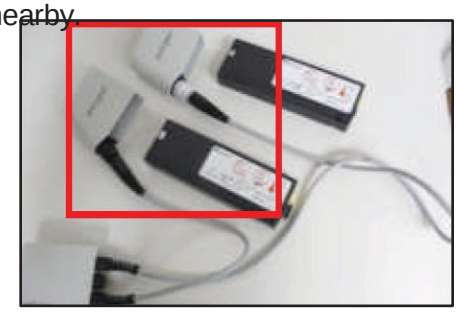


Figure 2B

Step 3: Disconnect the Driveline (coming from the patient) from the System Controller by pushing down on the black release button and gently pulling the Driveline connector out of the XVE System Controller socket. (Figure 3)

Figure 3

Step 4: Connect the Driveline to the new, replacement XVE System Controller by lining up the small black arrows on the Driveline connector and System Controller socket **FIGURE 4A.** Gently push the connector into the socket until it snaps into place **FIGURE 4B**. The new System Controller will alarm if the System Controller Battery Module is NOT in place. This is normal and should stop after the System Controller Battery Module is inserted. (Figure 4A, Figure 4B and Figure 4C)

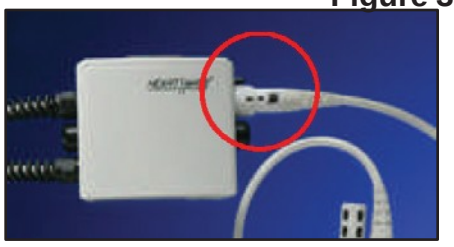


Figure 4A Figure 4B

Figure 4C

Step 5: Connect the new System Controller to power source (Batteries, PBU, or EPP). Your pump will restart and alarm will stop.

Step 6: If the pump does not restart, disconnect System Controller from power source and call for medical assistance; then immediately begin hand pumping.

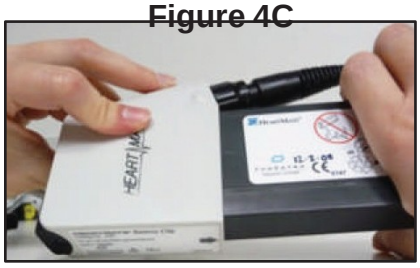
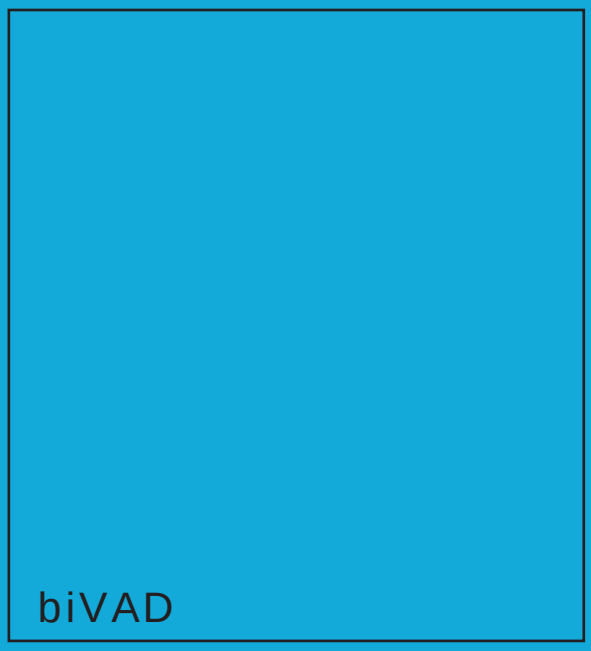


Figure 5

Air Transport Consideration: In rotor wing and fixed wing aircraft flying at heights lower than 10,000 feet-when using the hand pump for external CPR, you must re-purge the bulb every 2000 feet in ascent and 1000 feet in descent. This will assure you have consistent cardiac output.

Thoratec PVAD™ w/TLC II Driver

1. **Can I do external CPR?**
   No.
2. **If not, is there a "hand pump" or external device to use?**
   Yes, find the blue or red hand bulbs.
3. **If the device slows down (low flow state), what alarms will go off?**
   Low flow alarms: Loss of fill alarm will occur
4. **How can I speed up the rate of the device?**
   Give volume of IV fluids.
5. **Do I need to heparinize the patient if it slows down?**
   Only if it stops. Patient will be anticoagulated on Coumadin.
   Only hepariize if the pump stops.
6. **Can the patient be defibrillated while connected to the device?**
   Yes. Nothing needs to be disconnected. Patient should be placed on battery power BEFORE defibrillation.
7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No. If the defibrillation is unsuccessful, disconnect pump and continue to defibrillate.
8. **Does the patient have a pulse with this device?**
   Yes.
9. **What are acceptable vital sign parameters?**
   Normal blood pressure parameters.
10. **Can this patient be externally paced?**
    Usually in BiVAD configuration, if yes the ECG not important to treat. Because both sides of the heart are supported, there is little need to pace regardless of the rhythm seen on ECG.



IVAD is implanted inside the abd cavity and is attached to the same TLC II driver on the outside.

Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press.

- These patients have biventricular support through 2 pumps: right and left.
- EKG will NOT correlate with the patient's pulse.
- Patient may be in any arrhythmia, but because they have biventricular support — DO NOT TREAT arrhythmias. Only RVAD or LVAD patients should be treated for arrhythmias.
- Bring all extra batteries & electrical adaptor along during transport. This system is electrically driven.
- The pumps are driven by a compressor called the TLC II driver. The pneumatic hoses and cables plug into the top of the TLC II driver.
- If the Driver loses power, malfunctions, or stops, use the hand pump(s). (hand pump instructions on back of this page)
- Continue hand pumping and then, as soon as possible, replace the TLC II Driver with the backup Driver.
- Backup Driver accompanies the patient at all times. (Driver replacement instructions on back of this page)
- **WARNING:** If the pump has stopped and blood is stagnant in the device for more than a few minutes (depending on the coagulation status of the patient), there is a risk of stroke or thromboembolism. BEFORE the device is restarted or hand pumping is initiated, contact the implanting center for anticoagulation direction.

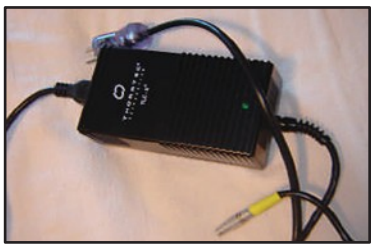
Battery Charger

Batteries loaded into battery slots on TLC-II Driver

TCL-II Driver

AC Power adapter – plug into yellow port on driver

LIGHT BLUE LIGHT BLUE LIGHT BLUE LIGHT BLUE



PVAD/IVAD

Type of Device: pulsitile

What is an LVAD?

Left Ventricular Assist Devices are pumps surgically attached to patients' hearts to pump blood for the ventricle. There are three basic parts to all VAD systems. The pump, a computer with lamps and alarms, and a power source.

Why do patients get VADs?

Patient who have been treated for heart failure but in spite of optimal care continue to suffer from life limiting heart failure. Patients may be on the heart transplant list but the transplant team is worried the patient may die before a suitable donor is found, bridge to transplant. Pts who are not candidates for transplant but suffer from end stage heart failure may also be implanted as destination therapy.

How do VADs work?

Most vads implanted nationally create continuous flow. Blood comes from patients own ventricle into the pump then a turbine like spinning fan pushes the blood out into the aorta then the body. A cable connects the pump inside with the computer/controller and batteries outside the body. The pump needs a constant power supply.

biVAD

IVAD is implanted inside the abd cavity and is attached to the same TLC II driver on the outside.

Do's

1. Page the On Call Perfusionist. Call the Tower OR at 3316 to ask for the beeper number.
2. Give whatever medications you want. (no medication contraindication)
3. Defibrillate if indicated
4. Hand pump only if the devise has stopped pumping, left faster than right.

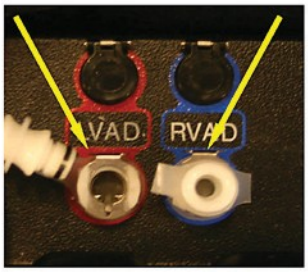
Don'ts

1. NO CHEST COMPRESSIONS.
2. NO MRI.
3. Don't panic if the ECG is at one rate. The LVAD rate is at another, and the RVAD rate is a third.

Questions:

1. CPR: NO
2. Hand pump: yes called hand bulbs
3. low flow alarms: Loss of Fill alarm
4. speed up device: fluids
5. heparin: only if it stops. Patient has to be on Coumadin
6. defib: yes
7. disconnect for defib: no
8. pulse: yes
9. Vital signs: Normal BP parameters
10. externally pace: Usually in Bi VAD configuration if yes the ECG not important to treat

Hand Pumping Instructions



Step 1: Obtain hand pump(s) from carrying case. Note: One (1) hand pump is needed for each VAD.

Step 2: Depress metal clip(s) to disconnect the pneumatic lead(s) from the TLC II Driver.

Step 3: Connect the hand pump(s) to the pneumatic lead(s).

Step 4: Squeeze hand pump(s) once per second. Use your foot if necessary.
Note: For 2 VADs (BiVADs), squeeze each hand pump at the same rate. Never hand pump the right VAD (RVAD) faster than the left VAD (LVAD), as this may cause pulmonary edema.

Switching to Backup TLC-II Driver

Step 1: Insert a fully-charged battery (stored in carrying case) into each battery slot of backup TLC-II driver.

Step 2: Turn on key switch

Step 3: Depress metal clip(s) to remove white occluder from pneumatic port(s) :

- LVAD port is **RED**.
- RVAD port is **BLUE**.
- Note: for BiVADS, switch LVAD first. Do NOT remove occluder caps from both ports at the same time (or from unused port during single VAD support), or system will depressurize.

Step 4: Disconnect pneumatic lead(s) from primary Driver (or hand pump) and connect to backup Driver.

Step 5: Disconnect electric lead(s) from primary Driver and connect to backup Driver.

Step 6: Place Driver in AUTO mode, if necessary.
Note: Backup Drivers are preprogrammed with a patient's unique settings.

Step 7: Verify full signal(s) is/are ejecting completely.

Step 8: Remove key and place in carrying case pocket.

Step 9: Connect to external power, if available by using the AC power adapter cord.

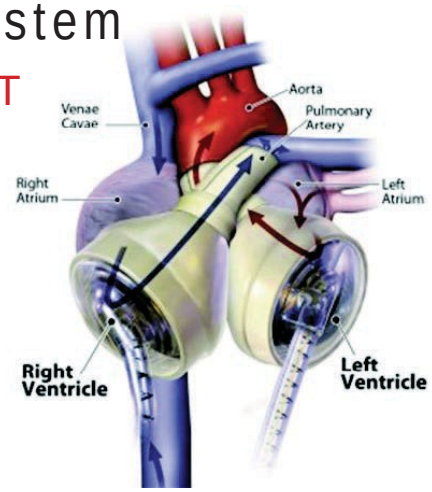
All modes of emergency transport are acceptable for VAD patients.
Aviation electronics will NOT interfere with VAD operation (and vice versa).

Air Transport Consideration: In rotor wing and fixed wing aircraft flying at heights lower than 10,000 feet-when using the hand pump for external CPR, you must re-purge the bulb every 2000 feet in ascent and 1000 feet in descent. This will assure you have consistent cardiac output.

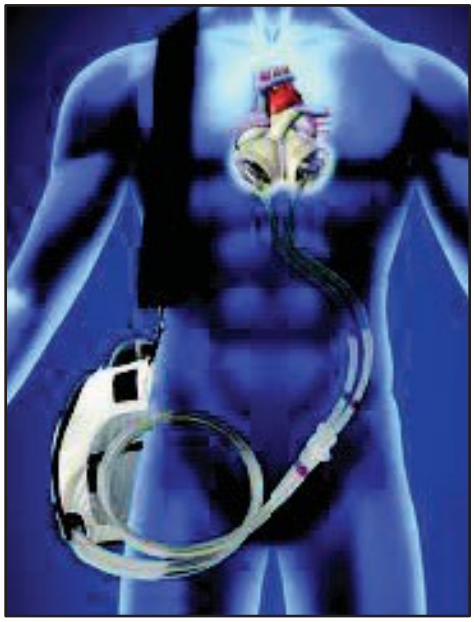
JANUARY 2012

Total Artificial Heart Freedom™ Driver System

This Patient is on an ARTIFICIAL HEART
(not a left ventricular assist device-LVAD)



1. **Can I do external CPR?**
   No. Will need to rapidly exchange to the backup driver.
2. **Is there a "hand pump" or external backup device to use?**
   No.
3. **Can I give vasopressive IV drugs like epinephrine, dopamine or dobutimine?**
   Never give vasopressive drugs, especially epinephrine. These patients primarily have sysmptomatic hypertension and rarely have symptoms of hypotension. Most IV vasopressive drugs can be fatal to a TAH (Total Artificial Heart) patient.
4. **Can I speed up the rate of the device?**
   No. The device has a fixed rate between 120-140-BPM.
5. **What is the primary emergency intervention for a TAH (Total Artificial Heart)?**
   Nitroglycerin sublingual for symptomatic hypertension.
6. **Can the patient be defibrillated or externally paced while connected to the device?**
   No. There is no heart.
7. **What if the patient is symptomatic and the Freedom Driver is alarming with a continuous alarm and the red light ?**
   If the pump has failed or a line is disconnected or kinked, the patient may pass out within 30 seconds. Even when alarming, the device should continue to pump. When in doubt, immediately change out he Freedom™ Driver immediately. Then quickly check for loose or kinked connections.
8. **Does the patient have a pulse with this device?**
   Yes. The device produces Pulsatile flow. The device is pneumatically driven and is normally loud.
9. **What are acceptable vital sign parameters?**
   The BP will vary. Normal range 100-130 systolic and 60-90 diastolic.
10. **What kind of Cardiac rhythm should be displayed?**
    Asystole.



"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010"

JANUARY 2013

Trouble Shooting Freedom™ Driver System

This Patient is on an ARTIFICIAL HEART

(not a left ventricular assist device -LVAD)

Freedom™ Driver System

IN THE EVENT OF AN EMERGENCY

Immediately notify VAD coordinator listed on the medical alert bracelet or tag

attached to the console - please identify the device as a total artificial heart.

“Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010”

JANUARY 2013

HOW TO RESPOND TO FREEDOM™ DRIVER ALARMS

There is no way to mute an Alarm.

ALARM	HEAR	SEE	MEANING	WHAT YOU SHOULD DO
Battery Alarm	Loud Intermittent Tone	Yellow Battery LED Flashing	One or both of the Onboard Batteries have less than 35% remaining charge (only two green lights display on the Battery Fuel Gauge).	Replace each low Onboard Battery, one at a time, with a charged Onboard Battery or connect to external power (NOTE: Once the batteries are charged above 35% the Battery Alarm will stop) .
			Onboard Battery is incorrectly installed.	Reinsert Onboard Battery until locked in place. If Battery Alarm continues, insert a new Onboard Battery.
			One Onboard Battery missing.	Insert charged Onboard Battery into Freedom™ Driver until locked in place.
Temperature Alarm	Loud Intermittent Tone	Red Alarm LED Flashing	The temperature of the Driver is too hot or too cold.	Remove any objects that are blocking the Filter Cover and/or Fan and check the filter.
			The internal temperature of the Driver is too hot.	Move the Freedom Driver to a cooler or warmer area.
Fault Alarm	Loud Continuous Tone	Red Alarm LED Solid	Valsalva Maneuver: Strenuous coughing or laughing, vomiting, straining during a bowel movement, or lifting a heavy weight.	Relax/interrupt Valsalva Maneuver.
			Kinked or disconnected drive lines.	Straighten or connect drive lines.
			Driver is connected to External Power without at least one correctly inserted Onboard Battery.	Insert a charged Onboard Battery into the Freedom™ Driver until locked into place.
			One or both of the Onboard Batteries have less than 30% remaining charge.	Replace each low Onboard Battery, one at a time, with a charged Onboard Battery or connect to external power. (NOTE: the Fault Alarm will continue and will change into a Battery Alarm as the Onboard Batteries recharge. Once the Onboard Batteries are charged above 35%, the Battery Alarm will stop.)
			Malfunction of the Driver	If the steps above do not stop the Fault Alarm, switch to Backup Freedom Driver. Return to implant hospital.
Temperature Alarm	Loud Intermittent Tone	Red Alarm LED Flashing	The internal temperature of the Driver is too hot.	Remove any objects that are blocking the Filter Cover and / or Fan and check filter.
			The temperature of the Onboard Batteries is too hot or too cold.	Move the Freedom Driver to a cooler or warmer area.

You must immediately address the issue that caused the Alarm.

P P P P
I I I I
N N N N
K K K K

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JANUARY 2013

Switching from Primary to Backup Freedom™ Driver

CAUTION: It is recommended to have TWO people exchange the primary Freedom Driver for the backup Freedom Driver. Make sure all items and accessories are closely available before attempting to exchange Drivers.

Setting up the Backup Freedom™ Driver

1. Remove the drive line caps from the ends of the Drive lines.
2. Insert one charged Onboard Battery. The driver will immediately start pumping. (*Figure 1*)
3. Remove the Orange Dummy Battery. (*Figure 1*)
4. Insert the second charged Onboard Battery. (*Figure 2*)
5. If possible, connect the backup Driver into a wall power outlet.
6. Your Freedom™ Driver is now ready to connec to the patient.

FIGURE 1

FIGURE 2

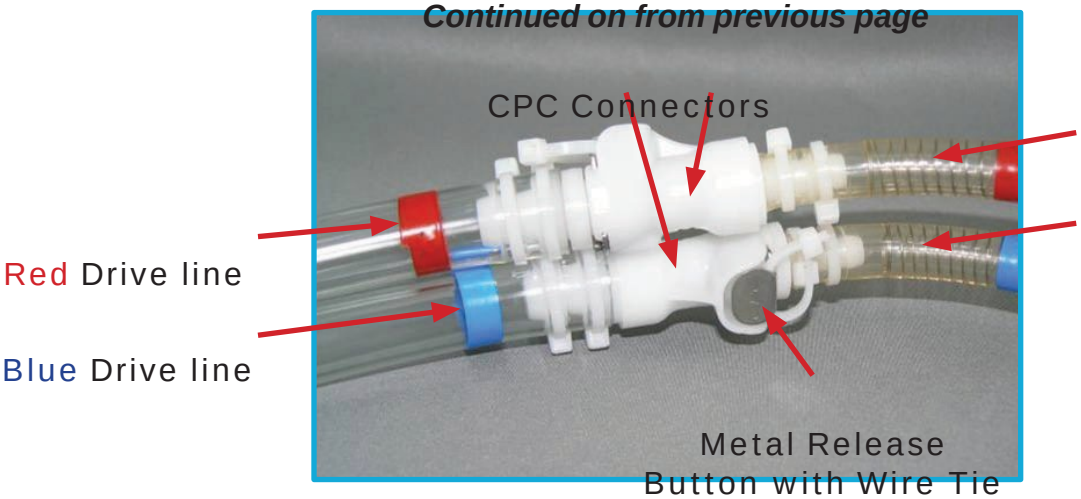
BEATS PER MINUTE, FILL VOLUME AND CARDIAC OUTPUT

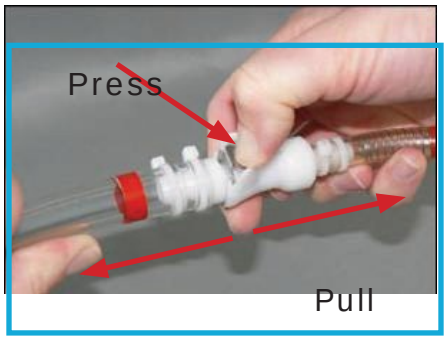
FIGURE 3

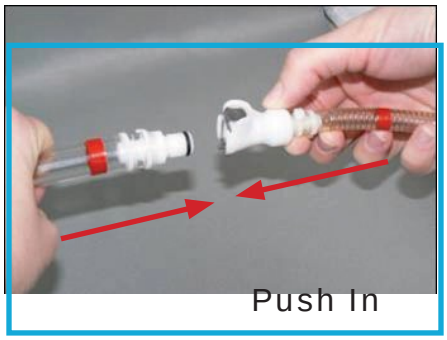
Continued on next page.

Switching from Primary to Backup Freedom™ Driver

Continued on from previous page







1. With the Wire Cutter Tool, cut the Wire Tie under the metal release button of the CPC Connector that secures the ReD TAH-t Cannula to the ReD Freedom Drive line. Gently pull to remove the Wire Tie and discard. DO NOT DISCONNECT THE CANNULA FROM THE DRIVE LINE YET.
2. With the Wire Cutter Tool, cut the Wire Tie under the metal release button of the CPC Connector that secures the BlUe TAH-t Cannula to the BlUe Freedom Drive line. Gently pull to remove the Wire Tie and discard. DO NOT DISCONNECT THE CANNULA FROM THE DRIVE LINE YET.

CAUTION: Before disconnecting the Drive lines of the primary Freedom Driver, you must have the Drive lines of the backup Freedom Driver within reach. The backup Driver must be turned on. Perform steps 3 and 4 simultaneously.

3. Disconnect the ReD Cannula from the ReD Drive line of the primary Freedom Driver:
   - Press and hold down the metal release button. Pull the ReD Cannula away from the ReD Drive line.
   - Immediately insert the ReD Cannula into the new ReD Drive line from the backup Freedom Drive Insert until a click is heard and lightly tug on the connection to make sure that it is secure.
4. Simultaneously disconnect the BlUe Cannula from the BlUe Drive line of the primary Freedom Driver:
   - Press and hold down the metal release button. Pull the BlUe Cannula away from the BlUe Drive line.
   - Immediately insert the BlUe Cannula into the new BlUe Drive line from the backup Freedom Driver.
   - Insert until a click is heard and lightly tug on the connection to make sure that it is secure.
5. Slide a Wire Tie under the metal release button of each CPC connector. Create a loose loop in the tie, taking care not to depress and disconnect the connectors. Cut off the excess length of both Wire Ties.
6. Patient must notify Hospital Contact Person of the switch.
7. The Hospital should notify SynCardia Systems that the Driver has been switched and return the faulty Driver.

JANUARY 2013

DuraHeart™ System®

1. **Can I do external CPR?**
   - Only if necessary; treat per physician discretion.
   - Closed chest CPR is contraindicated
   - May be performed as needed at the discretion of the attending physician
   - External chest compressions may cause the dislocation/damage of pump Inflow/Outflow conduits
   - External defibrillation any be performed on a patient with the DuraHeart™ System® without disconnecting any of the system components

2. **If not, is there a "hand pump" or external device to use?**
   No.

3. **If the device slows down (low flow state), what alarms will go off?**
   An emergency alarm will sound and the emergency alarm indicator (RED LIGHT) will light up.

4. **How can I speed up the rate of the device?**
   The rate of the device can only be modified in a hospital setting. For low flow rates, check for hypovolemia or RHF and treat accordingly.

5. **Do I need to heparinize the patient if it slows down?**
   Call the accepting VAD facility for guidance.

6. **Can the patient be defibrillated while connected to the device?**
   Yes.

7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No, defibrillate per protocol.

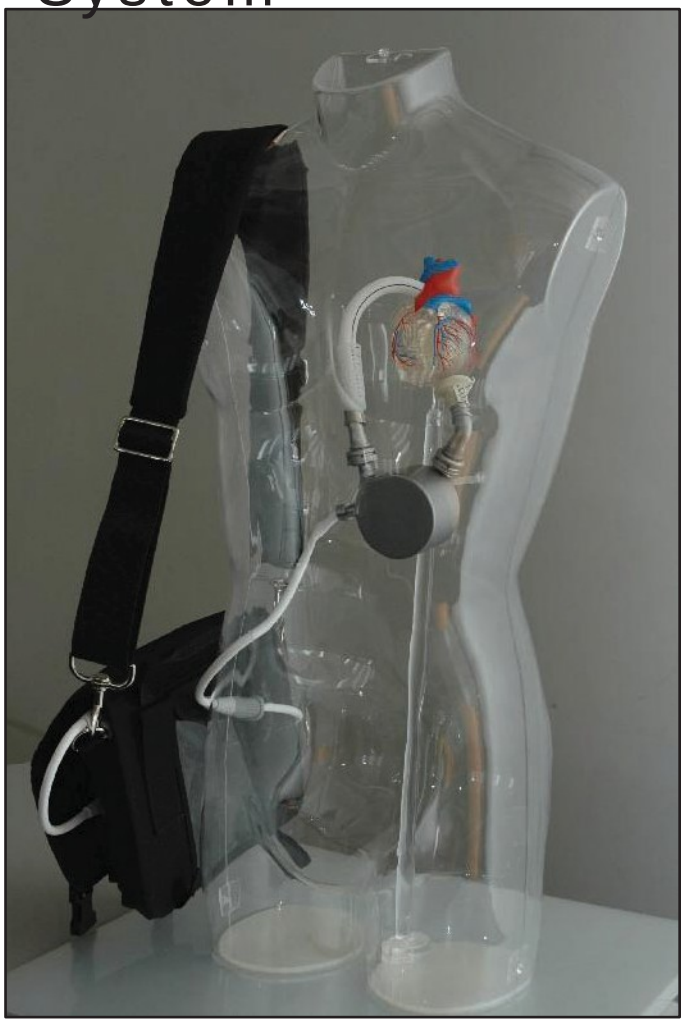
8. **Does the patient have a pulse with this device?**
   If the patient's own heart has some residual function, you may be able to feel a pulse.

9. **What are acceptable vital sign parameters?**
   Mean Arterial Pressure (MAP) 80-90 mm Hg.

10. **Can this patient be externally paced?**
    Yes, as needed.

DuraHeart™ System®

The DuraHeart™ LVAS is the latest-generation rotary blood pump designed for long-term patient support. The system incorporates a centrifugal flow rotary pump with an active magnetically levitated impeller featuring three position sensors and magnetic coils that optimize blood flow. The impeller's magnetic levitation is designed to eliminate friction by allowing a wide gap between blood contacting surface areas, enabling blood to flow through the pump unimpeded in a smooth non-turbulent fashion.



The DuraHeart™ System consists of an implantable Pump and several components that support the function of the Pump. The system is made up of seven main components (see photo below) which include:

External Batteries
Li-ion batteries provide power tot the pum for untethered operation for up to 3-1/2 hours per battery. Each battery can be recharged up to 200 times.

"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010

DuraHeart™ System®

contRoLLER

Controller and Batteries

BATTERIES

- Communicates with console for system set up, monitoring and troubleshooting
- Controls and monitors pump function, stores system data
- Interfaces with external power sources (Console, Batteries, Charger , Emergency Backup Battery)
- Displays system status – Pump Flow Rate
  – Pump Rate
  – Motor Current
  – System alarms and Alerts
  – Power Supply Status

CONTROLLER

Emergency Alarm Indicator (RED)

Display

MUTE Button

- Emergency Alarms
  - High Priority.
  - Flashing RED light and continuous Emergency Alarm tone.
  - Requires immediate care by medical specialist and controller exchange.

Emergency Alarm Indicator (RED)

MENU Button and Power Light

Caution Alarm Indicator (YELLOW)

MENU Button and Power Light

CALL HOSPITAL

EmErgEnCy ALArm mESSAgES

EmERgEncy ALARmS

ALARM MESSAGE	PROBLEM
Replace Controller	The Pump may not be rotating
Connect Pump cable/Pump disconnected	The Pump cable is disconnected
Controller Error	Possible serious problem with the controller
Pump Failure	Pump motor may have serious problem
Mag-Failure	The impeller may not be levitated

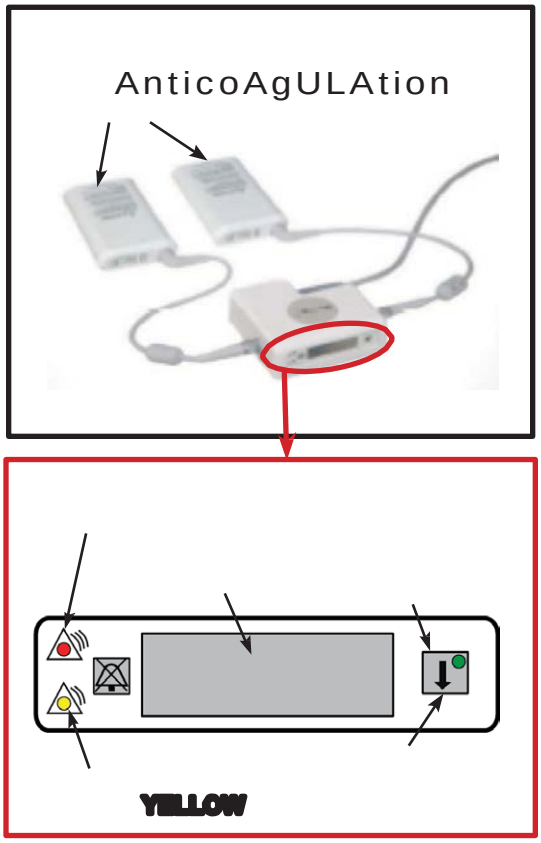
SiLEncing ALARmS

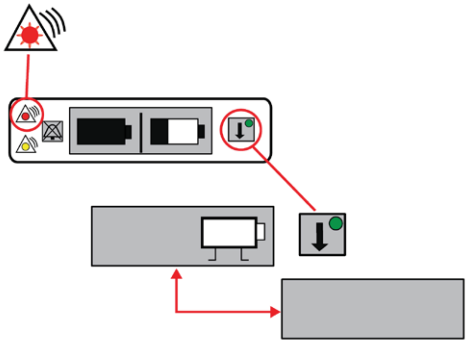
Emergency Alarms

- Mute button silences audible alarm for 2 minutes
- Audible alarm returns after 2 minutes

Caution Alerts

- Mute button silences audible alarm for 5





Patients will be on Coumadin with this deviceTarget INR range should be between 2.0 to 3.0 Combination antiplatelet therapy of ASA 81mg daily and Persantine 25-75 mg TID

"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010"

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Caution Alerts

4.18. Medication Administration

4.18.1. Auto Injectors

4.18.1.1. AtroPen

Mild symptoms of nerve agent (nerve gas) or insecticide exposure appear in situations where exposure is known or suspected: blurred vision, miosis, excessive unexplained teary eyes, excessive unexplained runny nose, increased salivation such as sudden unexplained excessive drooling, chest tightness or difficulty breathing, tremors throughout the body or muscular twitching, nausea and/or vomiting, unexplained wheezing or coughing, acute onset of stomach cramps, tachycardia, or bradycardia. One AtroPen® is recommended if 2 or more of the above are identified.
Severe symptoms include: strange or confused behavior, severe difficulty breathing or severe secretions from the lungs/airway, severe muscular twitching and general weakness, involuntary urination and defecation (feces), convulsions, or unconsciousness. If a victim is encountered who is unconscious or has any of the severe symptoms, immediately administer 3 AtroPen® injections into the victim's midlateral thigh in rapid succession using the appropriate weight-based AtroPen dose.

1. Check the expiration date.
2. Remove the auto-injector’s safety cap.
3. Grasp the unit like a pen and position the tip of the AtroPen® on the outer thigh mid-way between waist and knee.
4. Push the auto-injector firmly against the site until the injector is activated.
5. Hold the auto-injector in place until the medication is fully injected (minimum of 10 seconds).
6. Record the time.
7. Dispose of the auto-injector in a biohazard puncture-resistant container.
8. Reassess the patient.

4.18.1.2. EpiPen auto-injector

Level: EMT-(B-I-A), EMT-P,

Indications: The EMT (or Paramedic) may administer prescribed Epinephrine via an auto injector for patients who are exhibiting signs of respiratory distress associated with allergic reaction. These signs include: dyspnea, hives, flushing of the skin, wheezing, edema, and possible unstable vital signs.

Procedure:

1. Initial patient assessment protocol 2.1.1

2. Assure auto-injector is prescribed for patient (Epi-Pen for adult patient and Epi-Pen Jr. for pediatric patient), check expiration date and cloudiness or discoloration if possible.
3. If patient is exhibiting signs of moderate to severe allergic reaction as described above, assist patient in administering Epinephrine via auto-injector.
4. Remove auto-injector safety cap
5. Grasp the unit like a pen and position the tip of the EpiPen on the outer thigh mid-way between waist and knee.
6. Select appropriate injection site.
    a. Thigh- lateral portion of thigh, midway between waist and knee
    b. Shoulder- fleshy portion of upper arm
7. Push auto-injector firmly against site until injector activates.
8. Hold in place until medication is fully injected (minimum of 10 seconds).
9. Record time
10. Dispose of injector in biohazard container
11. Reassess patient

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4.18.1.3. DuoDote Auto-Injector

1. Tear open the plastic pouch at any of the notches. Remove the DuoDote auto-injector from its protective pouch.
2. Place the DuoDote in your dominant hand. Firmly grasp the center of the DuoDote with the green tip (needle end) pointing down.
3. With your other hand, remove the gray safety release. The DuoDote auto-injector is now ready to be administered.

Select Site & Inject

4. The injection site is the mid-outer thigh area. The DuoDote can inject through clothing. However, make sure pockets at the injection site are empty.
5. Swing and firmly push the green tip against the mid-outer thigh; it should be at a 90 degree angle to the thigh. Continue to firmly push until you feel the DuoDote trigger and begin injecting the antidote. IMPORTANT: After the auto-injector triggers, hold the DuoDote in place against the injection site for approximately 10 seconds.

After Injecting

6. Remove the DuoDote from the thigh and look at the green tip. If the needle is visible, the drug has been administered. If the needle is not visible, check to be sure the grey safety release has been removed and repeat the previous steps beginning with Step 4, but push harder in Step 5.
7. After the drug has been administered, dispose of the unit in a biohazard puncture-resistant container. If biohazard container is not available push the needle against a hard surface to bend the needle back against the auto-injector.
8. Reassess the patient, immediately move yourself and the patient away from the contaminated area and seek definitive care for the patient.

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4.18.1.4. MARK I Auto-Injector

Level: EMT-(B-I-A), EMT-P

Indications: The Mark I kit (NAAK) and DuoDote may be administered by the EMT or Paramedic who have had adequate training in the on-site recognition and treatment of nerve agent exposure. Some of the classic symptoms of nerve agent exposure include:

- Unexplained runny nose
- Tightness in chest/difficulty breathing
- Pinpoint pupils of the eye resulting in blurred vision
- Drooling, excessive sweating
- Nausea, vomiting and abdominal cramps
- Involuntary urination and defecation
- Jerking, twitching and staggering
- Headache, drowsiness, coma convulsions
- Respiratory arrest

Specific dosage and indications are found in the Hazardous Material Exposure Protocols.

Contraindications:

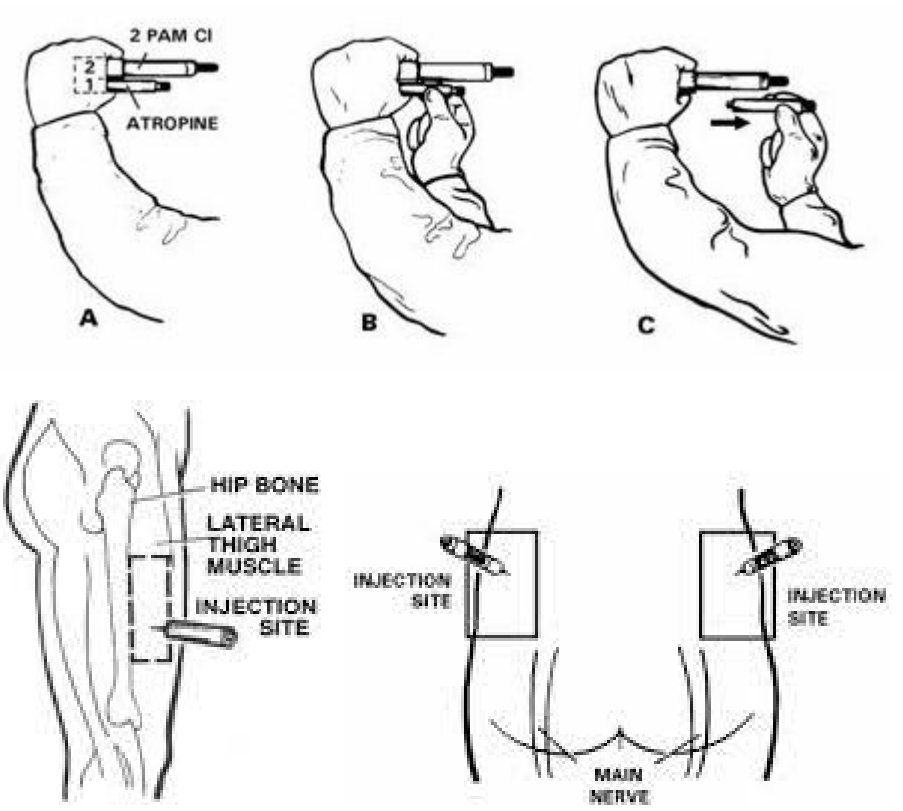
Mark I auto-injector or DuoDote should not be used for pediatric patients less than 8 years of age.

Procedure: Mark I

When a first responder arrives on scene potentially contaminated with nerve agents, he/she must don a protective mask. If symptoms of nerve agent exposure manifest:

1. Remove Mark I kit from protective pouch.
2. Hold unit by plastic clip
3. Remove AtroPen from slot number 1 of the plastic clip. The yellow safety cap will remain in the clip and the AtroPen will now be armed. DO NOT hold unit by green tip. The needle ejects from the green tip.

4. Grasp the unit and position the green tip of the AtroPen on victim's outer thigh.
5. Push firmly until auto-injector fires.
6. Hold in place for 10 seconds to ensure Atropine has been properly delivered.
7. Remove 2-PAM C1 ComboPen from slot number 2 of the plastic clip. The gray safety cap will remain in the clip and the ComboPen will now be armed. DO NOT hold the unit by the black tip. The needle ejects from the black tip.
8. Grasp the unit and position the black tip of the ComboPen on victim's outer thigh.
9. Push firmly until auto-injector fires.
10. Hold in place for 10 seconds to ensure Pralidoxime Chloride has been properly delivered.
11. If nerve agent symptoms are still present after 10 minutes, repeat injections. If symptoms still exist after and additional 10 minutes, repeat injections for a third time. If after the third set of injections, symptoms remain, do not give any more antidotes but seek medical help.



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4.18.1.5. CANA Kit AUTO-INJECTOR KIT

Level of training: EMT-P (EMT-B on self or partner, not patient)

Purpose: Convulsant Antidote for Nerve Agent (CANA): The CANA consists of a single auto injector containing 10 mg of diazepam. Used to control convulsions and prevent brain and cardiac damage following severe exposure to nerve agents (and similar toxins). Often used in conjunction with NAPP and MARK I Kit. CANA is PDA approved.

The CANA Kit is specifically designed for use on the battlefield by both medical and non-medical personnel. As a result of its durability, simplicity, and similarity to other civilian medical auto-injectors (i.e. The EPI-PEN) the CANA KIT is being deployed into civilian medical arenas as well. The CANA KIT is particularly useful during "dirty" or "hot zone" medical care because no IV is needed.

The CANA kit may be available to EMS Personnel and other responders through EMS, civil defense authorities, FEMA sponsored groups, the military, or other agencies in a time of crisis or in response to increased terrorism threat assessments.

Indications:

1. CANA is safe and effective for use as an adjunct to control convulsions following severe exposure to nerve agents.
2. The use of the CANA Kit is especially desirable in hazardous environments, as they can be given through clothes and NBC Suits.

Doses:

Adults:
Administer a single CANA kit IM as needed.

Children:
Administer a single CANA kit IM as needed to children over 50 pounds

Infants:
The adult sized CANA injector should never be given to infants

Who May Use the CANA Kit?

1. EMS personnel may self-administer ("Self Aid") the CANA Kit if exposure to a nerve agent, organophosphate, or similar toxin is suspected.
2. A responder's CANA kit may be administered by another responder if the first responder is unable to do so himself ("Buddy Aid").
   Regardless, a responder should never use his/her own CANA kit on a patient.
3. CANA KIT should only be administered to non-responders (patients) by a Paramedic or other appropriately trained responder.

Procedure:

Administration of auto-injectors

The CANA is a single injector; the procedure is essentially the same as for an individual MARK I Injector.

To use the auto-injector:

1. **Remove CANA kit from protective pouch.**
2. **Pull off gray safety cap.**
3. **Place Black end on mid outer thigh.**
4. **Push hard until injector functions.**
5. **Withdraw after 10 seconds,**

According to CFR 1910.1030 (d)(2)(vii) through 1910.1030 (d)(2)(vii)(B), contaminated sharps can be bent if the employer can demonstrate that no alternative is feasible or that such action is required by a specific medical or dental procedure. The CANA kit will be used primarily in areas outside of hospitals, clinical or research laboratories. It is prudent and a required procedure (i.e., using a one-handed technique) to bend the needle from the CANA kit to permanently blunt the exposed sharp until they can be disposed of properly.

Other Concerns:

1. The CANA Kit should be protected from temperatures below 32 degrees F. It may be necessary to carry next to body to keep warm.
2. CANA must be passed hand-to-hand or placed in secure storage; accountability necessary.
3. May hold CANA administration for **Diazepam** being administered by other routes.
4. Use of the CANA Kit is not a substitute for decontamination and use of proper protective gear.

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4.18.1.6. Tetanus Immunization (as part of Disaster Response)

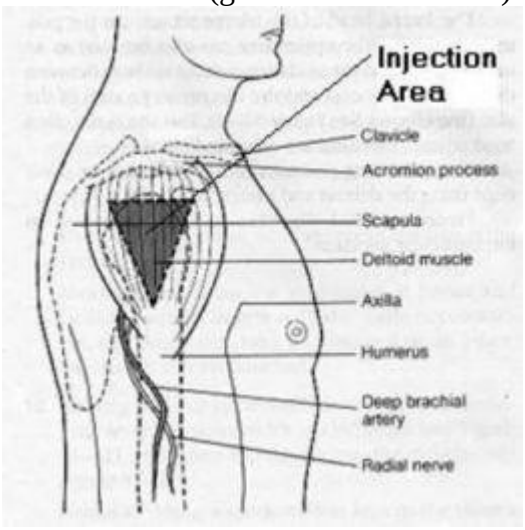
Level of training: EMT-P,

Purpose: During a disaster situation, there may be a large amount of destruction potentially exposing a large number of individuals to a tetanus prone wound. Our EMS service, (if allowed by state statute in disaster situations) may be called upon to assist in administering tetanus toxoid immunization to individuals involved in the disaster response/recovery efforts. This would help to decompress the demand for immunizations on hospital emergency departments, where following a disaster, may be the only location to obtain one. Tetanus is caused by a toxin produced in infected wounds by the bacillus bacteria *clostridium tetani*. The disease is marked by extreme muscular rigidity, violent muscle spasms, and often, respiratory and autonomic failure. Tetanus immunizations are usually good for 10 years but it is not unreasonable for a patient to receive an immunization after 5 years if exposed to a tetanus prone wound. The distribution of tetanus toxoid immunization to our EMS service will be governed/directed by the local health department and/or hospital. The type of immunization, i.e. Tetanus Toxoid or dPT (diphtheria, pertussis, tetanus) toxoid will also be determined by the health department and/or participating hospital. This protocol will explain who is permitted to participate in immunizing individuals during a disaster situation.

Policy/Procedure:

1. Only paramedics who have been briefed on the disaster situation and are working/participating in the immediate disaster area are authorized to give immunizations.
2. The duration of this authorization will be for as long as the local Health Department and/or participating hospital request our service and supply us with the necessary immunizations and supplies or inform us that our services are no longer needed for this disaster.
3. Keep in mind the tetanus toxoid and dPT immunizations needs to be kept refrigerated and therefore arrangements to keep cool is imperative.
4. Who gets a Tetanus Toxoid immunization?
    a. Patients with no injury who has not been immunized in 10 years.
    b. Patient with injury or possible exposure if > 5 years since last dose
    c. Hospital or Health Department may restrict us giving immunizations only to those individuals involved in the search, rescue, recovery, and cleanup operations, such as healthcare workers, law enforcement, EMS/Fire personnel, city/county employees, etc. If such a restriction is imposed upon us, any general public individual would need to be referred to the health department or their primary care MD for immunizations.
    d. An expectant mother (if included in the group approved by health department /hospital) whose tetanus immunization status is uncertain or whose last immunization was more than 10 years ago should be immunized against tetanus.

5. Tetanus Toxoid Immunization
    a. Dose: 0.5ml IM (give in deltoid muscle)



    b. Contraindications
        i. Hypersensitivity to drug/class/compound
        ii. Hypersensitivity to thimerosal
        iii. Caution if hypersensitivity to latex (multidose vial)
        iv. Caution if tetanus toxoid-related Guillain-Barre syndrome hx

v. Caution if immunocompromised

c. Adverse Reactions
   i. Serious reactions:
      1. Anaphylaxis
      2. Hypersensitivity reaction, Arthus-type
      3. Brachial neuritis
      4. Guillain-Barre syndrome
      5. CNS dz, demyelinating
      6. Mononeuropathy, cranial
      7. Mononeuropathy, peripheral
      8. Encephalopathy
      9. Death
   ii. Common reactions
      1. Injection site reaction
      2. Urticaria
      3. Rash
      4. Malaise
      5. Fever
      6. Pain
      7. Hypotension
      8. Nausea
      9. Arthralgia

d. Vaccine Adverse Reaction Reporting
   i. In the event patient has an adverse reaction after receiving a dose of immunization, call 1-800-822-7967

6. Before you administer Tetanus Toxoid Immunization:

a. The "Five Rights" in administering medications are:

1. Right patient
2. Right time and frequency of administration
3. Right dose
4. Right route of administration
5. Right drug

b. Introduce yourself to your patient
c. Make patient as comfortable as possible
d. Ascertain patient's ALLERGIES
e. Ascertain when patient last had a tetanus immunization booster
   i. If < 10 years and no injury or exposure, does not need one, is up to date
   ii. If < 5 years and has a skin wound/injury received during disaster operations, does not need a one, is up to date. Provide wound care.
f. Locate the injection site (deltoid) and clean with alcohol
g. Administer 0.5 ml of Tetanus Toxiod (or dPT) IM.

h. Observe for bleeding post injection and cover with band-aid if bleeding.
i. Keep record of patient's name, lot number of tetanus toxoid immunization given, location of injection site.

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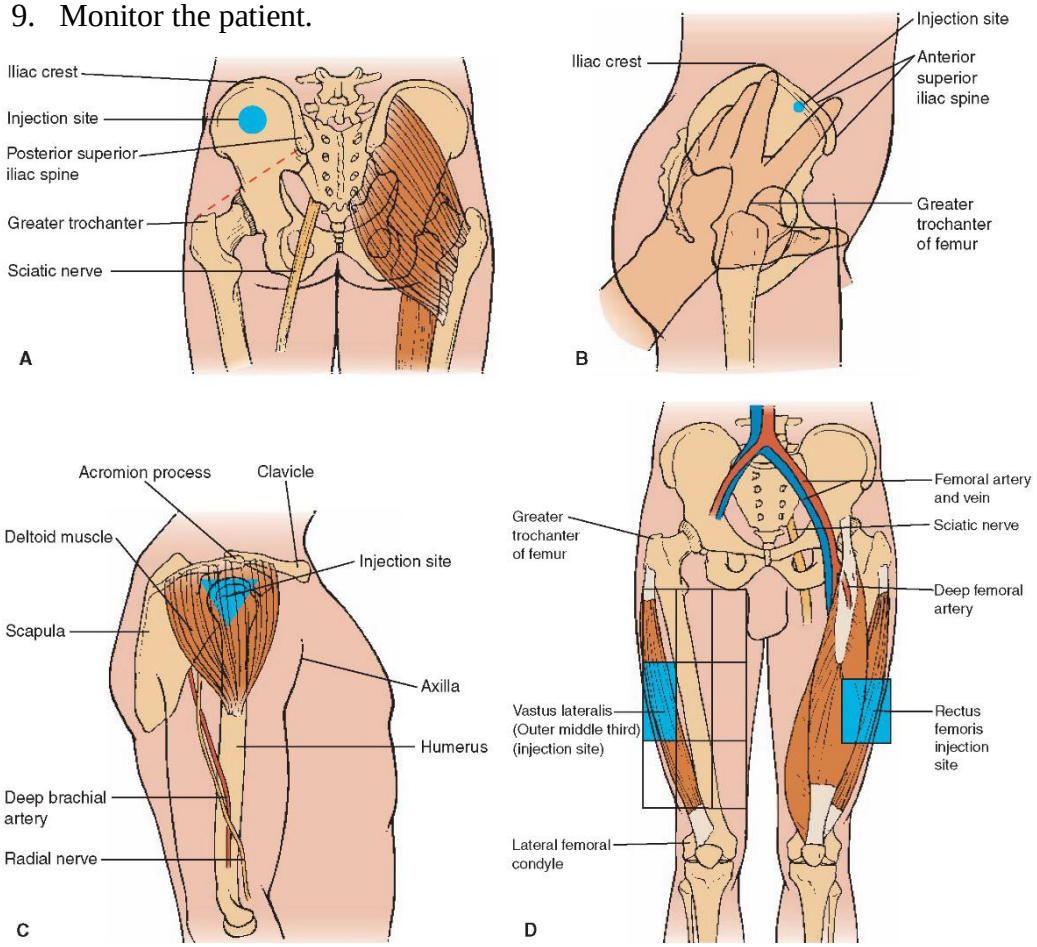
4.18.2. Intramuscular (IM) injections

Level of training: EMT-P

Intramuscular Injection (IM):

1. Prepare the equipment. The needle size should be 21-23 gauge and 1-1.5 inches long.
2. Preferred site is mid-lateral thigh, if the patient is obese use the distal portion of the thigh. The deltoid can also be used but has a longer absorption rate.
3. Check for proper medication, expiration date, vial integrity, and color and clarity. Draw the medication into the syringe.
4. Cleanse the injection site (deltoid, lateral thigh, or gluteus maximus) with alcohol or Betadine in an expanding circular pattern using a firm pressure.
5. With one hand, pull the skin taut and insert the needle at a 90-degree angle into the muscle.
6. Aspirate to ensure that a blood vessel has not been entered. If blood is aspirated, remove the needle and repeat the procedure at a different site.
7. Administer the appropriate dose.
8. Remove the needle from the injection site and dispose of it in a secure sharps container.
9. Monitor the patient.



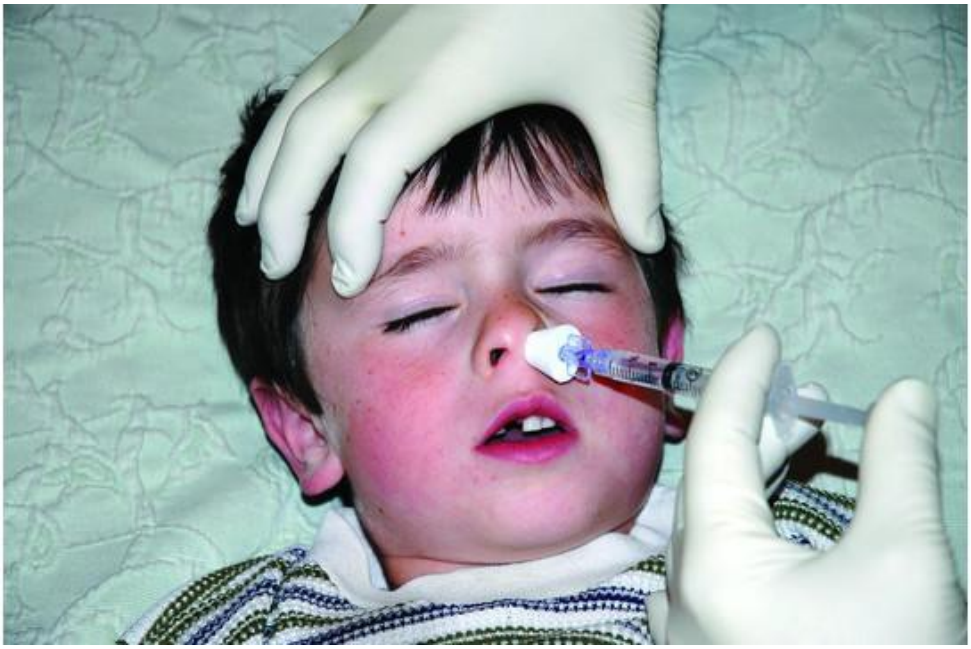
4.18.3. Intranasal (IN) administration (EMT/1st Responder Approved)

4.18.3.1. Mucosal Atomizer Device (MAD)

Damaged nasal mucosa may inhibit absorption of the medication. For this reason, contraindications for a MAD include the following conditions:

- Facial trauma.
- Epistaxis (nose bleed).
- Nasal congestion or discharge.
- Any recognized nasal mucosal abnormality.

1. Prepare the equipment.
2. Check the medication for proper name, expiration date, vial integrity, and color and clarity.
3. Draw the medication into the syringe.
   - Maximum adult and pediatric administration is 1 mL per nostril. The medication should be split with ½ of the dose given in one nostril and the other ½ given in the other nostril.
4. Expel all of the air from the syringe.
5. Securely attach the mucosal atomizer to the syringe.
6. The patient should be in a recumbent or supine position. If the patient is sitting, compress the nares after administration.
7. Briskly compress the syringe plunger to properly atomize the medication.
8. Monitor the patient.



Note:
Medications which are appropriate for intranasal use include:

- Fentanyl (50 mcg/ml) 25 – 50 mcg

- Glucagon (solubilized 2 mg vials in 1 ml sterile water) 1 – 2 mg
- Ketamine (100 mg/ml) 50 – 100 mg
- Lorazepam (2 mg/ml) 0.5 – 4 mg
- Midazolam (5mg/ml) 1 – 10 mg
- **Naloxone (1mg/ml) 0.4 – 2 mg**

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4.18.4. Intraosseous (IO)

4.18.4.1. Bone Injection Gun (BIG) – Intraosseous

Adult

1. Find and mark a penetration site located 2 cm medially and 1 cm proximally to the tibial tuberosity.
2. Clean the area with a povidone-iodine swab.
3. Position the BIG device with one hand to the site and pull out the safety latch with the other hand.
4. Trigger the BIG at a 90-degree angle to the surface.
5. Remove the BIG handle.
6. Pull out the stylet trocar.
7. Fix the cannula with the safety latch.
8. Attach a 10-cc syringe filled with normal saline.
    - Aspirate for bone marrow, and then flush with fluid.
    - Observe for any signs of infiltration.
9. If the route is patent, connect it to the drip set tubing.
10. Attach a pressure infuser.
11. Secure the site.

Child

1. Find and mark a penetration site located 1 cm medially and 1 cm distally to the tibial tuberosity.
2. Clean the area with a povidone-iodine swab.
3. Position the BIG device with one hand to the site and pull out the safety latch with the other hand.
4. Trigger the BIG at a 90-degree angle to the surface.
5. Remove the BIG handle.
6. Pull out the stylet trocar.
7. Fix the cannula with the safety latch.
8. Attach a 10-cc syringe filled with normal saline.
    - Aspirate for bone marrow, and then flush with fluid.
    - Observe for any signs of infiltration.
9. If the route is patent, connect it to the drip set tubing.
10. Attach a pressure infuser.
11. Secure the site.

See Below (next page)

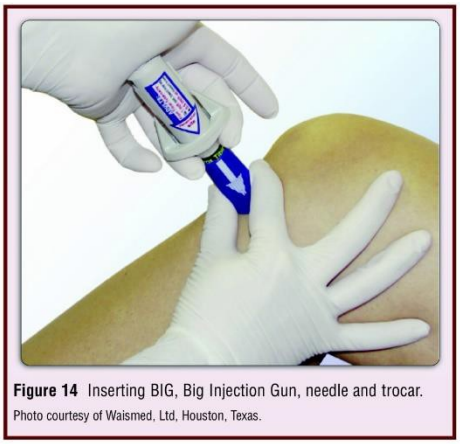
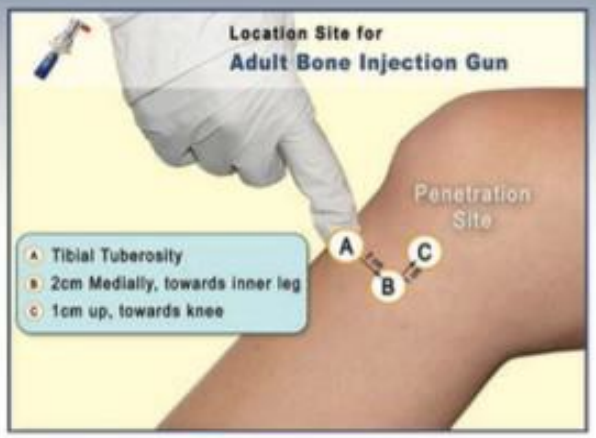


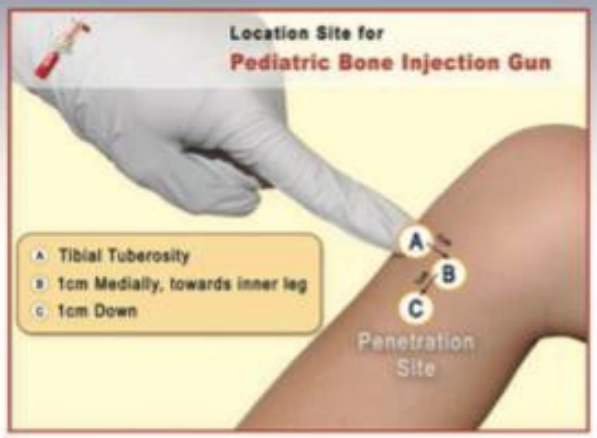
Figure 14 Inserting BIG, Big Injection Gun, needle and trocar.
Photo courtesy of Waismed, Ltd, Houston, Texas.

BIG
SIMPLY SAVING LIVES

Disposable Automatic Intraosseous Injector

Intravascular Access in seconds





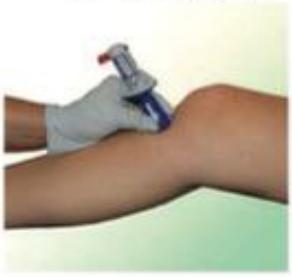
Adult depth is adjustable by 4 different anatomical locations.

NSN - # 6515-01-518-8487

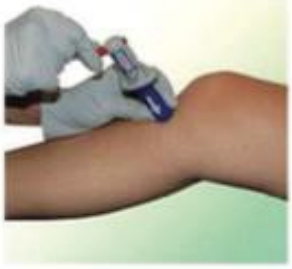
Pediatric depth is adjustable by age in years.

NSN - # 6515-01-518-8497

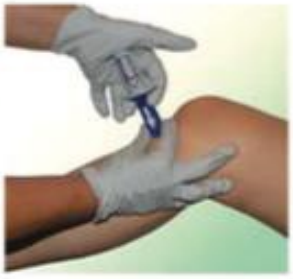
❶ Position the B.I.G. 90˚ to the bone



❷ Remove Safety Latch



❸ Trigger



❹ Clip & Secure

❺ Remove Stylet

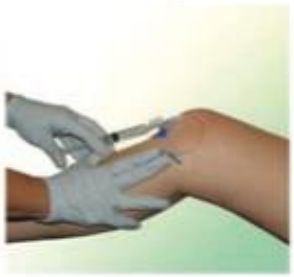
❻ Aspirate*

* Bone Marrow may not always be present.

❼ Flush*

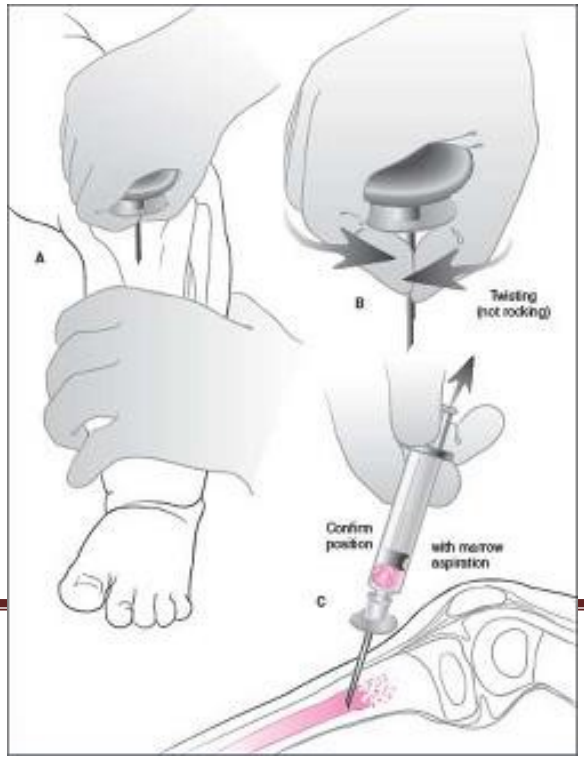
*10-20cc in Adults / 5-10cc in Pediatrics.

❽ Infuse Drugs / Fluids



4.18.4.2. Cook Pediatric IO – Intraosseous

1. Locate the site of cannulation. Palpate the tibial tuberosity, and move 1-3 cm below the tuberosity on the medial surface of the tibia, approximately one finger's width below the tuberosity.
2. Prep the area with antiseptic solution (e.g., povidone-iodine).
3. Grasp the patient's thigh and knee above and lateral to the insertion site with the palm of your non-dominant hand. Wrap your fingers and thumb around the knee to stabilize the proximal tibia. Do not let any portion of your hand rest behind the insertion site.
4. Palpate the landmarks again to confirm the insertion site.
5. Insert the needle through the skin, over the flat anteromedial surface of the tibia.
6. Advance the needle through the bony cortex of the proximal tibia, directing the needle perpendicular (90 degrees) to the long axis of the bone or slightly caudal (toward the toes) to avoid the epiphyseal plate, using a gentle back-and-forth twisting or drilling motion.
7. Stop advancing the needle when a sudden decrease in resistance to forward motion of the needle is felt.
8. Unscrew the cap and remove the stylet from the needle.
9. Stabilize the needle and attach a 10-mL syringe filled with normal saline.
10. Aspirate for bone marrow, and then flush the needle with normal saline. Check for any signs of increased resistance to injection or swelling of the surrounding tissue.
11. If the test injection is successful, remove syringe and connect the IV tubing.
12. Attach a pressure infuser.
13. Secure the site.



4.18.4.3. EZ-IO Intraosseous

Level of training: EMT-P

Indications: EZ-IO AD (40kg and over) & EZ-IO PD (3 – 39kg)

1. Intravenous Fluids or medications are needed and peripheral IV cannot be established in 2 attempts or 90 seconds AND the patient exhibits one or more of the following:
    a. An altered mental status (GCS of 8 or less)
    b. Respiratory compromise (SaO_2 80% after appropriate oxygen therapy, respiratory rate < 10 or > 40 min)
    c. Hemodynamic instability (Systolic BP < 90)
2. EZ-IO AD & EZ-IO PD may be considered prior to peripheral IV attempts in the following situations:
    a. Cardiac Arrest (medical or traumatic)
    b. Profound hypovolemia with altered mental status
    c. Patient in extremis with immediate need for delivery of medications and or fluids
    d. Patients in need of vascular access where veins are not easily identified
3. If the initial IO attempt is unsuccessful, attempt again at another site

Contraindications:

1. Fracture of the bone selected for IO infusion (consider an alternative site)
2. Excessive tissue at insertion site with the absence of anatomical landmarks (consider alternative site)
3. Previous significant orthopedic procedures (IO within hours, prosthesis- consider alternative site)
4. Infection at the site selected for insertion (consider alternative site)

Considerations:

1. Flow rate:
    a. Administer a rapid syringe bolus (flush) of saline prior to infusion NO FLUSH = NO FLOW
        i. > 40 kg (EZ-IO AD) – 10 ml normal saline
        ii. < 40 kg (EZ-IO PD) with 5ml of normal saline
        iii. repeat syringe bolus (flush) as needed
    b. To improve continuous infusion flow rates always use pressure bag or infusion pump
2. Pain:
    a. Insertion of the EZ-IO AD and EZ-IO PD in conscious patients does not require local anesthesia. IO infusion for alert patients has been noted to cause severe discomfort
        i. Prior to IO syringe bolus in alert patients, administer 2% lidocaine (preservative free) through the EZ-IO hub.
            1. EZ-IO AD administer 20 – 40 mg 2% Lidocaine
            2. EZ-IO PD administer .5mg/kg 2% Lidocaine

Equipment:

1. EZ-IO Driver
2. EZ-IO AD or EZ-IO PD Needle Set
3. Alcohol or Betadine Swab
4. EZ-Connect or Standard Extension Set
5. 10 ml syringe
6. Normal Saline (or suitable sterile fluid)
7. Pressure Bag or Infusion Pump
8. 2% Lidocaine (preservative free [cardiac lidocaine])

Procedure: If patient is conscious, advise of the EMERGENT NEED for this procedure and obtained informed consent

1. Wear approved Body Substance Isolation Equipment (BSI)
2. Determine EZ-IO AD or EZ-IO PD indications
3. Rule out contraindications
4. Locate an insertion site:
   - **Proximal Tibia**
     The proximal tibia insertion site is approximately 2 cm below the patella and approximately 2 cm medial to the tibial tuberosity (depending on patient anatomy).
   - **Proximal Humerus** – permitted in pediatrics when landmarks are clearly identified the proximal humerus insertion site is located directly on the most prominent aspect of the greater tubercle. Ensure that the patient's hand is resting on the abdomen and that the elbow is adducted (close to the body). Slide thumb up the anterior shaft of the humerus until you feel the greater tubercle, this is the surgical neck. Approximately 1 cm (depending on patient anatomy) above the surgical neck is the insertion site. This is the preferred site for patients who are responsive to pain. Once the insertion is completed secure the arm in place to prevent movement and accidental dislodgement of the IO catheter.
   - **Distal Tibia** - The distal tibia insertion site is located approximately 3 cm proximal to the most prominent aspect of the medial malleolus (depending on patient anatomy). Place one finger directly over the medial malleolus; move approximately 3 cm proximal and palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone
5. Select the appropriate needle.
   - Medium (blue) 25mm needle: weight ≥ 5 kg
   - Large (yellow) 45mm needle: weight > 40 kg and patients with excessive tissue over insertion sites
6. Prepare insertion site using aseptic technique (If allergic to Betadine, use alcohol)
7. Prepare the EZ-IO driver and needle set
8. Stabilize site and insert appropriate needle set
9. Release the driver's trigger until:
   • There is a sudden "give" or "pop."
   or

• The needle reaches the desired depth at 5 mm, which is indicated on the needle by the black lin

10. Remove EZ-IO driver from needle set while stabilizing catheter hub
11. Remove stylet from catheter, place stylet in shuttle or approved container
12. Confirm placement via aspiration of blood or marrow (Sept 2011)
13. Connect primed (with flush or 2% Lidocaine) EZ-Connect
14. Slowly administer dose of Lidocaine 2% (Preservative Free) IO to alert patients
15. Syringe bolus (flush) the EZ-IO catheter with the appropriate amount of normal saline
16. Begin infusion
17. Utilize pressure (pressure bag or infusion pump) for continuous infusions
18. Dress site, secure tubing and apply wristband as directed
19. Monitor EZ-IO site and patient condition

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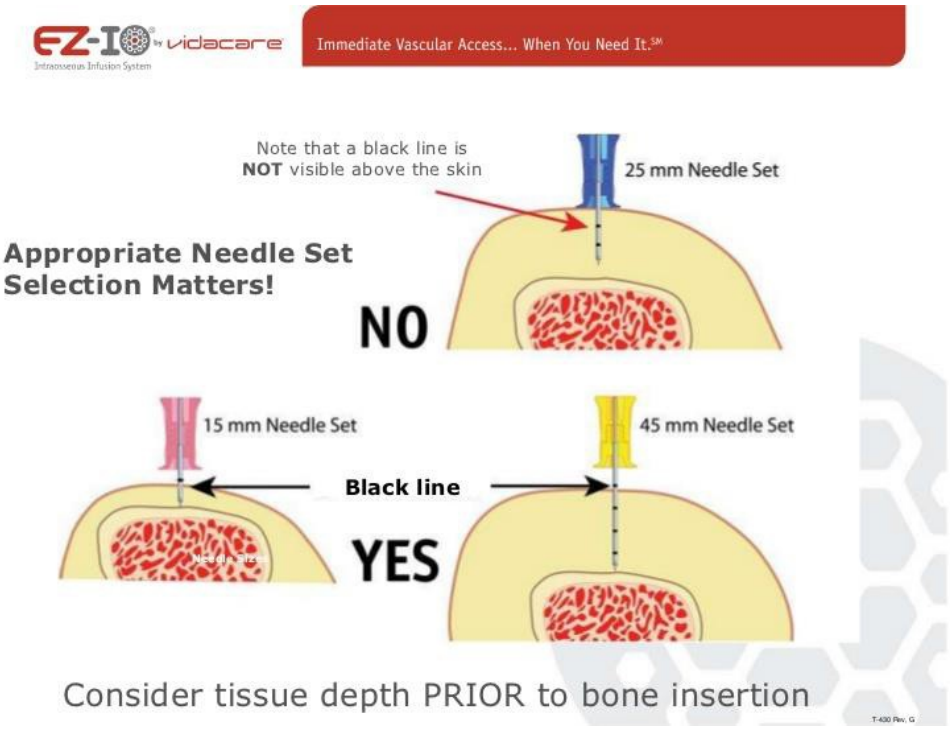

4.18.5. Intravenous Cannulation (IV)

Level: EMT-(B-I-A), EMT-P,

Purpose: To establish access to the patient's vasculature for the administration of fluids and/or medications, to obtain blood samples. **Only EMTs who have had the IV training and signed off by medical director are allowed to start un-medicated IVs**.

Indications:

1. Need for IV access in the emergency setting for the administration of fluids or medications.
2. As a lifeline when there is a high index of suspicion that access may be needed for fluids and medications.

Contraindications: None

Adverse Effects/Complications:

1. Hematoma
2. Air Embolus
3. Pain
4. Infiltration
5. Infection
6. Nerve Injury
7. Thrombosis
8. Over-hydration
9. Cellulitis
10. Phlebitis
11. Sepsis
12. Arterial Puncture

Procedure:

1. Peripheral catheterization procedure:
    a. Locate a suitable venipuncture site. The back of the hand, forearm, and antecubital fossa are preferred sites. The external jugular vein is acceptable if no other suitable site can be found.
    b. Inspect the catheter to be sure that catheter hub and primary push-off tab are fully seated to the needle housing assembly.
    c. Place a constricting band to halt venous return without obstructing arterial flow. Leave one end of the slip knot exposed to assure rapid release when the procedure is complete.
    d. Prepare skin with Betadine or alcohol swabs.
    e. Locate a suitable vein. Palpate one that is well fixed (not rolling) and that does not have valves (firm nubs of tissue) proximal to the intended site of entry.
    f. Secure vein with fingers; ask patient or assistant to secure extremity.
    g. Insert needle and catheter assembly into vein; watch for free blood return.
    h. When intraluminal placement confirmed by blood return, advance the catheter into vein and off of the needle. Remove needle. Remove tourniquet.

i. Attach IV fluid line to catheter hub; insure patency by briefly running fluid WO. Fluid should continue to run at a rate indicated by the status of the patient.
j. Secure catheter with tape, occlusive dressing, and/or Veniguard.

Trauma patients:

1. Establish 2 IV lines
2. Use largest available vein and catheter
3. Use blood tubing for second IV line
4. Avoid IV lines on fractured extremities or on the same side as a significant thoracic trauma.
5. External Jugular Access may be attempted if other peripheral sites not possible (c-spine permitting). ONLY ONE SIDE can be accessed!!
6. When upper extremity sites are inappropriate, lower extremity sites may be used (Medical control suggested)
7. Intravenous access should be attempted en route during rapid transportation of the priority trauma patients
8. For Adults; flow rates are wide open if pressure below 90 mm Hg up to 2000 ml total infused. Assess lung sounds for signs of pulmonary congestion frequently. If BP improves or 2 liters administered, contact medical control for IV rate or additional fluids
9. For Pediatric patients: 20ml/kg. Repeat x 3 max

Medical Patients

1. Establish IV in largest appropriate vein
2. Saline locks may be utilized whenever appropriate, however IVs should only be started if patient requires immediate fluid resuscitation or medication administration.
3. Flush lock after every use with 10cc saline
4. Limit IV attempts on scene when possible
5. Flow rate determined by protocol
6. If no specific rate given in protocol, rate is TKO
7. Monitor lung sounds closely for signs of over-hydration

Drawing Blood

1. Drawing blood is done at the discretion of the paramedic based on the hospital's desire and willingness to accept our samples.
2. Using the Vacutainer's Luer Lock adapter, attach the Vacutainer to the IV catheter. Insert the tube into the vacutainer, puncturing the tube seal. The negative pressure will draw the blood into the tube. When at least halfway filled, remove the tube and reinsert the second tube and repeat.
3. Discard the entire Vacutainer device
4. Write the patient's name and birth date on the tube and deliver to ED personnel

Troubleshooting a Non-flowing IV

- Has the constricting band been removed? This is the most common cause.
- Is there swelling at the cannulation site? This indicates infiltration into the tissues.
- Are the tubing control valves open?
- Does the cannula need to be repositioned because it is up against a valve or wall of the vein? You may have to remove the securing device to check for this condition.
- Is the IV bag hung high enough?
- Is the drip bag completely filled with solution? If it is, turn bag upside down and squeeze the drip chamber to return some of the fluid to the bag.
- Lower the bag below the level of the insertion site. If blood return is seen in the IV site, the site is patent.
- If problems persist, remove the IV and reestablish it at another site.

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4.18.6. Nebulizer Treatment

Level: EMT-P,

Purpose: Delivery of medications, e.g. albuterol and or ipratropium via an inhaled mist.

Indications:

1. Treatment of acute Bronchospasm due to exacerbation of asthma or COPD
2. Albuterol nebs are used as one of the treatments of Hyperkalemia
3. Epinephrine for severe croup

Potential Adverse Effects:

1. Allergic reaction to the medication
2. Failure to achieve the desired dose if patient does not inhale through nebulizer
3. Respiratory depression secondary to high O_2 concentrations with long term COPD

Precautions:

1. Limited treatments to 8 – 10 minutes
2. Discontinue treatment if: LOC decreases or Respiratory rate or depth drops below normal

Procedure:

1. Unless indicated in specific protocols, the patient should be on the cardiac monitor and have an IV established
2. Assemble nebulizer unit and connect to unhumidified oxygen delivery port
3. Place appropriate dose of medication into the reservoir of the nebulizer unit
   a. Albuterol 2.5mg (3ml unit dose). < 2 years old, use 1.25mg (1.5ml)
   b. Atrovent 500microgm (2.5ml unit dose)
      1. Use only in 1st neb treatment
      2. For < 12 years old, use 250 micro gm (1.25ml) in first neb only
4. Adjust oxygen liter flow to administer the treatment over 7 –10 LPM
5. Have patient place mouthpiece of nebulizer into mouth with tightly sealed lips and breathe as deeply as possible.
6. Significantly less medication is delivered using the facemask, do not use unless patient cannot keep a seal without assistance.
   a. Use the mask with an attached nebulizer unit only for patients too fatigued or unable to hold the mouthpiece.
7. Continue treatment until misting of medication has stopped.
8. Place patient back on previous oxygen delivery device and save nebulizer unit for subsequent treatments if necessary
9. Treatments of Albuterol can be given every 15 minutes prn up to three treatments.

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4.18.7. Rectal Administration

Level: EMT-P

Purpose: As an alternative method for administering certain medications

Procedure:

1. Place the patient lying on side with the upper most leg flexed (Sim's position)
2. Use the smallest possible syringe size
3. Draw up into the syringe only the amount of medication ordered
4. Remove the needle from the syringe and dispose of it into a sharps container
5. Apply a small amount of lubricant to the end of the syringe
6. Expose the anus by elevating patient's upper buttock with your non-dominant hand
7. Instruct the patient to take a deep breathe
8. As the patient inhales, gently insert the tip of the syringe into the anus exerting sideways pressure on the syringe to direct it toward the lateral wall of the mucosa
9. Slowly inject the medication taking care to not remove the tip of the syringe
10. Gently withdraw the syringe from the anus.
11. Gently squeeze the patient's buttocks together for up to a minute until the reflex urge to empty the bowel passes
12. Properly dispose of the syringe
13. Remove your gloves by peeling from the hand, turning them inside out. Wash your hands
14. Document the procedure, noting the time, dose and route of the medication.

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4.18.8. EMT Assisted Administration of Rx Medication

Level: EMT-(B-I-A), EMT-P

INHALERS: The EMT may assist the patient in administering prescribed inhalers (e.g. Albuterol, Proventil, Ventolin, Isoethraine, Alupent, metaproteranol, Bronkosol, Bronkometer, etc.) when the patient is experiencing respiratory distress.

1. Initial Patient Assessment Protocol 2.1.1
2. Assure Inhaler is prescribed for patient, check expiration date.
3. If patient is short of breath, has wheezes, and has not administered more than one dose in the last hour, assist the patient in administering inhaler.

NITROGLYCERIN; The EMT may assist the patient in administering prescribed Nitroglycerin when the patient is experiencing chest pain and the systolic BP is > 90 mm Hg. The following procedure should be followed:

1. Initial patient assessment protocol 2.1.1
2. Assure Nitroglycerin is prescribed for patient, check expiration date. Nitroglycerin is contraindicated when patient takes Viagra, Levitra, etc.
3. If patient is having chest pain and systolic BP is > 90 mm Hg, administer Nitroglycerin by either placing a tablet or spray under tongue, one dose.
4. After 3 minutes, if chest pain continues, recheck BP, If systolic BP is ≥ 90 mm Hg, repeat dose.
5. After 3 minutes, if chest pain continues, recheck BP. If systolic BP is ≥ 90 mm Hg repeat dose. Do not repeat dose after third dose given.

ORAL GLUCOSE: The EMT may assist the patient in administering prescribed oral glucose when the patient's blood sugar is < 60mg/dl

1. Initial patient assessment protocol 2.1.1
2. Assure oral glucose is prescribed for patient, check expiration date.
3. If blood glucose is < 60 mg/dl and patient is able to control his/her airway, assist the patient in administering oral glucose.

ASPIRIN: The EMT may assist the patient in administering Aspirin when the patient is complaining of chest pain and there is concern for a cardiac cause.

1. Initial patient assessment protocol 2.1.1
2. Allow patient to take or assist in taking 325 mg Aspirin (one full adult or four baby aspirin).

Epi-Pen (Auto injector Epinephrine): The EMT may assist the patient in administering a dose of Epinephrine via the auto-injection pen.

1. Initial patient assessment protocol 2.1.1
2. Usual site of injection is the outside lateral mid-thigh. Clean with alcohol wipe or similar skin cleanser before injection.
3. See **Epi-Auto Injector protocol**

TYLENOL: The EMT can assist a parent with administering Tylenol (or Ibuprofen) to a child if none has been given in the previous four hours and the child has a documented fever.

4. Initial patient assessment protocol 2.1.1
5. Assist parent in measuring the temperature if it hasn't been taken
6. If temp > 101.0, allow parent to give Tylenol to child per dosing instructions on bottle/package. Should measure out to be 10 mg/kg of acetaminophen.

IBUPROFEN (MOTRIN): The EMT can assist the parent with administering Ibuprofen (or Tylenol) to a child if none has been given in the previous 6 hours and the child has a documented fever.

1. Initial patient assessment protocol 2.1.1
2. Assist parent in measuring the temperature if it hasn't been taken
3. If temp > 101.0, allow parent to give Ibuprofen to child per dosing instructions on bottle/package. Should measure out to be 10 mg/kg of Ibuprofen.

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4.18.9. Indwelling Vascular Access Catheters

Level of training:EMT-P

Indication(s):

1. Any patient with an indwelling catheter whom you need to obtain vascular access for administration of IV fluids and/or medications. This procedure can also be performed if blood collection is needed. ONLY EMS PERSONNEL WHO HAVE BEEN PROPERLY TRAINED IN THIS PROCEDURE ARE TO PERFORM IT.

Contraindications: None

Adverse Effects/Complications:

1. Localized pain and bruising.
2. Rupture of the membrane may occur if pressure >40 mmHg is used during infusion.
3. Infection

Materials needed:

1. Gloves
2. Pre-made "Indwelling Catheter Access Kit" which includes:
    a. ChloraPrep® swab
    b. 20 gauge Huber needle
    c. Sterile 2x2 gauze sponges
    d. Large tegaderm
    e. IV extension set
    f. Saline flush
3. 10, 20 or 30mL syringes (at least 2)
4. Luer-lock blood transfer adapter

Procedure:

1. Explain the procedure and obtain verbal consent.
2. Place the patient in a seated position.
3. Prime the IV extension tubing with normal saline, and clamp the tubing.
4. Ensure that clean gloves are on.
5. Modestly expose the site of the indwelling catheter and palpate the device. Make sure to isolate the base of the device, as well as the septum.
6. Holding the device with your non-dominant hand, vigorously cleanse the site with the ChloraPrep® swab. Use a back-and-forth stroking technique for 30 seconds and cover the entire area with antiseptic. Allow it to air dry for a minimum of 30 seconds.
7. Still holding the base of the device with your non-dominant hand, have your partner hand you the Huber needle and hold it by the wings with your dominant hand.
8. At a 90 degree angle, insert the needle into the center of the septum and advance it until is comes in contact with the bottom of the chamber.
9. You may release the device, but ensure that you don't pull on the tubing.
10. Unclamp the tubing and gently flush 2-3 mL's of normal saline. If the saline does not flush easily, the patient may need to be repositioned or the needle withdrawn a few millimeters.
11. Take the two sterile 2x2 gauze sponges and fold them, placing one under each wing of the needle device.

12. Take a large tegaderm and place over the needle assembly and device. Secure the base of the assembly/extension device with tape.
    a. If blood collection is desired, using a 10-30 mL syringe, withdraw 5-7 mL of blood and discard.
    b. Obtain a new syringe (10-30mL) and withdraw the appropriate amount of blood needed.
    c. Using a lure-lock transfer device, safely transfer blood from the syringe(s) into the appropriate blood collection tubes.

    Note: In some patients, you may be able to administer fluids and medications, but unable to withdraw blood.
13. Flush the line with saline and clamp, or administer any appropriate medications and/or IV fluids.
14. Document the size of the needle, the date, time and your initials on the tegaderm, as well as in the electronic chart.

Notes:

- Once a patient's indwelling catheter is accessed in the field, the patient must be transport to the hospital for appropriate de-accessing (ie, administration of heparin flush solution).
- If you are unsuccessful at accessing the device, simply continue to hold the base of the device and withdraw the Huber needle. The procedure may be repeated.
- Patients are most often aware of the particular behavior of their catheters. It's often beneficial to ask them about any problems with positioning or collection of blood.
- This procedure should be performed under the cleanest of conditions. Maintaining a sterile/sterile-like environment is desired.

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4.19. Morgan Lens

Hyperlink to: Morgan Therapeutic Lens

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4.20. Nasogastric Tube Insertion

Level of training: EMT-P

Purpose: Nasogastric Tube insertion is indicated to relieve gastric distention in the ventilated patient who meet the following criteria:

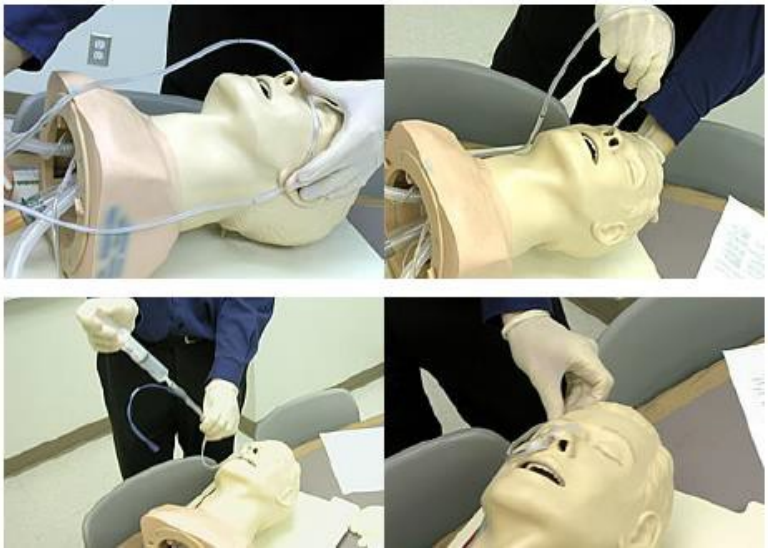
1. The adult patient with noticeable gastric distention that interferes with ventilatory support.
2. Any pediatric patient that is intubated or receives long term (>3 minutes) ventilation by Bag Valve Mask.

Cautions:

1. This procedure should **not** be performed in the presence of frontal head or mid-facial trauma where the cribriform plate may be fractured.
2. **DO NOT FORCE THE NG TUBE**. If resistance is felt, withdraw slightly and gently reinsert using a twisting motion to avoid the turbinates in the nose.
3. The NG tube should be passed in a horizontal position.

Procedure:

1. Ready the proper size tube (adult 16 French/pediatric as per the Broselow Tape 6 - 16 French), 60 cc syringe, water soluble lubricant, and tape.
2. Measure the tube by placing over the stomach region and extend to the ear and then to the nose. (Note tube mark at this time.)
3. Coil the tip of the tube around your finger and stretch the tube to create a slight curve of the tip. This will help navigate the curve in the nasopharynx
4. Lubricate the end of the tube with Lidocaine gel and insert into the largest nares, advancing until the tube mark noted above is at the nares opening. (The conscious patient can assist while swallowing during insertion.)
5. Verify placement by auscultating epigastric sounds while inserting 20-30 cc's of air while listening with your stethoscope over the epigastrium.
6. Tape in place and note depth of tube on the run report.



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4.21. Nitrous Oxide- Nitronox (*For future consideration*)

Level: Paramedic

1. Prepare the equipment. Nitronox units consist of a nitrous oxide cylinder, a blending regulator, an oxygen cylinder, and a mask.
2. Contraindications: altered state of consciousness, COPD, acute pulmonary edema, pneumothorax, decompression sickness, air embolus, pregnancy (except during delivery), abdominal pain with distention or suspicion of obstruction, and inability to self-administer the medication.
3. Turn the oxygen and nitrous oxide cylinder valves to the "on" position. Make sure the device shows appropriate blending of the gases.
4. Attach a mask to the Nitronox unit regulator and provide it to the patient for self-administration. The patient must be able to self-administer the medication; if he/she cannot, Nitronox cannot be used.
5. Monitor the patient's vital signs and pulse oximeter. If the patient's vital signs become unstable or the patient becomes symptomatic from the side effects, discontinue Nitronox.

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4.22. Pediatric Weight-Base Emergency Tape: Broselow and Handtevy

Level of training: EMT-(B-I-A), EMT-P

Purpose: The Broselow Pediatric Emergency Tape and Handtevy System are designed to be used as a quick reference drug dosing and equipment sizing on pediatric patients. The Broselow tape is calibrated in different colors according to different lengths. The color that corresponds to the patient's length is used. If the Broselow bag is also used, the color on the tape can be matched with the color on the pouch that contains the appropriately sized equipment and drugs

Procedure:

1. Place the patient in a supine position.
2. Remove tape from the package and unfold
3. Place tape next to patient, ensuring that the multicolored side is facing up
4. Place red end of tape even with the top of the patient's head
5. Place the edge of one hand on the red end of the tape.
6. Starting from the head, run the edge of your free hand down the tape
7. Stop hand even with the heel of the patient's foot (if patient is larger than tape, stop here and use appropriate adult technique).
8. Verbalize the color block (on edge of tape) and weight range where your free hand has stopped. If patient falls on the line, go to the next higher section.
9. Use the color block (on the edge of the tape) to identify the weight range of the patient.
10. **Use weight range to determine appropriate sizes of equipment and approximate** dosages for medications.

NOTE: The "*First Five Minutes*" tape is used in the same manner as the Broselow Tape. The only difference is the Broselow tape uses color codes where the "First Five Minutes" Tape uses letters

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4.23. Pulse Oximeter

Level: EMT-(B-I-A), EMT-P

Purpose:

SPO_2 monitors display a digital readout showing an estimate of the amount of saturated hemoglobin. Pulse oximetry measures two light frequencies, red and infrared and compares how much of each frequency is absorbed in order to obtain a reading.

Normal SPO_2 readings:

a. Adult: > 94%
b. Children > 94 - 96%

Indications:

1. Any patient requiring monitoring of oxygenation status
2. Mechanical ventilation
3. Oxygen administration
4. Assessing oxygenation during patient assessment

Caution: Withholding oxygen based upon an SPO_2 reading with signs and symptoms of hypoxia (treating the monitor instead of the patient). Many outside factors such as fever, acidosis, and alkalosis affect the SPO_2 reading. Because of this, it is possible to get a reading of 95% and still be hypoxic. Always treat the patient, not the monitor.

Procedure:

1. Use an extremity not being used for BP if possible. Remove any nail polish.
2. Provide oxygen by whatever means is appropriate.
3. Clean selected probe area with alcohol
4. Connect oximetry sensor to patient
5. Assess the SPO_2 reading and document.
   Evaluate the results:
   - Normal range: oxygen saturation of 92-100%
   - Mild distress: oxygen saturation of 90-92%
   - Moderate distress: oxygen saturation of 80-89%
   - Severe distress: oxygen saturation of less than 80%
6. Evaluate the patient for possibly false high readings:
   - Carbon monoxide poisoning: Elevated carboxyhemoglobin can falsely elevate saturation readings because carboxyhemoglobin modulates light similar to oxyhemoglobin as it passes through the tissue.
   - Trauma: Despite a normal saturation level, severe hemorrhage can cause the patient to not have enough blood to perfuse the organs, so that the patient is hypoxic.
7. Monitor for changes.
8. If SPO_2 falls more than 10%, investigate possible causes for decrease:
   a. Respiratory failure (CHF, mechanical, circulatory, etc).
   b. Improper ET tube placement
   c. Pressure changes (altitude in aircraft)

d. Sensor failure due to:
    1. Poor contact.
    2. Circulatory compromise (shock, ASCVD, etc)
    3. Excessive movement
    4. Dirty or bloody site of sensor,
    5. Devices constricting extremity (BP cuff, clothes, etc)
    6. Hypothermia

9. Monitor cardiac rhythm
10. Match SPO_2 monitor with pulse rate
11. Other causes of false readings:
    a. Nail polish or fake nails: may diminish light transmission.
    b. Sickle Cell
    c. Patient movement: may cause the pulse oximeter to not register.
    d. Low blood flow states: may cause the pulse oximeter to not register.
    e. Bright lights
    f. Edema
    g. Peripheral vascular disease
    h. Do not use any extremity that has an AV fistula (dialysis shunt)
    i. Deeply pigmented patients: may diminish light transmission.

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4.24. Patient Restraints

4.24.1. Pediatric Restraint Device (Pedi-Mate)

The Pedi-Mate® is designed to secure infants and toddlers from 10 to 40 lbs (4.5 to 18.1 kg) on a stretcher.

The Pedi-Mate® is designed for use only in an emergency setting and only by suitably trained personnel. Where child restraint is needed outside of this setting, the transport applicable local standards and regulations, including but not limited to, the United States Federal Motor Vehicle Safety Standards and Regulations. The Pedi-Mate® is not designed as an immobilization device and should not be used to immobilize the patient, or as part of an immobilization system.

Positioning the Pedi-Mate®

1. Remove any restraints attached to the cot.
2. Raise the cot backrest and lock in place at an angle between 15 and 45 degrees. This will keep the patient's shoulders higher than the pelvis and maintain the proper center of gravity.
3. Unroll the Pedi-Mate® mattress with all straps extended.
4. Center the blanket left to right on the mattress.
5. Position the blanket with the black backrest strap at the point where you expect the patient's shoulders to rest.
6. Using the Pedi-Mate®
7. Run the ends of the backrest strap around the cot backrest until they meet in the back, then fasten the buckle. Leave some slack in the strap for

Securing the Pedi-Mate® to the stretcher

1. Place the patient on the Pedi-Mate®. If the black backrest strap is not at the patient's shoulder level, adjust the blanket position.
2. With the blanket properly positioned, tighten the strap until the mattress is compressed.
3. Fasten a main frame strap by threading the free end downward between the cot main frame and the mattress next to the head--end sidearm casting.
4. Wrap the strap up around the cot main frame and fasten the buckle. Leave a little slack in the strap for final adjustment
5. Repeat with the other main--frame strap.
6. Tighten each main frame strap by holding onto the buckle with one hand and pulling firmly on the free end of the strap.

Note: *To loosen a main--frame strap, unfasten it, then grasp the buckle tang, and pull outward. Refasten the buckle.*

Securing the Pedi-Mate® to the stretcher

1. Place the patient on the Pedi-Mate®. If the black backrest strap is not at the patient's shoulder level, adjust the blanket position.
2. With the blanket properly positioned, tighten the strap until the mattress is compressed.
3. Fasten a main frame strap by threading the free end downward between the cot main frame and the mattress next to the head--end sidearm casting.
4. Wrap the strap up around the cot main frame and fasten the buckle. Leave a little slack in the strap for final adjustment
5. Repeat with the other main--frame strap.
6. Tighten each main frame strap by holding onto the buckle with one hand and pulling firmly on the free end of the strap.

Securing the Patient

1. Pull the crotch strap buckle up between the patient's legs and lay the strap on the patient's abdomen.
2. Lift a shoulder strap over one shoulder of the patient. Place patient's arm through the strap, then lock the buckle half into the central buckle.
3. Repeat with the other shoulder strap.
4. Thread the shoulder strap on the patient's left side through the chest clip and slide the chest clip to armpit level.
5. To snug the shoulder/torso straps, refer to Figure 6 and use the following procedure:
   - Snug the shoulder strap against the shoulder and chest by pulling the end of the strap of the strap with one hand while steadying the central buckle with the other hand.
   - Repeat with the other shoulder strap.
   - Snug the torso strap by pulling on the end of the strap with one hand while steadying the central buckle with the other hand.
   - Repeat with the other torso strap.
6. Snug the crotch strap by pulling on the free end.

Disinfecting the Pedi-Mate®

Wipe or spray disinfectant on all Pedi-Mate® and surfaces and straps. Follow the disinfectant manufacturer's directions for application and contact time.

Cleaning the Pedi-Mate®

Hand wash the Pedi-Mate® blanket and straps with warm, soapy water and a clean cloth or soft brush. Rinse with clear water. Dry the blanket with a towel and allow the straps to air dry. Do not immerse the buckles in water.

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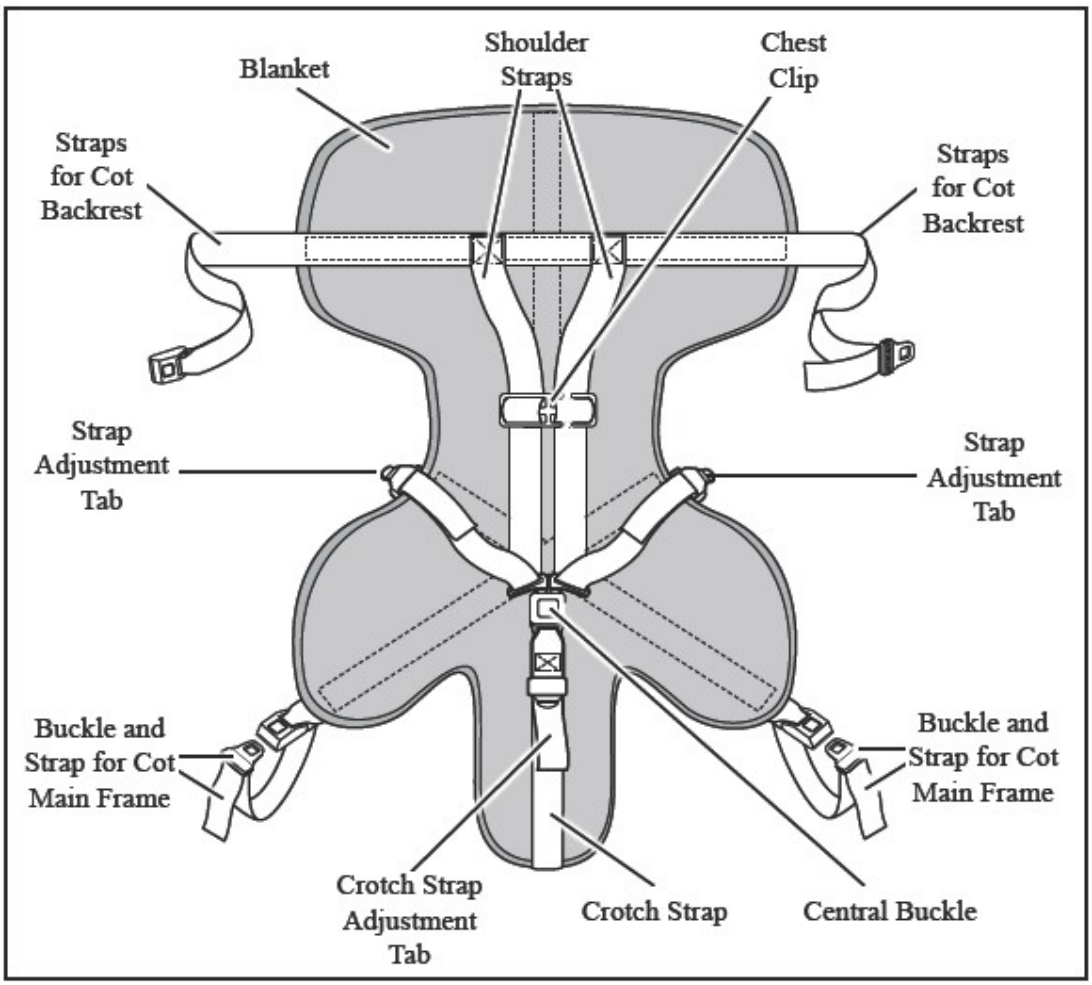
3 Components



4.24.2. Physical Restraints

Level: EMT-(B-I-A), EMT-P

Introduction: Restraint is defined as any mechanism that physically restricts a person's freedom of movement, physical activity, or normal access to his/her body. Restraint should be used only as a last resort, since restraint has the potential to produce serious consequences such as physical and psychological harm, loss of dignity, violation of the individual's rights and even death. Justification for the restraints must be noted in the EMS run report

Indications:

a. Restraint use may be necessary in clinically justified situations (e.g. Incapacitated persons that require emergency medical intervention such as the head injured patient or the patient in shock) and are applied only when less restrictive measures such as pharmacological intervention (when applicable), verbal intervention, and family intervention are deemed ineffective.
b. Restraint use may be necessary for those patients exhibiting behaviors that are harmful to self or others and have been Baker Acted or a patient deemed mentally incompetent and are applied only when less restrictive measures such as pharmacological intervention (when applicable), verbal intervention, and family intervention are deemed ineffective.
c. Restraint use may be necessary for those patients attempting an act that poses an immediate threat of harm to self or others (e.g. attempting to move a live electrical wire, attempting to walk into the path of a moving vehicle, patient is attempting to inflict bodily harm on EMS personnel despite their attempts to flee) and are applied only when less restrictive measures such as verbal intervention are deemed ineffective.

Procedure:

Methods of Restraint

1. **Partial Restraint**
   a. Place patient supine on stretcher
   b. Secure straps across chest, waist and thighs
   c. If necessary, secure wrist and ankles on ipsilateral side (same side) of stretcher frame (not side rails).
   d. Continually insure that restraints do not restrict patient's ventilatory effort.
2. **Full restraint**.
   a. Place patient supine on stretcher
   b. Secure straps across chest, waist, thighs, and calves.
   c. Secure wrists with one arm on ipsilateral side and the other above head on stretcher frame (not side rails).
   d. Secure ankles on ipsilateral sided of stretcher frame (not side rails).
   e. Continually insure that the restraints do not restrict patient's ventilatory effort (beware of positional asphyxia).
3. **Padded backboard** (for purposes of restraining a patient)

a. The patient should be placed supine on a well-padded long spine board (or backboard). Never place a patient in the prone position
   - Use of a long spine board provides the flexibility to easily move the patient should he/she vomits.
   - It also provides a safe means of transfer from the stretcher to the bed.

b. Wrap the cuff pad around each limb.
   - Do not cinch the strap tight. You should be able to insert one finger between the limb and the device.
   - Ensure that the device is properly applied per the manufacturer's instructions, as some products can constrict circulation when improperly installed.

c. Secure one of the patient's arms on the upper part of the long spine board and the other arm on the lower part of the long spine board.
d. Secure the patient's ankles to the lower portion of the long spine board.
e. Secure the strap to the long spine board with a quick-release tie.
f. Check for and correct any circulatory, respiratory, or neurological compromise caused by the restraint.
g. Document the time when the restraint is applied.
h. Utilize the strapping mechanisms of the long spine board to provide additional security and support for the patient with moving.
i. Continuously monitor the patient for the following issues:
   - Tightening of the strap around the limb.
   - Changes in mental status.
   - Changes in vital signs.
   - Changes in pulse oximetry.
   - Changes in capnography
   - ECG changes.
   - Changes in respiratory effort (positional asphyxia).
   - Vomiting.
   - Signs of circulatory and/or neurological compromise at the site of the restraint.
j. Immediately address any changes in patient status.
k. Document the duration of the restraint.

Types of Restraints.

1. **Hard Restraints** (leather or rubber type alternative cuffs and straps)
   a. Choose slot on ankle/wrist cuff, allowing one or two fingers to pass between skin and cuff.
   b. Secure cuff by passing leather strap through anchor on cuff, thread loose end through anchor again.
   c. Thread loose end of strap through mattress support (not side rail) and then through buckle. For restraints with round key, it snaps shut and locks. For flat

key locks, depress button on top of side bar of lock while pushing the side bar in.

d. To unlock, place flat key into slot on opposite side of the side bar until side bar pops out.
e. To unlock round key lock, insert key into fitted hole on top of the buckle and turn to right. To remove key, return to starting position.

2. **Soft restraints (**small towels, sheets, cravats, triangular bandages or webbed straps).
    a. Webbed straps, sheets, or cravats may be used to secure the patient's chest, wrist, thighs, and calves. Secure then to stretcher frame (not side rail).
    b. Small towels, cravats, and triangular bandages may be used to secure the patient's wrists and ankles.
        1. Form a bight around the wrist/ankle and use tape to hold the running ends together close to the patient. Do not use a knot around the patient, as this may later tighten and restrict patient circulation distal to wrist/ankle.
        2. Wrap other end around stretcher frame and either knot or tape as described above.
        3. Do not use tape alone as a restraint.
    c. Webbed straps with Velcro closures may be used for the non-violent patient to secure the wrist and ankles. These types of restraints should not be used for patients who are extremely agitated and unsafe with this type of device.
4. **Manual restraint (**physically holding patient).
    a. Physically holding a patient may be necessary when employing other methods of restraint and when there is an immediate need to protect the patient or others from harm by the patient.
    b. When using manual restraint, care should be taken to avoid harm to the patient and EMS personnel.
    c. Use as many EMS and Police personnel as possible when using manual restraint to limit the chance of harm to the patient or personnel.
    d. Beware of positional asphyxia.

Patient monitoring:

1. Any time physical restraint is used, the patient's status must be monitored with special attention to avoid positional asphyxia.
2. Monitor end tidal CO2 via nasal cannula on all physically and chemically restrained patients. If marked elevation or marked decrease, immediately assess your patient, and in particular, their respiratory status.
3. Note the time the patient was restrained for future reference.

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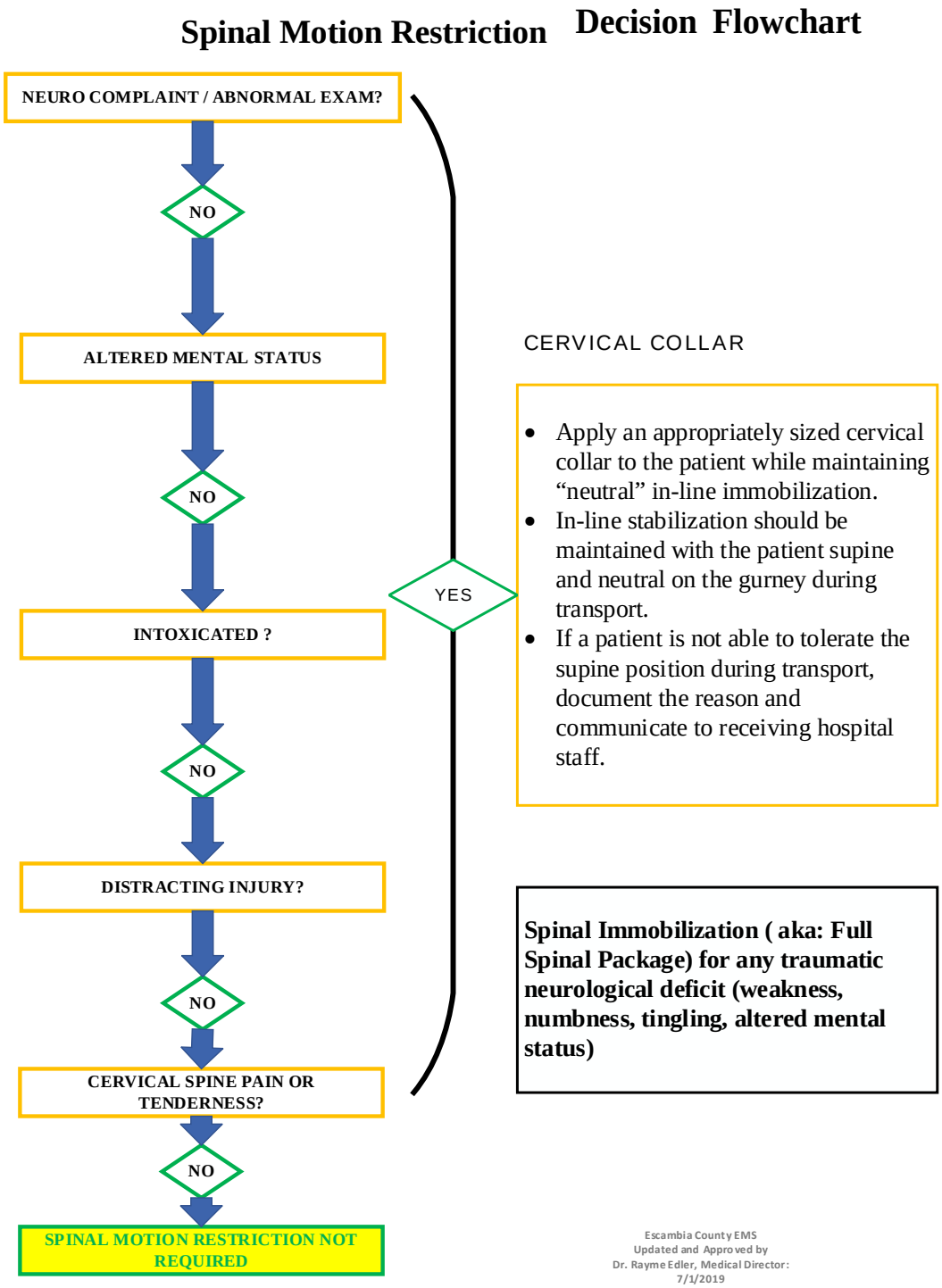
4.25. Spinal Motion Restriction

4.25.1. Spinal Motion Restriction Decision Flowchart



Spinal Motion Restriction Decision Assessment (see flow chart)

i. Spinal motion restriction is required if any of the following is present in the trauma patient (remember NSAIDS):
   1. **N**eurological Deficit (e.g. focal deficit, tingling, reduced strength, numbness in extremity).
   2. **S**ignificant traumatic mechanism and extremes of age (> 75YRS, < 5 YRS).
   3. **A**ltered mental status
   4. **I**ntoxicated or Mental impairment
   5. **D**istracting painful injury- other painful injury that may distract the patient from the pain of c-spine injury
   6. **S**pinal exam reveals point tenderness or pain to range of motion to spinal process (e.g. cervical, thoracic, or lumbar-sacral). Any neck pain with or without movement

ii. If all of the above are absent, spinal motion restriction is not required

iii. The decision not to implement spinal motion restriction is the responsibility of the Paramedic. The patient's cervical spine will PHYSICALLY be assessed by the Paramedic or EMT. The findings WILL be documented on the ePCR

iv. Pearls:
   1. The patient should be oriented to person, place, situation and time.
   2. Significant mechanism of trauma includes windshield spider, dash deformity, ejection, rollover, and space invasion of > 1 foot.
   3. Patient's range of motion should not be assisted. The patient should touch their chin to their chest, extend their neck (look up), and turn side-to-side (shoulder-to-shoulder) without pain.
   4. Major injuries that may distract a patient's awareness of pain include pelvic fracture, femur fracture, extensive burns or soft tissue injury, acute abdomen, or significant pain from other injuries.

v. IF DECISION MADE TO Restrict Spinal Motion:
Spinal Motion Restriction Equipment:
   1. Long spine board.
   2. Appropriate Cervical Collar
   3. Cervical immobilization device (CID)
      a. Headbed
      b. Ferno head block
      c. Blanket roll
   4. Straps (minimum of 3)
   5. Padding (for head)
   6. Tape (2 inch or 3 inch)
   7. Additional devices (KED, Pediatric Immobilizer)

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vi. Spinal precautions can be maintained by application of a cervical collar and securing patient firmly to the stretcher without a long backboard if all 4 of these criteria are met:

1. Patient is ambulatory at the scene
2. Patient does not demonstrate an altered level of consciousness or inability to communicate
3. Patient does not have complaints suggestive of spinal injury
4. Patient does not have distracting injuries

Spinal Motion Restrict all patients with the following conditions:

- High voltage electrical injuries (does not include Taser use)
- Shallow water drowning or diving injuries

If spinal motion restriction is indicated but refused by the patient:

- Advise the patient of the indication for immobilization, and the risks of refusing the intervention
- If the patient allows, apply the cervical collar even if backboard is refused
- Maintain spinal alignment as best as can be achieved during transport
- Clearly document refusal of spinal motion restriction

If spinal motion restriction is indicated but the patient cannot tolerate supine position:

- Apply all elements of spinal motion restriction that the patient will tolerate
- Maintain spinal alignment as best as can be achieved during transport
- Clearly document the clinical condition that interfered with full spinal motion restriction

4.25.2. Supine/Prone Position

1. Begin with manual immobilization of the head in a neutral, in-line position. Manual immobilization should be provided without interruption until complete patient immobilization is accomplished.
2. Contraindications to placement in an in-line position.
    a. Neck spasm that prohibits neutral alignment.
    b. Increased pain
    c. Onset of or increase of a neurological deficit such as numbness, tingling, or loss of motor ability.
    d. Compromise of the airway or ventilation
    e. If the patient's injuries are so severe that the head presents with such misalignment that it no longer appears to extend from the midline of the shoulders.
3. Size and apply the appropriate cervical collar. To size the collar, measure the distance, using your fingers, between the bottom of the jaw to the top of the trapezius muscle or according to manufacturer's recommendations. (NOTE:

In the rare instance an appropriately sized cervical collar is not available, maintain manual immobilization and complete the spinal motion restriction process without a cervical collar.)

4. While maintaining manual stabilization with a cervical collar in place:
    a. Log roll the patient.
    b. Position the backboard next to the patient so that the head of the backboard is approximately 1-2 feet above the patient's head
    c. Roll the patient onto the backboard in a supine position.
    d. Reposition patient, in order to center on backboard, by sliding patient in an upward motion (axial) on the board. Do not slide patient in a direct lateral position, as this may manipulate the spine.
5. Place cervical motion restriction device in place.
6. Pad the space, as needed, between the back of the head and the backboard to prevent hyperextension of the cervical vertebrae.
7. Secure the patient's body to the board with straps.
    a. Immobilize the upper torso to prevent upward sliding of patient's body during movement and transportation. This can be accomplished by bringing straps over the shoulders and across the chest to make an X.
    b. Additional straps must be placed to prevent side-to-side movement of the body on the board. This can be accomplished by placing straps across the iliac crests and mid-to-distal thigh or at the pelvis with groin loops.
    c. Arms should be placed at the patient's side to prevent movement of the shoulder girdle.
    d. Secure both feet together to prevent rotary movement of the legs.
    e. Apply 1 or 2 inch tape directly across the forehead and secure the head while extending the tape under the backboard. DO NOT apply tape directly under the chin as this may create an airway obstruction. Tape may be placed across the surface of the semi-rigid cervical collar.

4.25.3. Pediatric Spinal Motion Restriction

1. Manually immobilize the patient's head in a neutral, in-line position. Manual immobilization should be provided without interruption until complete patient immobilization is accomplished.
2. Contraindications to placement in an in-line position:
    - Neck muscle spasm that prohibits neutral alignment.
    - Increased pain.
    - Onset of or increase of a neurological deficit such as numbness, tingling, or loss of motor ability.
    - Compromise of the airway or ventilation.

- If the patient's injuries are so severe that the head presents with such misalignment that it no longer appears to extend from the midline of the shoulders.

3. Size and apply a cervical collar according to the manufacturer's recommendations.
4. While maintaining manual stabilization with a cervical collar in place:
   - Log-roll the patient.
   - Position the pediatric immobilizer next to the patient so that the head of the immobilizer is approximately 6-12 inches above the patient's head.
   - Roll the patient onto the backboard in a supine position.
   - Reposition the patient to center him/her on the immobilizer, by sliding the patient in an upward motion (axial) on the immobilizer.
   - Do not slide the patient in a direct lateral position, as this may manipulate the spine.
5. Secure the patient's body to the board with straps.
   - Pediatric immobilizers with integrated strapping design: Secure them according to the manufacturer's recommendation.
     or
   - Immobilize the upper torso to prevent upward sliding of the patient's body during movement and transportation. This is accomplished by bringing the straps over the shoulders and across the chest to make an X.
   - Additional straps must be placed to prevent side-to-side movement of the body on the board. This can be accomplished by placing the straps across the iliac crests and mid-to distal thigh or at the pelvis with groin loops.
6. If the patient is so small that there is a space left between straps and sides of patient, take up space with pads (e.g., blanket, towel).
7. The patient's arms should be placed at his/her side to prevent movement of the shoulder girdle.
8. Secure the patient's head with a cervical immobilization device.
   - Commercially available cervical immobilization device: Follow manufacturer's recommendation
     or
   - Towel rolls applied to each side of the head: Secure the towels by placing 1- or 2-inch tape directly across the patient's forehead to the underpart of the backboard. Also secure the towels with tape across the surface of the semi-rigid cervical collar to the underpart of the backboard. Do not apply tape directly under the patient's chin, as this may create an airway obstruction.
9. Pad the space, as needed, between the back of the patient's head and the backboard to prevent hyperextension of the cervical vertebrae.

4.25.4. Vest-type Extrication Device (KED)

1. Rescuer One should be positioned behind the patient to stabilize the head and neck.
2. Contraindications to placement in an in-line position:
    - Neck muscle spasm that prohibits neutral alignment.
    - Increased pain.
    - Onset of or increase of a neurological deficit such as numbness, tingling, or loss of motor ability.
    - Compromise of the airway or ventilation.
    - If the patient's injuries are so severe that the head presents with such misalignment that it no longer appears to extend from the midline of the shoulders.
3. Rescuer Two checks neurological and vascular response of all extremities.
4. Rescuer Two measures and applies the cervical collar.
5. The KED is slide into position behind the patient.
6. The KED is wrapped around the patient, and the middle strap is secured. The KED should be snug beneath the patient's armpits.
7. The bottom strap is secured next.
8. Each leg strap is wrapped around the leg and secured.
9. The top strap of the KED is secured.
10. The patient's head is secured into the KED.
11. All of the straps are tightened down.
12. The patient's wrist and legs are secured.
13. A long spine board is placed under the patient's buttocks.
14. The patient is removed from the vehicle and transferred to the long spine board.
15. Disconnect the leg straps, allowing the patient's legs to lay flat on the long spine board.
16. Secure the patient to the Long Spine Board.

Note: Neurological and vascular checks should be performed on the patient prior to and after extrication, and any changes noted.

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4.26. Splinting

4.26.1. Rigid Splint

1. Expose the injured area.
2. Evaluate the patient's distal pulse, motor function, and sensory function.
3. Align the extremity, stabilize it, and support the extremity. Do not align a joint injury if resistance is met.
4. Acquire the appropriate-length wood planks. Provide padding to ensure even contact with the splint.
5. Place the wood on each side of the injury.
6. Secure the extremity to the rigid splint with tape, cling, or Ace wraps.
   - Long bone injury: Immobilize the joint above and joint below the injury.
   - Joint injury: Immobilize the bone above and bone below the injury.
7. Reevaluate the patient's distal pulse, motor function, and sensory function.

4.26.2. HARE Traction Splint

Level of training: EMT-(B-I-A), EMT-P

Purpose: The hare traction splint is designed to be used on those patients who have suffered a suspected femur fracture. Proper use can decrease the pain and damage caused by the fracture.

Indications: suspected femur fracture

Contraindication: Open femur fracture

Procedure:

1. Upon recognizing the injury, Rescuer One should stabilize the leg in position found while applying manual traction.
2. Rescuer Two will then expose the injured leg
   a. Assess neurological function distal to injury site.
   b. Assess circulatory function distal to injury site.

3. Rescuer Two should prepare traction splint
    a. Position splint against injured leg.
    b. Place the ischial pad against the iliac crest.
    c. Adjust splint to length, extending the splint so the bend is even with the heel of the foot.
    d. Tighten locking collars.
    e. Open and position the Velcro straps along the splint.
    f. Release the ratchet, extending the entire length of the traction strap.
    g. Place the splint next to the injured leg.
4. Rescuer Two should apply the ankle hitch to the patient.
5. Rescuer Two should apply gentle but firm traction.
6. Rescuer One will now move the splint into position. Slide the splint into position under the injured leg.
    a. The splint should be firmly seated against the ischial tuberosity.
7. Rescuer One secures the pubic strap.
    a. The strap is brought over the groin and high over the thigh and secured.
8. Rescuer One attaches the ankle hitch to the traction splint.
9. The traction strap is taken in, applying mechanical traction until the pain and muscle spasms are relieved.
    a. Maintain manual traction until the mechanical traction takes over.
    b. Traction can be stopped when the injured leg is approximately the same length as the uninjured leg.
10. Secure the remaining Velcro straps around the leg.
11. Reevaluate all of the straps.
    a. When splint is properly applied, the patient's foot should be upright.
12. Reassess circulation and neurological function distal to injury site.
    a. Compare to original findings and note any changes.
13. Transport patient on firm surface, such as a long spine board, so that the splint is supported.

Notes:

1. If the patient is determined to be unstable, do not waste time applying the traction splint. Splint the injured leg against the uninjured leg to expedite transport.
2. Continue to monitor patient's vital signs during transport
3. Continue to reassess circulatory and neurological function distal to injury site.
    a. Compare to original findings and note any changes.
4. If the hospital has not removed the splint prior to departing, request the hospital staff **to notify the EMS Supervisor once the splint is removed. It should be picked up as** soon as possible and placed back on the unit.

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4.26.3. Sager Traction Splint

1. Assemble two-person team
2. Check distal pulses and sensation (be certain to document the presence/ absence of pulses and sensation).
3. One team member may maintain slight manual traction on the fractured leg. Check distal pulses and sensation (document again).
4. Assemble the splint and adjust to the proper length. Adjust the ankle strap to the approximate size of the patient's ankle.
5. Place the padded brace between patient's legs, resting the ischial perineal cushion against the ischial tuberosity. Avoid undue pressure on external genitalia. Apply the abductor bridle (thigh strap) around the upper thigh of the fractured leg and tighten firmly. The perineal area and the area under the abductor strap may be padded with a towel for comfort and to minimize pressure over the femoral vessels. Extend the inner shaft of the Sager until the crossbar rests adjacent to the patient's heels.
6. Position the malleolar (ankle) harness beneath the heel(s) and around the ankle(s). Secure these snugly.
7. Shorten the loop straps on the harness to ensure that the cable ring is secure up against the foot.
8. Grasp the shaft with one hand and the traction bar with the other hand, gently extend the inner shaft until the desired amount of traction is obtained on the calibrated scale located on the wheel. The correct amount of traction would be approximately 10% of body weight to a maximum of 15 pounds. If more traction is indicated, contact on-line Medial Control.
9. Posterior to the knees, gently slide the largest elastic cravat through and upwards to the thigh, repeating with the smaller elastic cravats to minimize lower and mid-limb movement.
10. Re-tighten the adductor bridle (thigh strap) at the upper thigh and firmly secure the three elastic cravats.
11. Apply pedal binding (figure eight strap) to feet.
12. Check and document pedal pulses and sensation.
13. Consider elevating the extremity. Stabilize extremity to backboard or stretcher (be certain that splint does not extend past backboard or stretcher to avoid contact with door).

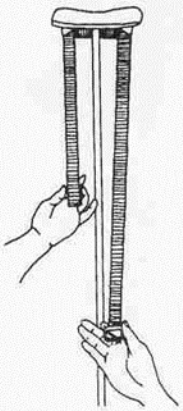
SAGER®
Emergency Traction Splints

BASIC APPLICATION

SAGER 201 Single Leg Traction Splint **pg. 1 & 2**
SAGER 202 Bilateral Leg Traction Splint **pg. 3**
SUPER SAGER 204 Bilateral Traction Splint **pg. 3**

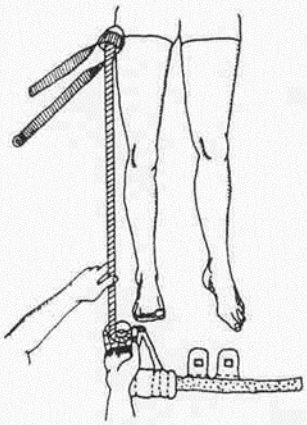
Training Video available in VHS for Super Sager 204.
*Coming Spring 1990—Training Video for Sager 201.

1



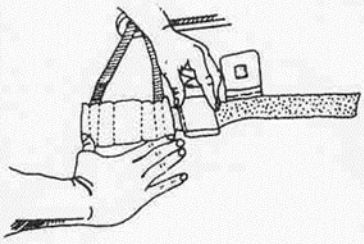
Before applying the splint to the leg, slide the adductor bridle (thigh strap) so that when it is closed, it will be located on the anterior (top) surface of the thigh.

2



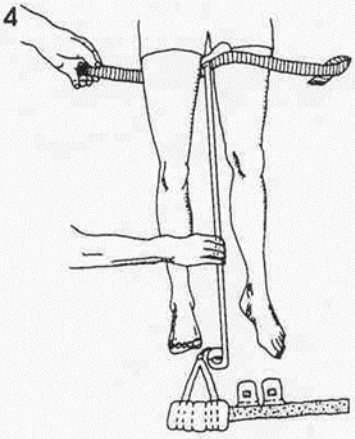
*Prior to application of the splint, get a rough measure of the length of splint needed. Extend it so that **the wheel is at the heel.** NOTE: Patients wearing tight jeans or underclothing, especially males, may not find the splint comfortable to wear unless clothing is removed or cut open, which, of course, should be done as part of patient evaluation prior to application of splint.

3



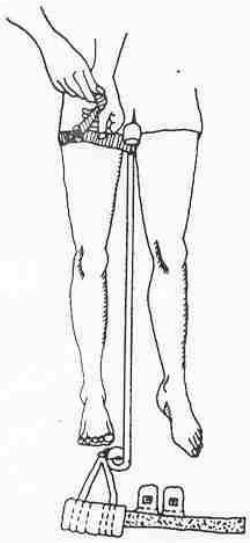
Roughly estimate the size of the ankle and fold down the number of pads needed to provide padding all around the lower leg.

4



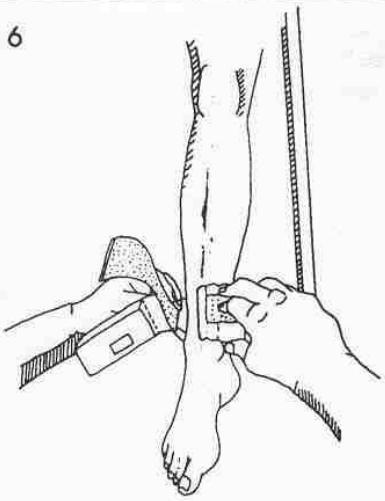
Grasp the adductor bridle and slide it up under the thigh so that the perineal cushion is snug against the perineum and ischial tuberosity.

5



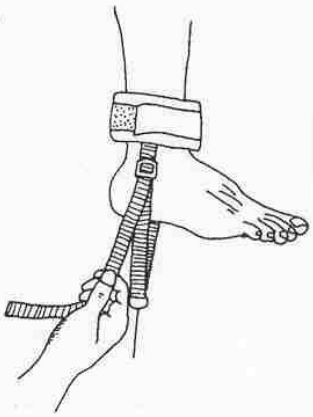
Tighten the adductor bridle (thigh strap), drawing the ischial perineal cushion to the lateral portion of the crotch.

6



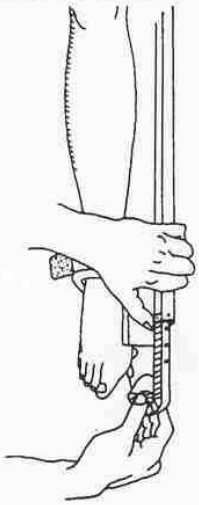
Apply the malleolar (ankle) harness tightly around the ankle above the medial and lateral maleoli of the ankle. ***Check posterior tibial and dorsalis pedis pulses before hitch application and after traction is established.**

7



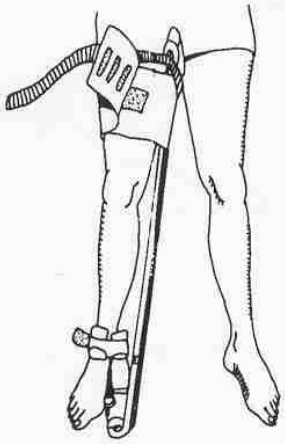
Shorten the loop of the harness connected to the cable ring by pulling on the strap threaded through the square "D" buckle. Do this to ensure that the cable ring is pulled snugly up against the bottom of the foot.

8



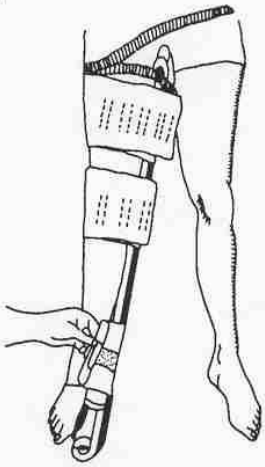
Extend the inner shaft of the splint by pulling it out until the desired amount of traction is noted on the calibrated wheel. Rough guide to determine amount of traction needed: apply 10% of body weight to maximum of 15 pounds (6.8 kgs.) traction.

9



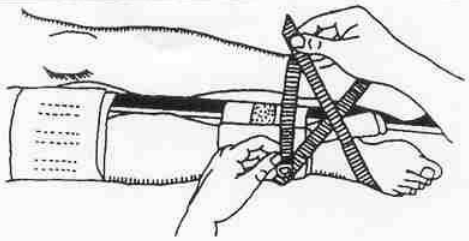
Apply the longest elasticized leg cravat as high up the thigh as possible.

10



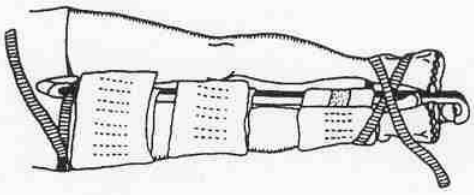
Apply the remaining elasticized leg cravats: a.) Around knee. Use padding if needed. b.) Over the malleolar (ankle) harness and lower leg.

11



Apply pedal pinion (figure eight strap) around both ankles by slipping the strap under the ankles. Cross strap over the feet as noted and secure snugly.

12



Patient's leg is now secured, traction is controlled, fractured distal fragment is prevented from moving or rotating. Patient is ready for strapping to spine board for transport. *Document absence or presence of distal pulses.

FEATURES

1. One Person Application - frees 2nd attendant for other patients and procedures.
2. Compatible with Anti-Shock Trousers - inside or outside.
3. Universal - single or bilateral (S202 and S204), adult or child (S201, S202 and S204).
4. Patient can be moved to any position with splint in place.
5. Light weight. Small storage space.
6. Nothing to assemble, ready for use.
7. Applied in any patient position.
8. Compatible with back boards, stretchers, baskets and gurneys.
9. Stays within the body silhouette (Model S-204 only).
10. Quantifiable Dynamic Traction. (Patented!!)

BENEFITS

1. Prevents excessive traction. Traction is "quantifiable", a positive consideration for Medical Legal Purposes.
2. Can be applied in a confined space.
3. No Sciatic Nerve compression (neuropraxia).
4. SAGER's counter traction design permits movement and lifting without slippage of traction device.
5. Secures and packages patient for optimal transportation.
6. Easy access to Dorsalis Pedis and Posterior Tibial pulses.
7. Does not require foot to be elevated, anatomically allows for natural body alignment.
8. Traction device can be applied with minimum movement of fractured leg(s).
9. No body weight limitation.

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4.27. tPA; Interfacility Transport of Patient on tPA

(Interfacility Transfer – Stroke-IV tPA)

Level: EMT-P or CCT-P (Certain states may restrict tPA transports to critical care paramedics)

Purpose: To provide guidance for safe transport of patients who are receiving or have received intravenous tissue plasminogen activator (tPA) for treatment of ischemic stroke. Because of the critical nature of the patient that requires administration of tPA, the order/preference for the consideration of transportation should be as follows:

1) Call for helicopter transport (or fixed wing if long distance)
2) Send a nurse with the ground crew
3) Critical care medic with prior notification to Med Director*
4) Standard ALS ground crew w/ prior notification to Med Director*

*reserving the right to call for helicopter transport if available.

Procedure:

1. Perform and Document initial neurologic exam (See tPA Inter-facility Transfer Protocol form at end).
2. Perform and Document vital signs prior to transport. If SBP>180 or DBP >105 discuss treatment of hypertension with sending hospital prior to transport and obtain necessary medications
3. Oxygen to maintain pulse oximetry >94%.
4. Cardiac Monitor
5. Glucometer. If patient is hypoglycemic, treat using Hypoglycemia Protocol (3.21). It is preferable to use the blood glucose measurement obtained by the transferring hospital in order to avoid unnecessary delay.
6. Establish or maintain IV access.
7. Patient must remain NPO (nothing by mouth) including medications
8. The Paramedic is NOT authorized to give the tPA bolus but IS authorized to maintain the tPA infusion. tPA may only be given if ordered and started at the sending facility.
9. Monitor and document neurologic exam every 15 minutes. If patient develops worsened neurologic condition or if patient develops severe headache, acute hypertension, difficulty breathing, evidence of allergic reaction, or major bleeding then stop the tPA infusion (if still infusing) and contact OLMD.
10. Monitor and document vital signs every 15 minutes. If antihypertensive medications (Labetalol, Nicardipine, Metoprolol) are started or ordered at the sending facility, they may be continued for SBP>180 or DBP>105.

Potential medications involved (supplied by sending facility):

1. ***tPA****:*

   0.9 mg/kg IV; not to exceed 90 mg total dose; administer 10% of the total dose as an initial IV bolus over 1 minute and the remainder infused over 60 minutes

2. ***Labetalol infusion****:*
   2mg/min and increase by 2 mg/min every 10 minutes to MAX 8 mg/min for goal SBP<180 and/or DBP<105. If SBP<140 or DBP<80 or HR<60, discontinue drip and call OLMD

3. ***Nicardipine infusion****:*
   2.5 mg/hr and increase by 2.5 mg/hr every 5 minutes to MAX 15 mg/hr until BP<180 and/or DBP<105. If SBP<140 or DBP<80 or HR<60, discontinue drip and call OLMD
4. ***Metoprolol****:*
   5 mg IV, may repeat every 5 min to MAX 20 mg. Hold if SBP<140 or DBP<80 or HR<60

Note:

- Verify and Document the time of initial IV tPA bolus and time of infusion completion.
- If IV tPA dose administration will continue en route, verify estimated time of completion and amount to be infused. Verify with the sending hospital that any excess tPA has been withdrawn from the tPA bottle and wasted so that the tPA bottle will be empty when the full dose is finished infusing. For example, if the total dose is 70 mg, there would be an extra 30cc in the tPA bottle that has to be withdrawn and wasted since a 100 mg bottle of tPA contains 100cc of fluid when reconstituted.
- At the completion of the tPA infusion, infuse 100cc of NS to flush the remaining tPA from the IV tubing so that the patient receives the full dose of tPA.
- Avoid unnecessary venipuncture or invasive procedures when possible due to increased risk of bleeding in patients receiving tPA.
- Do not infuse other medications in the same IV where tPA is infusing.
- Do not cycle blood pressure on the same arm where tPA is infusing.
- Rarely, patients can have allergic reactions to tPA including but not limited to angioedema. If this happens, treat the patient according to the Allergic Reaction protocol.
- If NIH stroke scale is documented at sending facility, note that on the patient's ePCR.

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4.28. Vagal Maneuvers

Level: EMT-P

Description and Indications:
The degree of stimulation in the vagus nerve affects the heart rate. The greater the degree of vagal stimulation, the more the vagus nerve will SLOW the heart rate inhibiting the SA node. Therefore, vagal stimulation is modality in the treatment of clinically dangerous supraventricular tachycardia (SVT) due to primary cardiac rhythm disturbances, such as paroxysmal reentry disorders.

Contraindications:
Carotid sinus massage should not be used in patients with inequality of carotid pulses or past history of carotid surgery (endarterectomy). Do not use these procedures to treat SVT secondary to hypovolemia. Due to the risks of the procedure, it should only be employed when the SVT itself poses a significant clinical danger.

Warnings:
Carotid sinus massage may break off a plaque in the elderly and patients who have diabetes or hypertension, resulting in a CVA secondary to the embolus. Bradycardia or asystole may occur during stimulation; hence, ALL vagal stimulations must be performed under constant ECG monitoring.

Procedure**:**

4.28.1. Valsalva maneuver - This is the least dangerous method and should be used before others are attempted. The procedure may be repeated.

1. Attach the patient to an ECG for continuous monitoring.
2. Establish intravenous access.
3. Determine that the patient is conscious and cooperative.
4. Document the ECG and any dysrhythmia.
5. Describe the procedure to the patient.
    - Have the patient inhale and hold his/her breath.
    - Bear down as if to have a bowel movement.
    - Hold for 20-30 seconds.
    - Try to turn the face red.
      OR
    - Have the patient blow forcefully through a straw or IV catheter for as long as possible.
6. Continue to monitor the heart rhythm during the procedure. Stop the procedure if:
    - The patient becomes confused.
    - The heart rate drops below 100 BPM.

- Asystole occurs.

4.28.2. Ice water immersion of the face - This technique should be attempted if the Valsalva was ineffective. The results, if any, will be almost immediate. This procedure may be repeated. This method should NOT be used in patients with a cardiac history (e.g. MI, angina, HTN, heart transplants, etc.).

1. Attach the patient to an ECG for continuous monitoring.
2. Establish intravenous access.
3. Determine that patient is conscious and cooperative.
4. Note that this procedure is contraindicated for patients with history of acute coronary syndrome, hypertension, and heart transplant.
5. Document the ECG and any dysrhythmia.
6. Describe the procedure to the patient.
    - Fill a large basin or sink with ice water. It must be very cold.
    - Ask the patient to hold his/her breath and put the entire face into the water for several seconds.

    OR
    - Fill a large latex exam glove with ice water.
    - Place the glove on the patient's face for several seconds.
7. Continue to monitor the heart rhythm during the procedure. Stop the procedure if:
    - The patient becomes confused.
    - The heart rate drops below 100 BPM.
    - Asystole occurs.

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4.29. Wound Care

4.29.1. Hemostatic Gauze (QuickClot, Celox, Combat Gauze, etc.)

Indications

1. Wounds involving the scalp, face, neck, axilla, groin or buttocks.
2. Severe wounds that cannot be controlled by other means (direct pressure/tourniquet).
3. Junctional hemorrhage

Contraindications

1. Avoid contact with eye injuries
2. Vaginal bleeding
3. Internal bleeding
4. Open abdominal or chest wounds

Procedure

1. Provide supportive care.
2. 2. Apply direct pressure to wound or proximal pressure point (axillary junction or medial groin).
3. If extremity wound and a trauma tourniquet is indicated, apply tourniquet.
4. If direct pressure is insufficient, apply hemostatic dressing; maintain direct pressure when using hemostatic dressing.
5. Open the hemostatic dressing package and remove dressing.
6. Remove clothing around wound. Remove excess pooled blood from wound with gauze.
    a. Preserve any clots already in the wound to aid in the clotting process.
    b. When the source of the bleeding is located, pack the wound tightly and directly onto the wound with the hemostatic dressing.
    c. Use as much of the dressing as needed to stop the blood flow. The remainder of the dressing can be used to cover the top of the wound.
7. Quickly apply pressure until the bleeding stops. Estimated time 3-5 minutes of continuous pressure.
8. Leave the hemostatic dressing in place and wrap the area with kling or ace bandage to secure wound and dressing.
9. Do NOT remove the bandage or hemostatic dressing, elevate the injury if needed.
10. Reassess the wound and patient for any changes and document.
11. Transport the patient to the appropriate trauma center.

Note:

Hemostatic dressings are NOT appropriate for minor bleeding, bleeding that can be controlled by direct pressure, or bleeding that can be controlled by the application of a trauma tourniquet.

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4.29.2. C-A-T TOURNIQUET (Combat-Application-Tourniquet)

Level of training: EMT-(B-I-A), EMT-P

Purpose: This protocol is to be used by EMTs or Paramedics to control life threatening hemorrhaging and prevent exsanguinations in situations where there is a serious injury to an extremity with severe bleeding and direct pressure fails to control the bleeding.

Indications for tourniquet use:

1. To stop bleeding when;
    a. Life-threatening limb hemorrhage is not controlled with direct pressure or other simple measures, as may occur with a mangled extremity.
    b. Traumatic amputation has occurred.

Contraindications:

1. Non-extremity hemorrhage
2. Proximal extremity location where tourniquet application is not practical.

Procedure: Application of Combat Application Tourniquet (CAT)

1. Placement
    a. Expose the extremity by removing clothing in proximity to the injury.
    b. Place CAT directly over exposed skin at least 5 cm proximal to the injury.
    c. Route the self-adhering band around the extremity.
    d. Pass the band through the outside slit of the buckle.
    e. Pull the self-adhering band tight and secure the band back on itself with the Velcro adhesive strap.
    f. Twist the rod until bright red bleeding stops.
    g. Lock the rod in place with the windlass clip.
    h. Record the date/time of application on the tourniquet.
2. Evaluation
    a. The tourniquet is effectively applied when there is cessation of bleeding from the injured extremity, indicating total occlusion of arterial blood flow.
    b. Any preexisting distal pulse should be absent at that time as well.
3. Tourniquet time and removal
    a. Tourniquets should be removed as soon as possible under conditions where the hemorrhage can be directly controlled.
    b. Tourniquet placement must be communicated in patient reports for all pre-hospital to hospital and inter-hospital transfers.
    c. Tourniquet time > 6 hours is associated with distal tissue loss

Training: Appropriate tourniquet use requires initial and annual renewal training with skill demonstration.

Note: If one tourniquet correctly applied does not completely control hemorrhage, in addition to direct pressure, an additional tourniquet may be applied just proximal to the first tourniquet. Once bleeding has been controlled by a tourniquet, leave the tourniquet in place throughout the remainder of scene care and transport.

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5 Drug Reference

5. QUICK DRUG REFERENCE

Purpose: This section contains a brief description of drugs used in these protocols. This list will be periodically updated as new drugs are added and some removed. It is intended to supplement other standard references (Paramedic Emergency Care, ACLS, PALS, BTLS, PHTLS, etc). Drugs are listed alphabetically by their generic name. Trade names are shown in parentheses.

5.1 MEDICAL PROTOCOL DRUGS

5.1.1 Adenosine (Adenocard)

Class: Antiarrhythmic

Actions: slows AV conduction. Adenosine exerts its effects by decreasing conduction through the AV mode. The half-life of Adenocard (Adenosine) is less than 10 seconds. Thus, its effects, desired and undesired, are self-limited

Indications: symptomatic PSVT, including that associated with accessory bypass tracts (Wolf-Parkinson-White Syndrome). NEW: *It can now also be used for regular monomorphic wide-complex tachycardia.*

Contraindications: second- or third-degree heart block, sick-sinus syndrome, known hypersensitivity to the drug.

Precautions: Arrhythmias, including blocks, are common at the time of cardioversion. Use with caution in patients with asthma. Make sure that adenosine is not used for irregular, polymorphic wide-complex tachycardia or VT. Use in these cases may cause clinical deterioration.

Side Effects:

Serious: Severe bradycardia, V-fib, V-tach, atrial fib, asystole, complete heart block, bronchospasm

Common: Facial flushing, headache, shortness of breath, dizziness, nausea, brief asystole or bradycardia.

Dosage: 6 mg given as a rapid IV bolus over a 1-2 second period followed by a 20 ml bolus of NS; if, after 1-2 minutes, cardioversion does not occur, administer a 12-mg dose over 1-2 seconds followed by a 20 ml NS bolus. All efforts should be made to administer adenosine as quickly as possible.

Routes: IV, IO; should be administered directly into a vein or into the medication administration port closest to the patient and followed by flushing of the line with IV fluid.

Pediatric Dosage: 0.1 mg/kg (max. 6 mg) rapid IVP immediately followed by 6 ml NS flush. Repeat in 2 minutes, at 0.2 mg/kg (max. 12 mg) rapid IVP followed by 6 ml NS flush PRN.

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5.1.2 Acetaminophen (Tylenol)

Class: Analgesic, Antipyretic

Actions: Analgesic mechanism of action unknown, antipyretic effect via direct action on the hypothalamic heat-regulating center

Indications: Mild pain, fever

Contraindications: hypersensitivity to drug class

Precautions: Hepatic impairment, renal impairment (long term use), severe hypovolemia, PKU, malnutrition, chronic alcohol use.

Side Effects: Anaphylactic rxns, hepatotoxicity, acute renal tubular necrosis, chronic analgesic nephropathy, anemia, thrombocytopenia

Dosage: 325 – 1000 mg

Routes: Oral (or rectal suppositories)

Pediatric dose: 10 – 15 mg/kg

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5.1.3 Activated Charcoal

Class: Adsorbent

Actions: Adsorbs toxins by chemical binding and prevents gastrointestinal adsorption.

Indications: Poisoning following emesis or when emesis is contraindicated.

Contraindications: None in severe poisoning.

Precautions: Should only be administered following emesis, in cases in which it is so indicated. Use with caution in patients with altered mental status.

Side Effects: Nausea, vomiting, and constipation.

Dosage: 1 g/kg (typically 50-75 grams) mixed with a glass of water to form a slurry.

Routes: Oral

Pediatric Dosage: 1 g/kg mixed with a glass of water to form a slurry

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5.1.4 Albuterol (Proventil) (Ventolin)

Class: Sympathomimetic (ß2 selective)

Actions: Bronchodilation. Albuterol is primarily a beta-2 sympathomimetic and as such produces bronchodilation. Because of its greater specificity for beta-2 adrenergic receptors it produces fewer cardiovascular side effects and more prolonged bronchodilation than isoproterenol. Onset is within 15 minutes; peaks in 60-90 minutes. Therapeutic effects may be active up to 5 hours. Albuterol also helps to shift potassium back into cells thus reducing the concentration of extracellular K+. Albuterol is a β**2**-agonist that is believed to exert a

hypokalemic effect by binding to a β**2**-adrenoreceptor, resulting in adenylate cyclase activation. Adenylate cyclase stimulates the production of cyclic adenosine monophosphate, which is then used by the Na+–K+ ATPase pump to transfer potassium into the intracellular space.

Indications: Asthma, reversible bronchospasm associated with COPD. Treatment of Hyperkalemia.

Contraindications: Known hypersensitivity to the drug, symptomatic tachycardia

Precautions: Blood pressure, pulse, and EKG should be monitored use caution in patients with known heart disease, hypokalemia, diabetes, seizure disorder, hyperthyroidism, pheochromocytoma, pregnancy, elderly patients.

Side Effects: Palpitations, anxiety, headache, dizziness, and sweating, hypertension, angina, MI, tachycardia, throat irritation, URI symptoms, cough, bad taste, tremor, nervousness, hypokalemia, arrhythmia, arrhythmia nausea.

Dosage: Strenght clarification: 2.5 mg/3ml = 0.083%;
5mg/ml = 0.5%

Metered Dose Inhaler: 1-2 sprays (90 micrograms per spray)
Small-Volume Nebulizer: 2.5 mg in 2.5 ml normal saline over 5-15 minutes
Rotohaler: one 200-microgram rotocap should be placed in the inhaler and b reathed by the patient

Routes: Inhalation

Pediatric Dosage: Strength clarification: 0.63 mg/3ml = 0.021%
1.25 mg/3ml = 0.042%
2.5 mg/3ml = 0.083%
5 mg/ml = 0.5%

< 2 yr; 0.15 mg/kg in 2.5 ml NS. (If <1 year or <10 kg: add 1.25 mg of Albuterol mixed in 1.5 ml of NS (0.083%) to nebulizer and flow oxygen at 3 liters/min. Treatment will be delivered over approximately 5 to 15 minutes). Max 1.25 mg/dose

2-5 yr; 0.15 mg/kg in 2.5 ml of NS. Max. 2.5 mg/dose

> 5 yr; 2.5 mg in 2.5 ml of NS

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5.1.5 Amiodarone (Cordarone ®)

Class: Class III Antiarrhythmic

Actions: Prolongs action potential phase 3

Indications: a) Life-threatening recurrent V-Fib and
b) Recurrent hemodynamically unstable ventricular tachycardia.

c) Can be considered for atrial fibrillation with RVR, if a-fib onset is less than 48 hours (must use medical control). It should not be used for a-fib > 48 hours.

Contraindications: Severe sinus node dysfunction causing marked sinus bradycardia; 2nd and 3rd degree AV block, hypersensitivity to iodine, cardiogenic shock, neonatal or infants, pregnancy, breast-feeding.

Precautions: Hypotension may be due to rate of infusion, caution in: elderly patients, and patients with liver dysfunction, thyroid disease, pregnancy, pulmonary disease, QT prolongation, hypokalemia, hypomagnesemia, implantable cardiac device, surgery

Side Effects: Serious; Arrhythmias, prolonged QT interval, bradycardia, severe AV block, complete sinus arrest, Torsades de pointes, cardiogenic shock, hypotension, severe CHF, pulmonary toxicity, severe skin reaction, ARDS, hypo are hyper thyroidism, rhabdomyolysis, hepatotoxicity, pancreatitis, optic neuritis, blood dyscrasias.

Common: nausea/ vomiting, malaise/fatigue, ataxia, tremor, hyperkinesia, peripheral neuropathy, constipation, anorexia.

Dosage: V-Fib/Pulseless V-Tach; 300mg IV/IO, may repeat 150mg IV. Rapid IV/IO if pulseless/no BP, otherwise administer over 10 minutes to decrease risk of hypotension.

Wide Complex Tachycarda; 150 mg IV/IO over 10 minutes, then 1mg/min IV/IO x 6 hrs.

Atrial Fibrillation with RVR < 48 hours onset (must go through medical control) 150mg IV/IO over 10 minutes.

If patient is on a drip or a drip is started, see; Amiodarone IV Drip 450mg or Amiodarone IV Drip 900mg

Routes: IV, IO

Pediatric Dosage: V-Fib/Pulseless V-Tach: 5mg/kg IV/IO (maximum dose 15mg/kg).

Supraventricular Tachycardia; 5mg/kg IV/IO (maximum dose 15mg/kg) over 20 min

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5.1.6 Aspirin (Bufferin)

Class: Platelet inhibitor/anti-inflammatory, analgesic, anti-pyretic.

Actions: Blocks platelet aggregation. It appears to cause an inhibition of synthesis and release of prostaglandins. Aspirin also blocks formation of Thromboxane A - 2. (Thromboxane A - 2 causes platelets to aggregate and arteries to constrict). Reduces overall mortality from acute myocardial infarction.

Indications: New-onset chest pain suggestive of ACS or MI

Contraindications: Patients with history of hypersensitivity to the drug. Known allergy to Aspirin (e.g. asthma), active GI ulceration or bleeding, hemophilia or other bleeding disorders, during pregnancy, children under 2 years of age.
Precautions: GI bleeding and upset.
Side Effects:

Serious: Anaphylactic Rxn, bronchospasm/wheezing, angioedema, bleeding, DIC, thrombocytopenia, GI ulceration/bleeding, pancytopenia, agranulocytosis, aplastic anemia, hypoprothrombineia, nephrotoxicity, hepatotoxicity, salicylism, Reye syndrome

Common: Nausea, vomiting, dyspepsia/heartburn, Tinnitus, urticaria, hyperuricemia, bleeding, ecchymosis, constipation, diarrhea, dizziness

Dosage: 150-325 mg PO or chewed.
Routes: PO.
Pediatric Dosage: not recommended.

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5.1.7 Atropine for Cardiac Use or increased secretions from Ketamine and other drugs

Class: Parasympatholytic (anticholinergic).
Actions: Blocks acetylcholine receptors, increases heart rate, and decreases gastrointestinal secretions. It is a potent anticholinergic (parasympathetic blocker, parasympatholytic) that reduces vagal tone and thus increases automatically the SA node and increases A-V conduction.
Indications: Hemodynamically-significant bradycardia, hypotension secondary to severe bradycardia, organophosphate poisoning.
Contraindications: None when used in emergency situations.
Precautions: Dose of 0.04 mg/kg should not be exceeded except in cases of organophosphate poisonings, tachycardia, and hypertension. Too small of a dose (< 0.5 mg) or if pushed too slowly, may initially cause the heart rate to decrease. Antihistamines and antidepressants potentiate atropine.
For 2nd degree AV block type II and 3rd degree AV block, omit Atropine and go to external pacer.
Side Effects: Palpitations and tachycardia, headache, dizziness, and anxiety, dry mouth (xerostomia), pupillary dilation, and blurred vision, urinary retention (especially older males), restlessness, agitation, confusion, psychotic reaction, insomnia mydriasis, delirium, ataxia, tremor and headache.
Dosage: Bradycardia: 0.5 mg IV/IO every 5 min to max of 0.04 mg/kg or 3 mg total.
Organophosphate poisoning: 2-5 mg.
Routes: IV, IO, ET (ET dose is 2 - 2.5 times IV dose).
Pediatric Dosage: Bradycardia or increased bronchial secretions: 0.02 mg/kg IV
Maximum single dose (child 0.5 mg) (adolescent 1.0 mg)
Maximum total dose (child 1.0 mg) (adolescent 2.0 mg)

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Drug Reference Bradycardia Proto Peds Bradycardia RSI Oral Tracheal Intubation
Excited Delirium

5.1.8 Atropine for Antidote to Poisoning

Class: Parasympatholytic (anticholinergic).

Action: Atropine is a potent parasympatholytic that binds to acetylcholine receptors thus diminishing the actions of acetylcholine.

Indications: Anticholinesterase syndrome poisoning such as; Organophosphate (e.g. parathion, Parathion, Rid-A-Bug) and Carbamate (Baygon, Sevin and many common roach & ant sprays). Signs of organophosphate poisoning are: Salivation, Lacrimation, Urination, Defecation, GI distress, Emesis, pinpoint pupils, bradycardia, and excessive sweating.

Contraindications: None when used in the management of severe organophosphate poisoning.

Precautions: It is important that the patient be adequately oxygenated and ventilated prior to using atropine as Atropine may precipitate ventricular fibrillation in a poorly oxygenated patient. Even after Atropine is administered, the patient may require intubation and aggressive ventilatory support.

Side Effects: Victims of organophosphate poisoning can tolerate large doses (1000 mg) of Atropine. Signs of atropinization are the end point of treatment: flushing, pupil dilation, dry mouth, and tachycardia.

Dosage:

Adult: 2 mg IM/IV x 1 for mild to moderate (frail/elderly start 1 mg IM x 1).
4-6 mg IM/IV for severe symptoms (frail/elderly start 2-4 mg IM x 1).
Continue atropinization @ 1-2 mg IM/IV Q 10-30 min until muscarinic symptoms gone. Give Atropine first if also using Pralidoxime (2-PAM).

Pediatric:

< 2 yr old: 0.05 mg/kg (max. 3 mg) IM or 0.02 mg/kg IV, repeat q 5-10 minutes until atropinization occurs. (If nerve agent, Start 0.05 mg/kg IM x 1 for mild/moderate sx. Start 0.1 mg/kg IM for severe sx).

2 – 10 yrs: 1 – 2 mg IM/IV q 10 – 30 min prn; Start 1 mg IM/IV x 1. (If nerve agent, Start 1 mg/kg IM x 1 for mild/moderate sx. Start 2 mg/kg IM for severe sx).

> 10 yrs: 1-2 mg IV/IV q 10 – 30 min prn; Start 2 mg IM/IV x 1. (If nerve agent, Start 2 mg/kg IM x 1 for mild/moderate sx. Start 4 mg/kg IM for severe sx).

Note: Give Atropine first if also using Pralidoxime (2 PAM).

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Drug Reference Tox OD protocol Peds Organophosphate Poison Peds Tox

5.1.9 Calcium Chloride 10% (CaCl)

Class: Electrolyte.
Actions: Increases cardiac contractility.
Indications: Acute hyperkalemia (elevated potassium), acute hypocalcemia (decreased calcium), calcium channel blocker (Nifedipine, Verapamil, etc.), overdose, abdominal muscle spasm associated with spider bite and Portuguese man-o-war stings, antidote for magnesium sulfate.
Contraindications: Patients receiving digitalis, hypercalcemia, hypophosphatemia, ventricular fibrillation.
Precautions: IV line should be flushed between calcium chloride and sodium bicarbonate administration. Extravasation may cause tissue necrosis.
Side Effects: Serious: Hypercalcemia, Arrhythmias (bradycardia and asystole), syncope, nephrolithiasis, extravasation necrosis.
Common: hypercalcemia, hypercalciuria, vasodilation, hypotension, bradycardia, arrhythmia, syncope, nephrolithiasis, hypomagnesemia, flushing, dizziness, constipation, nausea.
Dosage: [Strength clarification: 10% IV sol = 1 gm calcium chloride/10 ml = 270 mg (13.5 mEq) elemental Ca].
Arrhythmias: 500 – 1000 mg IV (5 – 10 ml of 10% Ca Chloride); may be repeated at 10-minute intervals.
Calcium Channel Blocker OD: 1-2 gm IV over 10 min q 20 min x 5 doses
Routes: IV.
Pediatric Dosage:
Arrhythmias due to hyperkalemia: 20 mg/kg IV/IO q 10 min prn
***Calcium Channel Blocker OD*:** 20mg/kg IV over 10 min q 20 min x5

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5.1.10 Dextrose 10% a.k.a D10W, D10

Class: Carbohydrate.
Actions: Elevates blood glucose level rapidly.
Indications: Hypoglycemia.
Contraindications: None in the emergency setting.
Precautions: A blood sample should be drawn before administering 50% dextrose.
Side Effects: Local venous irritation.
Dosage: ~~25 grams (50 ml).~~ 100 - 250 ml D10W (titrate to effect)
Routes: IV.
Pediatric Dosage: Neonates: 10% Dextrose: 2-5 ml/kg (0.2-0.5 g/kg)
Infants: 10% Dextrose: 5 ml/kg (0.5 g/kg)
Children: 10% Dextrose: 5 ml/kg (0.5 g/kg) not to exceed total of 250 ml (25gms)
NOTE: D50W = 50 gm Dextrose in 100 ml Sterile Water (0.5 gm/ml) D25W = 25 gm Dextrose in 100 ml Sterile Water (0.25 gm/ml) D10W = 10 gm Dextrose in 100 ml Sterile Water (0.1 gm/ml)
~~**To make D25W** dilute 1:1 of D50W with sterile water (or NS) to form a 25% solution~~

~~(0.25 gm/ml).~~
To make a D10W dilute 2 ml of D50W with 8 ml of sterile water or NS (0.1gm/ml). If using D25W, dilute 4 ml of D25W with 6ml of sterile water or NS (0.1gm/ml)

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5.1.11 Diltiazem (Cardizem)

Class: Calcium channel blocker.

Actions: Inhibits the influx of calcium ($Ca2^{+}$) ions during membrane depolarization of cardiac and vascular smooth muscle, decreasing sinoatrial and atrioventricular conduction and inhibits the contractile process of the myocardial smooth muscle cells leading to dilatation of the coronary and systemic arteries and improved oxygen delivery to the myocardial tissue. Slows conduction through the AV node, causes vasodilation, decreases rate of ventricular response, and decreases myocardial oxygen demand.

Indications: To control rapid ventricular response associated with atrial fibrillation and flutter. Paroxysmal supraventricular tachycardia

Contraindications: Severe Hypotension, wide complex tachycardia, conduction system disturbances, second or third degree AV block (except functioning ventricular pacemaker), sick sinus syndrome (except functioning ventricular pacemaker), severe hypotension and cardiogenic shock, concomitant use or use in close proximity of intravenous Diltiazem and intravenous beta blockers, atrial fibrillation or atrial flutter associated with the sensory bypass tract such as WPW syndrome or short
PR syndrome, ventricular tachycardia

Precautions: Use caution in patients with Hypotension.

Side Effects: Serious: bradycardia, first and second degree AV block, arrhythmia, hypotension, syncope, congestive heart failure, cardiac failure, acute hepatic injury, erythema multiforme, exfoliative dermatitis, acute exanthematous pustulosis.

Common: Peripheral edema, headache, dizziness, asthenia, orthostatic hypotension, dyspepsia, constipation, rash, bradycardia, 1st degree AV block, ALT/AST elevation

Dosage: 0.25 mg/kg bolus (typically 20 mg) IV **over 2 minutes.** If inadequate response **after 15 min**, repeat at 0.35 mg per kilogram IV bolus over 2 min. This should be followed by a maintenance infusion of 5-15 mg/hour (see Diltiazem IV Drip Chart).

Routes: IV, IV drip.

Pediatric Dosage: Rarely used.

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5.1.12 Diphenhydramine (Benadryl) Class:

Antihistamine, antiemetic.

Actions: Non-selectively antagonizes central and peripheral histamine H1 receptors (antihistamine); suppresses the medullary cough center (antitussive); possesses anticholinergic (Atropine like effect) properties, resulting in antidyskinetic, antiemetic and sedative effects.
Indications: Anaphylaxis, allergic reactions, dystonic reactions due to phenothiazines (Haldol), antiemetic, sedation, vertigo/motion sickness.
Contraindications: Hypersensitive to drug/class, neonates and premature infants, Asthma, nursing mothers.
Precautions: Hypotension. Use with caution on the following patients: < 2 year of age (must be used with extreme caution and usually only given for anaphylactic rx or extrapyramidal rx, go through medical control), < 6 yrs old, elderly, CNS depressant use, IOP (intra-ocular pressure) increase glaucoma (angle-closure), hyperthyroidism, cardiovascular dz, HTN, COPD, lower resp tract sx, GI obstruction, Peptic ulcer disease, prostatic hypertrophy, bladder neck obstruction, poor CYP2D6 metabolizer, high environmental temperature.
Side Effects:
Serious: Anaphylaxis, hemolytic anemia, thrombocytopenia, agranulocytosis, leucopenia, pancytopenia, arrhythmias, seizures, toxic psychosis, labyrinthitis, heat stroke,
Common: drowsiness/sedation, dizziness, impaired coordination, headache, epigastric discomfort, thickened bronchial secretions, dry mucous membranes, CNS stimulation (paradoxical), constipation, dysuria, urinary retention, hypotension, blurred vision, diplopia, palpitations, tachycardia, photosensitivity, diaphoresis, erectile dysfunction
Dosage: 25-50 mg.
Routes: Slow IV push, deep IM, I/O.
Pediatric (≥ 2 yrs of age) Dosage: 1 – 2 mg/kg; max 50 mg/dose. (< 2 years old, contact medical control).

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5.1.13 Dopamine (Intropin)

Class: Sympathomimetic.
Actions: Increases cardiac contractility, causes peripheral vasoconstriction.
Indications: Hemodynamically significant hypotension (systolic BP of 70-100 mm Hg) not resulting from hypovolemia, cardiogenic shock.
Contraindications: Hypovolemic shock where complete fluid resuscitation has not occurred.
Precautions: Should not be administered in the presence of severe tachyarrhythmias. Should not be administered in the presence of ventricular fibrillation, ventricular irritability. Beneficial effects lost when dose exceeds 20 µg/kg/min.
Side Effects: Ventricular tachyarrhythmias, hypertension, and palpitations.
Dosage:
Shock: 1-50 mcg/kg/min IV, (Max; 20-50 mcg/kg/min). Incr 1-4 mcg/kg/min q 10-30 min, titrate to effect
Heart Failure: 1-3 mcg/kg/min. Start 0.5 – 2 mcg/kg/min
ALS Bradycardia: 2-10 mcg/kg/minute.

Cardiac output maint: 2 – 20 mcg/kg/min. Start 2 – 5 mcg/kg/min; Max 20 mcg/kg/min

Method: 800 mg should be placed in 500 ml of D5W giving a concentration of 1600 µg/ml. Start low and increase as needed.See IV Drip Calculations Appendix(400mg) and/or Dopamine IV Drip Calculation (800 mg)

Routes: IV/IO drip only.

Pediatric Dosage:

Shock: 5-20 µg/kg/minute. Incr 1 – 4 mcg/kg/min q 10 – 30 min

Cardiac Output Maint: 2-20 mcg/kg/min. Start 2 – 5 mcg/kg/min; Max 20 mcg/kg/min

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5.1.14 Epinephrine 1:1,000

Class: Sympathomimetic.

Actions: Stimulates alpha and beta adrenergic receptors. Bronchodilation. A hormone produced by the adrenal gland (attached to the kidneys) and synthesized commercially. It is employed therapeutically as a vasoconstrictor, as a cardiac stimulant, and to relax bronchioles. It is also used to treat asthmatic attacks and treat anaphylactic shock.

Indications: Bronchial asthma, exacerbation of COPD, allergic reactions, Pediatric Bradycardia.

Contraindications: Hypersensitivity to drug. Patients with underlying cardiovascular disease, pregnancy, labor and delivery, patients with tachyarrhythmias, angle closure glaucoma, organic brain syndrome.

Precautions: Should be protected from light. Blood pressure, pulse, and EKG must be constantly monitored. Use with caution on patients with: HTN, elderly patients, hypersensitive to sulfites, CVA, hyperparathyroidism, diabetes, Parkinson's disease, psychiatric disorder.

Side Effects:

Serious: respiratory difficulty, pulmonary edema, arrhythmias, HTN, cerebral hemorrhage, tissue necrosis

Common: Palpitations and tachycardia, anxiousness, headache, tremor, nausea/vomiting, pallor, diaphoresis, dizziness, weakness, tremor, apprehension, nervousness, restlessness.

Dosage: 0.3-0.5 mg.

Routes: SQ, IM (IV, IO and/or ET for pediatric cardiac arrest).

Pediatric Dosage: *For Resp distress/Allergic rxn*: 0.01 mg/kg IM/SQ up to 0.3 mg.
For Bradycardia: 0.1mg/kg ETT q 3-5 min (max 10 mg/dose)
For subsequent doses of Epi following 1st 1:10,000 dose: 0.1 mg/kg IV/IO

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5.1.15 Epinephrine 1:10,000

Class: Sympathomimetic.
Actions: Increases heart rate and automaticity.
Increases cardiac contractile force.
Increases myocardial electrical activity.
Increases systemic vascular resistance.
Increases blood pressure.
Causes bronchodilation.
Indications: Cardiac arrest, anaphylactic shock, severe reactive airway disease.
Contraindications: Epinephrine 1:10,000 is for intravenous, intraossious or endotrachealuse; it should not be used in patients who do not require extensive resuscitative efforts.
Precautions: Should be protected from light. Can be deactivated by alkaline solutions.
Side Effects: Palpitations, anxiety, tremulousness, nausea and vomiting.
Dosage: ***Cardiac arrest***: 0.5-1.0 mg repeated every 3-5 minutes.
Severe anaphylaxis: 0.3-0.5 mg (3-5 ml); occasionally and Epinephrine drip (med control) is required. Epinephrine drip may be 2 - 10 mcg/min, start 1mcg/min. See IV Drip Calculations (for 1 mg in 250ml) and/or Epi IV Drip Chart (for 2 mg in 250ml)
Routes: IV, IO, IV drip, ET.
Pediatric Dosage:
For Bradycardia; **1:10,000** 0.01 mg/kg (0.1ml/kg) IV/IO
For Pulseless Arrest; **1:10,000** 0.01 mg/kg (0.1 ml/kg) IV/IO. May repeat q 3-5 minutes. If unable to establish an IV/IO, administer **Epinephrine (1:1,000)** 0.1 mg/kg (0.1 ml/kg) via ET. Repeat every 3-5 minutes for duration of pulselessness.

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5.1.16 Etomidate/ (Amidate)

Class: Induction/Maintenance
Action: Etomidate is a short-acting, non-barbiturate hypnotic, lacking analgesic properties used for induction of general anesthesia. The action is at the level of the reticular activating system in the brainstem. Etomidate is generally considered to have minimal adverse effect on cardiac and respiratory function. The duration of action is 3-5 minutes and excretion is through the renal system.
Indications: The use of this drug as well as paralytic drugs in performing R.S.I. under the SMART Airway Management protocol is reserved for those paramedics that have received extensive training in advanced airway management. The administration of Etomidate and paralytic drugs found in the SMART Airway Management procedure must only be done by those paramedics that have prior medical director authorization. Authorized paramedic(s) may induce and paralyze patients to facilitate intubation. See Medical Procedure – SMART Airway Management.
Contraindications: Allergy to this class of drugs
Precautions: Causes respiratory paralysis; supportive airway control must be continuous and under direct observation at all times. Etomidate can decrease the adrenal gland's production of

steroid hormones. Use caution may be synergistic with other CNS depressants. Monitoring of vital signs is important.

Adverse effects:

1. Respiratory depression or apnea.
2. Hypotension (infrequent)
3. Involuntary myoclonus (muscle twitching)
4. Adrenal suppression (possible with repeated dosing)

Precautions:

1. The effects of Etomidate can be accentuated by CNS depressants (such as narcotics and alcohol).
2. Myoclonic movements are common and should not be confused for fasciculations due to a depolarizing neuromuscular blocking agent or seizure activity.

Dosage: Adult & Pediatric (over 10 years of age): 0.3 mg / kg slow administration (about one minute) IV. Maximum dose: 0.6 mg / kg.

Onset: Rapid

Duration: 15 to 30 minutes (dose dependant)

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5.1.17 Fentanyl (Sublimaze)

Class: Schedule II narcotic, Analgesic

Action: Binds to various opioid receptors producing analgesia and sedation.

Indications: Pain control (analgesic action of short duration), sedation, as pre-treatment for head injury patients before RSI (Do Not use as pre-treatment in pediatric patients less than 10 years old), Chest pain unrelieved by Nitro.

Contraindications: Hypersensitivity to drug.

Precautions: Caution in: elderly, renal impaired, liver impaired, head injury, increased ICP, impaired pulmonary fxn, cardiovascular fxn, bowel obstruction, hypotension, enlarged prostate, CNS depression, biliary disease, seizure disorder.

Side Effects: Serious; Resp depression, resp arrest, dependency, bradycardia, hypotension, anaphylaxis, laryngospasm, bronchioconstriction, muscle rigidity, cardiac arrest, circulatory collapse, arrhythmias, ICP increase, delirium, seizures, paralytic ileus

Common: Somnolence, nausea, vomiting, confusion, asthenia, constipation, xerostomia, diaphoresis, dizziness, urinary retention, nervousness, euphoria, hallucinations, dyspnea, pruritus, hypotension, bradycardia, muscle rigidity, biliary spasm, impaired coordination.

Dosage:

1. For acute onset of pain: 50 – 100 mcg IV/ IO, IM, or IN initial dose (titrate to pain), then contact med control for additional orders prn.

2. As pre-treatment in head injury for RSI: 3 mcg/kg ~200 mcg given over 30- 60 seconds) Do Not use as pre-treatment in pediatric patients less than 10 years old.

3. Acute Coronary Syndrome/Chest pain: Fentanyl may be given 50 mcg IN increments every 3-5 minutes to a maximum of 200 mcg IN

OR

IM/IV dose 1mcg/kg SLOW IV increments every 3-5 minutes up to a maximum initial dose of 100 mcg, titrated to pain and BP remains above 90 mm Hg. Second dose if needed, maximum total dose of 200mcg IV/IN/IM. If Fentanyl was initially

given IN and an IV is then established, one IV dose (50mcg) can be given if needed.

4. Bradycardia: Analgesia for Cardiac Pacing: 25 – 50 mcg slow IV. May repeat q 5 min prn up to 100 mcg then contact med control for additional dosing if needed.
5. Post intubation management: use alone on in conjunction with a benzodiazepine. Give 50 – 100 mcg slow IV/IO push. May repeat q 15 minutes as needed to total of 200 mcg.

Routes: IV / IO, IM**,** or IN (intra-nasal)

Pediatric dosage: 1-3 yrs old: 1 – 2 mcg/kg IV slow or 1.5 mcg/kg IN via atomizer

3 – 12 yrs old: 1 – 2 mcg/kg IV slow or 1.5 mcg/kg IN via atomizer

>12 yrs old: 1 – 2 mcg/kg IV slow or 1.5 mcg/kg IN via atomizer

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5.1.18 Furosemide/(Lasix)

Class: Loop Diuretic

Action: A sulfonamide derivative and potent diuretic, which inhibits the reabsorption of sodium and chloride in the proximal and distal renal tubules as well as in the Loop of Henle. Has a direct venodilating effect in acute pulmonary edema. With IV administration, onset of venodilation is generally within 5-10 minutes; diuresis will usually occur in 20-30 minutes.

Indications:

1. Pulmonary edema.
2. Hypertension.
3. Cerebral edema.

Contraindications: Anuria. - Should be used in pregnancy only when benefits clearly outweigh risks. Sulfa – Avoid if allergic to Sulfa products. Hepatic coma, electrolyte imbalances. Use with caution in patients with: DM, acute MI, arrhythmias, hearing impaired, concurrent ototoxic agents, Systemic Lupus Erythematosis, Hepatic impairment, renal dz, urinary retention, gout, pancreatitis, gestational HTN, premature neonates, elderly pts, iodinated contrast.

Side Effects: Serious: Hypokalemia, electrolyte imbalance, metabolic alkalosis, hypovolemia/dehydration, ototoxicity, thrombocytopenia, anemia (hemolytic), aplastic anemia, leukopenia, agranulocytosis, anaphylaxis, vasculitis, interstitial nephritis, necrotizing angiitis, erythema multiforme, exfollative dermatitis, Stevens-Johnson syndrome, toxic epidermal necrolysis, pancreatitis, cholestatic jaundice, SLE exacerbation, thrombosis, eosinophilia, rash, exanthematous pustulosis

Common; Urinary frequency, dizziness, nausea/vomiting, weakness, muscle cramps, hypokalemia, hypomagnesemia, hypotension (orthostatic), ALT/AST elevation, blurred vision, anorexia, abdominal cramps, diarrhea, pruritus, rash, hyperuricemia, hyperglycemia, hypocalcemia, tinnitus, paresthesia, photosensitivity, incr cholesterol, incr triglycedrides.

Precautions: Furosemide should be protected from light. Dehydration and electrolyte imbalance can result from excessive dosages. Rapid diuresis can lead to hypotension and thromboembolic episodes.

Dosage: Adult: Start 20 – 40 mg IV/IO/IM. IF giving IV/IO, give slowly over 1-2 minutes.
Route: IV/IO/IM
Pediatric:

***Edema*: Neonates**: 0.5-1.0 mg/kg IV/IM. (If IV slowly over 1-2 minutes). Start 1 mg/kg IM/IV

Infants/Children: 0.5 – 2 mg/kg IV/IM. Start 1 mg/kg IM/IV x 1

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~~**5.1.19 Haldol (Haloperidol)**~~

~~**Class:** Antipsychotic, 1st generation~~

~~**Action:** Selective antagonizes dopamine D2 receptors. Pecise mechanism of action unknown.~~

~~**Indication:** Acute psychosis (including excited delirium), acute agitation, Tourette syndrome,~~

~~**Contraindications:** Hypersensitivity to drug, Parkinson dz, CNS depression, avoid abrupt withdrawal, Coma~~

~~**Precautions:** Elderly pts with dementia-related psychosis treated with antipsychotics are at increased risk of death. Caution if: High dose treatment, congenital QT syndrome, Fmly hx of QT prolongation, electrolyte abnormalities, hypokalemia, hypomagnesemia, cardiac abnormalities, cardiovascular dz, seizure hx, seizure risk, smoking habit changes, hepatic impairment, hypothyroidism, dementia, drug-induced leukopenia or neutropenia, thyrotoxicosis, if high environmental temperature.~~

~~**Side effects: Serious:** Extrapyramidal sx, tartive dyskinesia, dystonia, hyperpyrexia, heat stroke, neuroleptic malignant syndrome, pneumonia, hypotension, HTN, QT prolongation, Torsades de Pointes, arrhythmias, sudden death, hyponatremia, seizures, withdrawal if abrupt d/c, hepatic impairment, leukopenia, neutropenia, agranulocytosis, cataracts, retinopathy~~

~~**Common:** extrapyramidal sx, tardive dyskinesia, akathisia, insomnia, anxiety, drowsiness, lethargy, weight changes, anticholinergic effects, gynecomastia, breast tenderness, galactorrhea, menstrual irregularities, photosensitivity~~

~~**Dosage:** 5 - 10 mg . NOTE: MUST give Benadryl 25 mg IM or IV in conjunction with Haldol~~

~~**Route:** IM (NOT approved for IV administration)~~

~~**Pediatric Dosage:** Safety and effectiveness in pediatric patients has not been established~~.

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5.1.20 Ipratropium (Atrovent)

Class: Anticholinergic.

Actions: Causes bronchodilation by antagonizing acetylcholine receptors, dries respiratory tract secretions.

Indications: Bronchial asthma, reversible bronchospasm associated with chronic bronchitis and emphysema.

Contraindications: Patients with history of hypersensitivity to the drug should not be used as primary agent in acute treatment of bronchospasm. Use with caution if prostatic hypertrophy, or if bladder neck obstruction or if history of angle-closure glaucoma.

Precautions: Blood pressure, pulse, and EKG must be constantly monitored.

Side Effects: **Serious**: Bronchospasm (paradoxical), anaphylaxis, hypersensitivity rxn, Glaucoma (angle-closure).

Common: Cough, nervousness, nausea, xerostomia (dry mouth), dyspepsia, dizziness, headache, COPD exacerbation, oral irritation, rash/urticarial, palpitations, anxiety, tremors,

Dosage: Small-volume nebulizer: 500 µg (add 0.5 mg [2.5 ml] of Atrovent to nebulizer) should be placed in small volume nebulizer (typically administered with a ß agonist). Use in conjunction with the albuterol nebulized treatment.
Routes: Inhalation only.
Pediatric Dosage: If < 8 years, add 0.25 mg (1.25 ml); if > 8 years, add 0.5 mg (2.5 ml) of Atrovent to nebulizer (in addition to pediatric dose of Albuterol) and flow O_2 at 6-8 L/min

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5.1.21 Ketamine (Ketalar)

Class: Anesthetics**,** General; Sedation
Actions: The drug exerts its effect by "disconnecting" the thalamocortical and limbic systems, effectively dissociating the central nervous system from outside stimuli (eg, pain, sight, sound). The resulting trancelike cataleptic state of "sensory isolation" is characterized by potent analgesia, sedation, and amnesia while maintaining cardiovascular stability and preserving spontaneous respirations and protective airway reflexes.
Indicatons: 1. As an induction agent for RSI. Consider for use as induction agent for patients in septic shock or patients with reactive airway disease.
2. As a sedative for emergent treatment of violent and excited delirium patients
3. Alternative pain medication

Contraindications: Hypersensitivity to drug/class. HTN, Stroke, Head Trauma, Known Schizophrenia, Intraocular trauma or high intraocular pressures, intracranial mass or hemorrhage.
Precautions: CAD, CHF, Thyrotoxicosis, psychosis, hepatic impairment, acute alchololism, chronic alcohol use, substance abuse.
Side Effects: Serious: respiratory depression, laryngospasm, ICP incr., IOP incr., hypotension, bradycardia, arrhythmias, emergence delirium, hallucinations, tonic clonic movements, anaphylaxis, withdrawl sx (long-term use)
Common: sialorrhea, anorexia, nausea/vomiting, BP elevated, HR elevated, diplopia, nystagmus, fasciculations, depressed reflexes, hallucinations, bradycardia, hypotenstion, cystitis
Dosage: ***Sedation (excited delirium/violent pt)***:
Adult: 5 mg/kg IM x 1, or 2 mg/Kg IN (concentration 100 mg/ml). Note: (1 – 2 mg/kg IV slow if IV established, titrate to effect)
NOTE: in excited delirium, do NOT risk injury to yourself by attempting to hold down the patient to start an IV. Give the drug IM. IF the patient already has an IV, then give Ketamine 1 – 2 mg/kg IV slow over 30 – 60 seconds and titrate to effect
Pediatric: use a benzodiazepine for violent pediatric patients
Pain:
Adult: IV/IO dose: 0.1 – 0.5 mg/kg titrate to effect over one to two minutes.
IM dose: 5mg/kg x 1
IN dose: 0.5 mg/kg. (use MAD, limit to 1 ml/nostril)
Contact medical control for additional dosing if needed.
Pediatric: IV/IO dose: 0.1 – 0.5 mg/kg titrate to effect over one to two minutes

IM dose: 5mg/kg x 1.
IN dose: 0.5 mg/Kg (use MAD, do not exceed 1 ml max each nostril)
Contact med control for additional dosing if needed or

Induction for RSI:
Adult: 1 - 2 mg/kg IV/IO; (4mg/kg IM)
Pediatric: 1 – 2 mg/kg IV/IO; (4mg/kg IM)

Routes: IM for excited delirium/violent pt (can give IV if one is established but do not risk injury trying to start an IV on a violent patient just to give medication)
IV/IO/IM/IN for pain or violent/excited delirum
IV/IO/IM for RSI

Pediatric Doseage:
RSI induction – IV/IO: 2 mg/kg; (IM: 4 mg/kg)
Pain - IV/IO: 0.1 – 0.5mg/kg titrate to effect or
IM: 5mg/kg or
IN: 0.5 mg/kg (use MAD [atomizer], max 1 ml/nostril)

Maintenance Infusion (Med control only): Ketamine Drip: Mix 250 mg in 250 ml NS (1:1 concentration = 1mg/1ml). Start within 20 minutes of the initial bolus. If more than 20 minutes passed give the patient a second bolus prior to the initiation of the infusion.
2 – 4 mg/kg/hr (sedation). Begin with 2 mg/kg/hr and titrate to 4 mg/kg/hr
1 – 2 mg/kg/hr (analgesia). Begin with 1mg/kg/hr and titrate to 2 mg/kg/hr

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~~**5.1.22 Labetalol (Trandate) (Normodyne)**~~
~~**Class:** Sympathetic blocker.~~
~~**Actions:** Selectively blocks ÿ1 receptors and nonselectively blocks ß receptors.~~
~~**Indications:** Hypertensive crisis.~~
~~**Contraindications:** Bronchial asthma, congestive heart failure, heart block, bradycardia, cardiogenic shock, sick sinus syndrome without pacemaker, .~~
~~**Precautions:** Blood pressure, pulse, and EKG must be constantly monitored. Atropine and transcutaneous pacing should be available. Use with caution in patients with: peripheral vascular dz, bronchospastic dz, major surgery, DM, thyroid disorder, WPW syndrome, hepatic or renal impairment, pheochromocytoma, myasthenia gravis,~~

~~**Side Effects: Serious:** Bradycardia, heart block, congestive heart failure, bronchospasm, postural hypotension, syncope, angina exacerbation if abrupt D/C, MI if abrupt D/C. Raynaud phenomenon, bronchospasm, lupus erythematosus, hepatotoxicity, hypersensitivity rxn, anaphylactoid rxn,~~
~~**Common:** Hypotension (orthostatic), dizziness, paresthesia, nausea/vomiting, elvated BUN/Cr, fatigue, dyspepsia, rhinitis, headache, ejaculatory dysfxn, dyspnea, edema~~

~~**Dosage:** *Method 1*: 20 mg by slow IV infusion over 2 minutes; doses of 40 mg can be repeated in 10 minutes until desired supine blood pressure is obtained or until 300 mg of the drug has been given.~~

~~*Method 2*: 500 mg placed in 250 ml d5w(conc of 2mg/ml) to deliver ~2 mg/minute. See Labetolol IV Drip Chart.~~

~~**Routes:** IV infusion or slow IV bolus as described earlier.~~

~~**Pediatric Dosage:** *Method 1:* 0.2 – 1 mg/kg IV q 10 min prn. Max 20mg/dose~~
~~*Method 2:* 0.4 – 1 mg/kg/hr IV. May give 0.2 – 1 mg/kg IV x 1 before infusion~~

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5.1.23 Lorazepam (Ativan)

Class: Schedule IV narcotic, anti-anxiety

Action: Binds to benzodiazepine receptors: enhances GABA effects

Indications: Seizures, Anxiety, procedural sedation, violent, combative, excited delirium

Contraindications: Acute narrow-angle glaucoma, sleep apnea syndrome, severe respiratory insufficiency. Not for intra-arterial injection. Neonates or infants (benzyl alcohol containing INJ forms).

Precautions: Monitor all parameters to maintain vital function. Risk of respiratory depression or airway obstruction in heavily sedated patients. May cause fetal damage during pregnancy. Increased risk of CNS and respiratory depression in elderly. Avoid with hepatic/renal disease.

Side Effects: Serious: Respiratory depression/failure, apnea, dependency, seizures, suicidality, tachycardia, hypotension, syncope, blood dyscrasias, jaundice, CNS stimulation (paradoxical), gangrene (intra-arterial), withdrawal sx if abrupt D/C.

Common; sedation, dizziness, asthenia, ataxia, local injection site rxn, resp depression, hypoventilation, hypotension, fatigue, amnesia, confusion, disinhibition, irritability, libido changes, menstrual irregularities, diplopia, dysarthria, appetite changes, constipation, incontinence, urinary retention, dystonia, elevated ALT/AST.

Dosage: Adults: 2 – 4 mg IV/IO, IM or IN

Routes: IV, IM, IO, IN

Pediatric dose:

Anxiety: 0.05 mg/kg IV slow or IN. (Max 2mg/dose)

Status Seizures: 0.05 – 0.1 mg/kg IV over 2 – 5 minutes. Can also be given IM or IN; not to exceed 4 mg/dose; repeat 0.05 mg/kg prn q 10 – 15 min

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5.1.24 Lidocaine (Xylocaine) Bolus

Class: Antiarrhythmic.

Actions: Suppresses ventricular ectopic activity, increases ventricular fibrillation threshold, reduces velocity of electrical impulse through conductive system.

Indications: Malignant PVCs, ventricular tachycardia, ventricular fibrillation, prophylaxis of arrhythmias associated with acute myocardial infarction and thrombolytic therapy, premedication prior to rapid sequence induction.

Contraindications: High-degree heart blocks, WPW, PVCs in conjunction with bradycardia, Stokes-Adams syndrome. If PVC's occur in conjunction with sinus bradycardia, the bradycardia should be treated first. Ventricular dysrhythmias associated with tricyclic antidepressant overdose

Precautions: Dosage should not exceed 300 mg/hr. Monitor for CNS toxicity. Dosage should be reduced by 50% in patients older than 70 years of age or who have liver disease in cardiac arrest, use only bolus therapy.

Side Effects: Serious: Seizures, resp arrest, arrhythmia exacerbation, status asthmaticus, heart block, bradycardia, coma, anaphylaxis, Methemoglobinemia, convulsions, widening of QRS.

Common: injection site pain, lightheadedness, tremor, confusion, hypotension, blurred vision, tinnitus, anxiety, dizziness, euphoria, drowsiness, lethargy, nausea, vomiting, agitation,
hallucinations.

Dosage: Bolus: (Use 2%)

*Ventricular Arrhythmia***;** 1.5 mg/kg q3-5 min, Max: 300 mg total

ACLS VF/pulseless VT: 1.5 mg/kg IV/IO x 1. Then 0.5 - 0.75 mg/kg q5-10-minute prn up to max 3mg/kg; reduce dosage by 50% in patients older than 70 years of age.

Routes: IV, IO bolus, IV infusion, IN, SQ.
Pediatric Dosage: (Use 1%) 1 mg/kg bolus. Max 100mg/dose. May repeat q10 – 15 min x 2

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5.1.25 Lidocaine (Xylocaine) Drip

Class: Antiarrhythmic
Action: Decreases ventricular automaticity and raises the ventricular fibrillation threshold.
Indications: Same as 1% and 2% Lidocaine. Used as a maintenance infusion.
Contraindications: Same as 1% and 2% Lidocaine.
Side Effects: Same as 1% and 2% Lidocaine.
Precautions: Lidocaine is metabolized in liver. Maintenance dosage should be decreased in half in patients with liver disease and low cardiac output states (e.g. acute MI, shock, congestive heart failure); patient older than 70 years old.
Dosage: Adult: Mix 1,000 mg in 250 ml of D5W and flow at 1-4 mg/min. as follows:
2 mg/min. (30 gtt/min).
3 mg/min. (45 gtt/min).
4 mg/min. (60 gtt/min). See IV Drip Calculations for 1gm and/or (Lidocaine Drip Chart for 2 gm)
Pediatric: Mix 120 mg in 100 ml of D5W (or 60 mg in 50 ml of D5W) and flow at 20-50 mcg/kg/min.

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5.1.26 Magnesium Sulfate

Class: Anticonvulsant/Antiarrhythmic.
Actions: CNS depressant, anticonvulsant, antiarrhythmic, labor suppression/tocolytic, Minerals.
Indications: Obstetrical eclampsia (toxemia of pregnancy), pre-eclampsia/PIH, cardiovascular severe refractory ventricular fibrillation, pulseless ventricular tachycardia, post-MI as prophylaxis for arrhythmias, Torsades de pointes (multi-axial ventricular tachycardia). Severe respiratory distress.
Contraindications: Shock, heart block, Diabetic coma, myocardial damage.
Precautions: Caution should be used in patients receiving digitalis. Hypotension. Calcium

Chloride should be readily available as an antidote if respiratory depression ensues. Use with caution in patients in renal failure.

Side Effects: Serious: Cardiovascular collapse, respiratory paralysis, hypothermia, depressed cardiac fxn, pulmonary edema

Common: depressed reflexes, hypotension, flushing, drowsiness, impaired cardiac fxn, diaphoresis, hypocalcemia, hypophosphatemia, hyperkalemia, vision changes.

Dosage: *Vent Arrhythmias*: 2-6 gms IV over several minutes.

*Seizures, preeclampsia***:** start 4 mg IV x1 (or 4-5 gm IM each buttock), then 1-2gm/hr IV

Tocolysis: Start 4-6gm IV over 20 min then 2-4 g/hr IV x 12-24hr.

Torsades de Pointes: 1-2 gm IV/IO prn. May follow w/ 0.5-1g/hr IV

Severe Asthma: 2 gm IV over 10-15 min

If patient on a maintanence drip, see IV Drip Calculaion

Routes: IV/IO, IM.

Pediatric Dosage: *Torsades de Pointes:* 25 – 50 mg/kg (maximum 2gm) IV/IO (mixed in 50 ml of D5W given over 10 – 20 minutes).

Severe Respiratory Distress: 25 – 40 mg/kg (maximum 2gm) IV/IO (mixed in 50 ml of D5W given over 10 – 20 minutes).

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5.1.27 Dexamethazone (Decadron)

5.1.28 Class: Steroid.

Actions: Anti-inflammatory, suppresses immune response (especially in allergic reactions).

Indications: Severe allergic reaction, anaphylaxis, asthma/COPD,

Contraindications: Hypersens to drug, neonatal/infants (benzyl alcohol-containing INJ forms), thrombocytopenic purpua (IM use), systemic fungal infxn, active or recent varicella infxn, active or recent measles infxn, local infection at injection site, head injury (high dose use),

cerebral malaria, ocular HSV infxn.

Precautions: Must be reconstituted and used promptly. Onset of action may be 2-6 hours and thus should not be expected to be of use in the critical first hour following an anaphylactic reaction.

Side Effects: Serious: anaphylaxsis rxn, HPA axis suppression, hyperglycemia, IOP incr, glaucoma, catatracts, growth suppression, infection, cardiac arrest, arrhythmias, CHF, pulmonary edema, syncope, thromboembolism, vasculitis, osteoporosis, steroid psychosis, GI perforation/ulcer, pancreatitis, pseudotumor cerebri, seizures, Kaposi sarcoma, tendon rupture, Charcot-like arthropathy, steroid myopathy, angioedema

Common: IOP inc, glucose intolerance, sodium and fluid retention, hypokalemia, HTN, edema, skin disorder, rash, skin atrophy, impaired wound healing, weight gain, appetite incr., emotional lability, depression, hyperhidrosis, Cushing syndrome, hirsutism, menstrual irregularities, nausea, LFT elevated, hepatomegaly, muscle weakness, muscle atrophy, headache, insomnia, paresthesia, vertigo, neuropathy, psychiatric disorders,

Dosage: Acute Exacerbation of Asthma/COPD: 8-10 mg IV/IO/IM
Severe allergic Reaction/Anaphylaxsis: 8 - 10 mg IV/IO. If patient already on oral steroids or elderly (>75 yrs old) and frail, give 4 to 8 mg IV/IO/IM.

Routes: IV, IO, IM

Pediatric Dosage:

Status Asthmaticus and/or severe allergic reactions; start 0.6 mg/kg x 1,
***Adrenal Insufficiency*:** 2mg/kg IM, max 125 mg

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5.1.29 Midazolam (Versed)

Class: Benzodiazepine tranquilizer.

Actions: Hypnotic, sedative.

Indications: Premedication prior to cardioversion/RSI, acute anxiety states, sedation post intubation, procedural sedation, seizures, acute psychotic states, nerve agent antidote.

Contraindications: Patients with known hypersensitivity to the drug, narrow-angle glaucoma, shock.

Precautions: Emergency resuscitation equipment should be available. Flumazenil (Romazicon) should be available in ED. Dilute with normal saline or D5W prior to intravenous administration. Respiratory depression more common with Midazolam than with other Benzodiazepines. Use with caution if: BP < 110 systolic, pulmonary impairment, sleep apnea, CHF, CNS depression, alcohol use, alcohol or drug abuse hx, avoid abrupt withdrawal, seizure hx, renal impairment, hepatic impairment, elderly or debilitated .

Side Effects:

Serious: Respiratory depression, Apnea, Respiratory failure, cardiac arrest, hypotension, bradycardia, tachycardia, syncope, seizures, CNS stimulation (paradoxical),

dependency, abuse, withdrawal if abrupt discontinuation, bronchospasm, anaphylaxis.

Common: sedation, nausea, vomiting, injection site pain, hiccups, hypotension, agitation, dystonia (prolonged involuntary muscular contractions, repetitive movements, increased muscle tones), amnesia, Diplopia, disinhibition, confusion, ataxia, weakness, dysarthria (impairment in uttering words due to problem with oral, lingual or pharyngeal muscles), euphoria, rash.

Dosage:

For Procedural, post intubation, anxiety (med control) sedation*:*

- 1.0- 2.5 mg IV, I/O, IM, IN
- The initial intravenous dose for sedation in adult patients may be as little as 1 mg, but should not exceed 2.5 mg in a normal healthy adult. Lower doses are necessary for older (over 60 years) or debilitated patients and in patients receiving concomitant narcotics or other central nervous system (CNS) depressants. The initial dose and all subsequent doses should always be titrated slowly; administer over at least 2 minutes and allow an additional 2 or more minutes to fully evaluate the sedative effect.

For Ventilator Sedation infusion (per MD order):

- 0.02 – 0.1 mg/kg/hr IV.

For seizures:

- 5 mg IM (as alternative, can give 1 – 2.5 mg IV or I/O but IM shown to work better). May repeat x1 prn
- 10 mg IN. May repeat x 1 prn

For RSI induction:

- 0.3mg/kg IV or I/O, max 0.6 mg/kg cumulative dose

Routes: IV, IM, intranasal, I/O.

Pediatric Dosage:

For procedural sedation; **IV route**;

(6 mo – 5 yr); 0.05 – 0.1 mg/kg IV x 1 repeat q 2 – 3 min prn; max 0.6 mg/kg total

(6 – 12 yr); 0.025 – 0.05 mg/kg IV x 1, repeat q 2 – 2 min prn; max 0.4 mg/kg total

(> 12 yr old): 0.5 – 2 mg IV x 1; may repeat q 2 -3 min prn; max 10 mg

For procedure sedation: **IM route**;

> 6 mo; 0.1 - 0.15 mg/kg IM; max 0.5 mg/kg (use ideal body wt in obese pt)

***For Mechanical Vent sedation infusion (MD order)*;**

> 32 wk gest - < 1 mo; 1 mcg/kg/min IV; titrate to desired effect; use min effective dose.

1 mo – 12 yr; 1 – 2 mcg/kg/min IV, (start 0.05 – 0.2 mg/kg IV x 1)

For Status Seizures*;* 2 mo – 12 yrs;

For IV/IO start 0.15 mg/kg x1. Maximum 4 mg

For IN (intranasal [use atomizer]) 0.2 mg/kg. Maximum 10 mg

For IM tx of seizures, 0.2mg/kg. Maximum 10 mg

Return to: Contents at Top Drug Reference Bradycardia Proto Behavioral/Violent/Psych Narrow complex tachycard unstable COPD protocol Wide complex tach w/pulse Excited delirium Seizure proto CVA Tox OD Peds Seizure Heat related emerg Head and Spine trauma Peds Seizure Peds Unstable SVT Peds V-Tach w/pulse Stable Peds V-Tach w/pulse unstable Chem Tx Guide Blue Peds Violent/Impaired RSI Cardioversion External Pacer Post intubation management LVAD proto

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5.1.30 Morphine

Class: Narcotic, opioids.

Actions: CNS depressant, causes peripheral vasodilation, decreases sensitivity to pain. Binds to various opioid receptors, producing analgesia and sedation (opioid agonist).

Indications: Severe acute pain, any etiology, unstable angina, acute MI.

Contraindications: Hypersensitivity to the drug, Coma or impaired consciousness, respiratory depression, asthma, paralytic ileus, hypercarbia, circulatory shock

Precautions:, renal impairment, hepatic impairment, pulmonary impairment, CNS depression, seizure disorder, substance abuse, acute alcoholism

Side Effects:

Serious reactions: Respiratory depression (Narcan should be available), severe hypotension, apnea, cardiac arrest, shock, bradycardia, paralytic ileus, toxic megacolon, seizure, ICP increase, dependency and abuse, anaphylaxis, anemia, thrombocytopenia, withdrawal if abrupt, neonatal withdrawal (long term maternal use)

Common reactions: somnolence, constipation, nausea/vomiting, dizziness, hypotension, histamine release, dysphoria, euphoria, sweating, edema, abdominal pain, pruritus, Flushing, dry mouth, asthenia, paresthesia, urinary retention, biliary spasm, libido decreased, miosis.

Dosage: IM route: 2 – 10 mg (consider lower dose in elderly or patients < 50 kg)

IV/IO route: 2-5 mg initial, followed by 2 mg increments every few minutes until the pain is relieved or until respiratory depression ensues. After 10 mg, you should contact medical control for further guidance.

Rectal route: 10 – 20 mg per rectum. Consider lower dose, longer duration if elderly or patients < 50 kg.

Routes: IV, IM, IO, per rectum

Pediatric Dosage: < 6 months; 0.05 – 0.2 mg/kg SQ/IM/IV (avoid IM route if possible)
6 months- 12 yrs; 0.1-0.2 mg/kg IV/IM/SQ.

Return to: Contents at Top Drug Reference Pain Management Chest Pain suspicious for MI Marine Enven Sickle Cell Cold related emerg Electrical/Lightening Extremity Injuries Burns Dental Trauma Gen Crush Injury Peds Pain Management Peds Sickle Cell Cardioversion Post intubation management

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5.1.31 Naloxone (Narcan)

Class: Narcotic antagonist.

Actions: Reverses effects of narcotics.

Indications:

- Narcotic overdoses including the following: Codeine, Demerol, Dilaudid, Fentanyl, Heroin, Lortabs, Methadone, Morphine, Paregoric, Percodan, Tylox, Vicodin, synthetic analgesics,

- Overdoses including the following: Darvon, Nubain, Stadol, Talwin, alcoholic coma,
- To rule out narcotics in coma of unknown origin.

Contraindications: Patients with a history of hypersensitivity to the drug.
Precautions: Should be administered with caution to patients dependent on narcotics as it may cause withdrawal effects. Short-acting, should be augmented every 5 minutes. Use with caution on patients with: cardiovascular dz, hepatic impairment, renal impairment, w/cardiotoxic drugs
Side Effects: Serious: Ventricular fibrillation, cardiac arrest, seizures.
Common: Tachycardia, HTN, hypotension, nausea, vomiting, tremor, withdrawal sx, diaphoresis, pulmonary edema, irritability (peds pts)
Dosage: Start with 0.4 mg and titrte to effect up to 2 mg q 2-3 min prn..
Routes: SC**,** IV, IM, IN
ET (ET dose is 2.0-2.5 times IV dose).
Pediatric Dosage: *< 1 month*: 0.1 mg/kg IV q 2-3 min or 0.1 mg/kg IM q 3-8 min
1 mo - < 5 yrs old and < 20 kg: 0.1 mg/kg IV q 2-3 min or 0.1 mg/kg IO/IM/SQ/ETT/IN q 3-8 min
> 5 yrs old or > 20 kg: Titrate 0.4 mg up to 2.0 mg IV/IO/IM/SQ/ETT/IN q 2-3 min prn

Return to: Contents at top Admin Guidelines Adult Medical Protocols
Drug Reference Alter Ment Stat Alcohol Emerg Pul Edema/CHF Proto Tox OD Proto
Dystonic Reaction Newborn Resuscitation Peds AMS Peds Asystole Peds Tox

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5.1.32 Nitroglycerin; Spray (Nitrolingual Spray) or Tablet (Nitro 0.4mg) or IV Drip

Class: Antianginal.
Actions: Smooth-muscle relaxant, decreases cardiac work, dilates coronary arteries, dilates systemic arteries.
Indications: Angina pectoris, chest pain associated with myocardial infarction, hypertension, CHF.
Contraindications: Hypersensitivey to drug, hypotension, Anemia, elevated ICP, Methemoglobinemia. Sildenafil (Viagra) use (or other erectile dysfunction rx). NOTE: IV use contraindicated if: pericardial tamponade, restrictive cardiomyopathy, contrictive pericarditis
Precautions: Constantly monitor vital signs. Syncope can occur. Use with caution for patients with: hypovolemia, hypotension, IHSS, Acute MI, CHF, cerebral hemorrhage, head injury.
Side Effects: Serious; severe hypotension, anaphylactictoid reaction, nitrate tolerance (excessive or continuous use), Methemoglobinemia, paradoxical bradycardia,
Common; Dizziness, headache, lightheadedness, flushing, orthostatic hypotension, reflex tachycardia, edema, burning oral sensation, tingling oral sensation.
Dosage: Spray: One spray administered under the tongue; may be repeated in 10-15 minutes; no more than three sprays in a 15-minute period; spray should not be inhaled.
Sublinqual: 0.4 sublinqual q 5 min x 3
IV Drip: (Critical Care Transport) see IV Drip Calculation. 5 – 200 mcg/min
Routes: Sublinqual, IV, Sprayed under tongue on mucous membrane.
Pediatric Dosage: (Critical Care Transport only):
HTN: 1-5 mcg/kg/min IV (Start 0.25-0.5 mcg/kg/min, incr 0.5-1 mcg/kg/min q 3-5min until response. Max: 20 mcg/kg/min

CHF: 1 – 5 mcg/kg/min IV. (Start 0.25-0.5 mcg/kg/min, incr 0.5-1 mcg/kg/min q 3-5 min until response; Max: 20 mcg/kg/min)

Return to: Contents at top Admin Guidelines Adult Medical Protocols Drug Reference
Chest Pain suspicious for MI Hypertension Proto Pul Edema/CHF Proto

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5.1.33 Nitropaste (Nitro-Bid)

Class: Antianginal.

Actions: Smooth-muscle relaxant, decreases cardiac work, dilates coronary arteries, dilates systemic arteries.

Indications: Angina pectoris, chest pain associated with myocardial infarction, hypertension, CHF.

Contraindications: Hypersensitivey to drug, hypotension, Anemia, elevated ICP, Methemoglobinemia. Sildenafil (Viagra) use (or other erectile dysfunction rx). NOTE: IV use contraindicated if: pericardial tamponade, restrictive cardiomyopathy, contrictive pericarditis, and hypotension. Children younger than 12 years of age.

Precautions: Constantly monitor blood pressure, syncope. Use with caution for patients with: hypovolemia, hypotension, IHSS, Acute MI, CHF, cerebral hemorrhage, head injury.

Side Effects: Serious; severe hypotension, anaphylactictoid reaction, nitrate tolerance (excessive or continuous use), Methemoglobinemia, paradoxical bradycardia,
Common; Dizziness, headache, lightheadedness, flushing, orthostatic hypotension, reflex tachycardia, edema, burning oral sensation, tingling oral sensation.

Dosage: 1/2 to 2 inches.

Routes: Topical.

Pediatric Dosage: Not indicated.

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Chest Pain suspicious for MI Pul Edema/CHF Proto Hypertension Proto

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~~**5.1.34 Norepinephrine (Levophed)**~~

~~**Class:** Inotropes/Pressors~~

~~**Action:** Stimulates Alpha and Beta 1 adrogenic receptors. Produces inotropic and vasopressor effects~~

~~**Indications:** Shock, Septic Shock, Post resuscitation care. Likely to be used on patients during inter-facility transports of hypotensive patients~~

~~**Contraindications:** Hypersensivity to drug, severe volume depletion, vascular thrombosis, cycloproane anesthetic use, halothane anesthetic use, profound hypoxia,~~

~~**Precautions:** Use with caution on patients with sensitivity to sulfites, on MAO inhibitors or have hyperthyroidism.~~

~~**Side Effects:**~~

~~**Serious**: Bradycardia, hypertension, arrhythmias, ischemic injury, asthma exacerbation, anaphylaxis, extravasation necrosis~~

~~**Common**: Headache, anxiety, bradycardia, dyspnea~~

~~**Dosing:** Mix 8 mg in 250 ml D54 (32 mcg/ml);~~

~~**Weight based dosing:** 0.02 – 1 mcg/kg/min; Start -.1 – 0.5 mcg/kg/min IV then titrate.~~

~~**Non-weight based dosing**: 2 – 4 mcg/min IV. Start: 8 – 12 mcg/min. Dose may be titrated to patient response. See Levophed IV Drip Chart~~

~~**Routes:** IV on PUMP**!!!** Preferably via a central IV line.~~

~~**Pediatric Dosing:** 0.05 – 0.1 mcg/kg/min then titrate to effect. Max: 2 mcg/kg/min~~

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5.1.35 Ondansetron (Zofran)

Class: Antiemetic,
Action: Selectively antagonizes serotonin 5-HT3 receptors
Indications: Nausea and Vomiting
Contraindications: Hypersensivity to drug, congenital long QT syndrome
Precautions: Impaired liver function, Caution if abdominal surgery, caution if prolonged Qt interval risk
Side Effects:

Serious: Severe **a**llergic reaction, anaphylaxis, bronchospasm, extrapyramidal symptoms, oculogyric crisis, transient blindness, QT prolongation, torsades de pointes.
Common:, headache, constipation, fatigue, diarrhea, hypoxia, pyrexia, urinary retention, dizziness, agitation, pruritus

Dosage: Adults; 4 – 8 mg IV or IM,
Routes; IV or IM for adults, IV for pediatric
Pediatric Dosage: Peds (6 months – 12 Yrs) 0.1 mg/kg IV (maximum dose 4 mg)
Children > 12 yrs; 4 mg IV x1;

Can give Zofran ODT (oral dissolvable tablet) sublingual when possible.

Return to: Contents at top Drug Reference Chest Pain suspicious for MI Motion Sickness Pain Management Marine Enven Proto Contents at top Nausea and Vomiting Extremity Injuries Peds nausea and vomit

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Return to: Contents at top Admin Guidelines Adult Medical Protocols PVC protocol V-fib Drug Reference Wide complex tach w/pulse Peds V-Tach w/pulse Stable Peds V-Tach w/pulse unstable Appendix

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5.1.36 Promethazine (Phenergan)

Class: Antihistamine (h1 antagonist).
Actions: Mild anticholinergic activity, antiemetic, potentiates actions of analgesics.
Indications: Nausea and vomiting, motion sickness, to potentiate the effects of analgesics, sedation.
Contraindications: Comatose states, patients who have received a large amount of depressants (including alcohol).
Precautions: Avoid accidental intra-arterial injection.
Side Effects: May impair mental and physical ability, drowsiness.

Dosage: 25 mg.
Routes: IV.
Pediatric Dosage: 0.5 mg/kg.

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5.1.37 Famotidine (PEPSID)

Class: Antihistamine H2 blocker
Actions: Selectively antagonizes H2 receptors
Indications: Treatment of allergic reactions in conjunction with H1 blocker. Used for treatment of reflux, duodenal ulcer, gastric ulcer, hypersecretory conditions.
Contraindications: Hypersensitivity to drug class, porphyria,
Precautions: Hepatic or renal impaired, elderly or debilitated, chronic pulmonary disease, diabetes mellitus, immunocompromised
Side Effects: Serious: Thrombocytopenia, hepatotoxicity, pneumonia,
Common: headache, diarrhea, constipation, muscle aches, vertigo, malaise, dizziness, dry mouth (xerostomia), dry skin (xeroderma), nausea, vomiting, rash, confusion, fatigue.
Dose: 20mg IV

Route: PO
Peds Dosage: 2 -5 mg/kg po. Omit this drug in the prehospital setting if child unable to swallow pill.

Return to: Contents at top Admin Guidelines Adult Medical Protocols Drug Reference Allergic Rxn Proto Peds Allergic Rxn

5.1.38 Rocuronium (Zemuron)

Class: Paralytic
Action: is a nondepolarizing neuromuscular blocking agent with a rapid to intermediate onset depending on dose and intermediate duration.
Indications: It is indicated for patients as an adjunct to general anesthesia to facilitate both rapid sequence and routine tracheal intubation, and to provide skeletal muscle relaxation during surgery or mechanical ventilation.
The use of paralytic drugs in the SMART Airway Management protocol under (R.S.I) is reserved for those paramedics that have received extensive training in advanced airway management. The administration of paralytic drugs found in this procedure must only be done by those paramedics that have prior medical director authorization. See Medical Procedure– SMART Airway Management
Contraindications: Allergy to the drug.
Precautions: Caution in impaired liver function, severe obesity and impaired respiratory function patients.
Side Effects: Arrhythmias, anaphylaxis, bronchospasm, HTN, hypotension.
Dosage: FOR INTRAVENOUS USE ONLY. INDIVIDUALIZATION OF DOSAGE SHOULD BE CONSIDERED IN EACH CASE.
Rapid Sequence Intubation:
In appropriately premedicated and adequately anesthetized patients, ZEMURON® (Rocuronium Bromide) Injection 0.6-1.2 mg/kg will provide excellent intubating conditions in most patients in less than 2 minutes.
Dose for Tracheal Intubation:
The recommended initial dose regardless of anesthetic technique is 0.6 mg/kg.
Neuromuscular block enough for intubation is attained in a median (range) time of 1 minute(s) and most patients have intubation completed within 2 minutes. Maximum blockade is achieved in most patients in less than 3 minutes.
Duration: 30 minutes
Use in Pediatrics:
Initial doses of **0.6 mg/kg in pediatric patients** under anesthesia produce excellent to good intubating conditions within 1 minute. The median (range) time to maximum block was 1 minute(s). This dose will provide a median (range) time of clinical relaxation of 41 minutes in 3 months-1 year infants and 27 minutes in 1-12 year-old pediatric patients.
Compatibility:
ZEMURON® (Rocuronium Bromide) Injection is compatible in solution with:
1. 0.9% NaCl solution Sterile water for injection
2. 5% glucose in water Lactated Ringers
3. 5% glucose in saline

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5.1.39 Sodium Bicarbonate

Class: Alkalinizing agent.
Actions: Combines with excessive acids to form a weak volatile acid, increases ph. Helps drive Potassium back into cells.
Indications: Late in the management of cardiac arrest, if at all, tricyclic antidepressant overdose, severe acidosis refractory to hyperventilation. Hyperkalemia
Contraindication: Alkalotic states, hypochloremia, hypersensitivity to drug.
Precautions: Correct dosage is essential to avoid overcompensation of ph. Can deactivate catecholamines. Can precipitate with calcium preparations. Delivers large sodium load.
Side Effects: Serious: Metabolic alkalosis, CHF exacerbation, seizures, tetany, extravasation cellulitis (IV use).
Common: Flatulence (po use), gastric distension (po use), metabolic alkalosis, edema, hypernatremia, injection site pain.
Dosage: 1 mEq/kg initially followed by 0.5 mEq/kg every 10 minutes as indicated by blood gas studies.
Routes: IV, IO.
Pediatric Dosage: 1 mEq/kg initially IV/IO (1ml/kg of 8.4% solution) followed by 0.5 mEq/kg every 10 minutes. In neonates and infants, dilute the 8.4% solution 1:1 with sterile water (not saline) making a 4.2% solution to reduce the hyperosmolarity of the solution

Return to: Contents at Top Drug Index Asystole Proto PEA V-fib Excited Delirium Tox OD Proto Hyperkalemia Gen Crush Injury Peds Asystole Peds PEA Peds V-fib/V-tach no pulse Peds Ingestion OD Peds Chest Injuries Peds Hyperkalemia

5.1.40 Succinylcholine (Anectine)

Class: Neuromuscular blocking agent (depolarizing).
Actions: Skeletal muscle relaxant, paralyzes skeletal muscles including respiratory muscles.
Indications: To achieve paralysis to facilitate endotracheal intubation.
Contraindications: Patients with known hypersensitivity to the drug, maglignant hyperthermia hx (pt or family), myopathies/neuromuscular dz, muscular dystrophy, ALS, multiple sclerosis, major trauma or burns after 5 days and until healed, penetrating eye injury, unstable fractures, spinal cord injury or stroke between 5 days and 6 months, patients who **are** hyperkalemic, intra-abdominal sepsis between 5 days and time healed..
Precautions: Should not be administered unless persons skilled in endotracheal intubation are present. You must be authorized by the medical director to use this drug. Endotracheal intubation equipment must be available. Oxygen equipment and emergency resuscitative drugs must be available. Paralysis occurs within 1 minute and lasts for approximately 8 minutes. Use with caution on patients with: pulmonary dz, severe anaphylactic rxn hx, hepatic impairment, renal impairment, electrolyte abnormality, cardiovascular dz, **at risk for** hyperkalemia, arrhythmias, severe hypothermia, febrile, chronic abdominal infection, subarachnoid hemorrhage,
Side Effects:
Serious: Prolonged paralysis, respiratory depression, apnea, malignant hyperthermia, anaphylaxis, arrhythmias, ventricular arrhythmias (peds

pts), cardiac arrest (peds pts), rhabdomyolysis w/hyperkalemia (peds pts), myoglobenemia,
Common: Myalgia, muscle fasciculations, jaw rigidity, IOP elevation, HTN, hypotension, bradycardia, tachycardia, sialorrhea, rash.

Dosage: 1-1.5 mg/kg (40-100 mg in an adult).
Routes: IV.
Pediatric Dosage: 1 mg/kg.

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5.1.41~~Thiamine (Vitamin B1)~~

~~**Class:** Vitamin.~~
~~**Actions:** Allows normal breakdown of glucose.~~
~~**Indications:** Coma of unknown origin, alcoholism, delirium tremens, malnourished patient with altered mental status.~~
~~**Contraindications:** None in the emergency setting.~~
~~**Precautions:** Rare anaphylactic reactions have been reported.~~
~~**Side Effects: Serious**: Angioedema, cyanosis, anaphylaxis.~~
~~**Common**: Warmth sensation, pruritus, urticarial, injection site pain~~
~~**Dosage:** 100 mg.~~
~~**Route**: IV/ IM~~

5.1.42 Tranexamic Acid (TXA)

Class: Antifibrinolytic Agent
Action: Tranexamic acid competitively inhibits activation of plasminogen (via binding to the kringle domain), thereby reducing conversion of plasminogen to plasmin (fibrinolysin), an enzyme that degrades fibrin clots, fibrinogen, and other plasma proteins, including the procoagulant factors V and VIII. It inhibits both plasminogen activation and plasmin activity, thus preventing clot break-down rather than promoting new clot formation.
Indications: Treatment of hemorrhagic shock from trauma. Trauma must have occurred < 3 hours. Must have obvious bleeding external wounds neck to mid-thigh or suspected severe internal injuries from blunt or penetrating trauma. Must have sustainted HR > 110 beats/min and sustained hypotension with systolic BP < 90 mm Hg.
Contraindications: Non-hemorrhagic shock, Non-traumatic hemorrhagic shock, hemorrhagic shock stabilized with other hemostatic agents/measures. Active intravascular clotting (DVT, PE). Hypersensitivity to TXA or any ingredients. Subarachnoid hemorrhage. Color vision defect
Precautions: Delayed effects up to 48 hours consistent with anti-inflammatory actions. Precaution if thromboembolism risk, DIC, upper urinary tract bleeding, if cardiovascular surgery.
Side effects:
Serious: Hypersensitivity rxn, anaphylaxis, thromboembolism, seizures, cerebral edema, ureteral obstruction, ligneous conjunctivitis, retinal degeneration
Common: headache/migraine, URI sx, back pain, abdm pain, musculoskeletal pain, arthralgia, muscle cramps, anemia, nausea, fatigue, vomiting, diarrhea, dizziness, ligneous conjunctivitis, allergic contact derm, hypotension, vision change.
Dosage: **Bolus**: 1 gm mixed in 100 ml NS infused IV over 10 minutes
Maintenance: If transport is > 1 hr: 1 gm in 1 liter (1000ml) NS infused at 125 ml/hr IV.
Routes: IV
Pediatric Dose: **Bolus**: 20 mg/kg IV over 10 minutes. Do not exceed adult does
Maintenance: If transport time is greater than 1 hour, start maintenance infusion: 20 mg/kg to be infused over 8 hours. Not to exceed 1000 mg (1gm) over 8 hours.

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5.1.43 Terbutaline (Brethine)

Class: Labor suppression/Tocolytics, Beta-2 Agonist
Action: Stimulates beta-2 adrenergic receptor, relaxing airway smooth muscle
Indications: Tocolysis (for EMS purpose)

~~Contraindications:~~ ~~Hypersensitivity to drug, acute or maintaenance tocolysis (PO use), prolonged tocolysis >48 – 72 hours (SC/IV use)~~

~~Precautions:~~ ~~arrhythmias, cardiovascular disease, hypertension, hyperthyroidism, diabetes mellitus, seizure disorder.~~

~~Side Effects: Serious~~~~: Hypersensitivity rxn, paradoxical Bronchospasm, HTN, QT prolongation, myocardial ischemia, pulmonary edema, hypokalemia, hyperglycemia, seizures, neonatal hypoglycemia, fetal tachycardia~~

~~Common~~~~: Nervousness, tremor, headache, tachycardia, palpatations, drowsiness, nausea, vomiting, diaphoresis, muscle cramps, hypokalemia, hyperglycemia~~

~~Dosage:~~ ~~for Tocolysis; 0.25 mg SQ q20-30 min, max 1 mg/4hr SC. Alternative: 0.0025-0.01 mg/min IV, increase 0.005 mg/min q 10 min until contractions stop or max dose.~~

~~Route~~~~: SC or IV~~

6 Appendix

6.1 ABDOMINAL PAIN DIFFERENTIAL

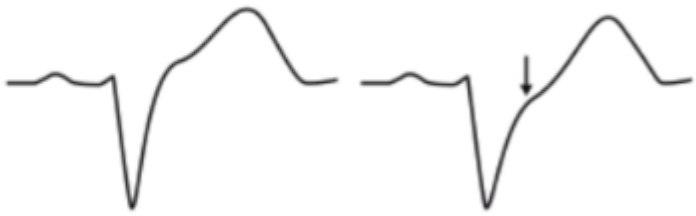
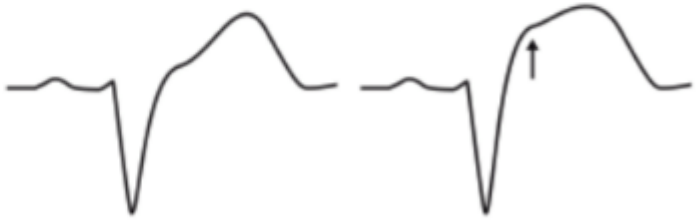
Upper GI Bleed	Lower GI Bleed	Gynecological
Hx of peptic ulcer disease; can cause massive hemorrhage	May be occult or bright red; a common cause of orthostatic hypotension and undetected anemia	Think ectopic!! if patient still having menses; diagnosis includes: 1. lower abdominal pain 2. hypotension 3. shoulder pain 4. vaginal bleeding +/- 5. syncope
Common causes associated with the different types of presenting pain		
Upper GI Bleed	**Lower GI Bleed**	**Gynecological**
Esophageal Varices (Hx of cirrhosis, hepatitis)	Diverticulitis	Ectopic Pregnancy
Peptic Ulcer Disease	Hemorrhoids	Pelvic Inflammatory Disease / STD's
Aspirin, NSAID's	Cancer	Ovarian Cyst
Alcohol	Inflammatory Bowel Disease	Kidney / Urinary Tract Infection
Ingestion of caustic substances	Chronic Diarrhea, overuse of laxatives	Endometriosis

Back Pain	Colicky Pain	Peritoneal Pain	Vomiting
Every pain presenting with new onset back pain (>60 yrs.) should have an abdominal exam R/O AAA	Spasmotic - usually results from smooth muscle contracting against obstruction of hollow organ	Rigid board-like abdomen, resulting from infection or long standing rupture	Non-specific syndrome, can be caused by a wide variety of underlying problems some of which are serious
Common causes associated with the different types of presenting pain			
Back Pain	**Colicky Pain**	**Peritoneal Pain**	**Vomiting**
Abdominal Aortic Aneurysm	Bowel Obstruction	Ruptured Appendix	Infection of GI Tract
Cholelithiasis	Renal Obstruction "Kidney Stones"	Ruptured Ovarian Cyst	Ulcers
Pancreatitis	Gallbladder	Pelvic Inflammatory	Toxic Ingestions

	Obstruction	Disease (PID)	
Perforated Ulcer	Ulcerative Colitis	Perforated Ulcer	Bowel Obstruction
	Crohn's Disease	Peritonitis Advanced	Stones of the Gallbladder or Kidney

Reference: "The 60 second EMT."

Sgarbossa's criteria

Criteria	Points	Normal LBBB	Ischemia on LBBB
ST segment elevation ≥1 mm in any lead with positive QRS complex (V4-V6, aVL, I). ***Explanation**: These leads should display ST-segment depression, since the ST-T segment should be discordant to the QRS in LBBB.*	5	**V4-V6, aVL, I** 	
ST segment depression ≥1 mm in V1, V2 and/or V3 ***Explanation**: These leads should display ST-segment elevation, since the ST-T segment should be discordant to the QRS in LBBB.*	3	**V1-V3** 	
ST segment elevation ≥5 mm in any lead with discordant QRS (mostly V1 till V3) ***Explanation**: There is normally slight ST-segment elevation in V1–V3, but it rarely exceeds 5 mm; if it does exceed 5 mm, ischemia is likely. Patients with concomitant ventricular dilatation or hypertrophy may have false positive criteria. The ASSENT 2 and 3 studies demonstrated that this criteria is rather poor.*	2	**V1-V3** 	

TIMI score	Yes 1 point	No 0 points
Age ≥65		
≥3 risk factors for ACS; hypertension, hyperlipidemia, smoking, diabetes, family history		
Use of aspirin in last 7 days		
Prior coronary stenosis ≥50%		
≥2 angina events in 24 hours or persisting discomfort		
ST-segment deviation of ≥0.05 mV on initial ECG		
Elevated cardiac biomarkers		
Total score		

Low risk	0–2
Intermediate risk	3–4
High risk	5–7

Grace score									
Age	Points	**HR**	Points	**SBP**	Points	**Cr**	Points	**Killip class**	Points
<39	0	<70	0	<80	40	0.0–0.39	1	I	0
40–49	18	70–89	5	80–99	37	0.4–0.79	4	II	15
50–59	36	90–109	10	100–119	30	0.8–1.19	7	III	29
60–69	55	110–149	17	120–139	23	1.2–159	10	IV	44
70–79	73	150–199	26	140–159	17	1.6–1.99	13	**Cardiac arrest**	30
80–89	91	≥200	34	160–199	7	2.0–3.99	21	**Elevated cardiac markers**	13
>90	100	–	–	≥200	0	≥4	28	**ST-segment deviation**	17

Low risk	1–88
Intermediate risk	89–118
High risk	≥119

4.29.1 Sigma Spectrum Single Channel IV Pump

Medina, New York 14103
v 800 356 3454
f 585 798 3909
www.sigmapumps.com

CONTENTS

REMOVE FROM THE SHIPPING BOX

The SIGMA Spectrum has been packaged to provide protection during transportation and storage. Remove the Spectrum from the protective anti-static bag and remove the protecting foam end caps. Discard the desiccant package.

The battery tab has been provided to isolate the battery voltage from the pump during transport and distribution. **Remove the battery insulating tab** prior to charging the pump's battery or operating the pump. This is accomplished by pulling the tab straight out from the Battery Pack mounting cavity.

Pull the battery tab straight out from the Battery Pack cavity.

> It is suggested that all packaging materials be saved for reuse. This is advised in the event product repair or warranty replacement is necessary.

> It is strongly recommended that the pump's battery be fully charged (12 hour minimum) before depending on the battery as a source of pump power.

KEY OPERATING TIPS

1. FOLLOW ALL PROMPTS.

2. LOAD SETS PROPERLY.
   To open the pump door, push the gravity IV set's slide clamp fully into the keyhole.
   Load tubing tautly, from top to bottom in loading points 1, 2, 3 and 4, following the red/green prompts.
   Push the door closed in the two door hook areas.
   Open the slide clamp by pulling it straight up, while holding the tubing around it down.

3. USE THE DRUG ERROR PREVENTION SYSTEM.
   DEP mode protects against human errors that could cause Adverse Drug Events.
   BASIC mode can not detect human errors.

4. DO NOT DROP THE POWER SUPPLY.
   The power supply is an electronic device. It is not simply a plug, and it will break if repeatedly dropped.

5. FOLLOW SECONDARY PROCEDURES
   Use SIGMA metal hooks to drop primary containers below secondary containers.
   With secondary rates above 300 mL/hr, look for and clamp off primary line siphoning.

BACKGROUND INFORMATION

Intended Device Use

The SIGMA Spectrum is a multifunctional, intravenous and epidural, drug error prevention (DEP) “smart” infusion pump. It is intended for infusion applications in hospitals, outpatient care areas and homecare services.

System Components

SIGMA Spectrum Pump:

Fig 1

Standard gravity IV sets:

with slide clamp (Required for door opening)

Fig 2

1 Master Drug Library (MDL)

The MDL is a software tool used by pharmacy to list every IV and epidural drug found in the pharmacy’s formulary, along with associated care areas and infusion parameters for each drug entry.

2 MDL Transfer

Accomplished by:

- Transfer from a wireless network connection to a pump using a wireless battery module
- Transfer from the PC to a mobile PDA and then transfer by infrared from the PDA to a pump

3 SIGMA Spectrum Infusion Pump (Fig 1)

4 Standard Gravity IV Sets (containing a slide clamp used for door opening) (Fig 2)

Cautions and Warnings

For other essential conditions of use, general warnings and operator preparation see “SETUP AND OPERATION”, “ALARMS” and “CAUTIONS and WARNINGS” section in this manual

SYMBOLS

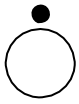
Attention, consult ACCOMPANYING DOCUMENTS

CLASS II EQUIPMENT

TYPE BF APPLIED PART

Direct current

ON (only for part of the EQUIPMENT)



OFF (only for part of the EQUIPMENT)

*** Note: to completely disconnect the equipment from the external power, unplug the AC Power Adaptor from the mains receptacle.**

Recyclable, dispose of properly

+ -

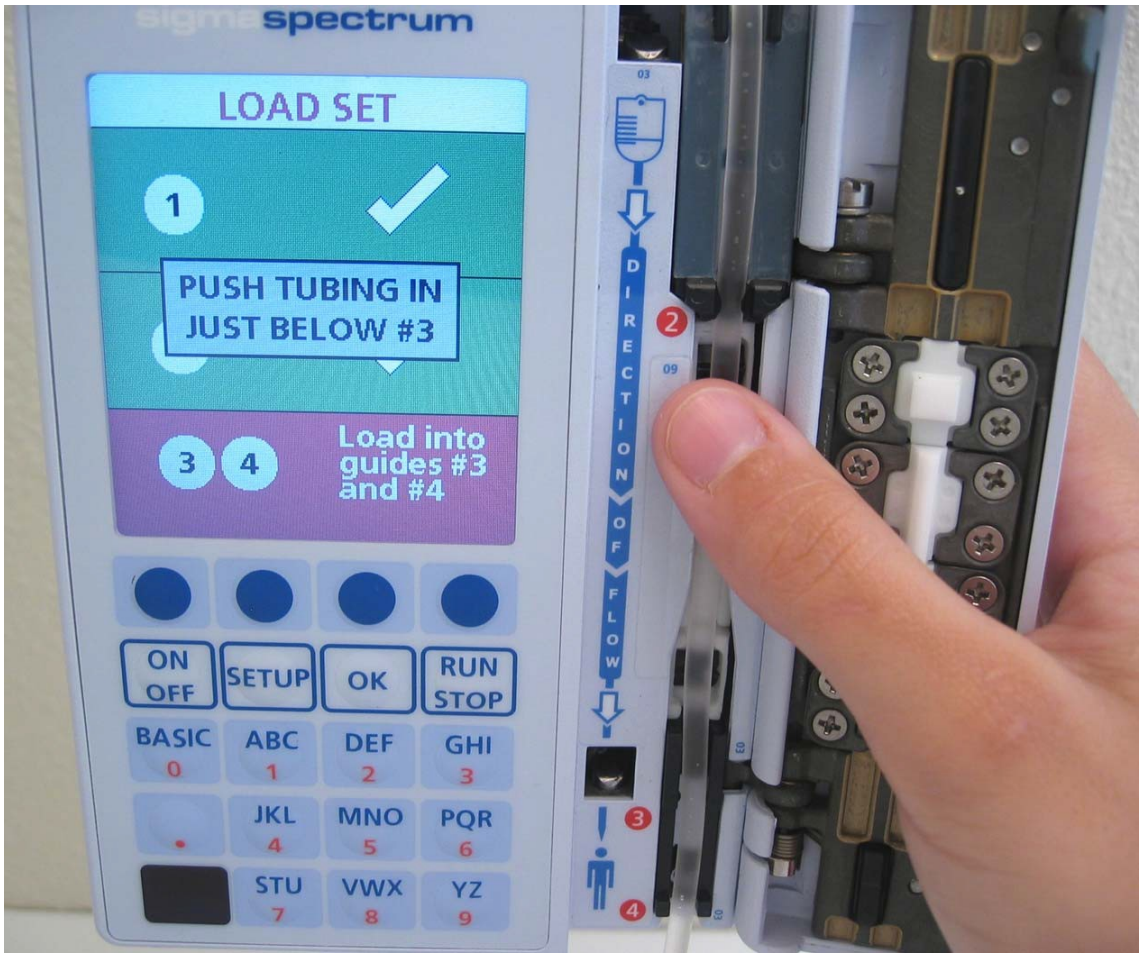
These symbols are on the Battery Pack and are used to identify polarity of the battery. This is for reference only.

This is a representation of the **Direction of Flow** label (not to scale). This label appears behind the door of the pump. It is intended to assist the user in determining the direction of fluid flow from the medication container to the patient. The fluid direction is controlled by the pumping mechanism when the door is closed and the pump is in the infusion mode (running).

Non-ionizing electromagnetic radiation

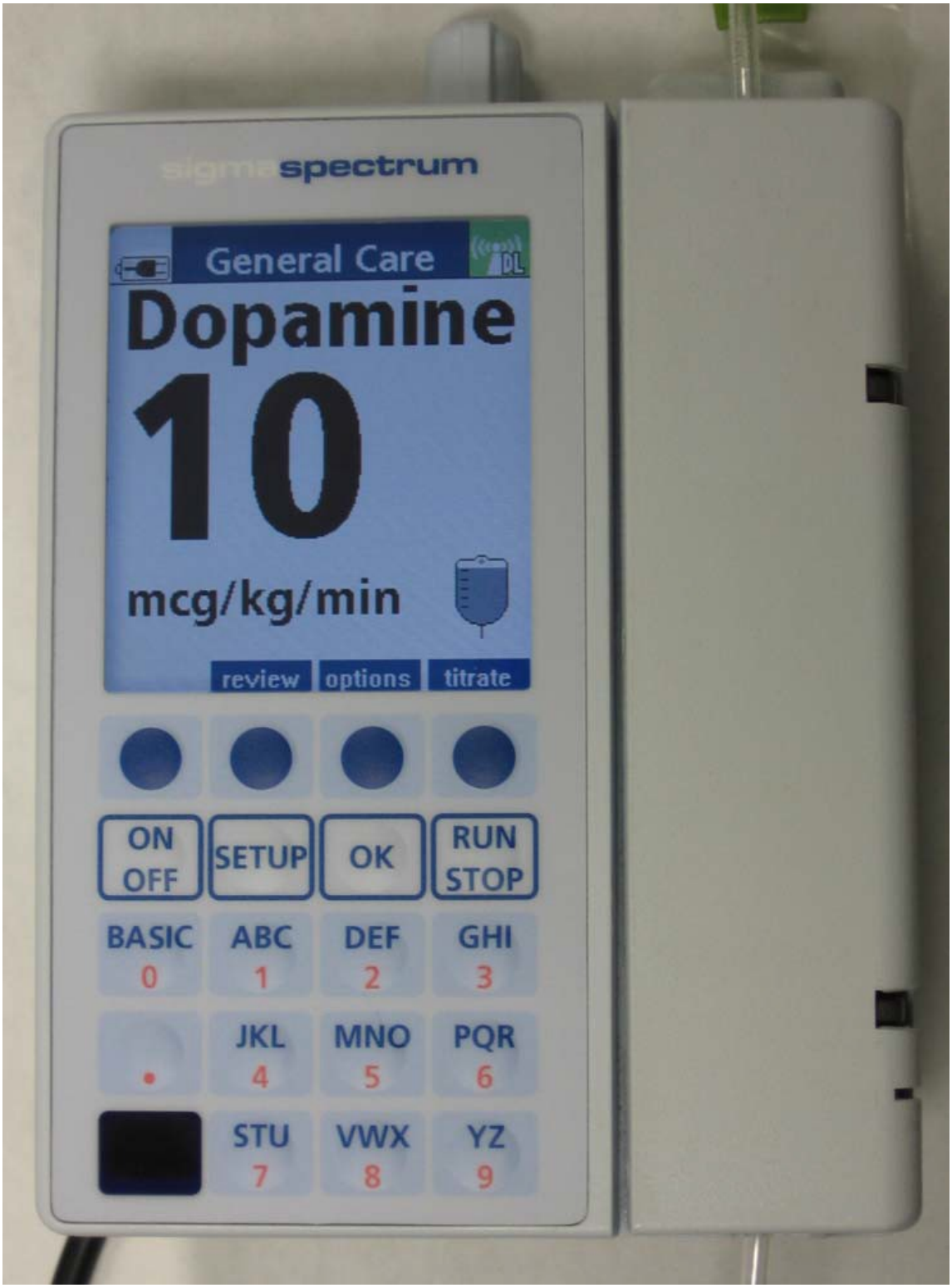
ILLUSTRATIONS

Front View – Door Open



Front View – Pump Running with Standard Battery

Front View – Pump Running with Wireless Battery Module



Back View- With Standard Battery

Back View- With Wireless Battery Module

SETUP AND OPERATION

Keys

- SOFT KEYS (the top row of keys on the keypad) are non-labeled keys with various functions depending on what is displayed above them.
- ARROWS advance cursors and select alternate choices.
- HELP selects photo instructions for things such as door opening / set loading.
- OK confirms entries and advances cursors.
- SETUP starts programming.
- LETTERS are selected by pushing corresponding numerical keys once, twice or three times quickly.
- BASIC allows selection of mL/hr setup (bypassing the Drug Error Prevention system). From BASIC, dose rate modes and ramp/taper modes may also be selected.
- CLEAR erases the highlighted entry.
- CLR ALL erases the entire pump set up screen.
- SILENCE quiets the audio alarm for 2 minutes. Additionally, any key can be pushed for silence.
- HOLD places the pump in standby mode.
- ON/OFF turns the pump on or off.
- RUN/STOP starts and stops the infusion.
- OPTIONS allow the user to select additional pump features.
- BACK allows the user to go back.
- RESET resets Manual Programming Mode to Step 1.
- RAMP allows access to the Manual Programming Mode.
- CLR STEP clears one step of Manual Programming Mode.
- TITRATE allows flow rate changes without stopping the pump.
- BOLUS allows Bolus Setup without stopping the pump.
- REVIEW pulls up the set up screen without stopping the pump.

Pre-Pump Programming

- MOUNT THE PUMP to an IV pole.
- Plug the pump into a wall outlet if available.

- IV SETS: select only IV sets made by the manufacturer listed on top of the pump. IV sets must be of standard stiffness and diameter. Performance can not be achieved using stiff, large or small diameter tubing. Contact SIGMA for compatible standard IV set lists and for special SIGMA blood, nitroglycerin and lipid sets.

- PUMPED-ON TUBING should not be re-loaded into the pumping channel (to avoid nuisance alarms and to maintain flow rate accuracy). **NOTE: Flow Rate accuracy will be maintained if the set has been pumped on for no more than 72 hours for Hospira and 96 hours for Baxter IV sets at rate settings not greater than 125 mL/hr, or for total volumes of not more than 9 liters (Hospira) or 12 liters (Baxter).**

- PREPARE IV CONTAINERS AND PRIME IV SETS by positioning roller clamps below the pump, positioning slide clamp near the keyhole at the top of the pump, inverting bags that need to be mixed (rather than shaking them), warming IV solutions to room temperature before use, filling drip chambers approximately halfway and using standard gravity IV set priming technique to purge air from sets and all Y sites.

AC Power Adaptor

WARNING USE ONLY THE POWER ADAPTOR SPECIFIED FOR THIS EQUIPMENT. USE OF OTHER POWER ADAPTORS MAY CAUSE PERSONAL INJURY OR DAMAGE TO EQUIPMENT.

The power adaptor is used to charge the pump's battery. The power adaptor uses a locking cord connection to prevent inadvertent disconnection. To engage the power adaptor, align the arrow of the power adaptor cord with the arrow on the connector identified as the external power adaptor connection (on the back of the SIGMA Spectrum pump). Insert the power adaptor module into the appropriate wall power outlet. The Spectrum will display a plug symbol if the power adaptor is working properly when the pump is in operation. The green led on the power adaptor should be on when the adaptor is plugged into a powered wall outlet.

NOTE: IMPROPER REMOVAL MAY DAMAGE THE POWER ADAPTOR. Remove the power adaptor cord connection from the SIGMA Spectrum by pulling back the external power adaptor's shell. This will unlock the connection and removal is accomplished by simply pulling on the connector with the shell retracted away from the back of the pump. Improper twisting or pulling of the connector or cable may damage the power supply.

NOTE: Repeated drops of power adaptors on floors will cause them to malfunction. As with all electronic devices, drops should always be prevented.

Set Loading (Unloading)

WARNING THE PUMP WILL INDEX WHEN THE SET'S SLIDE CLAMP IS REMOVED FROM THE PUMP'S KEYHOLE. THIS WILL PROPEL FLUID (MAXIMUM OF .1ML) IN THE IV SET IN THE DIRECTION OF FLOW AND POSSIBLY TO THE PATIENT. THIS WILL OCCUR IF THE ADMINISTRATION SET IS LOADED IN THE PUMP AND A PATIENT IS CONNECTED TO THE ADMINISTRATION SET.

- OPEN THE PUMP DOOR by inserting the slide clamp into the keyhole (loading point #1) and pressing down until the door opens.

- LOAD IV SET TUBING INTO THE TUBING CHANNEL. Loading must be from the top to bottom of the tubing channel and the tubing should be taught. Load the tubing into loading point #2 and then loading points #3 and #4.

- CLOSE THE DOOR by pressing the upper and lower corners near the door hooks areas.

- OPEN THE SLIDE AND ROLLER CLAMP.

- TO UNLOAD SETS, push the slide clamp in the keyhole until the door opens and pull tubing out from the bottom of the pump towards the top.

- PREVENT FREE FLOW whenever the pump door is open and when the set is out of the pump. This is accomplished by having the set's slide clamp or roller clamp fully closed or by partially opening the roller clamp to achieve gravity flow.

- WHEN CHANGING IV SETS OR CONTAINERS always keep the set's slide clamp or roller clamp fully closed, (except when following standard gravity set priming procedures).

Drug Error Prevention Programming

- Turn the pump ON.

- Select the care area (nursing area). Push OK.

- Type the drug's first two letters (all drugs beginning with those two letters will appear). Push OK. Scroll to the desired drug. Push OK

- Select the correct drug concentration (if more than one is offered). Push OK. If the "Concentration Confirmation" option is enabled, a dialog shall appear prompting confirmation of the selected drug concentration. Press "yes" to continue or "no" to reselect. Note that the confirmation dialog will appear only when selecting from a list of concentrations or if entering a concentration manually to a drug that has been assigned a "variable" concentration in the Master Drug Library (MDL).

- When the setup screen appears:
  - Confirm the drug and concentration is correct.
  - Select primary or secondary bag and push OK[1].
  - Enter all required data. Push OK after each entry.

    [1]*The bag selection prompt shall not be offered if the selected drug has been specifically assigned to either the primary or secondary bag in the MDL*.

- Push RUN to begin the infusion. Confirm that all infusion parameters are as intended.

Dose Rate Limits

- SOFT DOSE RATE LIMITS may be exceeded by pushing OK twice (once to enter the value and again to accept the limit warning) thereby providing a double confirmation.

- HARD DOSE LIMITS can not be exceeded. Reset rates within HARD limits to start the pump.

Basic (mL/hr) Programming

- Turn the pump ON.

- Push BASIC.

- If the prior setup needs to be erased, push CLEAR ALL.

- When the BASIC screen is displayed:
  - Select primary or secondary bag. Push OK.
  - Select mL/hr or use ARROW soft keys to scroll through dose rates. Push OK.
  - Enter the flow rate value. Push OK.
  - Enter the VTBI (Volume To Be Infused) in mL. Push OK.
  - Confirm the computed infusion time.
  - Confirm the Volume Given mL value (or push CLEAR to erase it).
  - Note: VTBI counts down to zero, while VOLUME GIVEN counts from zero up.

- Push RUN to begin the infusion.

Secondary Infusion

- Prepare primary and secondary bags and IV sets (see "Secondary Infusions" under HELP for photo instructions).
  - Use a primary set with an upper Y site and back check valve.
  - Connect the secondary set to the primary set's upper Y site.
  - Using the metal extension hook supplied by SIGMA, lower the primary bag approximately 20 inches below the secondary bag to provide the secondary bag with a gravity advantage. This causes the primary set's back check valve to close, which ensures secondary flow. When the secondary bag empties, the primary back check valve opens and primary fluid begins to flow.

- Program the pump for the primary bag as described above.

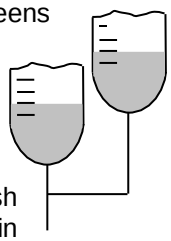
- Then push SETUP to begin programming the secondary bag.

- If a drug is to be delivered in the secondary program (drug must be pharmacy / hospital-approved for delivery as a secondary line), enter the drug name by typing the drug's first two letters. Scroll to the desired drug. Push OK.

- Otherwise push BASIC and use the soft key ▲▼ to change the bag to "Secondary". Press "OK" and select mL/hr or dose rate mode.

- When the setup screen appears:
  - Confirm the drug and concentrations are correct (if selected).
  - Select secondary bag (using the soft arrow keys).
    - A "watermark" indicator will be displayed beneath the parameter data to help distinguish the Secondary (2) setup screen from the Primary (1) setup screen.
    - Note that this watermark shall **not** appear on Primary-only infusions.
  - Enter all required data. Push OK after each entry.
  - To avoid infusing residual amounts of the secondary container at primary flow rates, be sure to properly set the secondary VTBI value.

- Push RUN to begin the secondary infusion. Scrolling run screens _ and/or a "two bag" icon denote the secondary is running.



  - Open the secondary set's roller clamp when prompted. Push OK again to confirm accomplishment of that step and begin delivery.
  - If the secondary rate is above 300 mL/hr, a dialog box appears prompting observation of the primary drip chamber.

- If drops are seen, the primary line should be clamped closed. Press "yes" in this dialog box if a clamp is being applied to the primary line. Upon completion of the secondary infusion, the pump will enter a KVO state and it will ask for the removal of the clamp from the primary line. Push OK once the clamp has been removed to clear the alert and begin the primary delivery.
- Press "no" in the dialog if drops are not observed in the primary drip chamber.

- Upon completion of the secondary infusion, transition to the primary infusion shall be automatic and a "one bag" icon shall replace the "two bag" icon on the RUN screen.

    - ***Note: Upon completion of the secondary infusion, the clamp on the secondary set should be closed to prevent any remaining fluid in the secondary bag being delivered at the primary delivery rate.***

Reviewing/Reprogramming a Depleted Secondary Infusion

- Once a secondary infusion has completed, its setup parameters may be reviewed by pressing the "review" softkey, moving the cursor to the bag selection parameter and pressing either arrow softkey to select "Secondary Bag". Pressing OK while viewing "Secondary Bag", with pump in stop, will repopulate secondary bag setup parameters from the Drug Library.

    - ***Note: Secondary bag setup parameters will not repopulate prior to completion of previous secondary infusion.***

Manual Programming Mode

- The Manual Programming Mode allows the pump to be programmed with up to 10 individual infusion steps using either the Drug Error Prevention or Basic Programming Operations. Drugs are eligible for use in the Manual Programming Mode, provided that the selected drug has not been specifically assigned to either the primary or secondary bag as identified in the pump's Master Drug Library.

- Initial programming is similar to the descriptions for Basic or Dose Error Prevention (SETUP) modes. At the primary bag selection of the programming, the RAMP soft key will be displayed allowing access into the Manual Program Mode. Press RAMP to enter Manual Program Mode.

    - *Note that Manual Program Mode is not available in Secondary Bag or in Primary Bag when a secondary program exists in memory.*

- With Manual Program Mode entered, setup again continues as described in the Basic or Dose Error Prevention programming sections.

- A step indicator bar is located at the top of the screen. The bar shows which steps within the program have parameter data (a small white highlight) and which step is currently being viewed (a full white highlight)

- Once setup of an individual step has been completed, press OK to advance and program the next step. When the 10^{th} step has been programmed, the program schedule is complete and no more steps may be programmed.

- Only one step is necessary to start a program however it must be the first and only programmed step. The pump may not be started if setup data is missing from any

step in the program. Any parameter data missing within the program shall be identified in a popup message when a program attempts to be started.

- The setup data for any programmed step may be viewed by moving the highlight (using the up ARROW soft key) to the step indicator bar located at the top of the setup screen and then using the left and right ARROW soft keys to move from step to step.
  - Note that a one-second delay exists from the time a step is selected and when its setup data is displayed. This delay is to allow rapid scrolling along the step bar without updating the screen contents repeatedly and unnecessarily.
  - If the pump is stopped, any setup data may be changed by navigating to that step and pressing OK to move to the values that must be changed. It the pump is running, any programmed step may be viewed by pressing the REVIEW soft key but no values may be changed with the exception of the Volume Given value which may be cleared by pressing the CLEAR soft key.

- Push RUN to start the program.
  - RUN screens appear as described in the mL/hr or Dose Error Prevention programming sections with the addition of a program step indicator shown in the "Step x of y" format, where x is the current step being delivered and y is the total number of programmed steps.
  - When the program completes and the STOP key is pressed, the program schedule automatically resets (Note: Always verify current program parameters for each step prior to starting a new infusion) itself and may be restarted without entering/reentering any setup data. The program will be retained indefinitely during power off cycles until reset. To reset the program push the RESET soft key from the PROGRAM STOPPED screen.

- To clear the entire program, press the CLR ALL soft key and answer YES to the confirmation screen.

- To clear the setup data from any individual step, the pump must be stopped. Move the highlight to the desired step in the step bar and press the CLR STEP soft key. Note that clearing a step does not delete that step unless it is the last step in the program.

Titrating

- To titrate flow rates without stopping the pump (not available in Program Modes):
  - Push TITRATE.
  - Observing the displayed hard and soft rate limits, enter a new flow rate.
  - Push either RUN or OK.

Patency Checks

- To confirm the IV line is not blocked:
  - Push STOP.
  - Open the door.
  - Slowly open the slide (or roller) clamp to check for gravity flow. If gravity flow can not be achieved, a clamp is closed, the tubing is kinked, the catheter is blocked or a filter may be clogged.

Keypad Lock Operation

- To lock the keypad the caregiver should enter the code 429 ("K", "E", "Y"). This code is entered when the pump is in the run mode to prevent unauthorized activation of

specific key entries. A popup message shall be displayed briefly indicating the keypad has been locked. The Key lock icon is shown on the top left corner of the screen.

- The REVIEW soft key may be pressed to allow review of the infusion setup data. No values may be changed and therefore navigation from value to value is not allowed when the keypad is locked.
- The keypad will allow certain alarm conditions to be silenced and cleared while in the Keypad Lock mode.
- The code must be re-entered to unlock the Keypad. If the keypad is unlocked while reviewing the setup data and the pump is running, if the pump is not stopped the keypad will automatically relock upon return to the RUN screen.

CAUTION: Always guard the keypad lock code from unauthorized view or access. Uncontrolled access by a patient or family member may possibly cause injury to the patient.

Pump Standby (Hold Mode)

- The pump may be placed in a standby state to prevent the occurrence of the Inactivity Alarm (see ALARMS) for the period of time specified in the User Settings / Alarm Settings menu option. The default setting is to provide an infinite period however this value may be changed from one minute up to 99 hours and 59 minutes.

- For Standby Mode to be available the set must be loaded and the infusion setup must be complete.

- Once setup has been completed and the highlight is on the *Volume Given mL* value, a display will appear stating that the pump may either be started or it may be placed in standby mode. To place the pump in standby, press the HOLD soft key.

- When standby is activated, the indicated message will be displayed in a flashing format. Note that if the delay period is set to infinite, the time value in the display will be replaced with a dashed line.

- While in standby, the user may press RUN at any time to begin the infusion. Pressing any other key or opening the pump door will cancel standby mode.

- Pump Standby may also be used when the pump is stopped in a non-alarm condition. Press the REVIEW soft key and then press the HOLD soft key from the SETUP screen.

Delayed Start

- The start of any programmed infusion may be delayed by up to 12 hours. During infusion setup, move the highlight to the *Volume Given mL* value at the bottom of the list - the D. RUN soft key shall appear, replacing the DOWN ARROW soft key.

- Pressing the D. RUN soft key shall cause the Delay time value parameter line to appear on the setup screen. Enter any value between one minute and twelve hours (00:01 – 12:00, hr:min) and press OK.

    - *Note: leaving the Delay time value clear and pressing OK or navigating away from it via an ARROW soft key will cause the parameter line to be removed from the display for the duration of the currently programmed*

infusion. The D.RUN softkey must be pressed again to display the delay time parameter.

- Once a delay time is entered the infusion program completed and the set is loaded, the RUN key may be pressed to begin the infusion delay timer. The screen shall update to a DELAY RUNNING display with the remaining delay time shown in a flashing format.

- While the delay is running it may be stopped by pressing the STOP key (display updates to DELAY STOPPED and the delay timer is paused and no longer flashes) or it may be cancelled by pressing the CANCEL soft key (remaining delay time is cleared and the display updates to PUMP STOPPED).

- The remaining delay time value may be changed while the delay is running or stopped. From the setup screen (press REVIEW if the delay is running) move the cursor to the Delay value and enter the new desired delay time and press OK. The new delay time shall be immediately observed.

    - *Note: the Delay time value may not be cleared while the delay is running.*

- When the delay time period expires, the pump shall begin delivery of the programmed infusion.

ALARMS

Air-in-Line

- Push OK and then push RUN to advance small bubbles past the air detector. Each push of RUN advances approximately 0.1 mL. Use a syringe to aspirate air from the lower Y site or re-prime the set.

Audio

- May be silenced for 2 minutes by depressing any key.
- Low, medium and high volume levels may be selected in the CONFIG screen.

Depleted Battery

- The battery is fully depleted and unable to run the pump. To continue the infusion and recharge the battery by plugging the pump's AC power adaptor into an AC outlet. Confirm that the adaptor's power cord connector is attached to the pump. Full charging requires a minimum of 8 hours for the Standard Battery and 12 hours for the Wireless Battery Module.

Door Not Fully Closed / Set Outside Channel

- The pump's door has not closed and latched correctly. Ensure the slide clamp is closed, open the door using the slide clamp and re-load the IV set. Close the pump's door ensuring both door latches shut securely.

Door Open

- The slide clamp has been closed and inserted in the keyhole when the pump was running. The pump is stopped. Close the door, open the slide clamp, remove it from the keyhole and push RUN to restart the infusion OR open the door and unload the IV set.

Downstream Occlusion

- Eliminate a closed clamp, kinked tube, positional catheter, clotted catheter, clogged IV filter or other sources of occlusion below the pump and the pump will restart automatically.

Infusion Complete

- The VTBI (volume to be infused) has counted down to zero and has been delivered. The pump is running at a rate of 1.0mL/hr (KVO rate) – keep vein open (or the actual infusion rate, whichever is lower). Push STOP to halt the KVO rate and return to the Setup Screen. Select a new VTBI value and push RUN.

Inactive Alarm

- The pump has been inactive for 2 minutes and no action has been taken. Follow the prompted action and resume or restart the pump by pushing Run.

In Stop – Load Set

- Load the IV set and push RUN.

In Stop – Open Slide Clamp

- Open the slide clamp, remove it from the keyhole and push RUN.

In Stop – Push Run

- Push RUN to begin the infusion.

Low Battery

- Less than 30 minutes of battery power remains. Plug the AC Power Adaptor into the pump and into the AC source outlet as soon as possible to recharge the battery. Full charging requires 12 hours for Standard Battery and 16 hours for Wireless Battery Module

Very Low Battery

- Less than ½ of the low battery capacity remains. The AC Power Adaptor should be plugged in immediately. The tutorial to check the AC Power Adaptor will automatically begin (see Appendix B for details).

Battery Missing

- Battery not detected. Check to make sure it is fully latched.

Shut Door

- Shut the pump door and either push RUN to start the infusion or push OFF. Power will not turn off with the door open.

Slide Clamp Closed

- Open slide clamp and push run or reload the set.

System Error

- An internal fault has been detected. Some faults can be cleared by either cycling power (off then on) or by turning the power off, disconnecting the battery, reconnecting it several seconds later and pushing the ON key. If neither procedure clears the fault return the pump for service.

Upstream Occlusion

- Eliminate the occlusion by checking for an upstream closed clamp, kinked tube or closed burette valve and push the RUN key.

TIPS

Prevent Nuisance Alarms

The following steps will help to prevent nuisance alarms:

- Remove all air from IV sets and Y sites.
- Warm solutions to room temperature before use.
- Invert (do not shake) IV bags that need to be mixed.
- Fill drip chambers half way.
- Do not load pumped on IV set tubing in the pumping channel or in the air and occlusion detector areas.
- Follow prompts and HELP screens.
- Use only compatible IV sets as labeled and identified on the SIGMA pump.
- Keep the tubing channel clean and dry.
- Avoid empty IV containers by properly setting VTBI values.
- Plug pump's AC power adaptor in to maintain battery charge.
- Using the Low Downstream pressure setting at flow rate setting above 500 mL/Hr may cause Downstream nuisance alarms that are created by I.V. set pulsation.

Managing Bolus before Occlusion (Downstream) Release

- MANAGING UNINTENDED SMALL BOLUS RELEASES WHEN CLEARING DOWNSTREAM OCCLUSIONS

  When a downstream occlusion alarm occurs, pressure and a small volume of <0.8 mL of fluid (the "bolus") builds up between the pump and the point of occlusion. When it might be harmful to infuse the bolus into the patient, simultaneously withdraw 0.9 mL of fluid from the lower "Y" site of the IV set and eliminate the source of the occlusion.

WARNINGS AND CAUTIONS

WARNING Operation is Limited to Trained and Tested Operators

SIGMA Spectrum operation is strictly limited to trained operators whose competency in safe Spectrum operation and in safe IV therapy practices has been tested and proven. Pump owners have sole responsibility for operator training and testing even when SIGMA personnel assist in training processes.

WARNING Confirm Safe Operation at Start and Thereafter

Confirm safe, accurate pump operation at start and periodically thereafter by:

- Confirming there is no drip chamber flow when the pump is stopped.
- Confirming the drop rate approximates the pump's flow rate during RUN operation.
- Confirming pump settings are as intended.
- Confirming correct: patient, route, dose, time and drug/concentration.
- Regularly observing that the patient's vital signs and IV site are in good condition. Note that infiltrations can not be detected by IV pumps. They must be detected by clinicians and minimized. The Spectrum is not a substitute for regular patient observation.

Never operate the Spectrum unless all of the above safe operations are being practiced.

WARNING Prevent Inaccuracy

The following can cause flow rate inaccuracies and must be avoided:

- Incompatible brand IV sets and compatible brand IV sets with unusually large or small diameters or unusually stiff materials.
- Operating temperatures outside of 60-90°F for Standard Battery and 60-80°F for Wireless Battery Module.
- Using IV sets longer than 72 hours for Hospira or 96 hours for Baxter.
- Using dropped, damaged, dirty or wet pump.
- Pressurizing IV bags.
- Positioning IV containers more than 3 feet above or 1 foot below the pump.

Note: Upstream occlusion detection is only effective for occlusions present immediately after the start of the pump's run operation. Upstream occlusions caused by non-vented IV sets used with non-vented glass bottles or closed burette air vents cannot be detected because of the very slow building vacuums resulting from these situations.

WARNING This equipment is not suitable for use in the presence of a Flammable Anesthetic Mixture with Air or with Oxygen or Nitrous Oxide. (This statement is a requirement of the IEC—60601-2-24 standard. It applies to oxygen enriched environments, such as oxygen tents. It is not meant to apply to patients on breathing tubes.)

WARNING Follow Epidural Precautions

Epidural administration of drugs other than those indicated for epidural use can result in serious patient injury.

- When administering epidural analgesics, use only catheters specifically labeled for epidural analgesia drug delivery.
- To help prevent accidental infusion of non-epidural drugs, DO NOT USE epidural administration sets that contain injection sites.
- Label the administration container and IV set "EPIDURAL USE ONLY".
- Clearly identify infusion pumps used for epidural administration.
- Use KEYLOCK.

WARNING Do Not Allow Uncontrolled Gravity Flow

To open the pump door, the IV set's slide clamp must first be closed (thus providing "set based anti-free flow" protection). Do not open the slide clamp when the door is open or during and after IV set unloading or dangerous uncontrolled free flow can occur. During IV container changes, always close the set's slide or roller clamp. When the set is in the pump and the door is closed, the slide clamp can be left open. If gravity flow is to be used, the pump door will be open or the set will be outside the pump and you will need to be sure gravity flow is maintained at the intended rate whenever the pump door is open and when the set is outside of the pump.

WARNING Disposal

To dispose of this device or the associated administration sets, adhere to local, state, federal and / or other governing regulation.

CAUTION Use the Specified Manufacturer's IV Set Type

This label is located on the top of the pump and indicates the specific type of IV tubing that the pump has been calibrated to. The use of other manufacturer's brands or type tubing may produce pump inaccuracies that may be unsafe for patients.

CAUTION Use Key lock to Avoid Tampering

To lock the keypad after the pump starts running, enter the number 429. The display will indicate "KEYPAD LOCKED". The keypad is now locked. A lock symbol will replace the display message. To unlock the keypad re-enter 429. During KEYLOCK, parameters can be read but not changed and the pump can not be stopped or turned off.

CAUTION Follow Neonatal and Pediatric Precautions

- Use 60 drops / 1 mL IV sets.
- Configure the pump with appropriate flow rate, VTBI, patient weight and occlusion alarm limits (using CONFIGURATIONS mode).
- Prior to connecting to patient, prime set, load set, open slide and roller clamp (if equipped) to avoid possible bolus (.2mL) that would result around door opening/set loading event.
- If the pump door is opened with an IV set connected to a patient and bolusing at door closing must be avoided **before closing the door,** clamp the set below the lower Y site, connect a syringe to the lower Y site, close the door, open the slide clamp, collect a 0.085mL bolus in the syringe and unclamp the set below the Y site.

CAUTION "Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure."

This caution is to alert the user that altering any part of the scanner or pump may cause light levels to exceed Class 1 limits. Under normal conditions this is not an issue.

CAUTION Use Sound IV Poles

Do not mount pumps on IV poles that allow pump cases to impact floors if poles tip over.

CAUTION Service Personnel Must be Trained at SIGMA

Servicing Spectrum pumps is restricted to qualified, SIGMA trained, service personnel who employ SIGMA authorized parts and procedures. Use of other parts and servicing procedures is prohibited.

CAUTION Perform Preventative Maintenance Annually

Pumps should be tested for proper performance annually and whenever damage from drops, fluid intrusion and other causes is suspected. See SIGMA Spectrum Service Manual for complete information.

CAUTION Do Not Improperly Clean Pumps

During cleaning, do not allow fluid to seep inside pump (especially through front panel door latch holes or back case speaker holes) or severe damage may occur. Wipe on minimal amounts of cleaning fluids, never spray them. Use only SIGMA specified compatible cleaning fluids. Do not autoclave or ETO sterilize pumps.

CAUTION Be Cautious Near RF Sources

The Spectrum pump meets the electromagnetic compatibility (EMC) requirements as specified in the International Electrotechnical Commission's (IEC) 60601-1-2 (2001-09) standard for emissions and immunity. It is good practice to keep the pump separated away from other equipment, such as hand held transmitters, cellular phones and electrosurgical equipment that may generate strong radio frequency interference (RFI). Reference the EMC Immunity Section, Separation Distance, in this manual for recommended minimum distance.

CAUTION Confirm Audio Operation

When pushing the ON key and all other keys confirm that an audio beep is heard. If sound cannot be heard, discontinue use of the pump and return to SIGMA for service.

CAUTION Battery Retaining Fastener

The battery retaining fastener (screw) can be used for both standard battery and Wireless Battery Module to avoid accidental battery disconnection and unexpected loss of power to the pump.

CAUTION Confirm Display Operation

Regularly observe the pump's display. Discontinue use of the pump and return to SIGMA for service if display abnormalities are observed.

CAUTION Electric Shock Hazard

There are no user serviceable parts. Do not open the case. Refer servicing to qualified service personnel at your institution or return to SIGMA.

CAUTION Accuracy

Reference trumpet curves for flow rate accuracy as a function of short infusion durations.

The upstream occlusion detector may not detect partially occluded tubing. Always check to ensure the IV set's clamp is not closed above the Spectrum pump. Small

bore catheters or needles may cause excessive backpressure at elevated flow rates. Please size the catheters according to expected flow rate and fluid viscosity.

CAUTION Follow Physicians Orders

Federal (USA) law restricts this device to sale or use by, on the order of, or under the supervision of, a physician or other licensed healthcare practitioner.

CAUTION Single Fault Conditions

The maximum downstream occlusion time due to a single fault condition (in seconds) may be determined by dividing 2448 by the flow rate in mL/hr.

In the event of a downstream occlusion detector failure, the secondary detection method will limit the pressure developed by the pump to 10 PSI above nominal setting and generate an audible and visual alarm.

A bolus of approximately 0.5 mL may be generated as a result of a single fault condition.

Air volume equivalent to 15 seconds of delivery may be delivered to the patient in the event of a single fault condition. The amount of undetected air, in mL, is dependent on flow rate setting divided by 360. This air may not reach the patient depending on tubing length from the pump to the patient. One inch of tubing is approximately equivalent to .120mL of fluid.

CLEANING AND STORAGE

The SIGMA Spectrum is portable and it should be cleaned and disinfected for each patient use according to facility protocol.

Compatible cleaners include:

1 10% solution of bleach and water

2 Up to 90% Isopropyl alcohol

3 Caltech Industries Dispatch®

4 Steris TBQ® and Steris Germicidal Surface Wipes, Product Number 1608-GS

5 Metrex Cavicide® and Cavi Wipes™

6 May be others. Contact SIGMA for additional information

To clean the pump, turn it off and unplug the AC power adaptor from the power source. Place the pump in an upright position (keyhole release upward). Apply the compatible cleaning agent with a dampened cloth per the manufacturers' instructions using appropriate dilution ratio. Disinfectants should remain on the pump's surface in an even, but not dripping film for the compatible cleaning agents' recommended contact time. Open the pump's door using a standard IV set's slide clamp. Clean the speaker vent, power adaptor connector, door release, Keyhole and pumping channel areas with soft swabs. Apply solutions sparingly to the swabs and wipe down the necessary areas. Do not use rigid cleaning instruments or spray solutions directly on the pump. **For severe solution spills it is recommended that the Standard Battery/ Wireless Battery Module be removed. The Battery Pack cavity area of the pump may be cleaned by wiping down those regions with a dampened cloth as described previously.** Dispose of all cleaning materials (including the slide clamp) as required per facility protocol/biohazard policy.

CAUTION

- Alcohols are flammable and should not be used for Standard Battery/ Wireless Battery Module cleaning/disinfection. Always use alcohols in a well-ventilated area.
- When cleaning the Standard Battery/Wireless Battery Module, care should be taken to prevent shorting of the pack's exposed terminals.
- Do not sterilize this device by autoclaving or ETO gas.
- Do not immerse any part of this device or allow cleaning fluids to seep inside the pump.
- Do not use phenol-based cleaners/disinfectants. Phenols degrade plastics and membrane switches. Phenols are intended for cleaning of hard non-porous surfaces such as: sinks, counter tops and stainless steel.
- Do not use abrasive cleaners.

Storing

- Connect the AC power adaptor to the pump and supply source power to charge the pump's battery during storage. This will insure a fully charged battery for subsequent use.
- Do not store or transport pumps in ways that might result in physical damage.
- For extended periods of storage remove the battery and repackage the pump in the

original shipping container.

- Storage at elevated temperatures will diminish battery life.

- Do not store in temperatures above 120°F or below -4°F and humidity should not exceed 90% RH non-condensing.

Battery Disposal

The SIGMA Spectrum contains a Lithium-Ion rechargeable standard battery pack/Wireless Battery Module. It **should not** be disposed of in trash or in fire. It is a recyclable product and should be disposed of properly. Return to SIGMA for disposal if an authorized disposal center cannot be found.

CAUTION

Do not short circuit the battery terminals.

Do not disassemble or modify.

Battery Charging

When the SIGMA Spectrum is connected to the AC Power Adaptor and the adaptor is plugged into a powered outlet receptacle (mains), the pump's standard battery pack or Wireless Battery Module will be charged to full capacity. It is not necessary to turn the pump on. Charging will take approximately 8 hours for Standard Battery and 12 hours for the Wireless Battery Module to fully charge a depleted battery.

Refer to Appendix C for a listing of the symbols used and their description

Battery Removal and Replacement

Should removal of the battery become necessary for any reason, the following procedure may be used.

1. Turn unit OFF if ON.
2. Disconnect the AC Power Adaptor, and lay the SIGMA Model Spectrum Pump on its front. Use a protective surface, such as plastic foam, to prevent damage to the keypad window.
3. Remove the screw located in the upper right hand corner of the SIGMA Spectrum Battery (if equipped).
4. Depress the release mechanism found in the top center portion of the battery and pull away from the back of the unit.
5. Install the battery by placing the battery insulation tab over the terminals and then gently sliding the battery down the back of the case and inserting the bottom of the battery into the pocket then pivoting it into the latch. Make sure the latch is engaged to retain the battery. Remove the battery insulating tab prior to charging the pump's battery or operating the pump. Install the retaining screw (if equipped).
6. Plug the AC power adaptor into an outlet and charge for 8 hours for Standard Battery and 12 hours for the Wireless Battery Module to assure a full charge.

SERVICING

CAUTION Electric shock hazard.
There are no user serviceable parts. Do not remove the case. Refer servicing to SIGMA trained and qualified service personnel. Refer to the Service Manual for inspection and maintenance procedures.

To Return Pumps to SIGMA

- Phone 1-800-356-3454 for a repair authorization (RA) number. A P.O. number for non-warranty repairs is also required.
- Ship pumps to SIGMA 711 Park Avenue, Medina, NY 14103
- Include a problem description, contact person, phone number and return address. Label the shipping box with the RA number. Return pumps in original boxes, with original inserts to prevent damage during shipment.

Required Maintenance and Frequency

- Maintenance consists of routine cleaning and annual performance evaluations as described in the service manual.

- Pumps suspected of being damaged must be tested for proper performance before being returned to patient use. This includes pumps that have been physically damaged, dropped or those that have fluid intrusion.

1.30.0. Impact (ZOLL®) 731+BiPaP Ventilator

Product Overview

This chapter describes the Z Vent ventilator and provides more detailed descriptions of the following:

- Main features
- Controls and indicators
- Display screen
- Fresh Gas/Emergency Air Intake and attachments
- Top Panel
- Pulse Oximeter compatibility
- Power sources
- Pneumatic design
- Oxygen Input
- Patient circuits

Z Vent Ventilator Description

The sections that follow provide a detailed description of the Z Vent ventilator.

Main Features

Figure 2-1 shows the ventilator's main features.

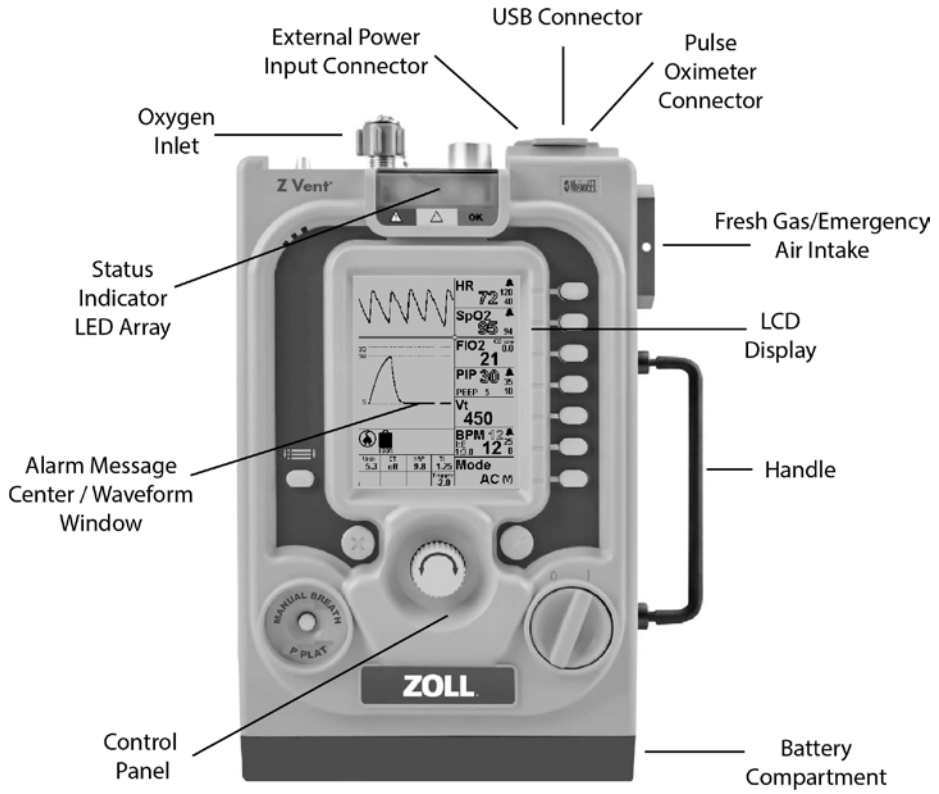


Figure 2-1 Main Features

Item	Location	Description
Oxygen Inlet	Top	Enables connection to an external high pressure oxygen source.
Status Indicator LED Array	Top	Lights to indicate ventilator status and a visible alarm indicator.
External Power Input Connector	Top	Enables connection to an external power source.
USB Connector	Top	Enables connection to a USB compatible device for servicing the ventilator.
Pulse Oximeter Connector	Top	Enables connection to a pulse oximeter sensor
LCD Display	Front	Displays settings, ventilation data, and alarm information.
Alarm Message Center	Front	Displays active alarms and alarm mitigation information.

Item	Location	Description
Control Panel	Front	Provides user access to the ventilator settings.
Battery Compartment	Bottom	Holds the ventilator's rechargeable Li-ion battery.
Fresh Gas/Emergency Air Intake	Side	Enables the ventilator internal compressor to use ambient air and acts as an anti-asphyxia valve.
Handle	Side	

Controls and Indicators

The ventilator controls and indicators (shown in Figure 2-2) facilitate ease of use and visibility in all operating environments.

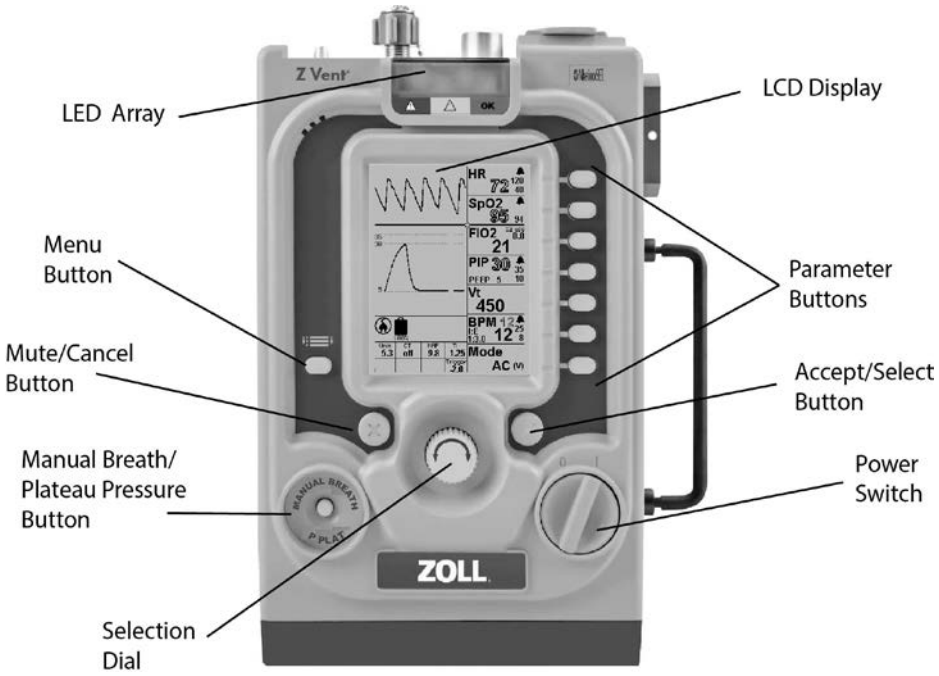


Figure 2-2 Controls and Indicators

Controls

The ventilator's controls consist of the following:

Control	Function
Power Switch	Enables the user to turn the ventilator ON and OFF.
Parameter Buttons	Enables the user to access primary parameters, secondary parameters and context menus associated with a primary parameter (if applicable), and then modify settings using the Selection Dial).
Menu Button	Enables the user to access the Menu.

Control	Function
Selection Dial	Enables the user to set values for a chosen (highlighted) Primary Parameter, Secondary Parameter, Context Menu item, and Menu item. Values accelerate with speed of turning.
Mute/Cancel button	The Mute/Cancel button mutes the audible alarm allowing the user time to change parameters. It can also be used to cancel parameter entries.
Accept/Select button	The Accept/Select button allows the user to accept parameter value settings, acknowledge popup messages, and accept a menu choices
Manual Breath Button/ Plateau Pressure	Enables the user to deliver a manual breath and measure Plateau Pressure Note: Plateau Pressure is an optional ventilator control.

Indicators

The ventilator's indicators consist of the following:

Indicator	Description
LCD Display	Displays settings, patient data, and alarm information.
LED Array	Indicates operational status (Red, Yellow, or Green).

Display Screen

The ventilator's display screen has four functional areas as shown in Figure 2-3:

- Alarm Message Center/Waveform Window
- Parameter Windows
- Shared Icon Area
- Auxiliary Parameter Boxes.

These functional areas are discussed in the following sections.

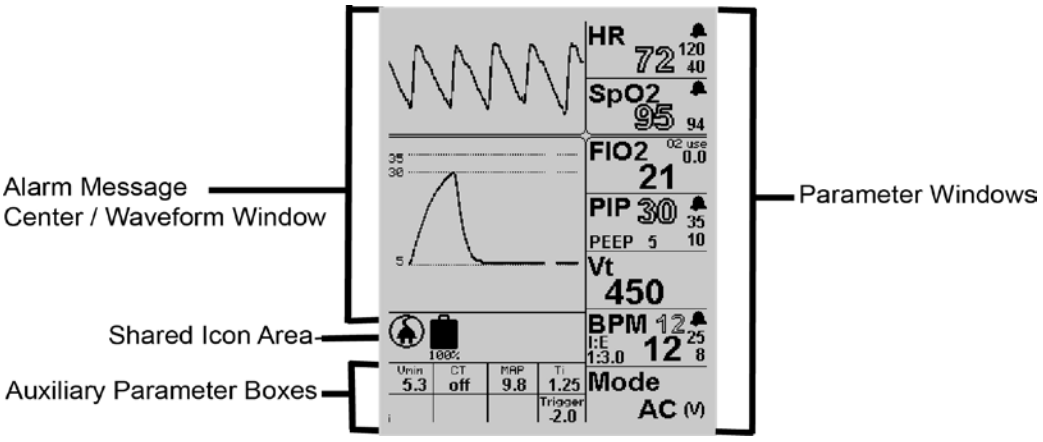


Figure 2-3 Display Screen Functional Areas

Message Area

The display screen's message area can display the following:

- **Airway Pressure and Pleth Waveform Plots** -- Under normal operation (as in the example above), the message area displays plots for airway pressure and, when the pulse oximeter is connected, the Pleth waveform. When a plot is necessary to facilitate a parameter adjustment, the message area displays both the plot and the parameter's context menu.
- **Menus** -- Displays the Menu after you press the Menu button on the ventilator's control panel, or displays a parameter's context menu (which appears after you ***press and hold*** the associated parameter button on the control panel).
- **Alarms** -- When an alarms occur, the message area displays Smart Help™ messages that identify the alarms and describe possible causes and actions that you can take in response.
- **Popup Windows** -- Display information that assists you when adjusting parameter values.

Parameter Windows

Each parameter window displays its primary parameter and associated secondary parameters, that can include, associated parameters and alarm limits.

Two types of values appear in a parameter window.

- Solid text is used for primary and secondary parameter values you can adjust.
- Outlined text is used for patient-dependant measured values.

Chapter 4, "Using the Z Vent Ventilator" contains more information and instructions for adjusting parameter values.

Shared Icon Area

Directly below the message area, the device displays icons that indicate

- The ventilator's power source (operating on external power or its battery)
- The battery charging status
- An oxygen supply is attached
- Alarms are muted or audible

Auxiliary Parameter Boxes

Some parameters have values that the ventilator displays in the parameter boxes at the bottom of the display screen. You can adjust these values using the parameter's context menu.

Fresh Gas/Emergency Air Intake and Attachments

The Fresh Gas/Emergency Air Intake is located on the side of the ventilator as shown in Figure 2-4.

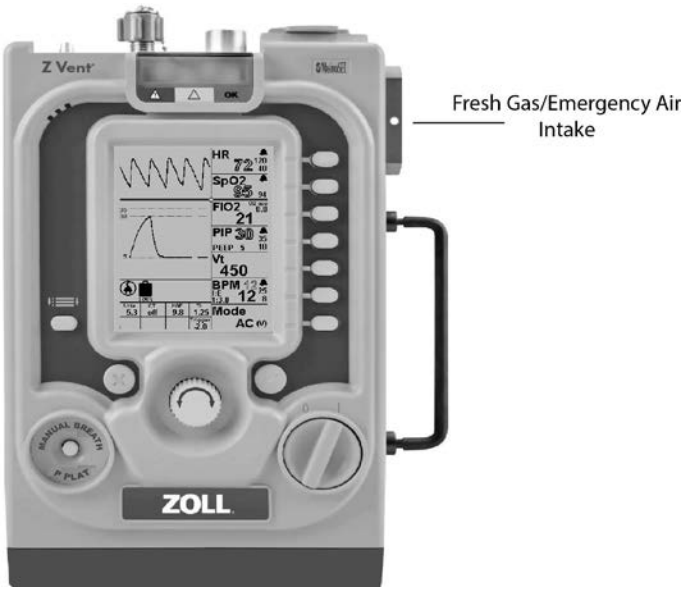


Figure 2-4 Fresh Gas/Emergency Air Intake

The Fresh Gas/Emergency Air Intake allows ambient air into the device's internal compressor. The intake also acts as an anti-asphyxia valve that enables the patient to breathe ambient air should the ventilator fail. The Fresh Gas/Emergency Air Intake contains a particulate filter and permits the user to connect either a bacteria/viral or a chemical/biological filter depending on ambient conditions.

ZOLL offers an Oxygen Reservoir Bag Assembly Kit to allow for low flow oxygen use with the ventilator to provide supplemental oxygen to patients. Low flow oxygen sources can be from a flow meter or an oxygen concentrator. Oxygen is delivered through the Fresh Gas/Emergency Air Intake when the device's internal compressor cycles to deliver a breath.

Oxygen Reservoir Bag Assembly

The Oxygen Reservoir Bag Assembly serves the following purposes:

- Acts as a reservoir, collecting oxygen during the expiratory phase of ventilation.
- Provides an interface to the ventilator and the attachment of the low-flow oxygen supply hose.
- Provides an inlet in the event the low-flow oxygen supply fails or the tidal volume is greater than the supplied oxygen.

See Chapter 3 for more information about using low flow oxygen sources.

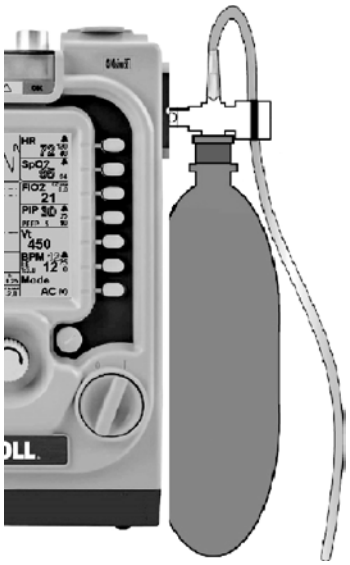


Figure 2-5 Z Vent with O_2 Reservoir Kit

Top Panel

The oxygen hose, patient circuit, external power, and pulse oximeter attach to the top panel of the ventilator. The USB port is only used when servicing the device.The ventilator top panel appears as shown in Figure 2-6.

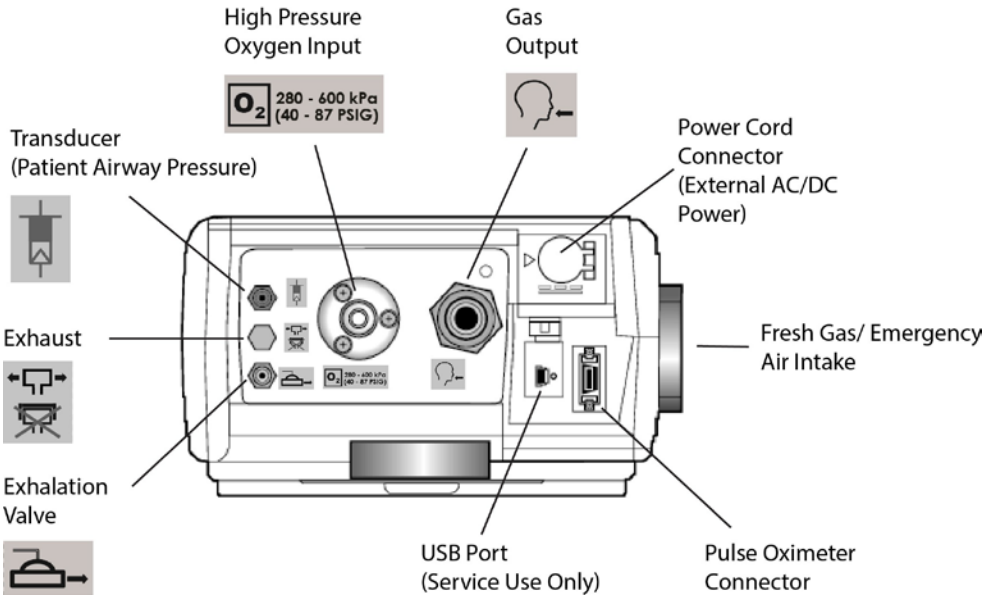


Figure 2-6 Top Panel

Pulse Oximeter Compatibility

The ventilator can accommodate an optional connection of external Masimo Pulse Oximeter. When the appropriate sensor is connected, the pulse oximeter provides continuous noninvasive monitoring of the oxyhemoglobin saturation (SpO_2) and pulse rate (measured by the SpO_2 sensor) for adult, pediatric and infant patients.

The Masimo LNCS series of probes are approved for use with the ventilator. The Accessory table in Appendix A lists the sensors which are available for use with the ventilator.

Power Sources

The ventilator can operate using external power or it can operate powered by its internal Li-ion battery.

The external AC/DC Power cable is a universal supply that can operate with an input of 100 to 240 VAC 50/60 Hz. The external supply can also power the device when provided with a 400 Hz input.

The external AC/DC Power cable that ZOLL provides with the ventilator delivers a DC input to the device of 24 V at 4.2 A. When this external power source is present, the ventilator automatically charges its internal battery while operating.

Only use the external power supply provided with the ventilator when connecting to AC power. This power supply provides both Class I and Class II protection.

Operating Using External DC Power

The ventilator can also operate using external DC power. When connected to a standard vehicle DC outlet using either the 12 or 28 VDC Power Cable that ZOLL offers, the ventilator automatically charges its internal battery while operating.

Note: The input connector of the ventilator accepts DC voltages between 11.8 to 30.0 VDC.

Caution When using the standard vehicle DC outlet, do not jump start the vehicle during operation of the ventilator.

Operating Using Battery Power

When an external power failure occurs, the ventilator automatically switches to its internal battery for operating power and activates the EXTERNAL POWER FAILURE alarm; there is no interruption in operation. When external power returns, operating power automatically switches to the external power source and the following symbol displays on the ventilator screen as shown in Figure 2-7.

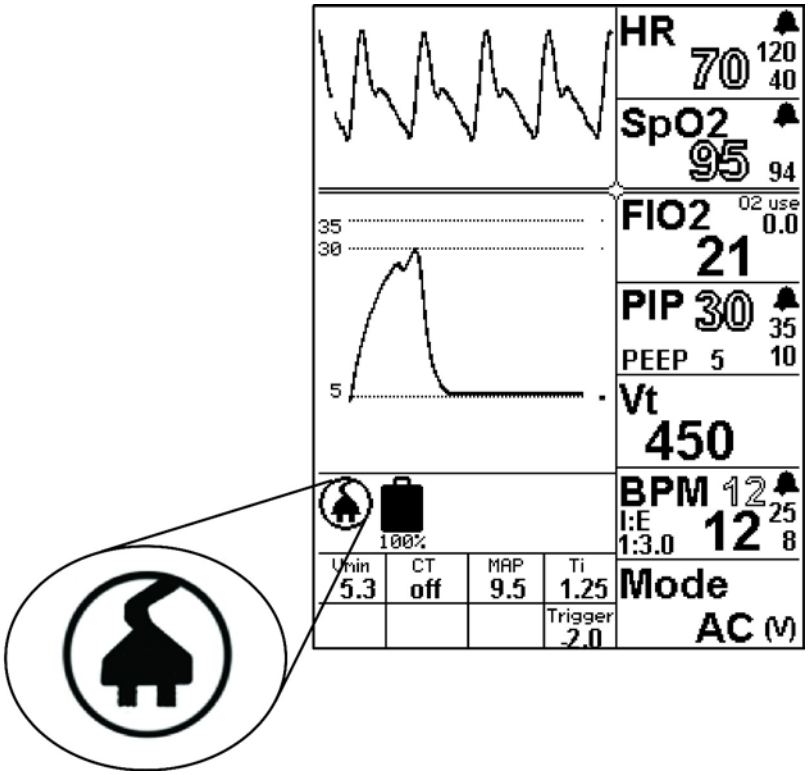


Figure 2-7 External Power GUI Symbol

In the event that the ventilator needs to be shutdown, turn the POWER switch to the OFF ("**O**") position. If this fails to work or puts the patient or user at possible risk, disconnect the device from the external power source.

Pneumatic Design

The ventilator includes an oxygen valve and a compressor to provide the appropriate gas mixture for the patient. The system includes transducers for pressure measurements including O_2 input supply and barometric pressure.

The Wye circuit is part of the ventilator's pneumatic system. The inspiratory side of the wye circuit provides gas to the patient. The expiratory side exhausts directly to atmosphere without returning to the ventilator. The ventilator pneumatically controls the exhalation valve and a transducer within the ventilator measures the airway pressure.

Figure 2-8 depicts a diagram of the ventilator's pneumatic design.

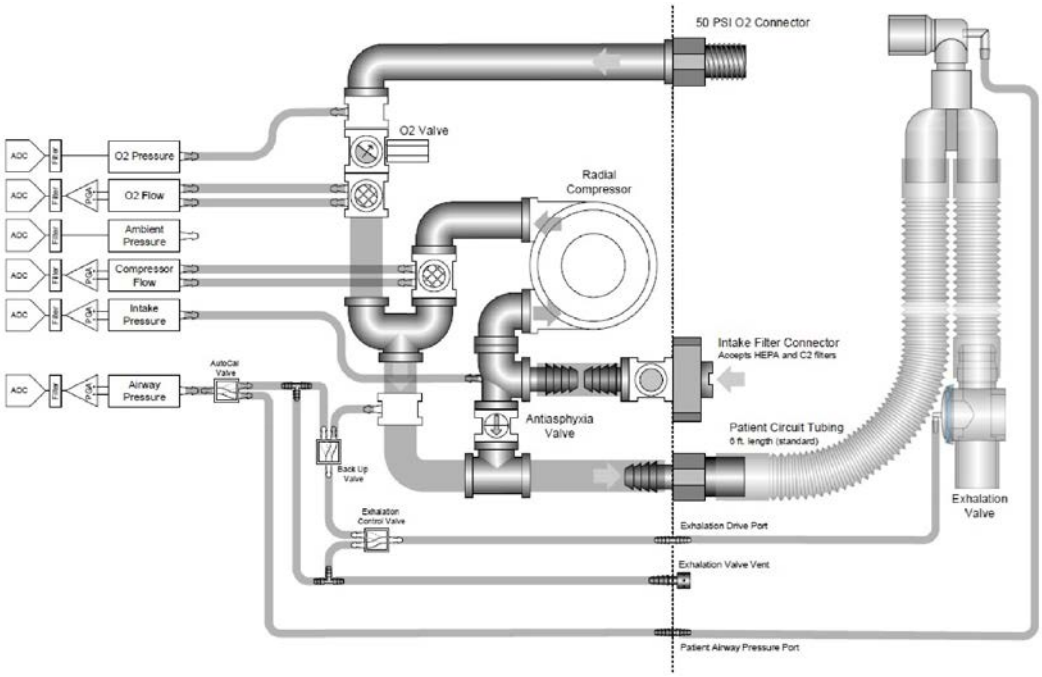


Figure 2-8 Pneumatic Design

Oxygen Input: High Pressure Gas Supply

An external high pressure gas source connects to the ventilator using the high pressure oxygen input port. The device attaches to a regulated medical grade (USP) O_2 system or O_2 cylinder supply of 40 to 87 psig (280 to 600 kPa). Maximum flow rate of the oxygen supply is 100 liters per minute. The Oxygen Input fitting (See Figure 2-9) has a male oxygen Diameter Index Safety System (DISS) thread.

Note: If external oxygen is connected, the oxygen pressure must be at least 41 psig (± 2 psig) at the time the ventilator performs its Self-Check after turning on the ventilator.

High Pressure Oxygen Supply Hose

A standard 6 foot oxygen hose is available for connecting the ventilator to a high pressure oxygen source. (Also see Chapter 6 “Operating Environments”). Hoses are available from ZOLL, or a suitable alternative as described below can be used as indicated.

High Pressure Oxygen Hose for compliance with ISO standard (ISO STANDARD 5359)		
Ventilator Side Connections	**Hose Attributes**	**Supply Side Connections**
DISS	6 ft (maximum 20 ft) Green or White (as determined by local regulations) non-conductive	Quick Disconnect, DISS, etc.

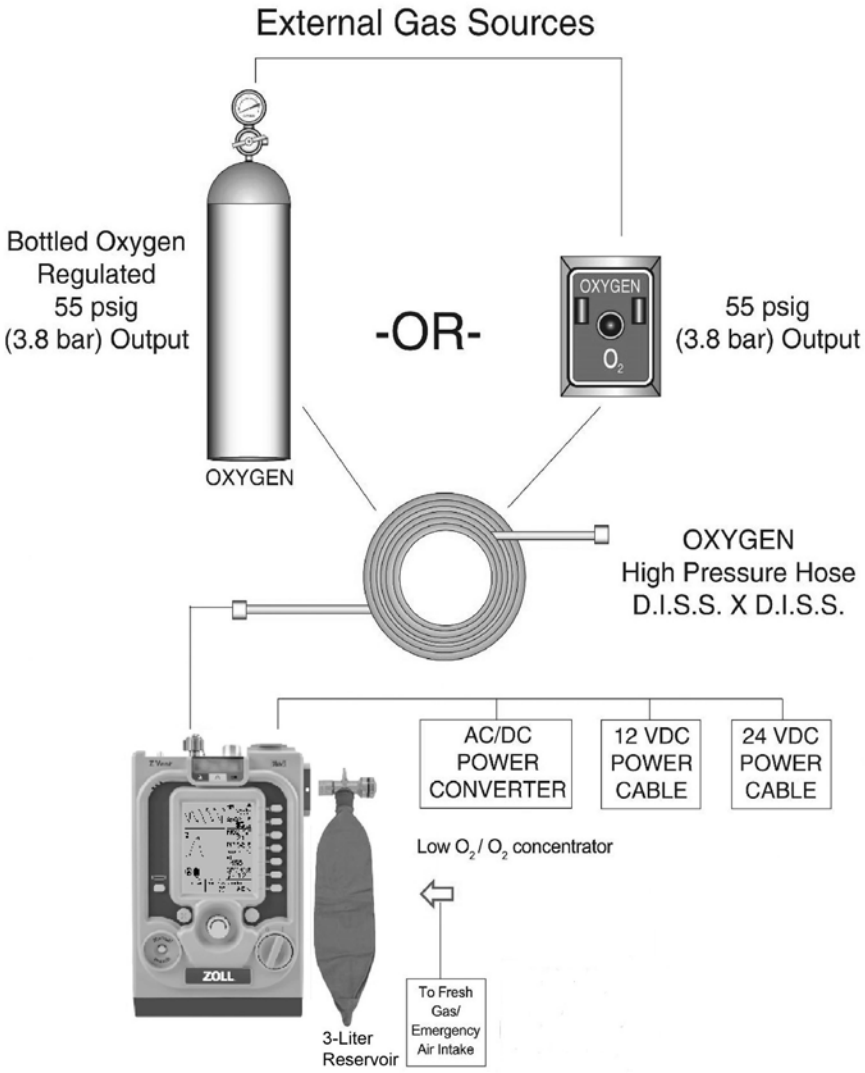


Figure 2-9 Ventilator Gas Sources

Patient Circuits

The ventilator can use 6 ft or 12 ft patient circuits (see Figure 2-10) to support adult, pediatric, and infant patients.

Note: Troubleshooting information regarding patient circuits is found in Appendix D.

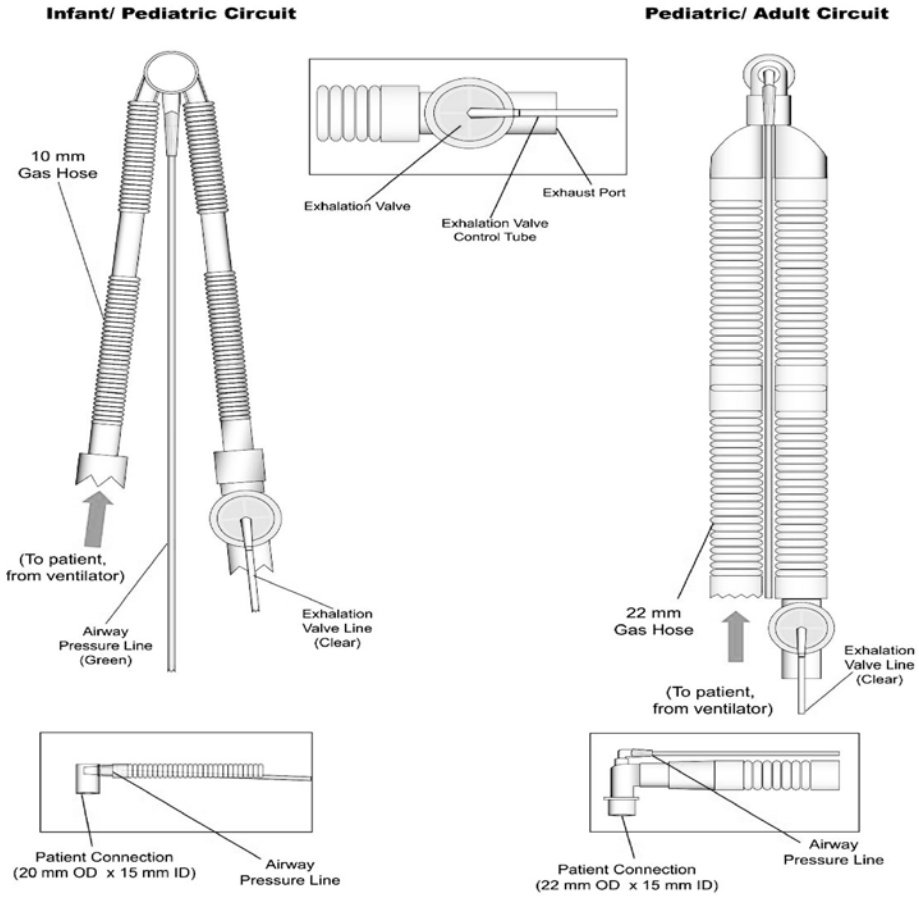


Figure 2-10 Patient Circuits

ZOLL provides the following circuit types:

- Pediatric/Adult, 6 ft and 12 ft
- Infant/Pediatric, 6 ft and 12 ft

Caution Always dispose of the circuit after single patient use following the institutional guidelines for biologically contaminated material. Reusing the circuit can result in cross contamination between patients.

Intended Use

The pediatric/adult patient circuits are intended for use when delivering tidal volume from 200 ml to Adult.

The infant/pediatric patient circuit is intended for use when delivering tidal volume from 50 ml to 300 ml.

Warning! **Patient circuits are non-sterile and intended for Single Patient Use Only**

Caution During use the circuit may come into contact with biohazard material. Handle carefully to avoid cross-contamination.

Not intended for use with heated humidifier.

Note: ZOLL Medical Corporation recommends that you examine the patient circuit on a daily basis for damage or wear, such as cracking, discoloration, or disfigurement. If there is any sign of physical degradation or if the ventilator has patient circuit alarm conditions replace the patient circuit.

Use of Heat and Moisture Exchangers

Heat and Moisture Exchangers (HMEs) can be used with the device. The HME provides heat and moisture to the inspired gas by recycling the heat and moisture contained in the patient's exhaled gas. While HMEs may not be suitable for all applications, they facilitate portability in a way that conventional humidifiers cannot. The device can be used with an optional HME or an optional HME/bacterial viral filter (HMEF). Be sure to follow all instructions provided by the manufacturer.

Note: Use of the HME will cause a slight increase in the inspiratory and expiratory resistance. Always monitor the patient and adjust the ventilator as needed.

ZOLL does not offer a heated humidification option for the device.

Warning! **Users should use the appropriate HME for the patient's size. Failure to do so can result in excessive dead space and lead to hypercapnia and hypoxia.**

Attaching a Patient Circuit to the Ventilator

Figure 2-11 shows how to attach a patient circuit to the ventilator.

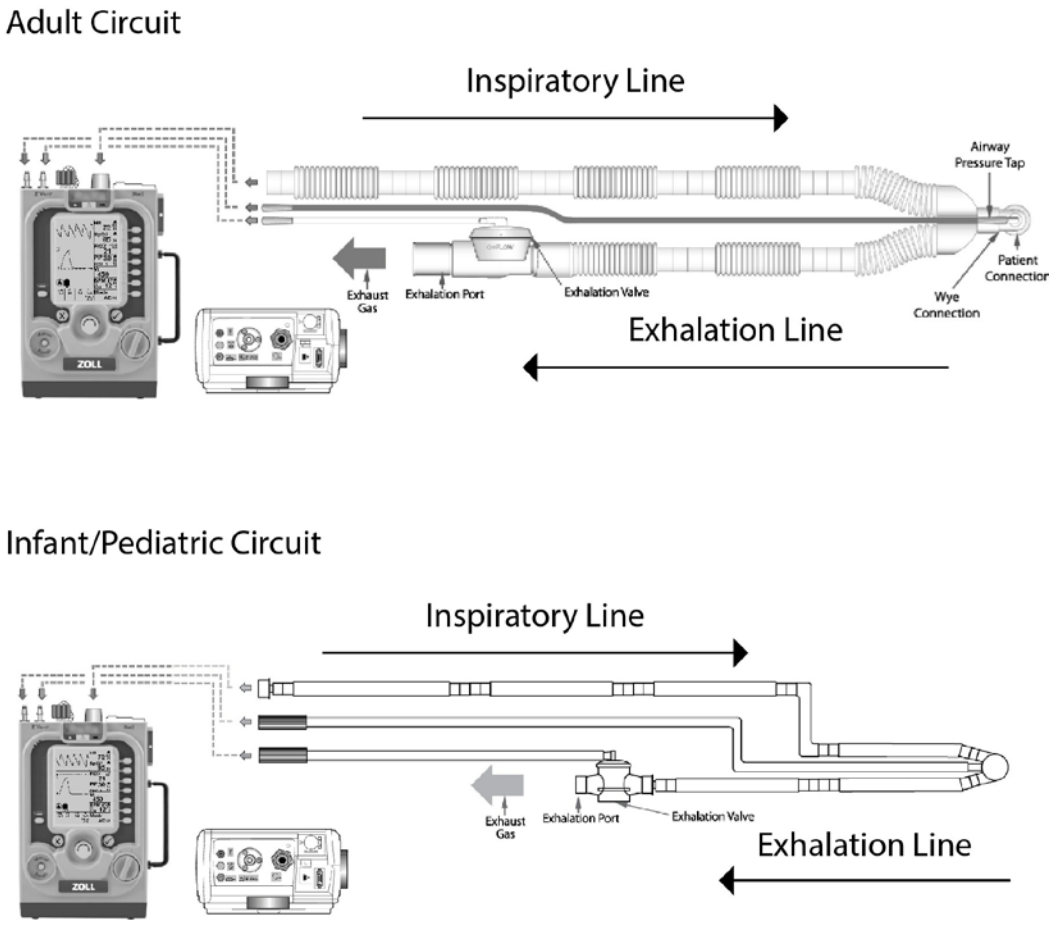
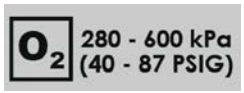


Figure 2-11 Patient Circuit Attachment

The list that follows identifies the circuit connections.

Connection	Symbol on the Ventilator	Description
Inspiratory Line		Gas Output
Pressure Line (Green)		Transducer

Connection	Symbol on the Ventilator	Description
Expiratory Line (Clear)		Exhalation Valve
Oxygen In		High Pressure Oxygen Outlet
Exhaust		Do Not Occlude

Specifications

Pediatric/Adult, 6 ft Patient Circuit

The Pediatric/Adult, 6 ft patient circuit has the following specifications:

- Internal Diameter: 22 mm
- Inspiratory Resistance: R_{INSP} @ 30 Lpm: 0.01 hPa/l/min
- Expiratory Resistance: R_{EXP} @ 30 Lpm: 0.10 hPa/l/min
- Tubing Compliance: C_T @ 60 hPa: 1.6 ml/cm H_20 ml/(hPa)
- Dead Space: 22 ml
- Maximum Working Pressure: 100 cm H_20 (hPa)

Pediatric/Adult, 12 ft Patient Circuit

The Pediatric/Adult, 12 ft patient circuit has the following specifications:

- Internal Diameter: 22 mm
- Inspiratory Resistance: R_{INSP} @ 30 Lpm: 0.02 hPa/l/min
- Expiratory Resistance: R_{EXP} @ 30 Lpm: 0.10 hPa/l/min
- Tubing Compliance: C_T @ 60 hPa: 2.8 ml/hPa
- Dead Space: 22 ml
- Maximum Working Pressure: 100 hPa (cm H_2O)

Infant/Pediatric, 6 ft Patient Circuit

The Infant/Pediatric, 6 ft patient circuit has the following specifications:

- Internal Diameter: 10 mm
- Inspiratory Resistance: R_{INSP} @ 15 Lpm: 0.11 hPa/l/min
- Expiratory Resistance: R_{EXP} @ 15 Lpm: 0.17 hPa/l/min
- Tubing Compliance: C_T @ 60 hPa: 0.5 ml/hPa
- Dead Space: 4.2 ml
- Maximum Working Pressure: 100 hPa (cm H_2O)

Infant/Pediatric, 12 ft Patient Circuit

The Infant/Pediatric, 12 ft patient circuit has the following specifications:

- Internal Diameter: 10 mm
- Inspiratory Resistance: R_{INSP} @ 15 Lpm: 0.17 hPa/l/min*
- Expiratory Resistance: R_{EXP} @ 15 Lpm: 0.17 hPa/l/min
- Tubing Compliance: C_T @ 60 hPa: 0.8 ml/hPa
- Dead Space: 4.2 ml
- Maximum Working Pressure: 100 hPa (cm H_2O)

Note: The extended length of the tubing in the 12 ft circuit results in a higher RINSP compared to the 6 ft circuit.

Warning! **Compressible volume can significantly decrease the delivered tidal volume. When managing patients at risk, always correct for compressible volume Use the Vt Context Menu to adjust Tubing Compliance and Compressible Volume Measurements.**

Warning! **Do not use the 12 ft circuit with PEEP settings below 5 cm H_2O.**

Warning! **Given the additional length of the 12ft circuit, the system may not be able to trap PEEP in patients with short expiatory time. Always ensure that the device is performing as required.**

Chapter 3
Setting Up the Z Vent Ventilator

This chapter describes how to set up the Z Vent ventilator. It lists the tasks required to set up the ventilator for safe, effective use, and describes each task in detail.

Warning! **You must properly set up the ventilator before use. Failure to do so can result in inadequate care or death of the patient.**

To set up the ventilator, you must perform the following tasks:

1. Attach the patient circuit
2. Attach the high pressure oxygen supply (optional)
3. Inspect Fresh Gas/Emergency Air Intake filters
4. Connect Fresh Gas/Emergency Air Intake attachments (optional)
5. Select the ventilator's power source
6. Power on the ventilator
7. Select Start Up default configurations
8. Change the operating mode (optional)
9. Change parameter values
10. Perform an operational test
11. Attach the pulse oximeter (optional)
12. Attach patient

We describe how to perform these tasks in the following sections of this chapter.

Warning! **Always follow physicians orders and local protocols that includes preparations to manually ventilate (bag) the patient. Ensure there is a functioning Bag Valve Mask available to support the patient in the event of a ventilator failure. DO NOT start up the ventilator with the patient attached.**

1. Attach the Patient Circuit

Select the correct patient circuit for the patient and environment (as we describe in the previous chapter). Always follow the instructions included with the circuit. Attach the patient circuit to the ventilator's top panel as follows. See Figure 3-1.

- The 22 mm corrugated hose to the ventilator's gas output
- The green 3/16 inch ID airway pressure line to the pressure transducer
- The clear 1/4 inch ID exhalation valve control line to the exhalation valve fitting.
- The oxygen hose to the Oxygen Input connector.

Note: The circuit recommended temperature range for use is -40 °C to 70 °C (-40 °F to 158 °F).

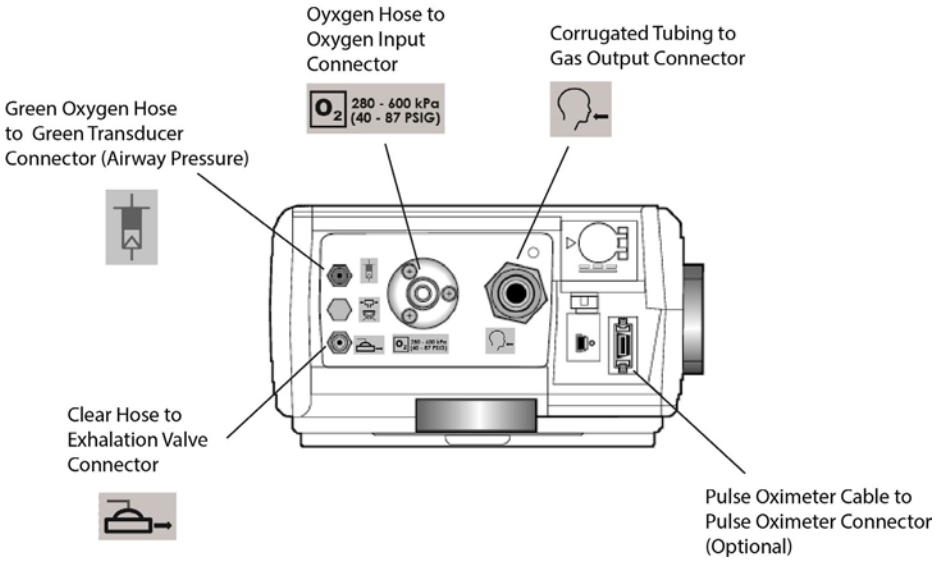


Figure 3-1 Patient Circuit Device Connections

Warning! **Adult patients should only be ventilated with Pediatric/Adult circuits. Infant patients should only be ventilated with Infant/Pediatric circuits.**

Warning! **ZOLL recommends the use of the patient circuits that ZOLL offers for the ventilator. If circuits with different resistance/compliance are used or additional accessories are placed in line with the circuit, you must use the appropriate compliance factors for the new circuit, and make sure the dead space volume of the added accessories are considered so that the device delivers an effective tidal volume to the patient.**

Warning! **Dead space increases with mask ventilation; always follow the mask manufacturer's directions.**

2. Attach the High Pressure Oxygen Supply (Optional)

Since the ventilator includes an internal compressor, the attachment of a high pressure oxygen supply is optional. Review the high pressure supply requirements that we describe in Chapter 2, and use the oxygen hose to attach the ventilator's oxygen inlet to the high pressure O_2 source. The ventilator oxygen inlet is shown in Figure 3-2.

Warning! Use only with medical-grade (USP) oxygen. When using with an oxygen cylinder, the cylinder must be secured. The O_2 hose is either colored green or white, depending on country specifications.

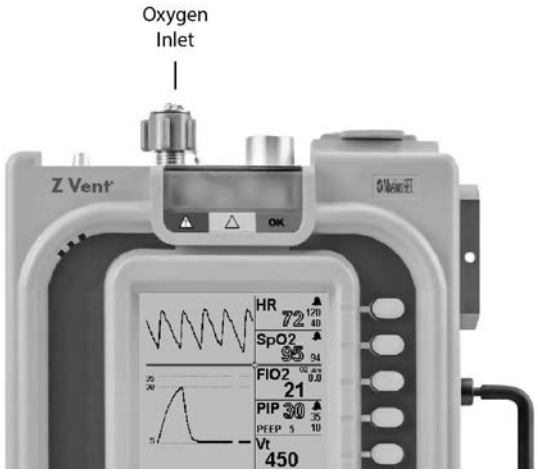


Figure 3-2 Oxygen Inlet

3. Inspect Fresh Gas/Emergency Air Intake Filters

The Fresh Gas/Emergency Air Intake provides the gas path for the ventilator's internal compressor. Two built-in filters protect the compressor and patient from particulate matter (a removable foam filter and a Fresh Gas/Emergency Air Intake disk filter).

The ventilator's Fresh Gas/Emergency Air Intake is shown in Figure 3-3. Inspect the filters and, if dirty, replace them (See the section, "Replacing Ventilator Filters" in Chapter 7.

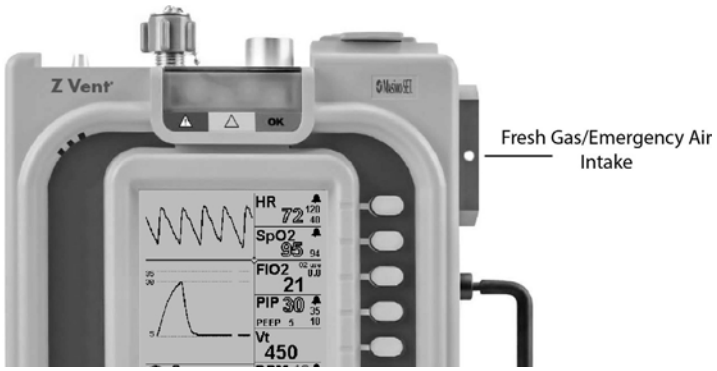


Figure 3-3 Fresh Gas/Emergency Air Intake

Warning! **Never block the Fresh Gas/ Emergency Air Intake, free flow of air is required during compressor operation or in the event of device failure to allow spontaneous breathing. The Fresh Gas/Emergency Air Intake also acts as an anti-asphyxia port in the event of a ventilator failure.**

4. Connect Fresh Gas/Emergency Air Intake Attachments (Optional)

The operating environment of the ventilator may require you to connect the following attachments to the Fresh Gas/Emergency Air Intake:

3-Liter Reservoir Bag Assembly

If the ventilator will use oxygen from low-flow sources, you may choose to attach an Oxygen Reservoir Bag Assembly. Follow these steps:

1. Press the **Menu** button and use the **Dial** to choose O_2 Reservoir "On". This tells the ventilator that the reservoir is attached and prevents the FRESH GAS INTAKE RESTRICTED alarm from sounding.
2. Attach the Oxygen Reservoir Bag Assembly to the Fresh Gas/Emergency Air Intake. This port is located in the side of the ventilator. It will be necessary to use the supplied 22 mm male-to-male adapter with 731 Series Ventilators.
3. Connect the O_2 supply tubing between the O_2 source and the hose barb on the Reservoir Kit.
4. Adjust the O_2 flow to achieve an acceptable O_2 saturation.

Note: The assembly will function when the reservoir bag is hanging down or lying horizontally provided the bag does not fall in such a way that occludes the neck of the bag. The ventilator will sound a Low Priority FRESH GAS INTAKE RESTRICTED Alarm if the menu has not been changed (see "1"above). Operating with the alarm active does not affect the ability of the ventilator to deliver breaths at the current settings. It is to alert the user that a restriction has been detected at the inlet.

Always allow 5 to 10 minutes between adjustments to assure the patient oxygenation has stabilized. This is very important when decreasing the O_2 supply where it may take several minutes for a patient to stabilize at the new O_2 flow.

Never use O_2 flows > 10-12 liters/min. Flows greater than this can cause the baseline pressure to drift, waste oxygen, and may cause an INCOMPLETE EXHALATION alarm.

Warning! **Always monitor the patient's oxygenation using a pulse oximeter. The O_2 flow from a concentrator or other O_2 source may not be adequate to achieve the desired SPO_2 target. Failure to follow the Instructions and WARNINGS provided with the O_2 Reservoir could result in an adverse effect on the patient.**

Note: Due to the slight difference between the densities of air and O_2, the tidal volume will decrease slightly as O_2 is entrained. The worst case is a < 10% decrease in tidal volume when the entrained O_2 results in FIO_2 of 100%.

The table below shows both the affect on tidal volume and the resultant FIO_2 supply rate.

Z Vent	**AC 12, Vt 700, PEEP 5, I:E 1:2.5**								
O_2 Flow	0	1	2	3	4	5	6	7	8
FIO_2	21	30	38	48	57	70	80	89	100
Vt (set)	740	732	725	718	711	703	691	689	682
Vt (actual)	700	692	685	678	671	663	651	649	642
% Chg	0	-1.1	-2.1	-3.1	-4.1	-5.3	-7.0	-7.3	-8.3
	AC 12, Vt 500, PEEP 5, I:E 1:2.5								
O_2 Flow	0	1	2	3	4	5	6		
FIO_2	21	30	43	56	69	89	100		
Vt (set)	527	523	514	506	502	493	486		
Vt (actual)	500	496	487	479	475	466	459		
% Chg	0	-0.8	-2.6	-4.2	-5.0	-6.8	-8.2		
	AC 18, Vt300, PEEP 5, I:E 1:2.5								
O_2 Flow	0	1	2	3	4	5	6		
FIO_2	21	32	47	62	76	96	100		
Vt (set)	312	307	303	299	298	291	287		
Vt (actual)	300	295	291	287	286	279	275		
% Chg	0	-1.7	-3.0	-4.3	-4.7	-7.0	-8.3		

Bacterial/Viral (BV) Filter

If the ventilator will operate in an environment where the patient is at risk from cross contamination or airborne pathogens, you may choose to attach a BV filter (See Chapter 6, “Operating Environments” for more information on this filter).

Chemical/Biological C2A1 Filter

If the ventilator will operate in a contaminated environment, you may choose to attach a chemical/biological C2A1 filter obtained from a Chemical/Biological Filter supplier.

Note: ZOLL does not offer this filter. (See Chapter 6, "Operating Environments" for more information on this filter).

Warning! **Always monitor the patient and ventilator when using external filters or the external O_2 reservoir. Changing modes can trigger false compressor failure alarms when the device's parameter configurations requires very high air flow.**

5. Select the Ventilator's Power Source

The ventilator can run using one of the following power sources:

1. Internal 14.4 VDC Li-ion rechargeable battery with 6.75 Ah capacity (fully charged, the battery provides 10 hours of operation at factory default settings with pulse oximeter operating at 25 °C (77 °F).
2. External AC/DC Power Supply that ZOLL provides (100 to 240 VAC 50/60 and 400 Hz with an IEC 320 style AC input connector. The AC/DC Power Supply provides a DC output of 24 V at 4.2 A.
3. External DC power from a standard vehicle DC outlet using either the 12 or 28 VDC Power Cable that ZOLL provides to connect the ventilator to the DC outlet. The ventilator's input connector accepts DC voltages between 11.8 to 30.0 VDC.

The ventilator uses external power when available rather than its internal battery pack. When an acceptable external power source is present, the ventilator automatically charges the internal battery while the device operates. When an external power failure occurs, the device automatically switches to its internal battery for operating power and activates the EXTERNAL POWER FAILURE alarm; there is no interruption in operation or loss of any alarms. When external power returns, operating power automatically switches from internal power to the external source.

In the event that the device needs to be shutdown, turn the **Power** switch to the OFF ("**O**") position. If this fails to work or puts the patient or user at possible risk, disconnect the device from the mains power.

To connect the ventilator to an external power source, connect an AC/DC Power Supply plug to the device's External Power Input and an acceptable electrical outlet.

Connecting the Power Supply

Connect the external power cable to the ventilator as described in Figure 3-4 and Figure 3-5.

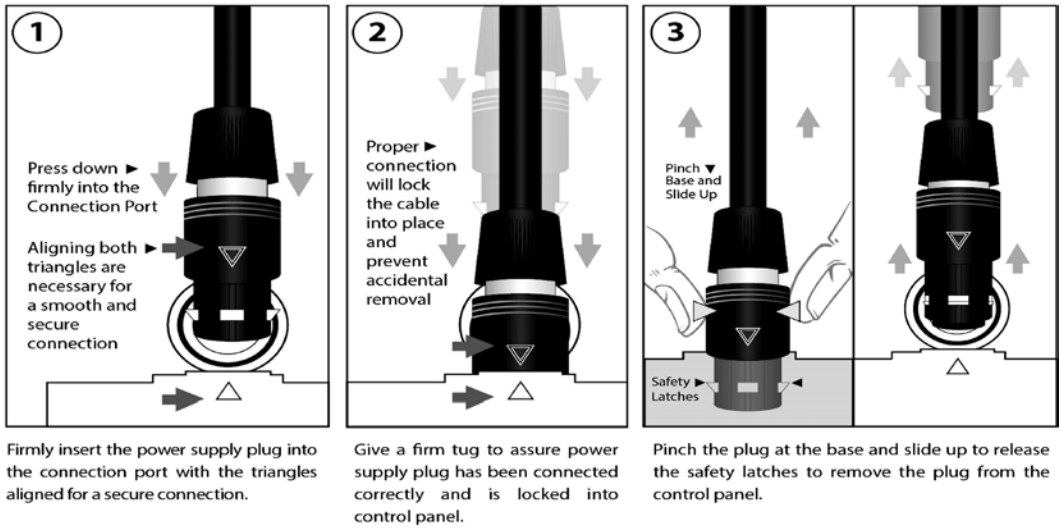


Figure 3-4 Connecting and Disconnecting the Power Supply

Warning!	**If the power supply, power cable, or power connection plugs are damaged or become damaged during use, immediately disconnect the power cable from external power and the device.**

Caution	Do not twist the power cable connection plug. Pinch the plug and slide up to release the safety latches. Failure to do so may damage the power connection plug and prevent it from functioning.

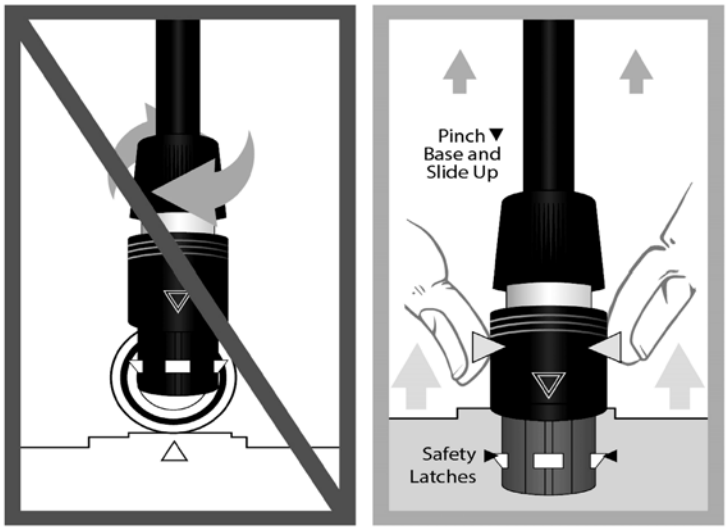


Figure 3-5 Power Supply Latching

6. Power On the Ventilator

To power on the ventilator, turn the Power switch to "**I**"**.** Figure 3-6 shows the location of the ventilator's Power switch.

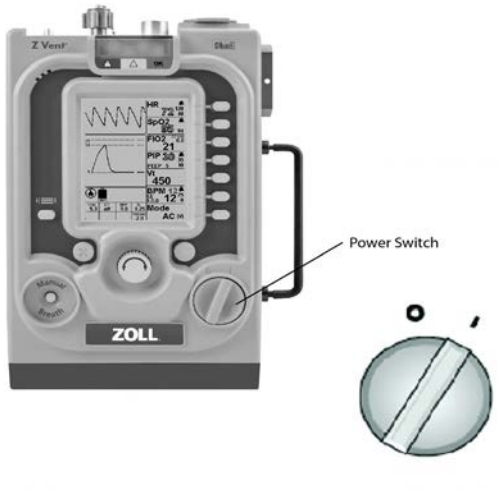


Figure 3-6 Power Switch

After powering on, the device performs its Self-Check test, which checks for alarm conditions and the operation of the pneumatic system, internal communications, and power system. After completing the Self-Check test, the ventilator waits for the user to select a starting configuration before it begins to operate. Once operation begins, the ventilator continuously monitors for alarm conditions.

During normal start-up, the ventilator's alarms are muted for 2 minutes (120 seconds) to allow you to connect the patient circuit, pulse oximeter, adjust ventilator settings, and perform an operational test without distraction. The start-up mute self clears when there are not any active medium priority alarms and no un-muted low priority alarms for a period of 15 seconds.

Warning! **Always start the ventilator, select the patient settings, ensure operation, and then connect the patient. Always manually ventilate the patient when they are not connected to the ventilator.**

7. Select Start Menu Option

When you power on the ventilator, the Start Menu appears, from which you choose an appropriate starting configuration for the patient. You can select from these patient defaults:

- Adult
- Pediatric
- Mask CPAP -- Continuous Positive Airway Pressure (CPAP)
- Custom -- Values saved in a previous session
- Last Settings -- Values set for the last patient treated before turning OFF the ventilator

Note: Gas flow at start up is used to detect the patient in event proper procedures are not followed.

Warning! **Default settings are intended to speed the configuration of the ventilator. Particular care should be taken to adjust the ventilator appropriately before ventilating infants and children. The ventilator should always be adjusted before placing the patient on the ventilator.**

The predefined configurations (Adult, Pediatric, Mask CPAP) are default settings defined within the specified use. The Custom default can be used to define a configuration that supports your use and/or patient population. See Chapter 4 for more information.

To select the device's default parameter values, highlight one of the above settings in the **Start Menu** and press the **Accept** button. To operate with parameter values that differ from the default values, use the device's parameter buttons (see the "Changing Parameter Values" section later in this chapter).

Note: You can configure the ventilator to automatically select Adult parameter defaults at start up from the start config submenu from the menu.

Warning! **Never use the CPAP and BL mode on a patient that is NOT spontaneously breathing and/or may stop spontaneous breathing. CPAP and BL are intended for *ventilatory support,* NOT *ventilation*.**

When noninvasive CPAP and BL with LC is used, the head with mask icon appears in the location used by the speaker/mute icons. Low and Medium priority alarms cause this head with mask icon to disappear. It reappears when low priority alarms are muted.

When Medium priority alarms are muted, the muted speaker icon appears.

8. Change Operating Mode (Optional)

The ventilator offers four operating modes that you can use to manage the patient (active modes, AC and SIMV can provide either pressure or targeted ventilation):

1. **AC** (Assist/Control) -- The patient receives either controlled or assisted breaths. When the patient triggers an assisted breath, the patient receives a breath based on either the volume or pressure target.
2. **SIMV** (Synchronized Intermittent Mandatory Ventilation) -- The patient receives controlled breaths based on the set breathing rate. Spontaneous breaths are either unsupported demand flow or supported using Pressure Support.
3. **CPAP** (Continuous Positive Airway Pressure) -- The patient receives constant positive airway pressure while breathing spontaneously. Spontaneous breaths are either demand flow or supported using Pressure Support.
4. **BL** (Bilevel) -- the ventilator provides two pressure settings to assist patients breathing spontaneously: a higher inspired pressure (IPAP) and a lower expiratory pressure (EPAP).

Note: SIMV mode is an optional mode on the Z Vent ventilator that might not be available on your Z Vent ventilator.

To select the operating mode, press the **Mode** parameter button, turn the **Dial** to highlight the mode you want to use, and press the **Accept** button.

When transitioning from active ventilation to CPAP/BL modes, or from CPAP/BL with LC mode to active ventilation, the following parameter/alarm limit may be adjusted:

- Low BPM Alarm
- High BPM Alarm
- Low Airway Pressure Alarm
- PEEP
- VT High Limit
- VT Low Limit
- Rise Time
- Pressure Support

Warning! **The transition into CPAP/BL automatically sets the rise time to 3, which may be too fast for some patients as well as infants and small children. Before using the ventilator with an infant or small child, you should always configure the ventilator appropriately before attaching the patient and monitor the patient to ensure optimal support.**

Note: The Patient Detect alarm triggers when you connect the patient to the ventilator while the Start Menu is still active. To resolve the alarm, you must select a mode of ventilation and configure the device appropriately for the patient. In addition, you should perform the Operational Test procedure before reconnecting the patient to the device.

9. Change Parameter Values

If the patient requires parameter values that differ from the default values, you can use the parameter buttons to change these values. To change the parameter values, press the parameter buttons to highlight the primary parameter and secondary parameter values, or press and hold the parameter button to display the parameter's context menu. Use the **Dial** to adjust the value of the highlighted parameter. Press the **Accept** button to implement the change.

Warning! **The alarm limits must be appropriate for the patient being ventilated. If a parameter is changed, adjust the high and low alarm limit to bracket the new value.**

10. Perform Operational Test

Before attaching the patient to the ventilator, you should perform an Operational Test to ensure that the breathing circuit is properly attached and that the primary patient safety alarms, such as PATIENT DISCONNECT and AIRWAY PRESSURE HIGH are functioning properly.

To perform the operational test procedure, do the following:

a. Press the **Manual Breath** button; gas should flow out of the patient connection each time the button is pressed.

b. Close the patient port with a clean gloved hand. The HIGH AIRWAY PRESSURE LIMIT alarm should activate after 2 breaths that reach the PIP High Limit.

   If the AIRWAY PRESSURE HIGH alarm fails to activate, check to determine that all of the circuit connections are secure, the exhalation valve is closing during inhalation, and that the High Airway Pressure Limit is set to 35 cm H2O or less.

c. After a breath or two, release the patient port while allowing the ventilator to operate. The PATIENT DISCONNECT alarm should activate.

d. Partially close the patient port to reset the PATIENT DISCONNECT alarm.

e. With no other alarms occurring, remove external power from the ventilator. The EXTERNAL POWER

   LOW/DISCONNECT alarms should activate. Reconnect external power to reset alarms.

   If either the HIGH AIRWAY PRESSURE, PATIENT DISCONNECT, or EXTERNAL POWER LOW/DISCONNECT alarms fail to activate, continue to manually ventilate the patient, check the patient circuit for leaks or a faulty exhalation valve and repeat the Operational Test.

If operating using the internal battery, verify that the Battery icon indicates sufficient available battery capacity remains to support the anticipated duration of operation. If not, begin ventilation and find an alternate source of power.

Warning! **Until you have determined that the ventilator is functioning properly and that the ventilator parameters are set correctly for the patient, do not connect the patient to the ventilator.**

11. Attach the Pulse Oximeter (Optional)

The pulse oximeter operates in all ventilator modes when its cable and sensor are properly attached to the SpO_2 connector (during start up, the pulse oximeter is on standby -- the SpO_2 and HR parameter windows display *stby*).

To operate the pulse oximeter, connect the sensor to the patient and the cable to the SpO_2 connector on the top of the ventilator as shown in the Figure 3-7.

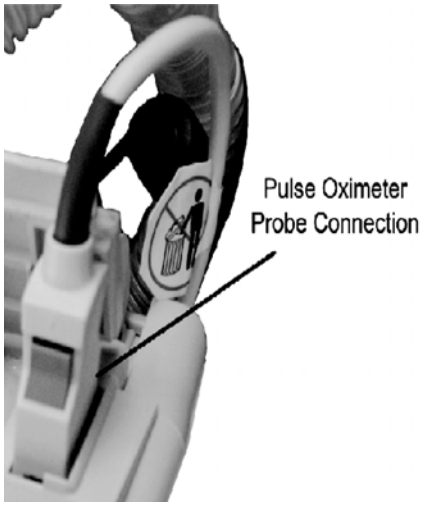


Figure 3-7 Connecting the Pulse Oximeter Sensor

Monitoring begins automatically when a valid patient signal is detected for greater than 10 seconds. For more information about the Masimo pulse oximetry technology that the ventilator uses, see Appendix C, Pulse Oximeter Principles.

12. Attach Patient

After you confirm that the ventilator is operating correctly, detach the test lung (if used in the Operational Test) from the patient circuit. Attach the patient airway (endotracheal tube, supraglottic airway or tracheotomy tubes) or mask to the patient circuit connection port.

Note: If there are circuit-related alarms during set up or initial use, such as Disconnect, PEEP Leak, Low Airway Pressure, or Auto PEEP, check all circuit connections and the exhalation valve.

Warning!	**Never leave the patient unattended.**

Warning!	**Always assure that there is an alternate means of providing mechanical ventilation. A bag-valve resuscitator and an appropriate mask for the patient being ventilated should be immediately available.**

Warning!	**Do not connect the patient to the ventilator until you determine that the ventilator is functioning properly and that the ventilator parameters are set correctly for the patient.**

Warning!	**Do not connect anything to the USB connection. The USB connection does not provide any signal output or input to the user. The USB connection is a tooled access used during service of the device.**

Chapter 4
Using the Z Vent Ventilator

This chapter describes how to use the ZOLL Z Vent ventilator. Effective operation of the ventilator requires understanding of the following topics:

- Initial operation with default (predefined) parameter settings
- Changing parameter settings
- Saving custom configurations for future use
- Using the last settings enabled on the ventilator
- Mode Parameter Window Options
- BPM Parameter Window Options
- Vt Parameter Window Options
- PIP Parameter Window Options
- FIO_2 Parameter Window Options
- SpO_2 Parameter Window Options
- HR Parameter Window Options
- Popup Messages
- Using the Menu

Initial Operation with Default Parameter Settings

Following power on, the ventilator goes through a Self-Check (a set of system tests and checks). If the Self-Check passes, the LED array turns green and the Start Menu displays, indicating that the ventilator is operational.

The Start Menu enables the user to choose between predefined ventilator parameter settings (for adult patients, pediatric patients, patients requiring Mask CPAP), a previously saved set of Custom parameter settings, or the parameter settings last used during ventilator operation. The Start Menu choices include:

Choice	Description
Adult	Preset ventilation parameter settings for adult patients.
Pediatric	Preset ventilation parameter settings for pediatric patients.
Mask CPAP	Preset ventilation parameter settings for Mask CPAP (Continuous Positive Airway Pressure) ventilation.
Custom	Ventilation parameter settings previously saved by a user.
Last Settings	The settings enabled on the ventilator during its last use (but not saved as Custom Settings by the user).

Warning! **Do not connect patient to the ventilator while the Start Menu is active.**

Default Parameter Settings for Adult, Pediatric and Mask CPAP

The default settings for Adult, Pediatric, and Mask CPAP are as follows:

Adult Default Parameter Setting Values

Parameter	Default Setting Value
Mode	AC (V)
BPM	12
I:E	1:3
VT	450
PEEP	5
PIP Limit	35
FIO_2	21

Pediatric Default Parameter Setting Values

Parameter	Default Setting Values	
Mode	SIMV (P)*	AC(P)
BPM	20	20
Ti	0.6	0.6
PIP	20	20
PEEP	4	4
PIP Limit	30	30
FIO_2	21	21
* Note: SIMV (V) and SIMV (P) are optional modes on the Z Vent.		

Mask CPAP Default Parameter Setting Values

Parameter	Default Setting Value
Mode	CPAP
Backup BPM	12
Backup I:E	1:3
Backup PIP	20
PEEP	5
PIP Limit	30
FIO_2	21

Making a Choice From the Start Menu

Choose the option that is most is appropriate for the patient. With the Start Menu displayed, follow these steps:

1. Turn the **Dial** to highlight your choice. For example, to choose the Mask CPAP default, turn the **Dial** until Mask CPAP highlights.
2. Press the **Accept** button to enable your choice. The ventilator begins operation with the choice you made. For initial set-up, see Chapter 3.

Note: The ventilator provides a 120-second alarm mute it automatically clears as described above to allow the provider time to adjust parameter settings for the patient.

Changing Parameter Settings

The Z Vent ventilator helps you to manage the patient by organizing ventilator parameters in groups that are accessed through *parameter windows* on the right side of the display screen. A button corresponding to each window, enables you to select and set parameters.

Parameter Group Item	Description
Primary Parameter	The primary parameter setting accessed and controlled through the parameter window. These are labeled with large font as: HR, SPO_2, FIO_2, PIP, Vt, BPM, and Mode.
Secondary Parameters and Alarm Thresholds/Limits	Secondary parameters associated with the primary parameter and alarm thresholds for alarms associated with the primary parameter, (small font).
Context Menu	Additional settings that further adjust the performance of the device related to the primary parameter.

Parameters controlled by the user appear as solid text (or a solid symbol) in either the parameter window or auxiliary boxes. Parameters dependent on the patient appear as outlined text in the parameter window. Figure 4-1 shows parameter windows.

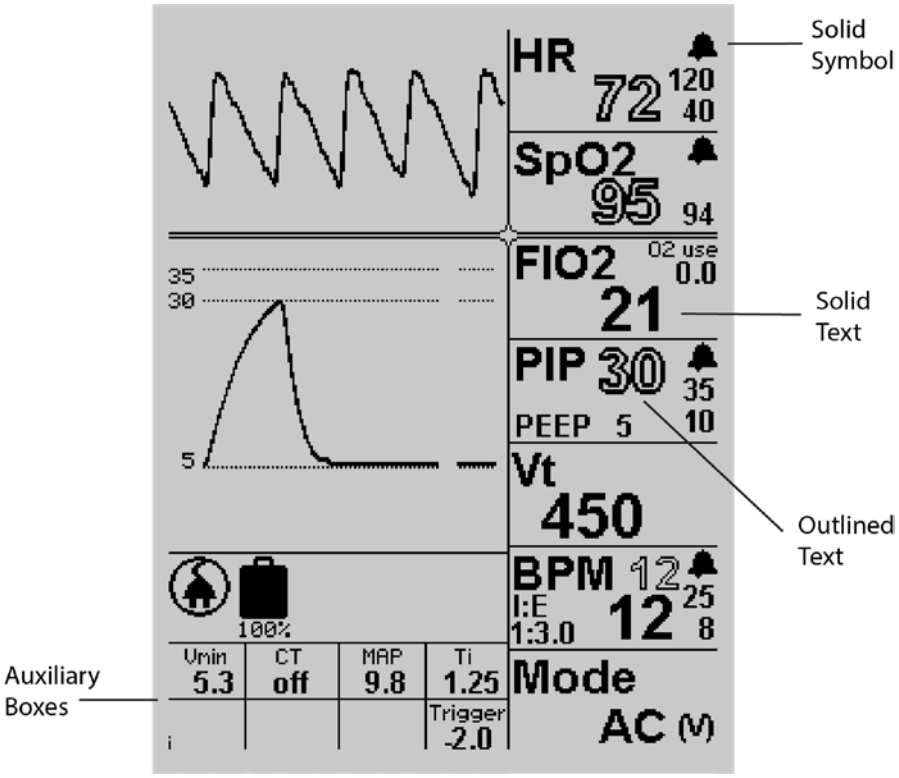


Figure 4-1 Parameter Windows and Auxiliary Boxes

Figure 4-2 shows the buttons associated with parameter windows.

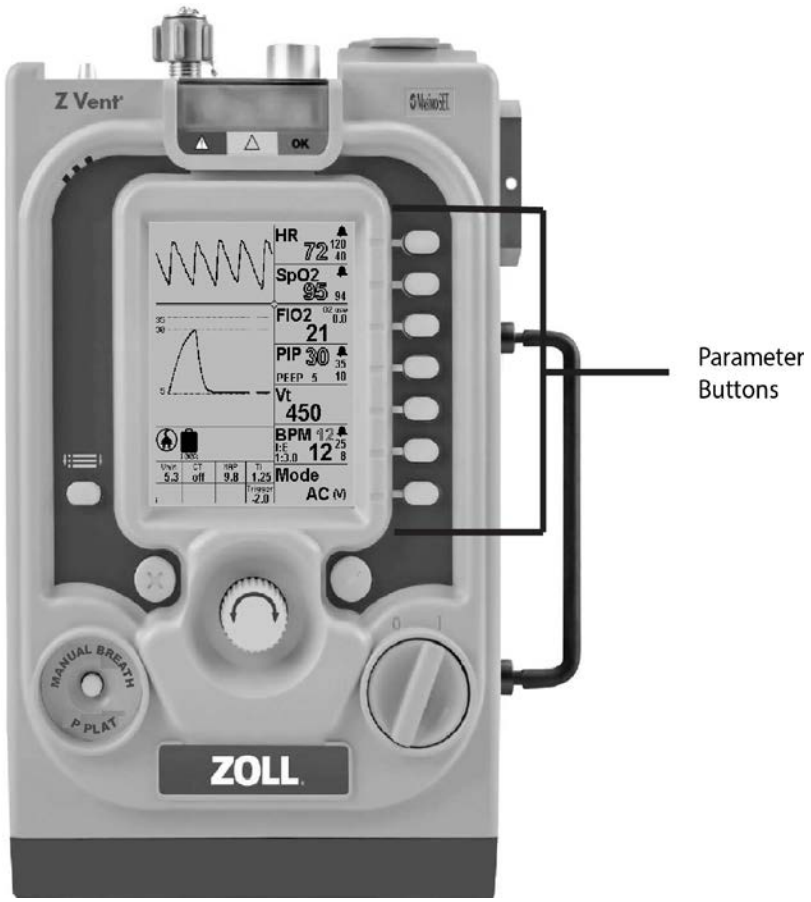


Figure 4-2 Parameter Buttons

Navigating the Parameter Windows Using Parameter Buttons

Parameter values are accessed with a parameter button as follows:

- **Single Press:** highlights the primary parameter for the chosen parameter window
- **Multiple Presses:** highlights secondary parameters and alarm limits. (Multiple presses highlight secondary parameters moving in a clockwise direction)
- **Press and Hold:** opens the context menu (for those primary parameters that have a context menu). Turning the **Dial** highlights context menu items.

Note: If you attempt to set parameter values that are outside the typical clinical range of settings, the ventilator displays popup messages that ask if you are sure you would like to set the parameter to that value. We describe popup messages in more detail later in this chapter. To set the parameter above the limit, you must press the **Accept** button, and then adjust the values and press the **Accept** button again.

Changing a Parameter Setting

To change a parameter, follow these steps.

1. Access the parameter you intend to change using the parameter buttons as described in the previous sections.
2. Press the **Accept** button to highlight your choice. Multiple presses are required for secondary parameters.
3. Turn the **Dial** to adjust the parameter value
4. Press the **Accept** button to enable your choice.

The examples that follow describe how to change a primary parameter, secondary parameter, and a context menu parameter.

Example 1 — Changing a Primary Parameter

In Example 1, the ventilator is operating with the default Adult parameters. The user wants to change the Mode from AC (Adult Default) to CPAP.

To change the Mode parameter from AC to CPAP, follow these steps:

1. Press the **Mode** parameter button once.

2. Turn the **Dial** until the Mode parameter window displays CPAP.

3. Press the **Accept** button.

Example 2 — Changing a Secondary Parameter

In Example 2, the ventilator is operating with the default Adult parameters and user wants to adjust the PEEP secondary parameter setting from 5 (the adult default setting) to 7 cm H_2O.

To change the secondary parameter PEEP setting from 5 to 7, follow these steps:

1. Press the **PIP** parameter button until PEEP is highlighted.

2. Turn the **Dial** until the PEEP setting is 7 as displayed in the PIP parameter window.

3. Press the **Accept** button.

Example 3— Changing a Context Menu Parameter

In Example 3, the ventilator is operating with the default Adult parameters and user wants to change the Masimo Pulse Oximeter Sensitivity from Norm (normal) which is the adult default setting – to Max (maximum).

To change the Sensitivity setting from *Norm* to *Max*, follow these steps:

1. Press and hold the **HR** or **SpO_2** parameter button until the Masimo context menu displays.
2. Release the parameter button, then turn the **Dial** until the Sensitivity choice highlights, then press the **Accept** button. The Sensitivity setting highlights.
3. Turn the **Dial** until the setting changes to Max (maximum).
4. Press the **Accept** button.

Saving Changed Parameters for Future Use

When you change parameters, you can save them for future use through the Custom Settings Menu option.

To save changed parameters for future use, follow these steps.

1. With the ventilator turned on, make the desired parameter changes using the parameter buttons, Dial and Accept button.
2. Press **Menu** button.
3. Using the **Dial**, highlight Powerup Settings, and then press the **Accept** button.
4. Use **Dial** to highlight Custom Settings, then press the **Accept** button to highlight Save, and then press the **Accept** button again to save the changed parameters.

To use or confirm that the changed parameters are saved as Custom settings, follow these steps:

1. Turn on the ventilator.
2. When the Start up Menu displays, turn the **Dial** to highlight Custom Settings, and then press the **Accept** button.
3. The ventilator displays the custom parameter settings in the parameter windows.

Warning! The Custom and Last Setting options save the current configuration of the ventilator. Always ensure that the both the ventilation settings and alarm limits are appropriate for the patient.

Using the Last Settings Enabled on the Ventilator

The ventilator preserves the last setting used on the ventilator (even if they were not saved as Custom Setting). To use the last settings, do the following:

1. Turn ON the ventilator, wait for the Self-Check to complete, and the Start Menu to display.
2. Turn the **Dial** to highlight the Last Settings choice.
3. Press the **Accept** button to enable your choice.

The ventilator begins operation with the last settings used.

Warning! Last Settings uses all of the parameters including alarms. You must ensure that both the setting and alarms are appropriate for the patient.

6.2 APGAR SCORE:

The APGAR Scoring Chart

Sign	0	1	2	1 Min	5 Min

Appearance (Skin Color)	Blue, Pale	Body Pink, Hand and Feet Blue	Completely Pink		
Pulse Rate (Heart Rate)	Absent	Below 100	Above 100		
Grimace (Irritability-Response to Flick on sole	No Response	Some Motion, Weak Cry	Vigorous Cry		
Activity (Muscle Tone)	Flaccid, Limp	Some Flexion of Extremities	Active Motion		
Respiratory (Effort)	Absent	Slow, Irregular	Good, Crying		

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6.3 APPROVED MEDICAL ABBREVIATIONS.

A
ā = before
@ = at
ABC = airway, breathing, circulation
abd. = abdomen
A/C = antecubital fossa
AICD = automatic implantable cardiac defibrillator
ACLS = advanced cardiac life support
A.D. = right ear
ALS = advanced life support
AMA = against medical advice
a.m. = morning
AMI = acute myocardial infarction
amp. = ampule
amt. = amount
AP = anteroposterior
APGAR
ASA = aspirin
ASAP = as soon as possible
ASHD = arteriosclerotic heart disease
ATV = all terrain vehicle
A/V = atrioventricular
==========
B
bbb = bundle branch block
BBS = bilateral breath sounds
B/F = black female
B/M = black male
BG = Blood Glucose
b.i.d. = twice a day
BKA = Below the Knee Amputation
BLS = basic life support
BM = bowel movement
BP = blood pressure
BSA = body surface area (burns)
BSI = body substance isolation
BVM = bag/valve/mask

C

Č = with
CA = cancer
CABG = coronary artery bypass graft
CAD = coronary artery disease
CAO = conscious, alert, oriented
C/C = chief complaint
CCU = coronary care unit

CHD = congenital heart disease
CHF = congestive heart failure
cm = centimeter
CNS = central nervous system
C/O = complains of
CO2 = carbon dioxide
COPD = chronic obstructive pulmonary disease
CP = chest pain
CPAP
CPR = cardiopulmonary resuscitation
CSF = cerebrospinal fluid
C-spine = cervical spine
CT
CVA = cerebrovascular accident
==========
D
DC = discontinue
DCAP- BLS = deformity, contusions, abrasions, penetrations, burns, lacerations, and swelling
D & C = dilation and curettage
diff. = differential
DKA = Diabetic Ketoacidosis
DOA = dead on arrival
DNR = do not resuscitate
DNRO = do not resuscitate order
DVT= Deep Vein Thrombosis
D5W = 5% Dextrose in water
D25 = Dextrose 25%
D50 = Dextrose 50%
DX. = diagnosis
==========
E
ED = emergency department
EENT = eyes, ears, nose and throat
ECG or EKG = electrocardiogram
EEG = electroencephalogram
e.g. = for example
EGTA = esophageal gastric tube airway
EMD = electromechanical dissociation
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EMS = emergency medical services
EMT = emergency medical technician
ENT = ears, nose and throat
EOA = esophageal obturator airway
EOM = extraocular movement
Epi = epinephrine
ER = emergency room
EET tube = endotracheal tube
ETA = estimated time of arrival

ETOH = ethyl alcohol
==========
F
FBAO = foreign body airway obstruction
F= Female
fl. = fluid
flex. = flexion
ft. = foot
FROM = full range of motion
fx = fracture
==========
G
g = gauge (diameter)
GI= Gastrointestinal
GCS = Glasgow Coma Scale
GERD = Gastroesophageal Reflux Disease
Gm = gram
GSW = gunshot wound
gtt. = drop
GU = genitourinary
GYN = gynecology
==========
H
H/F = Hispanic female
H/M = Hispanic male
HBP = high blood pressure
hr. = hour
HEENT = head, ears, eyes, nose and throat
HIV = human immune deficiency virus
hgb = hemoglobin
hosp. = hospital
HTN = hypertension
Hx = history
==========
I
ICU = intensive care unit
I & D = incision and drainage
IM = intramuscular
I & O = intake and output
IO = intraosseous
IUD = intrauterine device
IV = intravenous
IVP = intravenous push
==========
J
JVD = jugular vein distention
J = Joule
==========

K
kg. = kilogram
KCl = potassium chloride
KVO= Keep Vein Open
==========
L
(L) or lt. = left
lac. = laceration
lat = lateral
LBBB = left bundle branch block
lb(s) = pound(s)
L & D = labor and delivery
L/min or lpm = liters per minute
LLE = Left Lower Extremity
LUE= Left Upper Extremity
LLQ = left lower quadrant
LMA = laryngeal mask airway
LMP = last menstrual period
LOC = loss of consciousness
LP = lumbar puncture
LR = lactated ringers
LUQ = left upper quadrant
==========
M
MAE = moves all extremities
MAST = medical anti-shock trousers
mA = milliampere
mcg = microgram
MCI = mass casualty incident
meds = medications
Implemented midnight on March 15th, 2016 – Version 2 Page 570
M= Male
mEq = milliequivalent
MI = myocardial infarction
min. = minute
mg. = milligram
mkd. = marked
ml. = milliliter
mod. = moderate
MVC= Motor Vehicle Crash
MOE = movement of extremities
~~MS = morphine sulfate~~
==========
N
N2O = nitrous oxide
NaCl = sodium chloride
NAD = no acute distress
neg. = negative

NKA = no known allergies
n/g = nasogastric
NPA= Nasal Pharyngeal Airway
NPO = nothing by mouth
NS = normal saline
NSR = normal sinus rhythm
NTG = nitroglycerin
N & V = nausea and vomiting
==========
O
O2 = oxygen
OB = obstetrics
OBS = organic brain syndrome
OD = overdose - also means right eye
OPA= Oropharyngeal Airway
OPQRST = onset, provocation, quality, radiation, severity, time
Ophth = ophthalmology
OR = operating room
OS = left eye
OU = both eyes
==========
P
PA = posteroanterior
PAC = premature atrial contraction
PaCO2 = partial pressure of CO2 in arterial blood
PaO2 = partial pressure of O2 in arterial blood
PAT = paroxysmal atrial tachycardia
PDR = physician's desk reference
PE = pulmonary embolus
per = by
PERL = pupils equal and reactive to light
PERLA = pupils equal and reactive to light, and accommodation
PICC= Peripherally Inserted Central Catheter
PID = pelvic inflammatory disease
PJC = premature junctional contraction
p.m. = evening
PMD = private medical doctor
PO = mouth
post = after
pre = before
prn = as needed
PSVT = paroxysmal supraventricular tachycardia
pt. = patient
PVC = premature ventricular contraction
Px. = physical history
==========
Q
q = every

q.h. = hourly
q.i.d. = four times daily
q.o.d. = every other day
==========
R
RBBB = right bundle branch block
RBC = red blood count
(R) or rt. = right
RLE= Right Lower Extremity
RUE= Right Upper Extremity
RLQ = right lower quadrant
R/O = rule out
ROM = range of motion
RUQ = right upper quadrant
Rx= prescription
==========
S
□ = without
SAMPLE = signs/symptoms, allergies, medications, past Hx, last oral intake, events prior
SaO2 = percentage of oxygen in arterial blood
SIDS = sudden infant death syndrome
SL = sublingual
SOAP = subjective, objective, assessment, plan
SOB = short (ness) of breath
sol. = solution
spec. = specimen
Sub. Q (SQ) = subcutaneously
SpO2 = percentage of oxygen in the blood via pulse oximeter (equal to SaO2)
SVT= Supraventricular Tachycardia
STEMI= ST elevated myocardial infarction
==========
T
tab. = tablet
TB = tuberculosis
temp. = temperature
TIA = transient ischemic attack
t.i.d. = three times daily
TKO= To Keep Vein Open
TMJ = temporomandibular joint
TPR = temperature, pulse and respiration
Tx. = treatment
==========
U
UA = urinalysis
ULQ = upper left quadrant
URI = upper respiratory infection
URQ = upper right quadrant
UTI= Urinary Tract Infection

==========
V
V - fib (VF) = ventricular fibrillation V
- tach (VT) = ventricular tachycardia
VD = venereal disease
via = by way of
vol. = volume
VS = vital signs
==========
W
WBC = white blood count
W/F = white female
W/M = white male
WNL = within normal limits
wt. = weight
==========
Y
Y/O = years old
==========
Miscellaneous
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˜ = approximately
< = less than
> = more than
- = negative
+ = plus/positive
# = number
% = percent
@ = at
Δ = change
♂ = male
♀ = female
↑ = increase
↓ = decrease
(R) = right
(L) = left

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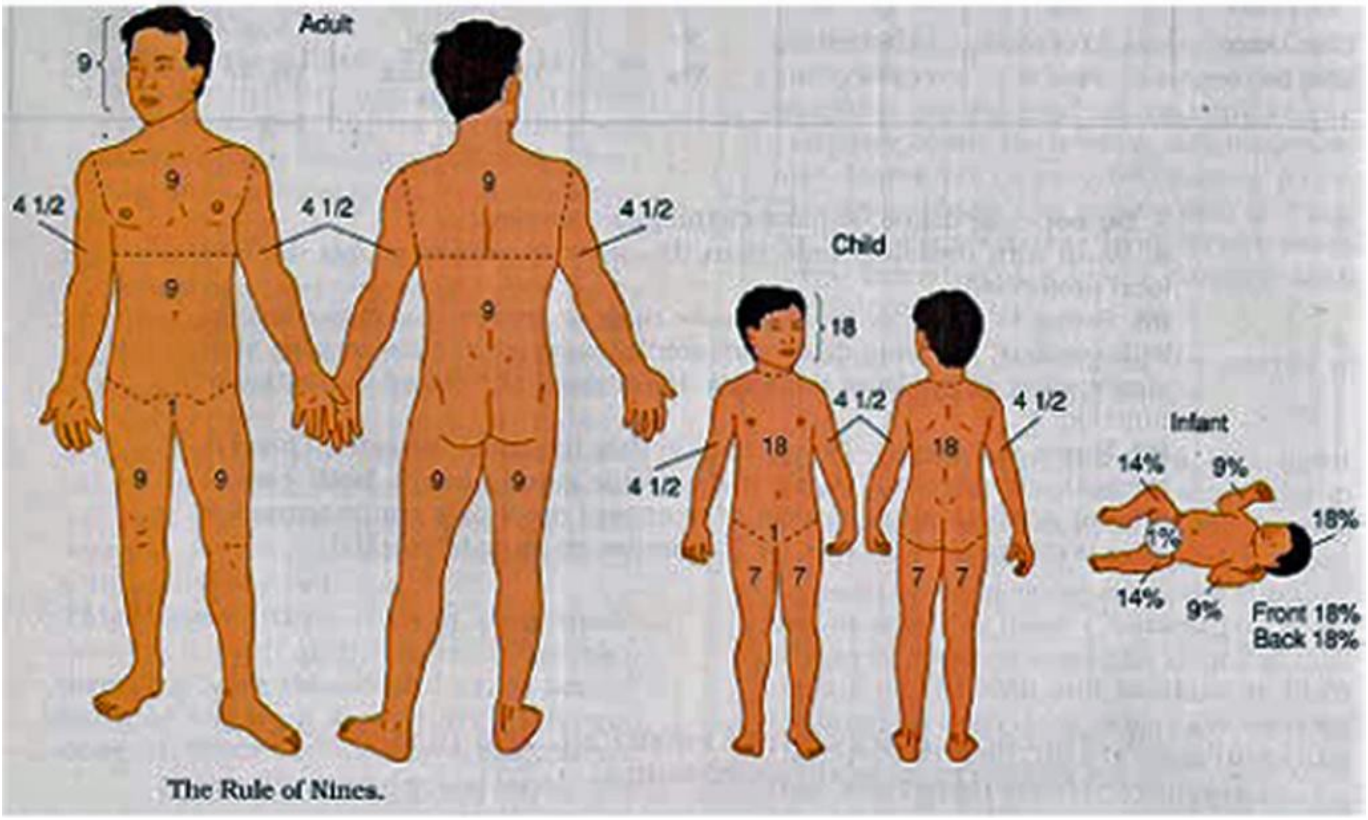
6.4 BURN PATIENT: RULE OF NINES



The Rule of Nines.

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6.5 BURN PATIENT: SEVERITY CATEGORIZATION

Burn Classification	Characteristics
Minor Burn Injury	**1º Burn** **2º Burn < 15% BSA in Adults** **2º Burn < 5% BSA in Children / aged** **3º Burn < 2% BSA**
Moderate Burn Injury	**2º Burn 16-25% BSA in adults** **2º Burn 5-20% BSA in Children / aged** **3º Burn 2-10% BSA**
Major Burn Injury	**2º Burn > 25% BSA in Adults** **2º Burn > 20% BSA in Children/Aged** **3º Burn > 10% BSA** **Burns involving the hands, face, eyes, ears, feet or perineum** **Most patients with inhalation injury, electrical injury, concomitant major trauma, or significant pre-existing diseases.**

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6.6 Conversion Table of Measurements - Commonly used for medication and drug computations

- 1 gram (g) = 1000 milligrams (mg)
- 1 kilogram (kg) = 1000 grams (g)
- 1 microgram (mcg) = .001 milligram (mg)
- 1 milligram = 1000 microgram (mcg)
- 1 liter (L) = 1000 milliliters (ml)
- 1 milliliter (ml) = 1 cubic centimeter (cc)
- 1 meter = 100 centimeters (cm)
- 1 meter = 1000 millimeters (mm)
- 1 cubic centimeter (cc) = 1 milliliter (ml)
- 1 teaspoon = 5 cubic centimeter (cc) = 5 milliliters (ml)
- 1 tablespoon = 15 cubic centimeter (cc) = 15 milliliters (ml)
- 1 tablespoon = 3 teaspoon
- 1 ounce = 30 cc = 30 ml = 2 tablespoons = 6 teaspoons
- 8 ounces = 240 cc = 240 ml = 1 cup
- 1 milliliter (ml) = 15 minims (M) = 15 drops (gtt)
- 5 milliliters (ml) = 1 fluidram = 1 teaspoon
- 15 milliliters (ml) = 4 fluidrams = 1 tablespoon
- 30 milliliters (ml) = 1 ounce (oz) = 2 tablespoons
- 500 milliliters (ml) = 1 pint (pt)
- 1000 milliliters (ml) = 1 quart (qt)

Weight

- 1 kilogram = 2.2 pound (lb)
- 1 gram (g) = 1000 milligrams = 15 grains (gr)

Length

- 2.5 centimeters = 1 inch

Centigrade/Fahrenheit Conversions

- C = (F - 32) X 5/9
- F = (C X 9/5) + 32

Ratios and Percent Solutions		
1:100	= 1g/100ml [10mg/ml]	= **1%**
1:200	= 500mg/100ml [5mg/ml]	= **0.5%**
1:1,000	= 100mg/100ml [1mg/ml]	= **0.1%**
1:5,000	= 20mg/100ml [200mcg/ml]	= **0.02%**
1:10,000	= 10mg/100ml [100mcg/ml]	= **0.01%**

Solid Metric Conversions			
1 pound (avoirdupois)	= 453.592 g	1/2 grain	= 30 mg
1 pound (apothecary)	= 373.242 g	1/4 grain	= 15 mg
1 ounce (avoirdupois)	= 28.35 g	1/8 grain	= 8 mg
1 ounce (apothecary)	= 31.10 g	1/12 grain	= 5 mg
15 grains	= 1 g	1/100 grain	= 600 mcg
10 grains	= 600 mg	1/150 grain	= 400 mcg
7 1/2 grains	= 500 mg	1/200 grain	= 300 mcg
5 grains	= 300 mg	1/250 grain	= 250 mcg
1 1/2 grains	= 100 mg	1/300 grain	= 200 mcg
1 grain	= 64.79891 mg	1 kilogram	= 2.2 pounds
1 pound	= 0.45 kilograms (kg)	1 stone	= 6.35 kg
1000 mcg	= 300 to 7000 iu (below)	1000 mcg	= 1 mg
1 scruple	= 1.2 g	1 drachm	= 28.8 g

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6.7 CHEST PAIN DIFFERENTIAL

	MYOCARDIAL INFARCTION	ANGINA PECTORIS	DISSECTING ANEURYSM	PERICARDITIS	PEPTIC ULCER
ONSET	Usually sudden	Exertional / Emotional	Acute	Subacute	Acute / Subacute
QUALITY	Crushing, Heaviness, Dull, Pressure, Band-like, Constricting, Squeezing, Burning, Bursting	Discomfort, Choking, Pressing, Squeezing, Strangling, Constricting, Bursting, Burning	Deep tearing, Shearing, "Knife-like"	Sharp	Burning
LOCATION	Substernal, may vary	Substernal	Substernal	Substernal, more left sided	Epigastric, Substernal
RADIATION	Across, mid-thorax, anterior, arms, shoulder, neck, jaw, teeth, fingers	Same as MI	Back lumbar region	Usually none, occasionally tip of shoulder, neck, flank	Occasionally back
DURATION	Usually > 30 minutes	5-15 minutes	Hours	Hours	Hours
PROVOCATION	Usually none, see comments	Exercise, Excitement, Stress, Cold, Meals	None	Worsened: lying, down, breathing, swallowing, coughing, twisting	Alcohol, lack of food, acid foods
ALLEVIATION	None	Rest, NTG	None	Tripod position, shallow respirations	Antacids, Food
COMMENTS	After heavy meals, severe emotional stress, S/S: SOB, N&V, pallor, diaphoresis, impending doom, elderly - atypical	May be nocturnal	Sudden onset, may subside spontaneously or be associated with paralysis	May be associated with URI, flu, Pronestyl, Hydralazine, lupus; MAY BE FEBRILE	ASA, NSAID's, e.g. Voltaren, Feldene, Naprosyn, Motrin, Advil, may trigger

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	PANCREATITIS	ESOPHAGEAL RUPTURE	PULMONARY EMBOLISM	ESOPHAGEAL SPASM	COSTO-CHONDRITIS
ONSET	Acute / Subacute	Acute	Sudden or Gradual	Subacute	Sudden or Gradual
QUALITY	Severe or Dull	Severe	Sharp or Dull	Dull, Pressure, Colicky	Sharp, Superficial
LOCATION	Epigastric	Retrosternal	Multiple	Substernal, Epigastric	Anterior / lateral costochondral junction
RADIATION	Back	Lateral	None	Jaw, Either arm	None
DURATION	Hours	Hours	Variable	5 – 60 Minutes	Variable
PROVOCA-TION	Alcohol, trauma, gall bladder disease	Swallowing	Respirations, Cough	Spontaneous, Cold liquids, Recumbency	Movement, Palpation, Cough, Respirations
ALLEVIATION	Time	None	None	Antacids, Occasionally NTG	Time, Heat, Analgesia
COMMENTS	May be viral – e.g. Mumps	Alcoholics with forceful vomiting; associated with pleural effusion, shock and hydro-pneumothorax	May have hemoptysis, signs of peripheral phlebitis, cough and fever	Mimics angina, may occur after meals, at night with an acid taste, sensation-linear	Signs and symptoms: Fever, Cough, URI

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	CERVICAL DISK	ANXIETY	PNEUMONIA	PNEUMO-THORAX	PLEURISY	GALL BLADDER
QUALITY	Superficial	Occasionally sharp, may be heavy or pressure-like	Sharp or Dull Ache	Sharp	Sharp	Spasms, Colicky, may wax and wane
ONSET	Subacute / Acute	Subacute	Slow	Sudden	Subacute	Acute / Subacute
LOCATION	Arm / Neck	Varies in chest, Substernal	Frequently lateral or substernal	Lateral	Lateral	Right upper quadrant
RADIATION	Along course of nerve being irritated	Usually none	None	None	None	Epigastric, Substernal, Right thoracic, Interscapular
DURATION	Variable	2 - 3 Minutes	Variable	Variable	Variable	Hours
PROVOCA-TION	Motion of head, neck palpation, bending	Emotions, Tachypnea	Respirations, Cough	Respirations, Cough	Respirations, Cough	Spontaneous or with food
ALLEVATION	Time, Analgesics	Stimulus removal, Relaxation	None	None (shallow breathing)	Shallow breathing	Time Analgesics
COMMENTS	Not relieved by rest	Paraesthesia-Facial, Circumoral, Finger or Toe, Spasms	Signs and Symptoms: Fever, Cough, URI	More common in tall, thin people	Usually associated with flu-like symptoms	1 - 2 hours after meals, Usually nausea and vomiting

Reference: **The University of Miami** School of Medicine.

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6.8 GLASGOW COMA SCALE

Determine the level of response with the following Glasgow Coma Scale:

Best Verbal Response:
- **5 = alert, lucid, oriented**
- **4 = confused, but talks in sentences**
- **3 = uses words, not sentences, incoherent**
- **2 = moans, no words**
- **1 = silent**

Best eye opening response:
- **4 = spontaneously opens**
- **3 = opens eyes to verbal stimulus**
- **2 = opens eyes to noxious stimuli or pain**
- **1 = closed, won't open eyes**

Best motor response:
- **6 = spontaneous movement, or to command**
- **5 = localizes noxious stimuli**
- **4 = withdraws from noxious stimulus**
- **3 = decorticate (abnormal flexor response)**
- **2 = decerebrate (abnormal extensor response)**
- **1 = no motor response to noxious stimuli**

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6.9 PEDIATRIC GLASGOW COMA SCALE

	> 1 year	< 1 year
Eye Opening	4 Spontaneously 3 To verbal command 2 To pain 1 No response	Spontaneously To verbal command To pain No response

	> 1 year	< 1 year
Best Motor Response	6 Obeys 5 Localizes pain 4 Flexion - withdrawal 3 Flexion - abnormal (decorticate rigidity) 2 Extension (decerebrate rigidity) 1 No response	Localizes pain Flexion - normal Flexion – abnormal (decorticate rigidity) Extension (decerebrate rigidity) No response

	> 5 years	<2-5 years	0-23 months
Best Verbal Response	5 Oriented and converses 4 Disoriented and converses 3 Inappropriate words 2 In-comprehensible 1 No response	Appropriate words and phrases Inappropriate words Cried and/or screams Grunts No response	Smiles, coos, cries appropriately Cries Inappropriate crying and/or screaming Grunts No response

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6.13 Oxygen Cylinder Duration Calculation

- **Oxygen Cylinder Capabilities**
- **1 cubic foot of gas = 28.3 liters of oxygen**
- **Various cylinder sizes and capabilities**
  - **D cylinder = 12.7 cu.ft. = 359.4 liters**
  - **E cylinder = 22 cu.ft = 622.6 liters**
  - **F cylinder = 55 cu.ft. = 1,556.5 liters**
  - **G cylinder = 187 cu.ft. = 5,292 liters**
  - **H/K cylinder = 244 cu.ft. = 6905.2 liters**

- **Calculation of Duration of Oxygen Availability**

$$\frac{\text{cu.ft. x 28.3 x (PSI} \div 2200)}{\text{liter flow}}$$

= number of minutes of oxygen left in tank

- **Where**
  - **cu.ft. = capacity of tank in cubic feet**
  - **28.3 = liters of oxygen per cu.ft. of gas**
  - **PSI = Psi reading on gauge of cylinder**
  - **2200 = a constant (maximum psi when full)**

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6.14 OXYGEN TOLERANCE IN COPD

It is common to find protocols that caution against the use of high concentrations of supplemental oxygen for patients with COPD (emphysema). Such protocols may restrict supplemental oxygen for a spontaneously breathing COPD patient at 2 liters/ minute by nasal cannula. The intent is to avoid inhibition of their spontaneous respiratory efforts. However, it is desirable to minimize how long a patient, including those with COPD, or serious hypoxia must endure. Shock from hypoxia is life threatening. All patients should receive supplemental oxygen as quickly and as high a concentration as their systems will tolerate when serious hypoxia is present. The clinical problem in the field is determining how much supplementary oxygen a COPD patient can safely tolerate.

The COPD patient regulates their spontaneous ventilation by internal measurement of the oxygen content in their blood. This is different from normal patients who use CO_2 content to guide ventilation. When a COPD patient is hypoxic, ventilation is over-stimulated. If the COPD patient has a large surplus of oxygen, as may occur with inappropriate use of high concentrations of supplemental oxygen, spontaneous ventilation decreases or becomes apneic. An understanding of this simple physiologic control mechanism can be used to safely titrate oxygen administration with COPD patients.

When COPD patients have acute respiratory distress, oxygen may be given in high concentrations until the rapid respiratory rate begins to slow down towards normal. This shows that hypoxia is becoming less severe and respiratory drive is starting to return to normal. The supplemental oxygen dosage may then be reduced in a titrated manner as the respiratory rate returns to normal. This approach allows oxygenation to be restored as quickly as possible and reduces the potential harm of extended hypoxia.

If spontaneous ventilation becomes severely compromised, perform bag-mask ventilations without supplemental oxygen until adequate spontaneous ventilations resume. If the spontaneous ventilation becomes further compromised from an acute respiratory emergency, and not from excessive oxygen, assist ventilations with supplemental oxygen. These two situations may be distinguished from one another by signs of severe hypoxia such as cyanosis, pallor, or diaphoresis. These would indicate acute respiratory distress. If there is uncertainty about whether or not to give oxygen, always give the oxygen and be ready to assist ventilations as needed. This will be less dangerous than withholding oxygen from a patient that may be in desperate need of it.

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6.15 REPORT OF ABUSE

FLORIDA ABUSE HOTLINE (800) 962-2873

State Substantive Laws (Crimes)
CHAPTER 415 - PROTECTION FROM ABUSE, NEGLECT AND EXPLOITATION

415.102 Definitions of terms used in FS 415.101-415.113.

(1) "Abuse" means the non-accidental infliction of physical or psychological injury or sexual abuse upon a disabled adult or an elderly person by a relative, caregiver, or household member, or an action by any of those persons which could reasonably be expected to result in physical or psychological injury, or sexual abuse of a disabled adult or an elderly person by any person. "Abuse" also means the active encouragement of any person by a relative, caregiver, or household member to commit an act that inflicts or could reasonably be expected to result in physical or psychological injury to a disabled adult or an elderly person.

(10) "Disabled adult" means a person 18 years of age or older who suffers from a condition of physical or mental incapacitation due to a developmental disability, organic brain damage, or mental illness, or who has one or more physical or mental limitations that substantially restrict ability to perform the normal activities of daily living.

(11) "Elderly person" means a person 60 years of age or older who is suffering from the infirmities of aging as manifested by advanced age or organic brain damage, or other physical, mental, or emotional dysfunctioning to the extent that the ability of the person to provide adequately for the persons' own care or protection is impaired.

415.111 Criminal penalties.

(1) A person who knowingly and willfully fails to report a case of known or suspected abuse, neglect, or exploitation of a disabled adult or an elderly person or who knowingly and willfully prevents another person from doing so commits a misdemeanor of the second degree...

415.503 Definitions of terms used in FS 415.502-415.514.

(1) "Abused or neglected child" means a child whose physical or mental health or welfare is harmed, or threatened with harm, by the acts of omissions of the parent or other person responsible for the child's welfare or, for the purposes of reporting requirements, by any person.

(2) "Child abuse or neglect" means harm or threatened harm to a child's physical or mental health or welfare by the acts or omissions of a parent, adult household member, or other person responsible for the child's welfare, or, for purposes of reporting requirements, by any person.

415.504 Mandatory reports of child abuse or neglect; mandatory reports of death; central abuse hotline.

(1) Any person, who knows, or has reasonable cause to suspect, that a child is an abused, abandoned, or neglected child shall report such knowledge or suspicion to the department...

415.511 Immunity from liability in cases of child abuse or neglect.

(1) Any person, official, or institution participating in good faith in any act authorized or required by FS 415.502-415.514, or reporting in good faith any instance of child abuse to any law enforcement officer shall be immune from any civil or criminal liability which might otherwise result by reason of such action.

415.513 Penalties relating to abuse reporting.

(1) A person who is required by FS 415.504 to report known or suspected child abuse or neglect; and who knowingly and willfully fails to do so, or who knowingly or willfully prevents another person from doing so, is guilty of a misdemeanor of the second degree...

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6.16 SIGNS OF CHILD ABUSE

Physical Assessment Suggestive of Child Abuse

1. Fractures in children less than 2 years of age.
2. Injuries in various stages of healing.
3. Frequent injuries.
4. Bruises or burns in patterns (e.g. iron or cigarette burns, cord marks, bite or pinch marks, and bruises to head, neck, back or buttocks).
5. Widespread injuries over the body.
6. Obvious physical neglect (malnutrition, lack of cleanliness).
7. Inappropriate dress (e.g. very little clothes in winter).

History Suggestive of Child Abuse

1. The history does not match with the nature or severity of injury.
2. The parents' and/or caregivers' account is vague or changes.
3. The "accident" is beyond the capabilities of the child (e.g. a 12 month old that burns himself by turning on the hot water in the bath tub).
4. There is a delay in seeking help.
5. The parent and/or caregiver may be inappropriately unconcerned about the child's injury.

Characteristics of the Abused Child

1. If less than 5 years old, is likely to be passive.
2. If over 5 years of age, is likely to be aggressive.
3. Does not look to the parent (the abuser) for support, comfort, or reassurance.
4. May cry without any expectation of receiving help.
5. May be quiet and withdrawn.
6. May be fearful of the parent (the abuser).

Characteristics of the Abuser

1. Crosses all religious, ethnic, occupational, educational, and socioeconomic boundaries.
2. May resent or reject the child.
3. May have feelings of worthlessness about self or about the child.
4. May have unrealistic expectations of what the child can do.
5. May be very critical of the child.
6. Oftentimes the abuser is repeating what was learned as a child (the abuser was more than likely abused as a child).
7. May be overly defensive rather than concerned.

Return to: Contents at top Appendix Newborn Sids Peds NonTrauma Abdm
Peds Non-Trauma Chest Pn Peds Suspected Child Abuse Peds Abdom/Pelvic Injuries

6.17 SUDDEN INFANT DEATH SYNDROME (SIDS)

Sudden Infant Death Syndrome, or "crib death," is the sudden and unexpected death of an apparently healthy infant, usually under one year of age, which remains unexplained after a complete medical history, death scene investigation and postmortem examination.

The majority of SIDS deaths (90%) occur in infants less than six months of age. SIDS is more common in males (60%) then females (40%). SIDS almost always occurs when the infant is asleep or thought to be asleep. SIDS is more prevalent in winter months and in infants with low birth weights. SIDS occurs in all socioeconomic, racial and ethnic groups. Occasionally, a mild upper respiratory infection may be present prior to death.

Physical examination of a SIDS infant may reveal lividity or settling of blood, which produces mottled, blue or gray skin. The lividity may give the appearance of "bruising." There may also be a froth, blood tinged mucus draining from the infant's mouth and nostrils. In addition, cooling and rigor mortis may be present. The SIDS infant usually appears well-developed and does not exhibit any signs of external injury.

SIDS should not be confused with child abuse (see Appendix - Signs of Child Abuse). Initially it is difficult to distinguish a SIDS death from other causes of death in infants. SIDS is the leading cause of death between one week and one year of age in the United States.

For specific treatment for SIDS see Pediatric SIDS Protocol 3.4.2.

6.18 RECOMMENDED GUIDELINES FOR OCCUPATIONAL EXPOSURES TO INFECTIOUS DISEASE

I. PREVENTION

A. **Purpose**. Emergency Medical and Public Safety employees ("Workers") are at risk for exposure to and possible transmission of vaccine preventable diseases. Maintenance of immunity is therefore an essential part of prevention and infection control programs.

1. **At-Risk Workers**. Workers who are exposed to blood, body fluids, feces and/or respiratory secretions should have on record before employment or should be offered during employment all immunizations currently recommended by the US Public Health Service.
2. **Low-Risk Workers**. Timely post-exposure prophylaxis rather than pre-exposure vaccination may be considered for other workers whose exposure to infectious agents is infrequent**.**
3. **Special Risk Groups.** Periodic evaluations may be done as indicated for job reassignment, for ongoing programs (e.g., TB screening), or for evaluation of work related problems**.**
4. **History of Immunity. A medical evaluation that includes childhood immunity or** immunization history for Measles, Mumps, Rubella and Varicella Zoster (Chicken Pox) should be obtained from and recorded for all new workers at the time of hire or as part of a catch-up program. (CDC MMWR 1997; 46 (No. RR-18)). (NFPA 1581, 2-5.2.2)).

II. BASELINE AND ANNUAL SCREENING

A. **Baseline Screening**: Baseline screening for TB, hepatitis A, B, and C is indicated for presumptive law requirements. (FS 112.181 6(a)(b))

B. **TB Screening**. Tuberculin skin test shall be performed for all workers who do not have a history of a positive skin test result. A two-step Mantoux skin testing shall be used for the initial screening of workers who have not been tested. The two-step procedure should only be performed once. (CDC MMWR 1994; 43 (RR13)). After that, only a PPD skin test should be administered annually. Workers with a new positive PPD should have a baseline chest x-ray performed with one follow up chest X-ray a year later.

C. **Hepatitis Screening**. If baseline screening for hepatitis A and B shows that immunity is absent, the employer should offer vaccination to the worker. Hepatitis C screening is performed for baseline and post-exposure only.

D. **Test Result Maintenance**. Baseline and annual screening test results shall be maintained according to applicable laws governing medical confidentiality; and released strictly by and between the medical provider conducting the tests and the worker. The employer may maintain a sealed copy of baseline, titer and/or annual test results in the worker's infection control file and may not cause to open said result(s) without the specific written consent from the worker. (29 CFR 1910.1030 (h)).

III. IMMUNIZATION

A. **Education**: Workers shall have Blood borne/Airborne Pathogen Training prior to immunization. (29 CFR 1910.1030(f) (2)). Medical providers and/or Designated Infection Control Officers should offer upon request vaccine product and safety information to

workers considering or undergoing vaccination. Educational materials need to be appropriate in content and vocabulary to the educational level and literacy of the worker.

B. **Declination**. Workers who waive vaccination shall sign a Declination Form. If the worker initially declines vaccination(s) but at a later date decides to accept the vaccination(s), the employer shall make the vaccination(s) available. (29 CFR 1910.1030(f)).

C. **Hepatitis Vaccination**. Hepatitis B vaccination shall be offered to at risk workers within 10 days of initial assignment, unless the worker has documentation of previously completed vaccination series, documentation of immunity or physician's documentation of medical contraindication for the vaccine. (29 CFR 1910.1030(f) (2)). Hepatitis A vaccination may be offered if specific local conditions dictate. (NFPA 1581, 2-5.2.2).

1. **Post-Vaccination Screening for Hepatitis A**. Post-vaccination screening for immunity to Hepatitis A is not indicated if the vaccine series is completed, because of the high rate of adult vaccine response.
2. **Post-vaccination Screening for Hepatitis B**. Post-vaccination screening for immunity to Hepatitis B is indicated. If vaccinated workers fail to develop a protective hepatitis B antibody level, the entire HBV vaccination series should be repeated only once.
3. **Periodic Serologic Screening and Booster Doses.** Any periodic post-vaccination screening is not recommended. Booster doses are not currently recommended. If the U.S. Public Health Service recommends a routine booster dose(s) of hepatitis vaccine at a future date, such booster dose(s) shall be made available. (29 CFR 1910.1030(f) (1) (ii)).

D. **Influenza.** Workers are considered to be at significant risk for acquiring or transmitting influenza (the common flu). Influenza vaccine should be made available to workers from October through February annually. (CDC MMWR 1997; 46(No. RR-18)).

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6.19 INFECTIOUS EXPOSURE REFERENCE SHEET

AIRBORNE	TRANSMISSION	PREVENTION	POST-EXPOSURE	FOLLOW UP
Tuberculosis (TB)	Droplets: coughing, sneezing, intubation, suctioning.	Initial 2 step test, then annual PPD. Wear HEPA masks.	Source = PPD, Employee = PPD, unless PPD tested within prior 12 weeks or previously PPD reactive.	PPD at week 12 post-exposure. If new positive: chest x-ray and Rx with Isoniazid for 6 months.
Meningitis (bacterial/viral)	Droplets: coughing, sneezing, intubation, suctioning.	HEPA mask.	Antibiotic: Cipro, Rocephin, Rifampin.	Seek medical care if symptoms of meningitis develop: fever, stiff neck, severe headache.
Influenza	Close contact, droplets: coughing, sneezing, intubation, suctioning. Also direct contact with vesicle fluid.	Flu shot.	Treatment: analgesics, Rimantadine, Tamiflu, Relenza.	As determined by medical professional.
Varicella Zoster (Chicken Pox)	Close contact, droplets: coughing, sneezing, intubation, suctioning. Also direct contact with vesicle fluid.	Vaccine = 1 shot (Varivax). HEPA mask	Treatment: Varicella Zoster Immune Globulin (VZIG) within 96 hours of exposure.	As determined by medical professional.
OTHER	TRANSMISSION	PREVENTION	POST-EXPOSURE	FOLLOW UP
Tetanus	Soiled object causing open wound.	Vaccine good for 10 years.	If no vaccine, administer at this time. If over 7 years from last vaccination and sustained open wound, booster dose.	Seek medical care if symptoms of tetanus develop: lockjaw, rigid muscles.
Lyme Disease	Tick-borne: tick attached 24 hours.	Avoid tick infested areas. Vaccine = 3 shot series for prone areas.	Antibiotics: Amoxicillin, Doxycycline	As determined by medical professional
Scabies	Direct contact: mite infested areas, bedding/clothing,	Avoid infected areas.	Lindane and Kwell applied to the whole body for 24 hours.	Close supervision of treatment including bathing.

	nursing homes.			
Rabies	Virus laden saliva of infected animal: animal bites.	Avoid animal bites.	Wash infected areas. Administer rabies anti-serum injection and first dose of rabies vaccine. Contact animal control, monitor animal for presence of infection.	If animal is positive, continue to treat employee with vaccine.
HAB	Fecal/Oral.	Vaccine = 2 shot series.	Source = Acute Hep Panel. Employee = Acute Hep Panel. If source positive, employee not immune: administer immune globulin and consider HAB vaccine series.	Periodic screening: 12 weeks after exposure or if symptoms occur.
BLOOD-BORNE	TRANSMISSION	PREVENTION	POST-EXPOSURE	FOLLOW UP
HIV	Blood to blood, to non-intact skin and mucous membranes.	No Vaccine.	See Post Exposure Management (Administrative Protocol 1.1.11)	Periodic screening: 6, 12, 26 weeks after exposure.
Syphilis	Blood and/or open sores/lesions.	No Vaccine.	Source = RPR, Employee = RPR. Penicillin. Repeat test at 3 and 6 months, if positive refer to FTA	As determined by medical professional.
HBV	Blood to blood, to non-intact skin and mucous membranes.	Vaccine = 3 shot series. Titer and reimmunize if necessary.	Source = Acute Hep Panel. Employee = Acute Hep Panel. If source positive, employee not immune: administer immune globulin and consider HBV vaccine series.	Periodic screening: 6, 12, 26 weeks after exposure.

HCV	Blood to blood, to non-intact skin and mucous membranes.	No Vaccine.	Source = Acute Hep Panel. Employee = Acute Hep Panel.	Periodic screening: 6, 12, 26 weeks after exposure. If source positive, consider employee qualitative HCV RNA & ALT testing 6 weeks after exposure. If employee becomes HCV RNA positive, treat with interferon / Ribavirin x 6 months.

TERMINOLOGY	
HEPA masks	A personal protective device worn on the face to remove particles equal to and greater than 0.3 microns (which essentially includes all bacteria, spores and viruses) with an efficiency of 99.97%.
PPD	A method of assessing whether someone has become infected with M. tuberculosis complex. The test involves measurement of a subject's immune response to an injection of tuberculin purified protein derivative (PPD) manufactured from killed Mycobacterium tuberculosis bacilli. Also referred to as tuberculin skin tests or PPD tests.
Vesicle fluid	The serum from the blister formed during a varicella zoster infection.
VZIG	Varicella Zoster Immune Globulin.
Qualitative HCV-RNA	Blood test to detect the presence of Hepatitis C virus.
ALT	Blood test to measure a liver-specific enzyme which indicates liver cell death or inflammation.

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6.20 TRAUMA ALERT CRITERIA (ADULT)

The following criteria are to be used to call trauma alerts on traumatized patients:

Alabama:

I. Patients who meet the following criteria should be taken to an appropriate trauma center.

a. Physiological criteria:
   i. Systolic BP < 90 mmhg in an adult or < 80 mm hg in a child 5 years old or younger
   ii. Respiratory distress:
      1. Resp. rate < 10 or > 29 in an adult
      2. Resp. rate < 20 or > 40 in child one year and younger
   iii. Altered mental status:
      1. No spontaneous eye opening
      2. Not oriented to time/place
      3. Abnormal extremity response

b. Mechanism of patient injury
   i. Patient with same method of restraint and in the same seating area of a dead victim.
   ii. Ejection of the patient from an enclosed vehicle.
   iii. Motorcycle/bicycle crash with the patient being thrown at least ten feet from the motorcycle/bicycle.
   iv. Auto versus pedestrian with significant impact with the patient thrown or run over by a vehicle.
   v. An unbroken falls of 20 ft or more.

c. Anatomical Criteria
   i. Flail chest
   ii. Two or more obvious proximal long bone fractures (Humerus, femur).
   iii. Penetrating injury of the head, neck, torso or groin associated with an energy transfer.
   iv. Patient has in the same body area a combination of trauma and burns (partial and full thickness) of 15% or greater TBSA,
   v. Amputation proximal to wrist or ankle
   vi. One or more limbs which are paralyzed
   vii. Pelvic fracture as evidenced by a positive pelvic movement exam.

d. EMT Discretion:
   i. If the EMT is convinced the patient could have a severe injury, which is not yet obvious, the patient should be entered into the trauma system.
   ii. The EMTs suspicion of severity of trauma/injury may be raised by the following factors
      1. Age > 55
      2. Age < 5
      3. Extremes of environment (hot/cold)
      4. Patient's previous medical problem
         a. Insulin dependant diabetes
         b. Cardiac condition
         c. Immuno-depressive disorder

d. Bleeding disorder
5. Pregnancy
6. Extrication time > 20 minutes with heavy tools utilized
7. Motorcycle crash

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Florida:

I. For blunt trauma, penetrating trauma or burn trauma cases call trauma alert for:
   a. Any **One** of the following;
      i. Airway
         1. Needs assistance beyond oxygen
      ii. Circulation:
         1. Lacks radial pulse with HR > 120/min
         2. BP < 90 mm Hg
      iii. Best Motor Response
         1. 4 or < on BMR of GCS
         2. Paralysis
         3. Loss of sensation
         4. Suspected Spinal Cord Injury
      iv. Cutaneous
         1. 2nd or 3rd degree burns > 15% TBSA
         2. Amputation proximal to ankle or wrist
         3. Penetrating injury to head, neck or torso
      v. Long Bone Fractures:
         1. Patient reveals signs or symptoms of 2 or more long bone fractures (Humerus, Radius and Ulnar, Femur, Tibia and Fibula)
   b. Any **Two** of the following:
      i. Airway: Respiratory rate >= 30
      ii. Circulation: HR >= 120
      iii. Best Motor Response = 5
      iv. Cutaneous:
         1. Major degloving
         2. Flap avulsion > 5 inches
         3. GSW to extremity
      v. Long bone Fracture: Single fracture resulting from a MVC or fall of >= 10 feet.
      vi. Age greater than or equal to 55 years
      vii. Mechanism:
         1. Ejection from a motor vehicle
         2. Driver impacted the steering wheel with deformity to it.
   c. After evaluation: Assessment of GCS <= 12
   d. Paramedic judgment based on patient's condition.

6.21.1 ADULT TRAUMA TRIAGE CRITERIA & METHODOLOGY

The EMT or paramedic shall assess the condition of those injured persons with anatomical and physiological characteristics of a person sixteen (16) years of age or older for the presence of at least one of the following four (4) criteria to determine whether to transport as a trauma alert. These four criteria are to be applied in the order listed, and once any one criterion is met that identifies the patient as a trauma alert; no further assessment is required to determine the transport destination.

CRITERIA:

Meets color-coded triage system (see below)
GCS ≤ 12 (Patient must be evaluated via GCS if not identified as a trauma alert after application of criterion 1.)
Meets local criteria (specify):
Patient does not meet any of the trauma criteria listed above but, in the judgment of the EMT or paramedic, should be transported as a trauma alert (document)

Component	B= Any two (2) – Transport as a Trauma alert	R= Any one (1) – transport as a Trauma alert
Airway	Respiratory rate of 30 or greater	Active airway assistance[1]
Circulation	Sustained HR of 120 beats per minute or greater	Lack of radial pulse with sustained heart rate (>120) or BP < 90 mm Hg
Best Motor Response	BMR = 5	BMR = 4 or less **or** Presence of paralysis, **or** suspicion of spinal cord injury **or** loss of sensation
Cutaneous	Soft Tissue Loss[2] or GSW to the extremities	2nd or 3rd degree burns to 15% or more TBSA **or** Amputation proximal to the wrist or ankle **or** Any penetrating injury to head, neck, or torso[3]
Long bone Fracture	Single Fx site due to MVA **or** Fall ≥ 10 ft.	Fracture of two or more long bones[4]
Age	≥55 years old	
Mechanism of injury	Ejection from vehicle[5] or deformed steering wheel[6]	

1. Airway assistance beyond administration of oxygen
2. Major degloving injuries, or major flap avulsions (> 5in)
3. Excluding superficial wounds in which the depth of the wound can be determined
4. Long bone (including humerus, (radius, ulna), femur, (tibia or fibula)
5. Excluding motorcycle, moped, all-terrain vehicle, bicycle, or open body of pickup truck
6. Only applies to driver of vehicle

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6.22 TRAUMA ALERT CRITERIA; PEDIATRIC TRAUMA SCORECARD METHODOLOGY

The EMT or Paramedic shall assess the condition of those injured individuals with anatomical and physical characteristics of a person fifteen (15) years of age or younger for the presence of one or more of the following three (3) criteria to determine the transport destination per 64J-2.001, Florida Administrative Code, (F.A.C.)

1. Pediatric Trauma Triage Checklist: The individual is assessed based on each of the six (6) physiologic components listed below (left column). The single, most appropriate criterion for each component is selected (along the row to the right). Refer to the color-coding of each criteria and legend below to determine the transport destination:

Component			
Size	> 20 kg (44+ lbs.) G	> 11 – 20 kg (24 – 44 lbs.) G	Wt ≤ 11 kg or length ≤ 33 inches on a pediatric length and weight emergency tape B
Airway	Normal G	Supplemented O_2 G	Assisted or Intubated [1] R
Consciousness	Awake G	Amnesia or Loss of consciousness B	Altered Mental Status[2] or Coma or Presence of paralysis R
Circulation	Good peripheral pulses: SBP > 90 mm Hg G	Carotid or Femoral pulses palpable, but the radial or pedal pulse not palpable or SBP < 90 mm Hg B	Faint or Non-palpable carotid or femoral pulse or SBP < 50 mm Hg R
Fracture	None seen or suspected G	Single closed long bone[3] fracture[4] B	Open long bone[3] fracture[5] or multiple fracture sites or multiple dislocations[5] R
Cutaneous	No visible injury G	Contusion or Abrasion G	Major soft tissue disruption[6] or Major flap avulsion or 2nd or 3rd degree burns to ≥ 10% TBSA or Amputation[7] or any penetrating injury to head, neck, or torso[8] R

R = Red, any one (1) transport as a trauma alert
B = Blue, any two (2) transport as a trauma alert
G = Green, follow local protocols

2. Meets local criteria (specify):_____

3. Patient does not meet any of the trauma criteria listed above, but the EMT or Paramedic can call a "Trauma Alert" if, in his or her judgment, the trauma patient's condition warrants such action. Must be documented on the run report pursuant to 64J-2.013, (F.A.C.)

1. Airway assistance includes manual jaw thrust, continuous suctioning, or use of other adjuncts to assist ventilatory efforts.
2. Altered mental status includes drowsiness, lethargy, inability to follow commands, unresponsiveness to voice, totally unresponsive.
3. Long bones include the humerus, (radius, ulna), femur, (tibia or fibula).
4. Long bone fractures do not include isolated wrist or ankle fractures
5. Long bone fractures do not include isolated wrist or ankle fractures or dislocations
6. Includes major degloving injury.
7. Amputation proximal to wrist or ankle
8. Excluding superficial wounds where the depth of the wound can be determined

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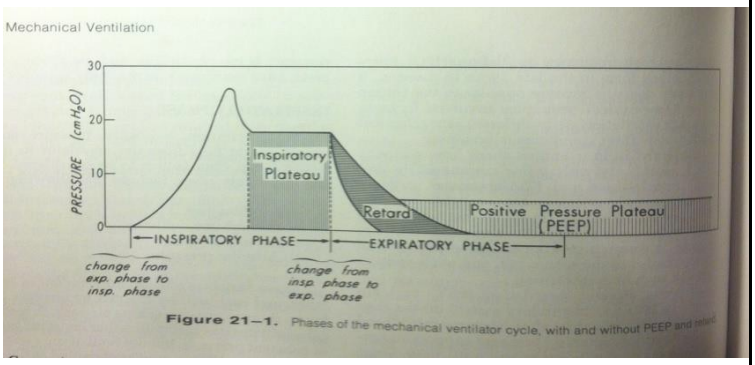
6.23 Ventilator Assist Support Document

ABBR:	Definition:
VCV	Volume Controlled Ventilation
PCV	Pressure Controlled Ventilation
PSV	Pressure Support Ventilation
A/C	Assist / Controlled
SIMV	Synchronized Intermittent Mandatory Ventilation
SIMV+PS	SIMV+ Pressure Support
CPAP	Continuous Positive Airway Pressure
NPPV	Noninvasive Positive Pressure Ventilation
VT	Tidal Volume
PIP	Peak Inspiratory Pressure
F	Frequency = Rate
FiO2	Fraction of Inspired Oxygen
PEEP	Positive End Expiatory Pressure
PS	Pressure Support
I-Time	Inspiratory Time
pPlat	Plateau Pressure
VTE	Exhaled Tidal Volume
VE	Minute Ventilation
MV	Minute Volume
I:E	Inspiratory : Expiatory
EtCO2	End Tidal Carbon Dioxide
IBW	Ideal Body Weight

Minute Ventilation Calculation

Exhaled Tidal Volume X Total Respiratory Rate = VE	
Tidal Volume 6-8 ml/kg of IBW	
Age	Respirations
Preterm	<40
Newborn-1 month	24-35
1 month-6 years	20-30
6 years -12 years	12-25
Over 12 years old	12-18
Normal Minute Ventilation for Adults 4-8 (4000ml-8000ml)	



Ideal Body Weight Chart for Men

(Height in feet and inches, while weight is in pounds.)

Height	Small Frame	Medium Frame	Large Frame
5' 2"	128-134	131-141	138-150
5' 3"	130-136	133-143	140-153
5" 4"	132-138	135-145	142-156
5' 5"	134-140	137-148	144-160
5' 6"	136-142	139-151	146-164
5' 7"	138-145	142-154	149-168
5' 8"	140-148	145-157	152-172
5' 9"	142-151	148-160	155-176
5' 10"	144-154	151-163	158-180

5' 11"	146-157	154-166	161-184
6' 0"	149-160	157-170	164-188
6' 1"	152-164	160-174	168-192

6' 2"	155-168	164-178	172-197
6' 3"	158-172	167-182	176-202
6' 4"	162-176	171-187	181-207

Ideal Body Weight Chart for Women

Height	Small Frame	Medium Frame	Large Frame
4' 10"	102-111	109-121	118-131
4' 11"	103-113	111-123	120-134
5' 0"	104-115	113-126	122-137
5' 1"	106-118	115-129	125-140
5' 2"	108-121	118-132	128-143
5' 3"	111-124	121-135	131-147
5' 4"	114-127	124-138	134-151
5' 5"	117-130	127-141	137-155
5' 6"	120-133	130-144	140-159
5' 7"	123-136	133-147	143-163
5' 8"	126-139	136-150	146-167
5' 9"	129-142	139-153	149-170
5' 10"	132-145	142-156	152-173
5' 11"	135-148	145-159	155-176
6' 0"	138-151	148-162	158-179

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7Blank Forms

Dive History/Profile

Complete as much as possible.

1. Type of Dive: Rescue_____Commercial_____Recreational_____
2. Type of gas used: Compressed air_____Nitrox_____Heliox_____Other_____
3. Water type: Contaminated_____Fresh_____Salt_____
4. Water temperature:_____
5. Number of Dives in the past several days: _____
   List each Dive with:

Maximum Depth	Bottom Time	Surface Interval
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

6. Time of last ascent: _____
7. Did Diver: Panic_____ Emergency ascend_____ Run out of air_____
   Hold breath upon ascent_____ Miss a decompression stop(s)_____
8. Problems during dive: (e.g. buoyancy, clearing ears, equipment)

   _____
   _____
   _____
9. Possible contact with dangerous marine life:_____
10. Fly after diving:_____How long after:_____
11. Alcohol ingestion:_____When:_____
    Quantity:_____
12. Dive workload: (e.g. Currents, hard work, over weighted)

    _____
    _____
    _____
13. Any post dive physical activity:_____
14. Dive Buddy:_____Is he present_____Name and Phone number:

    _____
    _____
15. Other witnesses (Names and Phone numbers):

    _____
    _____
    _____
16. Statements and other information:

    _____
    _____

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Dive Accident – Signs and Symptoms

Enter "Y" (yes) or "N" (no), Explain where needed.

1a) Joint pain_____1b) Location_____
2a) Head pain_____2b) Location_____
3a) Chest Pain_____3b) Location_____
3c) Increase with inspiration or cough_____3d) Radiates_____
3e) Location_____
4a) Abdominal pain_____4b) Location_____
5a) Unconsciousness_____5b) When_____
6a) Difficulty Breathing_____6b) Rapid respirations_____
1) Convulsions_____
2) Confused/Disoriented_____
3) Extremity Edema_____
10a) Rash_____10b) Blotching_____10c) Itching_____
11) Shock_____
12) Weakness/Fatigue_____
13a) Numbness_____13b) Tingling_____13c) Decreased sensation_____
13d) Location_____
14a) Faintness_____14b) Dizziness_____15a) Difficulty urinating_____
15b) Difficulty moving bowels_____
16a) Difficulty Hearing_____ 16b) Which ear_____17a) Difficulty speaking_____17b) Facial Droop_____17c) Which side_____
18a) Staggering_____18b) Paralysis_18c) Location_____
19) Visual disturbance_____20a) Apnea ___20b) Bloody froth from mouth_____20c) Cough_____
21a) Cyanosis_____21b) Location_____
22a) Feeling of Blow to Chest during dive_____22b) When_____

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Dive Accident – Rapid Field Neuro Exam Record

Answer yes or no

Mental Status: Does he/she know

1a) His/her name? _____ 1b) Where he/she is?_____1d)
1c) Time of day? _____ Most recent activity?_____
1e) Speech is clear, correct? _____
Sight:
2a) Correctly counts fingers?_____
2b) Vision clear?_____
Eye Movement:
3a) Move all four directions?__
3b) Nystagmus absent?_____
Facial Movement:
4a) Teeth clench OK?_____4b) Able to wrinkle forehead?_____4c)
Tongue moves all directions?_____4d) Smile symmetrical?_____
Head/Shoulder Movements:
5a) Adam's Apple Moves?_
5b) Shoulder shrug normal, equal?___
5c) Head movements normal, equal?_____
Hearing:
6a) Normal for that diver?_____
6b) Equal both ears?_____
Sensation: Present, normal and symmetrical across:
7a) Face_____7b) Chest_____7c) Abdomen_____
7d) Arms (front)_____7e) Hands_____7f) Legs (front)_____
7g) Feet_____7h) Back_____7i) Arms (back)_____
7j) Buttocks_____7k) Legs (back)_____

Muscle Tone: Present, normal and symmetrical for:
8a) Arms_____8b) Legs_____8c) Hand grips_____8d) Feet_____
Balance and Coordination:
9a) Romberg OK?_____9b) If supine: Heel-shin slide OK?_____
9c) Alternating hand movements OK?_____

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FIBRINOLYTIC INCLUSION/EXCLUSION CHECKLIST:

Patient Name:_____Date:_____

Inclusion Criteria	**YES**	**NO**
1. Patient ≥ 18 years old		
2. Ischemic discomfort ≥ 30 min. but not > 12 hours		
3. ST segment > 1mm in ≥ 2 contiguous leads or ST elevation ≥ 2mm in ≥ 2 contiguous precardial leads or presumed new LBBB		

Exclusion Criteria	**YES**	**NO**
Any "YES ANSWER" to the below listed questions will "EXCLUDE" the patient from being a candidate for thrombolytic therapy. Paramedic must check each box as the question is answered.		
1.Any active internal bleeding within the last 4 weeks (e.g. black tarry stools, hematemesis).		
2. History of CVA or TIA.		
3. ANY surgery within the past 4 weeks		
4. Brain tumor, AVM (arterial-venous malformation), Cerebral aneurysm		
5. Hemophilia or any known bleeding disorder		
6.Presenting hypertension, any blood pressure PRIOR to the delivery of thrombolytics that exceeds 180 systolic or 110 diastolic.		
7. Use of cocaine or amphetamines in the past 3 days		
8. Patient in cardiogenic shock (BP < 90), or intubated		
9. Recent trauma, including CPR > 2 minutes		
10. Back Pain indicative of a Dissecting Aneurysm, presenting as a tearing or ripping pain, in the upper back, accompanied by unequal blood pressures or distal pulses.		
11. Being treated for pericarditis, endocarditis		
12. Pregnancy		
13. Patient taking oral anticoagulation meds within the past 3 days		
Paramedic Signature:		

Return to: Contents at top Blank Forms Chest Pain suspicious for MI CVA

8 Hazardous Material Exposure (CHEMICAL AGENTS)

HAZARDOUS MATERIAL EXPOSURE

Overview: These protocols have been developed to address the specialized treatment of patients exposed to hazardous materials. Some of the agents covered in these protocols may be used as a weapon of mass destruction in a terrorist attack. In these instances, scene safety and a need to stage at a safe distance from the scene should be a primary concern for all personnel. The protocols cover exposure to Chemical (8.1), Biological (8.2) and Radiological (8.3) agents. A color-code is assigned to each protocol in the Chemical section (8.1) which coincides with chemical treatment guide.

Toxidromes

Toxidromes are clinical syndromes that the patient presents with. These patterns of signs and symptoms are essential for the successful recognition of chemical exposure. The toxidromes identified in this protocol are chemical exposure based while others such as the opioids are found within general medical protocol. These chemical toxidromes are identified clinically into five syndromes:

Irritant Gas Toxidrome

Asphyxiant Toxidrome

Corrosive Toxidrome

Hydrocarbon and Halogenated Hydrocarbons Toxidrome

Cholinergic Toxidrome

Each can present as a clinical manifestation of the chemical/poisoning involved with some cross-over between toxidromes. This list combines the toxic syndromes found within NFPA 473 (A.5.4.1 (2) and traditional syndromes.

Toxidrome Correlation to NFPA Standard 473 and Traditional Syndromes

Toxidrome	NFPA 473 A.5.4.1(2) Correlation	Hazardous Materials Protocol
Irritant Gas	(j) Irritants	Bronchospasm OC Pepper spray & lacrimants
Asphyxiant	(c)) Chemical asphyxiants (d) Simple asphyxiants (h) Blood Agents (n) Nitrogen Compounds	Carbon Monoxide Aniline dyes, Nitrites, Nitrates Cyanide & Hydrogen Sulfide Closed Space Fires Simple Asphyxiants
Corrosive	(a) Corrosives (g) Vesicants	Hydrofluoric Acid Chemical burns to the eye Chloramines and Chlorine
Hydrocarbon and Halogenated Hydrocarbons	(e) Organic solvents (q) Phenolic Compounds	Phenol Halogenated Hydrocarbons
Cholinergic	(b) Pesticides (f) Nerve Agents	Organophosphate & Carbamate
Opioids	(o) Opiate Compounds	

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General Symptomology Correlation to Toxidrome

HazMat Toxidrome	General Symptomology	General Examples
Irritant Gas Syndrome (see Corrosive syndrome)	Irritation to mucus membranes Bronchospasm Non-cardigenic PE	Ammonia Formaldehyde Chlorine Phosgene
Asphyxiant Syndrome	Hypoxemia CNS & CVS effects	Carbon Monoxide Methemoglobin forming Cyanides Sulfides Azides
Corrosive Syndrome	Chemical burns Coagulative necrosis Liquefactive necrosis	Acids Acetic Acid Nitric Acid Hydrochloric Acid Bases Potassium hydroxide Sodium hydroxide
Hydrocarbon & Halogenated HC	Hypoxemia CNS & CVS effects	Methane Butane Hexane Turpentine Toluene
Cholinergic Syndrome	Muscarinic Effects DUMBELS Nicotinic Effects Tachycardia, Weakness, Hypertension, Fasciculations	Malathion Parathion Chlorpyrifos Aldicarb Propxur

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8.1 HAZARDOUS MATERIAL EXPOSURE (CHEMICIALS)

Purpose: This protocol is to be used for those patients suspected of exposure to hazardous materials via any route of exposure (e.g. inhalation, absorption, etc.). Scene safety should be of primary concern, with attention to the need for personal protective equipment. Additional assistance may be necessary in certain cases (e.g. hazardous materials team for toxic exposure, police for scene control, fire department, etc.

A history of the events leading to the illness or injury should be obtained from the patient and bystanders, to include:

1. What poison or other substances was the patient exposed to?
2. When and how much?
3. Duration of symptoms?
4. Is there any pertinent medical history?
5. Accidental? Nature of accident?
6. Duration of exposure? (If applicable)

All patients who have been exposed to hazardous materials must be properly decontaminated prior to initiation of extensive medical treatment and transportation to the hospital.

Contact Poison information center (1-800-222-1222) if needed for consultation regarding specific therapy. It is imperative that the emergency department is made aware early that a contaminated patient is being transported in order for proper preparations to be made to receive the patient. The remainder of the chemical exposure section will review many of the chemicals involved in exposure situations. It will also direct you to the appropriate treatment section.

Responder self-protection is a paramount of importance when dealing with hazardous materials. The hazards of the materials involved need to be identified and a well developed risk assessment must be made by qualified hazardous materials technicians.

During the initial stages of the event and prior to the arrival of HazMat Technicians, the EMS responder needs to review and follow the recommendations of the North American Emergency Response Guide Book (NAERG) and their agencies policies and procedures. If the material involved cannot be readily identified, then follow the recommendations of the first guide page in the NAERG, guide page # 111, until more definitive information can be found.

Any attempts to rescue a victim from a hazardous environment needs to be based upon a risk/benefit analysis. The size-up of the scene, likelihood of victim survival, likelihood of success and the protective abilities the responder's personal protective equipment (PPE) all must be assessed prior to implementing any such rescue attempts. The NAERG provides guidance with regarding PPE capabilities and limitations during "quick in and out" life saving rescues and should be consulted.

Responders need to value the difference between "exposure" and "contamination". Not all exposures result in a contaminate patient. Physical state of the product, location of the patient

with regards to the release and direct contact with the product all play in determining possibly of contamination.

In addition to the patient care discussed below, protection of downstream medical facilities from contamination must be considered. Early notification of receiving facilities and field decontamination are essential.

The following are general guidelines for managing victims of hazardous material exposure. Specific treatment is further addressed in this section based on the causative agent identified.

- □ **Request Hazardous Material Team and Toxmedic and/or HazMat Medic assistance early**.

- □ **Self-protection of personnel.** Follow PPE recommendations of the NAERG until further hazard/risk assessment can be performed by qualified technicians.

- □ **MCI incidents follow S.T.A.R.T. Triage**

- □ **Prevent further exposure of the patient.** Rapidly remove viable victims from hazardous environment.

- □ **Provide supportive (BLS) care only when safe to do so.** Maintain Airway and provide supplemental oxygen PRN

- □ **Decontaminate as deemed necessary** Remove contaminated clothing. Victims exposed only to gases an vapors present little risk of secondary contamination/exposure once clothing is removed. If exposed to corrosive gases and vapors (Chlorine, ammonia, HCL, etc.) remove contaminated clothing then flush with water. Flush with water for contamination by liquids and solids. Stable, non-life threatening patients who are contaminated by liquids and solids that are not readily water soluble should be provided secondary decontamination in the field.

- □ **Provide Supportive ALS Care (all paramedics)**
    - Provide supplemental oxygen by appropriate means and rate (supplemental oxygen contraindicated in dipyridyl poisoning such as paraquat and diquat) seek guidance of supervising physician or poison control center.
    - Establish vascular access IV/IO when appropriate.
    - Initiate cardiac monitoring,
    - Treat dysrhythmias PRN in accordance with Medical Protocols 2.3 and 2.4 for “Cardiac arrest” and for “Cardiopulmonary Emergencies”.
    - Monitor oxygen saturation and if available carboxyhemoglobin and methemoglobin levels.
    - Proceed to “Acid, Alkali and Respiratory Irritant Protocol” H-2 (Yellow) as appropriate.

- Proceed to "Cholinesterase Crisis Protocol" H-5 (Green) for suspected nerve agent, organophosphate or carbamate pesticide poisoning (Mark I autoinjectors or DuoDote are authorized for suspected nerve agent exposure in accordance with the technical protocol for Mark I Autoinjectors or DuoDote. If patient is seizing, administer one of the following:
    - **midazolam (Versed)** 0.05 mg/kg bolus (maximum dose 5 mg) titrated to cessation of seizure activity or
    - **diazepam (Valium)** 5 – 10 mg slow IV/IO/IN. Repeat once prn. (Refer to Seizure-Adult Protocol 2.5.3).
    - **10 mg/IM Valium autoinjectors** are authorized for Hazmat Personnel and the mass casualty incidents involving 5 or more patients with seizures.
- Treat hypotension by appropriate means

□ **Consider contacting Poison Information Center at 1 – 800 – 222 – 1222 for further information and guidance**

☐ **Provide ALS Material Specific Care (HazMat Medic)** If applicable, follow protocol at the ToxMedic or HazMatMedic Level based upon the material involved

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8.1.1 ACIDS AND ACID MISTS

Treatment:

Chemical Treatment Guide 1: **YELLOW**:

Description:

Acids are colorless to yellow liquids with strong irritating odors. Some acids may be FLAMMABLE agents. Acids act as direct irritants and corrosive agents to moist membranes and to intact skin to a lesser extent.

Signs and Symptoms:

Low concentrations of airborne acids can produce rapid onset of eye, nose, and throat irritation.

Higher concentrations can produce cough, stridor, wheezing, chemical pneumonia and (non-cardiogenic pulmonary edema). Ingestion of acids can result in severe injury to the upper airway, esophagus, and stomach. In addition, there may be circulatory collapse, as well as partial or full thickness burns.

End-stage symptoms may resemble organophosphate poisoning. However, Patients will have NORMAL OR DILATED PUPILS (patient will not have pin-point pupils). These patients should not be given Atropine or 2-PAM.

Note:

This protocol does not include Hydrofluoric Acid (see Protocol 8.1.13).

Examples:

- Sulfuric Acid (battery acid)
- Muriatic Acid (pool cleaner)
- Hydrochloric Acid (HCL)
- Some drain cleaners

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8.1.2 ALKALINE COMPOUND

Treatment:

Chemical Treatment Guide 1: **YELLOW**

Description:

Most alkaline compounds are solids. Alkalis will impart a soapy texture to aqueous solutions. Alkalis act as direct irritants and corrosive agents to moist membranes and to intact skin to a lesser extent. The extent of tissue penetration and severity of injury is usually greater with alkalis than with acids.

Signs and Symptoms:

Low concentrations of airborne alkalis can produce rapid onset of eye, nose, and throat irritation.

Higher concentrations can produce cough, stridor, wheezing, chemical pneumonia and non-cardiogenic pulmonary edema. Ingestion of alkalis can result in severe injury to the upper airway, esophagus, and stomach. In addition, there may be circulatory collapse, as well as partial or full thickness burns.

End-stage symptoms may resemble organophosphate poisoning. However, patients will have NORMAL OR DILATED PUPILS (patient will not have pinpoint pupils). These patients should not be given Atropine or 2-PAM.

Examples:

- Lye (baseball field line chalk)
- Cement
- Some drain cleaners
- Sodium Hydroxide

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8.1.3 AMMONIA (LIQUID AND GAS)

Treatment:

Chemical Treatment Guide 1: **YELLOW**

Description:

Ammonia is a colorless gas having an extremely pungent odor, which may be in an aqueous solution or gaseous state. Liquefied compressed gas may produce a cryogenic (freezing) hazard as it is released into the atmosphere. Common household ammonia contains 5-10% ammonia. It is a direct irritant and in much higher concentrations, an alkaline corrosive agent to moist mucous membranes and, to a lesser extent, to intact skin. A chloramine gas can be liberated when household ammonia is mixed with a hypocholorite solution (bleach), which may injure the airway.

Signs & Symptoms:

Low concentrations or airborne ammonia can produce cough, stridor, wheezing, and chemical pneumonia (non-cardiogenic pulmonary edema). **Ingestion of concentrated ammonia** (e.g. >5%) may cause corrosive injury to the esophagus, stomach, and eye.

End-stage symptoms may resemble organophosphate poisoning However, patients will have NORMAL OR DILATED PUPILS (patient will not have pinpoint pupils). These patients should not be given Atropine or 2-PAM.

Examples:

- Component of household cleaners
- Refrigerant gas
- Used in manufacture of plastics, explosives, and pesticides
- Corrosion inhibitor
- Used in water purification process
- Component of fertilizers

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8.1.4 AROMATIC HYDROCARBONS (BENZENE, TOLUENE, XYLENE) KETONES

Treatment:

Chemical Treatment Guide 2: (Blue)

Description:

Aromatic hydrocarbons may be found as colorless liquids or in a solid form with an ether-like or pleasant odor. These compounds may be highly FLAMMABLE. Ketones are organic compounds derived from secondary alcohols by oxidation. They generally have low viscosity, low to moderate boiling points, moderate vapor pressures, and high evaporation rates. Most ketones are chemically stable liquids. Routes of exposure include: absorption through the skin and eyes, inhalation, and ingestion.

Signs & Symptoms:

Mild exposure: Cough hoarseness, headache, drowsiness, dizziness, weakness, tremors, transient euphoria, vision and hearing disturbances, nausea /vomiting, salivation, and stomach pain.

Moderate to severe exposure: cardiovascular collapse, tachy-dysrhythmias (especially ventricular fibrillation), chest pain, pulmonary edema, dyspnea, tachypnea, respiratory failure, paralysis, altered mental status, seizures, excessive salivation, and delayed carcinogenic effects.

Halogenated hydrocarbons (chloride, bromide, iodide, fluoride) may present with ventricular tachycardia, ventricular fibrillation, and supraventricular tachycardias.

Aromatic hydrocarbons may present with altered mental status.

End-stage symptoms may resemble organophosphate poisoning. However, patients will have NORMAL OR DILATED PUPILS (patient will not have pinpoint pupils). These patients should not be given Atropine or 2-PAM.

Examples:

Components of gasoline, methyl benzene, methyl benzol, phenyl methane

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8.1.5 ARSENIC COMPOUNDS (OR HEAVY METAL POISONING)

Treatment:

Chemical Treatment Guide 2: [redacted] (Blue)

Description:

Arsenic compounds may be found as white, transparent, or colorless crystals colorless liquids or colorless gas (e.g. Ant poison). They are either odorless or have a garlic-like odor. Some are FLAMMABLE. Exposure can be fatal or cause severe injury at concentrations too low to detect. Lewisite is a blistering agent made from arsenic that causes immediate pain, irritation and blistering of skin and mucous membranes. It is very similar in action to mustard and may be treated as mustard (see Protocol 8.1.18). Arsine gas is made from arsenic and a strong acid, which causes renal failure and destruction of red blood cells. Most exposures commonly occur when arsine gas is used to extract precious metals from ore.

Signs & Symptoms:

Severe gastrointestinal fluid loss, burning abdominal pain, watery or bloody diarrhea, muscle spasm, seizures, cardiovascular collapse, tachycardia hypotension, ventricular dysrhythmias, shock, and coma. There may be respiratory or cardiac arrest and acute renal failure may occur with bronze urine within a few minutes.

Examples:

- Component of wood preservatives, insecticides, and herbicides.
- Arsine gas is used to extract precious metals from ore.

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8.1.6 CARBAMATE INSECTICIDE POISONING

Treatment:

Chemical Treatment Guide 4: (Green)•

Description:

Carbamate may be found in a solid, powder, or liquid form with a white or gray color and a weak odor. It is a reversible acetylcholinesterase inhibitor found in insecticides, herbicides, and some medicinal products. Many carbamates are well absorbed through intact skin and thus pose a serious exposure risk to rescuers. Simple water washing may be sufficient to remove oily compounds. Carbamates affect both the parasympathetic (muscarinic effects) and the sympathetic (nicotinic effects) nervous systems. Although the muscarinic effects may be reversed with Atropine, the nicotinic effects may cause respiratory paralysis and require intubation and aggressive ventilatory support. Carbamate may be in a FLAMMABLE base.

Signs & Symptoms:

Muscarinic effects are the same as seen with organophosphates, which are described as the classic SLUDGE syndrome (excessive Salivation, Lacrimation, Urination, Diarrhea, Gastrointestinal distress, and Emesis). Additional muscarinic effects include: bronchorrhea, bronchospasm, and bradycardia. The patient will have constricted pupils (miosis) with inhalation or skin exposure. Ingestion may or may not cause myosis. However, stimulation of nicotinic receptors will produce tachycardia, muscle paralysis (apnea), muscle twitching/fasciculations, and seizures.

Examples:

Insecticides used for house tenting (Temic, Matacil, Isolan, Furadan, Lannate, Zectran, Mesurol, Dimetilan, Bagon)

PPE (usually Level A) with SCBA must be worn in hazardous area. PPE with minimum of Level C protection must be worn for treatment outside of the hazardous areas.

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8.1.7 CARBON MONOXIDE POISONING

Treatment:

Chemical Treatment Guide 2: [redacted] (Blue)

Description:

Carbon Monoxide poisoning should be suspected when the patient has been exposed to the products of combustion (e.g. smoke, automobile exhaust, exhaust fumes from fuel powered machinery, etc.) and are experiencing symptoms. These symptoms may vary with level of carbon monoxide exposure.

Colorless, odorless, tasteless, non-irritating gas. Converts hemoglobin into carboxyhemoglobin, a non-oxygen carrying compound causing chemical asphyxiation. Pulse oximetry can indicate an incorrect, false high oxygen saturation.

Pulse oximetry should be obtained with a device that has the ability to read carboxyhemoglobin and methemoglobin. Units that do not have this capability may give falsely high PaO2 readings

Signs & Symptoms:

Mild CO exposure: headache, nausea/vomiting, poor concentration, irritability, agitation, and anxiety. May resemble flu-type symptoms (suspect CO exposure during cold snap with use of charcoal heaters, etc. and where there are multiple victims in the same house or building).

Moderate to severe CO exposure: altered mental status, chest pain, cardiac dysrhythmias, pale skin, cyanosis, seizures, and rarely cherry red skin.

Examples:

- Suspect with multiple victims in same building exhibiting above symptoms.
- Use of petroleum fueled heaters, machinery, etc. inside a building (especially with improper ventilation).
- Incomplete burning of natural gas, LP gas, gasoline, kerosene, oil, coal, wood, etc. (any material containing carbon).
- Firefighters working at a fire scene, especially during overhaul operations.

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8.1.8 CHLORINATED HYDROCARBONS

Treatment:

Chemical Treatment Guide 2: [redacted] (Blue)

Description:

Methylene Chloride is a volatile liquid that yields heavy vapors. At room temperature it is a clear, colorless liquid with a pleasant (ether-like) odor. Exposure can occur through skin absorption, eye contact, inhalation, and ingestion. Methylene Chloride is converted inside the body to carbon monoxide.

Signs & Symptoms:

Cardiovascular collapse, ventricular dysrhythmias, respiratory arrest, pulmonary edema, dyspnea and tachypnea, headache, drowsiness, dizziness, altered mental status, seizures, nausea/vomiting, diarrhea, abdominal cramps, and chemical burns.

Examples:

- Component (solvent) in paint, varnish strippers, and degreasing agents.
- Used in production of photographic films, synthetic fibers, pharmaceuticals, adhesives, inks, and printed circuit boards.
- Employed as a blowing agent for polyurethane foams, as a propellant for insecticides, air fresheners, and paints.

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8.1.9 CHLORINE GAS AND PHOSGENE (CG)

Treatment:

Chemical Treatment Guide 1: **YELLOW** (yellow)

Description:

Chlorine can be found in the form of a colorless to amber-colored liquid (aqueous chlorine is usually in the form of hypochlorite [bleach] in variable concentrations) or a greenish-yellow gas (anhydrous) with a characteristic odor. The liquid hypochlorite solutions are very unstable and react with acids to release chlorine gas (e.g. bleach mixed with vinegar or toilet bowl cleaner containing HC1). Liquefied compressed chlorine gas may produce a cryogenic (freezing) hazard as it is released into the atmosphere. Clothing that has been soaked in a hypochlorite solution can be a hazard to rescuers. A chloramines gas may be liberated when a hypochlorite solution (bleach) is mixed with household ammonia, which may cause injury to the airway.

Phosgene (CG) is a chemical warfare agent. Phosgene gas can be liberated when Freon or chlorinated compounds (e.g. Bleach mixed with ammonia) are heated. Phosgene has similar effects on the body as chlorine; however, symptoms from phosgene may be delayed for several hours.

Signs & Symptoms:

Both agents: dyspnea, tachypnea, cough, choking sensation, rhinorrhea, acute or delayed chemical pneumonia (non-cardiogenic pulmonary edema), ventricular dysrhythmias, cardiovascular collapse, severe irritation and burns of the mucous membranes and lungs, headache, dizziness, altered mental status, nausea/vomiting, severe irritation and burns to the eyes and skin.

Examples:

- Chlorine gas is used in water purification process at water plants and sewage treatment plants, as well as pesticides, refrigerants, solvents, etc.
- Hypochlorite solutions used in cleaning solutions and as disinfectant for water (drinking, waste, swimming pools).
- Phosgene used in paint removers, dry cleaning fluid, dyes, and pesticides.

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8.1.10 CYANIDE-HYDROGEN CYANIDE, HYDROCYANIC ACID (AC), CYANOGEN CHLORIDE (CK), POTASSIUM CYANIDE, SODIUM CYANIDE

Treatment:

Chemical Treatment Guide 5: **RED** (Red)

Description:

Cyanide can be found in a liquid (solutions of cyanide salts), solid (cyanide salts), or gaseous (hydrogen cyanide) form. In solid form, it is white with a faint almond odor (20% of the population are genetically unable to detect the odor). Hydrogen cyanide gas may be formed when acid is added to cyanide salt or a nitrite or when plastics burn. If there is a large amount of liquid or solid cyanide material on the victim's clothing or skin, there is a significant risk of exposure to rescuers. Exposure can occur through skin absorption, eye contact, inhalation, and ingestion.

Signs & Symptoms

Cardiovascular - initially, pulse decreases and BP rises, in later stages, dysrhythmias and cardiovascular collapse can occur; there may also be palpitations and/or chest tightness.

Respiratory - can cause immediate respiratory arrest, although initially there is usually an increase in the rate and depth of respirations, and later becoming slow and gasping.

CNS - can cause immediate coma, although initially there is usually weakness, headache, and confusion; seizures are common.

GI - nausea/vomiting, salivation.

Skin - pale, cyanotic or reddish color. Death is caused by an inhibitory action on the cytochrome oxidase system, preventing tissue usage of oxygen.

PPE (usually Level A) with SCBA must be worn in hazardous area. PPE with minimum of Level C protection must be worn for treatment outside of the hazardous areas.

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8.1.11 DINITROBENZENE (D.N.B.)

Treatment:

Chemical Treatment Guide 3: **GRAY** (Gray)

Description:

D.N.B. is found as a colorless, oily liquid with a characteristic and peculiar sweet odor. It can also be found as a solid. D.N.B. causes methemoglobinemia, resulting in a state of relative hypoxia due to the inability of RBCs to carry oxygen. DNB is EXPLOSIVE, detonated by heat or shock.

Signs & Symptoms:

Signs and symptoms of the methemoglobinemia from this exposure include: chocolate-brown-colored blood, headache, ataxia, vertigo, tinnitus, dyspnea, CNS depression, hypotension, heart blocks, ventricular dysrhythmias, seizures (rare), cyanosis, and cardiovascular collapse.

Examples:

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8.1.12 ETHYLENE GLYCOL

Treatment

Chemical Treatment Guide 6: **PINK** (Pink)

Description:

Ethylene Glycol is an odorless, colorless, syrupy liquid found in antifreeze, brake fluid, and other industrial products. Because it is readily available and relatively inexpensive, it is often used in suicide attempts. Ingestion is the primary route of exposure. The potential lethal dose is reported to be 100 ml (1.0 to 1.5 ml/kg) in adults. It is the toxic metabolites, however, not the parent compound, that is responsible for the associated toxic effects. The effects include: metabolic acidosis, tetany, QT interval prolongation on the ECG, and irreversible kidney failure. Ethylene glycol poisoning can be fatal, and quick diagnosis and intervention are imperative to prevent the damaging effects of the metabolites. If the patient has concurrently ingested ethanol, symptoms of ethylene glycol toxicity may be delayed.

Signs & Symptoms:

The clinical manifestations of ethylene glycol poisoning are described in three phases:

Phase I (30 minutes to 12 hours)—ethanol-like inebriation, metabolic acidosis, seizures, and coma.

Phase 2 (12 to 36 hours)—tachycardia, tachypnea, hypertension, pulmonary edema.

Phase 3 (36 to 48 hours)—crystalluria, acute tubular necrosis with oliguria renal failure.

Examples:

Component of antifreeze (including new generation type), brake fluid, inks in stamp pads and ballpoint pens, paints, and plastics.

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8.1.13 HYDROFLUORIC ACID (HF)

Treatment:

Chemical Treatment Guide 7: **ORANGE** (Orange)

Description:

Hydrofluoric acid is a colorless to yellow liquid with a strong, irritating odor. Since the boiling point of HF is 67 F, when exposed to air, HF will readily change to a gaseous state. When HF comes in contact with metals, it forms hydrogen gas, which is extremely FLAMMABLE. Once HF is absorbed into the tissues, it binds to calcium and magnesium. This form of fluoride poisoning can be fatal, even if exposure is due to a dilute solution (<3%). As little as 7 ml of 100% solution can cause death. Injury is twofold in that the compound causes corrosive burning of the skin and deep underlying tissue, also binds with calcium and magnesium from the nerve pathways, bone, and blood stream. Systemic effects may be delayed. The results are spontaneous depolarization producing excruciating pain, and hypocalcemia, resulting in tetany and cardiac dysrhythmias, which may degenerate to cardiac arrest. Skin may look deceptively normal at the surface. Pain is an indication for treatment, and that it's managed through the administration of calcium not analgesic.

Signs & Symptoms:

Hypovolemic shock and collapse, tachycardia with weak pulse, acute pulmonary edema, asphyxia, chemical pneumonitits, upper airway obstruction with stridor, pain and cough, decreased LOC, nausea/vomiting, diarrhea, possible GI bleeding, and possible blindness. HF also causes severe skin burns.

The damage may be severe with no outward signs or minimal redness initially, except that the patient will complain of severe pain.

Examples:

Used in rust removers, metal plating, glass etching, and computer manufacturing.

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8.1.14 HYDROGEN SULFIDE, SULFIDES & MERCAPTANS

Treatment:

Chemical Treatment Guide 5: RED (Red)

Description:

This class of gases is colorless with a strong offensive odor, like rotten eggs or sewer gas. However, at high levels, olfactory senses will be overwhelmed making it –"odorless". They may be found in a liquid form at low temperatures or high pressures. Clothing that has become soaked in sulfide solutions or mercaptans may pose a risk to rescuers. These types of chemicals can cause severe respiratory irritation, including pulmonary edema and respiratory paralysis (especially Hydrogen Sulfide).

Signs & Symptoms:

Cardiovascular collapse, tachycardia, dysrhythmias, irritation of the respiratory Tract, cough, dyspnea, tachypnea, respiratory arrest, pulmonary edema, headache, altered mental status, garlic taste in mouth, seizures, nausea/vomiting diarrhea, profuse salivation, dermatitis, sweating, and possible cyanosis.

Examples:

- Found in sewers, septic tanks, livestock waste pits, manholes, well pits, etc.
- Also found in chemical wastes, petroleum or natural gas (28%).
- Produced in industrial processes that work with sulfur compounds.

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8.1.5 METHANOL

Treatment:

Chemical Treatment Guide 6: **PINK** (Pink)

Description:

Methanol is found as a highly volatile clear liquid and in mixtures. It is used in solvents, additives, and emulsifiers. It is a frequent ingredient in windshield washer fluid. Routes of exposure include: skin absorption, eye contact, inhalation, and ingestion. Methanol has CNS depressant properties that are highly toxic upon aspiration and can cause respiratory failure and cardiac dysrhythmias.

The metabolites, formaldehyde and formic acid, that are formed following the metabolism of methanol can cause a severe delayed toxicity.

Signs & Symptoms:

Cardiovascular - dysrhythmias and hypotension.

Respiratory - respiratory insufficiency or arrest, pulmonary edema, chemical pneumonitis, and bronchitis.

CNS - CNS depression and coma, seizures, headache, muscle weakness, and delirium.

GI - GI bleeding, nausea/vomiting, and diarrhea.

Eye - chemical conjunctivitis, blindness, "snow storm" vision, loss of peripheral vision.

Skin - irritation to full thickness burns.

Examples:

• Sterno

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8.1.16 METHYLENE BIPHENYL ISOCYANATE, ETHYL ISOCYANATE, AND METHYLENE DILSOCYANATE (MDI)

Treatment:

Chemical Treatment Guide 1: **Yellow** (yellow)

Description:

MDI is found as a solid in white to yellow flakes. Various liquid solutions are used for industrial purposes. There is no odor to the solid or liquid solutions. The vapor is approximately eight times heavier than air. This chemical is a strong irritant to the eyes, mucous membranes, skin, and respiratory tract. MDI is also a very potent respiratory sensitizer. Various industrial processes utilize MDI in production and usage of (poly) urethane foams, lacquers, and sealants, as well as, the production of insecticides and laminating materials. These are not cyanide compounds.

Signs & Symptoms:

Irritation to the eyes, mucous membranes, skin, and respiratory tract (cough, dyspnea, wheezing, and pulmonary edema).

Examples:

Component of smoke in plastic fires.

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8.1.17 MUSTARD (SULFUR MUSTARD) LEWISITE, BLISTERING AGENTS (H, HD, HS)

Treatment:

Chemical Treatment Guide 1: **YELLOW** (Yellow)

Description:

Mustard is a "blister agent" that causes cell damage and destruction. It is a colorless to light yellow to dark brown oily liquid with the odor of garlic, onion, or mustard. It does not evaporate readily, but may pose a vapor hazard in warm weather. It is a vapor and liquid hazard to skin and eyes, and a vapor hazard to airways. Its vapor is five times heavier than air. Sulfur mustard has been used as a research tool to study DNA damage and repair. A variety of military munitions are filled with mustard, including projectiles, mortars, and bombs. Mustard damages DNA in cells, which leads to cellular damage and death. Mustard penetrates skin and mucous membranes very quickly, and cellular damage begins within minutes. Lewisite is also a "blister agent" that has the same effect on the body as Mustard with the exception of onset of symptoms being immediate.

Signs & Symptoms:

Mustard: Clinical effects begin within 2 to 24 hours. The initial effects include: eyes: itching or burning, redness, corneal damage, skin: Erythema with itching and burning, blisters, and respiratory tract: epistaxis, hoarseness, sinus pain, dyspnea, and cough.

Lewisite: Same effect on the body as Mustard with the exception of onset of symptoms being immediate.

Examples:

• Chemical warfare agents

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8.1.18 NITROGEN PRODUCTS AND OTHER PRODUCTS CAUSING METHEMOGLOBINEMIA

Treatment:

Chemical Treatment Guide 3: **GRAY** (Gray)

Description:

Commonly found in fertilizers, paints, inks, and dyes. Changes hemoglobin into a non-oxygen carrying compound, methemoglobin. Blood color changes from red to a chocolate brown. Pulse oximetry will indicate an inaccurately low reading due to the opaqueness of the compound. Pulse oximetry should be obtained with a device that has the ability to read carboxyhemaglobin and methemaglobin levels

These products can be found in a gas, liquid, or solid form. They are released from the combustion or decomposition of substances that contain nitrogen. Depending on the individual compound, these agents may pose a significant health hazard for rescuers. Many are well-absorbed through intact skin. Simple water washing may be sufficient to remove oil compounds. Other routes of exposure include: eye contact, inhalation, and ingestion. These products are respiratory tract irritants that can cause a severe, delayed pulmonary edema or immediate upper airway irritation and edema. They also change Fe^2 to Fe^3 (methemoglobinemia), which does not bind to oxygen.

Signs & Symptoms:

Cardiovascular - cardiovascular collapse with weak and rapid pulse.

Respiratory - a mild-transient cough and tachypnea are the only symptoms at the time of exposure to most agents. A delayed onset of dyspnea, tachypnea, violent coughing, cyanosis, and pulmonary edema follows. Some agents work immediately on the upper airway, resulting in pain and choking, spasm of the glottis, temporary reflex arrest of breathing and possible upper airway obstruction spasm or edema of the glottis.

CNS - headache, dizziness, vertigo, fatigue, restlessness, and decreased LOC are usually delayed signs.

GI - burning of the mucous membranes, nausea/vomiting, and abdominal pain.

Eye - chemical conjunctivitis.

Skin - irritation of moist skin areas, pallor and cyanosis with normal Sp02 reading. Note: symptoms may be immediate or may be delayed for 5 to 72 hours.

Examples:

- Most gases are propellant fuels, and agricultural fumigants.
- Also used in laboratory research solvents, bleaching agents, and refrigerants.
- Found in grain silos (silo filler's disease).
- Product of combustion in most fires (structure fires, etc.).

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8.1.19 ORGANOPHOSPHATE INSECTICIDE POISONING AND NERVE AGENTS (GA (TABUN), GB (SARIN), GD (SOMAN), GF, VX)

Treatment:

Chemical Treatment Guide 4: (Green)

Description:

Organophosphate compounds are used as insecticides in residential as well as commercial agriculture. They are found as liquids, dusts, wetable powders, concentrates, and aerosols. **Chemical nerve agents include: Tabun (GA), Sarin (GB), Soman (GD), GF and VX.** Many are well-absorbed through intact skin, and thus pose a serious hazard to rescuers. Simple water washing may be sufficient to remove oily compounds. Routes of exposure include: skin absorption, eye contact, inhalation, and ingestion. Organophosphates affect both the parasympathetic (muscarinic effects) and the sympathetic (nicotinic effects) nervous systems. Although the muscarinic effects may be reversed with Atropine, the nicotinic effects may cause respiratory paralysis and require intubation and aggressive ventilatory support. Organophosphates may be in a FLAMMABLE base.

Signs & Symptoms:

Muscarinic effects are described as the classic **SLUDGE** syndrome (excessive Salivation, Lacrimation, Urination, Diarrhea, Gastrointestinal distress, and Emesis). Additional muscarinic effects include: bronchorrhea, bronchospasm, and bradycardia. The patient will have **constricted pupils** (miosis, which may last up to two months) with inhalation or skin exposure. Ingestion may or may not cause miosis. However, stimulation of nicotinic receptors will produce tachycardia, muscle paralysis (apnea), muscle twitching/fasciculations, and seizures.

Examples:

- Pesticides (Chlorthion, Diazinon, Dipterex, Di-Syton, Malathion, Parathion, Phosdrin, etc.)
- Chemical warfare agents (VX, Sarin, Tabun, Soman, etc.)

PPE (usually Level A) with SCBA must be worn in hazardous area. PPE with minimum of Level C protection must be worn for treatment outside of the hazardous areas.

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8.1.20 PHENOL (CARBOLIC ACID)

Treatment:

Chemical Treatment Guide 9: **WHITE** (white)

Description:

Phenol (carbolic acid), at room temperature, is a translucent, colorless, crystalline mass, white powder, or thick, syrupy liquid. The crystals turn pink to red in air. Phenol has a sweet, tar-like odor that is readily detected at low concentrations. Phenol is soluble in alcohol, glycerol, petrolatum and, to a lesser extent, water. Phenol is absorbed rapidly by all routes; however, the inhalation hazard is limited. In dilute concentrations (1% to 2%), Phenol may cause severe burns. Systemic toxicity can rapidly lead to death. Phenol is mainly used in the manufacture of phenolic resins and plastics. It is also used as a disinfectant and has medicinal applications as well (e.g. Campho Phenique®).

Signs & Symptoms:

Nausea/vomiting, diarrhea, excessive sweating, headache, dizziness, ringing in the ears, seizures, loss of consciousness, coma, respiratory depression, inflammation of the respiratory tract, shock, and death. Exposure to skin can result in severe burns which will cause the skin to have a white, red or brown appearance. Failure to decontaminate the skin may allow the Phenol to absorb into the system and result in death.

Examples:

- Used in the manufacture of phenolic resins and plastics.
- Used as a disinfectant.
- Campho Phenique

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8.1.21 PHOSPHINE

Treatment:

Chemical Treatment Guide 8: PURPLE (Purple)

Description:

Phosphine can be found in a gas, liquid, or solid form. Most gases are colorless to brown with a sharp odor. It is used as a chemical warfare and protection agent, propellant fuels, and agricultural fumigants. Others are used in laboratory research, solvents, and pesticides. They are released from the combustion or decomposition of substances that contain nitrogen. A toxic exposure can result from working on or in grain silos. Very small amounts of phosphine can be trapped in a victim's clothing after an overwhelming exposure, posing a risk to rescuers. Routes of exposure include: skin absorption, eye contact, inhalation, and ingestion. Phosphine is a respiratory tract irritant that can cause a severe, delayed pulmonary edema or immediate upper airway irritation and edema.

Signs & Symptoms;

Cardiovascular - cardiovascular collapse with weak and rapid pulse. It can show a reflex bradycardia.

Respiratory - a mild and transient cough is the only symptom at the time of exposure to most agents. A delayed onset of dyspnea, tachypnea, violent coughing and pulmonary edema follows. Some agents work immediately on the upper airway, resulting in pain and choking, spasm of the glottis, temporary reflex arrest of breathing and possible upper airway obstruction spasm or edema of the glottis.

CNS - fatigue, restlessness, and decreased LOC are usually delayed signs.

GI - burning of the mucous membranes, nausea/vomiting, and abdominal pain.

Eye - chemical conjunctivitis.

Skin - irritation of moist skin areas, pallor and cyanosis. Note: symptoms may be immediate or may be delayed for 5 to 72 hours.

Examples:

Pesticides (especially rodenticides). Also see description.

PPE (usually Level A) with SCBA must be worn in hazardous area. PPE with minimum of Level C protection must be worn for treatment outside of the hazardous areas.

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8.1G. Chemical Treatment Guides

Chemical Treatment Guide Index:

Chemical Name or Group Name:	Treatment Guide:
Acids & Acid Mist	Guide 1- Yellow
Alkaline Compounds	Guide 1- Yellow
Ammonia (Liquid & Gas)	Guide 1- Yellow
Aromatic Hydrocarbons (Benzene, Toluene, Xylene)	Guide 2- Blue
Arsenic Compounds (or Heavy Metal Poisoning)	Guide 2- Blue
Blister Agents (H, HD, HS)	Guide 1- Yellow
Carbamate-Insecticide Poisoning	Guide 4-
Carbon Monoxide Poisoning	Guide 2- Blue
Chlorinated Hydrocarbons (Methylene Chloride)	Guide 2- Blue
Chlorine Gas	Guide 1- Yellow
Cyanide	Guide 5- Red
Cyanogen Chloride (CK)	Guide 5- Red
Methylene Biphenyl Isocyanate	Guide 1- Yellow
Dinitrobenzene (D.N.B.)	Guide 3- Gray
Ethylene Glycol	Guide 6- Pink
Ethyl Isocyanate	Guide 1- Yellow
Hydrocyanic Acid (AC)	Guide 5- Red
Hydrogen Cyanide	Guide 5- Red
Hydrofluoric Acid (HF)	Guide 7- Orange
Hydrogen Sulfide, Sulfides	Guide 5- Red
Ketones	Guide 2- Blue
Lewisite	Guide 1- Yellow
Mercaptans	Guide 5- Red
Methanol	Guide 6- Pink
Methylene Biphenyl Isoyanate	Guide 1- Yellow
Methylene Dilsocyanate (MDI)	Guide 1- Yellow
Mustard (Sulfur Mustard)	Guide 1- Yellow
Nerve Agents (GA, GB, GD, GF, VX)	Guide 4-
Nitrogen Products and Other Products Causing Methemoglobinemia	Guide 3- Gray
Organophosphate Insecticide Poisoning	Guide 4-
Phenol (Carbolic Acid)	Guide 9- White
Phosgene (CG)	Guide 1- Yellow
Phosphine	Guide 8- Purple
Potassium Cyanide	Guide 5- Red
Sodium Cyanide	Guide 5- Red
Sulfur Mustard (Mustard)	Guide 1- Yellow

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Adult/Pediatric Chemical Treatment Guide 1: YELLOW

- ACIDS & ACID MISTS
- ALKALINE COMPOUNDS
- AMMONIA (Liquid & Gas)
- CHLORINE GAS AND PHOSGENE (CG)
- METHYLENE BIPHENYL ISOCYANATE, ETHYL ISOCYANATE, AND METHYLENE DILSOCYANATE (MDI)
- MUSTARD (SULFUR MUSTARD)—LEWISITE, BLISTER AGENTS (H, HD, HS)

Signs and symptoms:

Low concentrations of airborne acids and alkalis can produce:

- Rapid onset of eye, nose, and throat irritation.

Higher concentrations (low concentrations of ammonia) can produce:

- Cough,
- Stridor,
- Wheezing,
- Chemical pneumonia (non-cardiogenic pulmonary edema).

Ingestion of acids and alkalis can result in severe injury to the upper airway, esophagus, and stomach. In addition, there may be circulatory collapse as well as partial or full thickness burns.

End-stage symptoms may resemble organophosphate poisoning. However, patients will have NORMAL OR DILATED PUPILS (patient **will not** have pinpoint pupils). **These patients should not be given Atropine or 2-PAM**.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. If patient was exposed externally, remove clothing and jewelry and decontaminate with copious amounts of water. Provide ocular irrigation with normal saline (do not attempt to neutralize with another solution) (see Medical Procedure 4.21 Morgan Therapeutic Lens).
3. If patient has external burns, see Adult/Pediatric Protocol 2.10.6/3.9.7 (Burn injuries).
4. Medical Supportive Care Protocol 2.1.3 (adults)/3.1.3(peds). (Ipecac, charcoal, and NG tube are contraindicated; avoid oral airways).
5. **Contact Poison Information Center (1-800-222-1222**) for guidance or questions if time permits.
6. If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. Noncardiogenic pulmonary edema should not be treated with Lasix, but with positive end expiratory pressure (PEEP) or CPAP mask (see Medical Procedure).

ALS LEVEL 1:

1. If patient has bronchospasm, administer **Albuterol** (**Ventolin**®) 1 nebulizer treatment:
    a. Adult: 2.5 mg of **Albuterol** pre-mixed with 2.5 ml normal saline (see Medical Procedure 4.24). May repeat twice PRN (b) (c).
    b. Pediatric:
        i. If < 1 year or < 10 kg, mix 1.25 mg in 1.5 ml of Normal Saline {0.083%};
        ii. If > 1 year or > 10 kg mix 2.5 mg in 3 ml of Normal Saline {0.083%}) (see Medical Procedure 4.24). May repeat twice PRN (a).
2. If bronchodilator is administered, may add **Ipratropium Bromide** (**Atrovent**®) 0.5 mg (0.5 ml) to Albuterol nebulizer treatment **on first nebulizer treatment only** (b) (c).
3. If patient has inhaled chlorine or hydrochloric acid (HCI) and has significant respiratory distress, administer **Sodium Bicarbonate** via nebulizer (8.4% 3ml mixed with Normal Saline 3ml or 4.2% 6ml).
4. If patient is seizing, administer one of the following benzodiazepines:
    or
    a. **Midazolam** (**Versed**®)
        i. Adult: 2 mg IV. If unable to start IV, administer **Midazolam** 2 mg intranasal. May repeat once PRN (4 mg maximum dose) (d).
        ii. Pediatric: 0.1 mg/kg (maximum 2 mg) IV (d)
5. If hypotension persists, treat PRN (see Adult Protocol 2.4.4). For pediatric patients, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total)

ALS LEVEL 2:

1. Contact medical control or medical director for any questions or concerns.

NOTE:

(a) If risk of exposure from fumes is high, call HAZMAT team. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

(b) Do not give Albuterol or Ipratropium Bromide if heart rate is >140 (adults), or > 200 (pediatric).

(c)) Caution should be used when the patient is older than 40 years of age or has a history of hypertension or heart disease.
(d) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.
(e) Use Diastat® (commercial preparation of rectal diazepam)/ if available. If Diastat® is not available, use a lubricated tuberculin or 3-5 ml syringe without the needle to administer Ativan. Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject diazepam/ remove syringe and tape buttocks closed.
(f) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device
(g) If Diastat (rectal diazepam preparation) is used, administer 2.5 mg

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- AROMATIC HYDROCARBONS (Benzene, Toluene, Xylene)
- ARSENIC COMPOUNDS (or Heavy Metal Poisoning)
- CARBON MONOXIDE POISONING
- CHLORINATED HYDROCARBONS (Methylene Chloride)
- KETONES

Mild exposure signs and symptoms include:

Cough, hoarseness, headache, poor concentration, irritability, agitation, anxiety, drowsiness, dizziness, weakness, tremors, transient euphoria, vision and hearing disturbances, nausea/vomiting, salivation, diarrhea, stomach pain and chemical burns with chlorinated hydrocarbons (for Arsenic signs and symptoms see below).

Moderate to severe exposure signs and symptoms include:

Cardiovascular collapse, tachydysrhythmias (especially ventricular fibrillation), chest pain, pulmonary edema, dyspnea, tachypnea, respiratory failure, paralysis, altered mental status, seizures, excessive salivation, pale skin, cyanosis, rarely cherry red skin with carbon monoxide, and delayed carcinogenic effects (for Arsenic signs and symptoms see below).

Signs and symptoms of Arsenic exposure include:

Severe gastrointestinal fluid loss, burning abdominal pain, watery or bloody diarrhea, muscle spasm, seizures, cardiovascular collapse, tachycardia, hypotension, ventricular dysrhythmias, shock, and coma. There may be respiratory or cardiac arrest and acute renal failure may occur with bronze urine within a few minutes.

Signs and symptoms of ketone exposure include: **Cardiovascular**—
cardiac dysrhythmias and tachycardia.
Respiratory—upper respiratory tract irritation, dyspnea, tachypnea, a burning sensation in the chest and pulmonary edema.
CNS—CNS depression to coma, confusion, tinnitus, disorientation, headache, drowsiness, weakness, and seizures.
GI—pain and irritation of the mucous membranes, nausea/vomiting, and diarrhea.
Eye—chemical conjunctivitis.
Skin—irritation and dermatitis, cyanosis of extremities.

End-stage symptoms may resemble organophosphate poisoning. However, patients will have NORMAL OR DILATED PUPILS (patient **will not** have pinpoint pupils). **These patients should not be given Atropine or 2-PAM**. Products may be FLAMMABLE.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Medical Supportive Care Protocol 2.1.3 (adult) or Peds Med Supportive Care Protocol 3.1.3 (peds) (Ipecac & NG tube is contraindicated. Avoid oral airways except for carbon monoxide.
3. If patient was exposed externally, remove clothing and decontaminate as appropriate. Provide ocular irrigation with normal saline. If available, use a Morgan lens (see Medical Procedure 4.21 Morgan Therapeutic Lens).
4. Administer high-flow oxygen (100%) (b).
5. **Contact Poison Information Center (1-800-222-1222)** for guidance or questions if time permits.
6. If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. Non-cardiogenic pulmonary edema should not be treated with **Furosemide (Lasix®)**, but with positive end expiratory pressure (PEEP) or CPAP mask (see CPAP Procedure Protocol).

ALS LEVEL I:

1. **If airway compromised, provide advanced airway (Endotracheal intubation, LMA, other extra glottis device). Monitor End Tidal CO2**
2. If patient has dysrhythmias, treat PRN (see Adult Protocol 2.3 or Pediatric Protocol 3.3) (c).
3. If patient is seizing, administer one of the following benzodiazepines:

    a. **Midazolam (Versed®)**
        i. Adult: 2 mg IV. If unable to start IV, administer 2 mg intranasal or 5-10 mg IM. May repeat once PRN (4 mg IV/IN maximum dose) (d).
        ii. Pediatric: 2 mo – 12 yrs;
        IV/IO: start 0.15 mg/kg x1(Max 4 mg),
        IM: 0.2mg/kg. Maximum 10 mg
        IN (intranasal): 0.2 mg/kg. Maximum 10 mg (d).

2. If hypotension persists, treat PRN (see Adult Hypotension Protocol 2.4.1) (c). For Pediatric patients, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total).

ALS LEVEL 2:

1. Call Medical Control or Medical Director for any questions or concerns.

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

(b) Document duration of exposure to CO and when oxygen therapy was started (This information is needed to assist in making HBO decisions).

(c) Administration of Epinephrine to patients in a pre-code status may not be desirable for this group of patients. A physician and or Poison Information

Center should guide the administration of Epinephrine in these cases.

(d) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

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- ANILINE DYES
- DINITROBENZENE (D.N.B.)
- NITROGEN PRODUCTS AND OTHER PRODUCTS CAUSING METHEMOGLOBINEMIA

Signs and symptoms include:

Methemoglobinemia characterized by chocolate-brown-colored blood, CNS depression, headache, dizziness, ataxia, vertigo, tinnitus, dyspnea, tachypnea, violent coughing, choking, possible upper airway obstruction spasm or edema of the glottis, abdominal pain, hypotension, heart blocks, ventricular dysrhythmias, seizures (rare), pallor, cyanosis, and cardiovascular collapse. Note: symptoms may be immediate or may be delayed for 5 to 72 hours.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Medical Supportive Care Protocol 2.1.3 (adult) or 3.1.3 (Pediatric).
3. If patient was exposed externally, remove clothing and decontaminate as appropriate.
4. Administer high-flow oxygen (100%).
5. **Contact Poison Information Center (1-800-222-1222)** for guidance or questions if time permits.
6. If Nitrogen Product ingestion, administer **Activated Charcoal**:
   a. Adult: 50 gm PO
   b. Pediatric: 1mg/kg (maximum 50 gm) PO

ALS LEVEL 1:

1. If the patient is dyspneic, cyanotic, normal SpO_2 and has chocolate-brown-colored blood, administer **Methylene Blue (1%)** 1-2 mg/kg slow IV over 5 minutes, followed by a NS 30 ml flush to decrease pain at site.
2. If patient has dysrhythmias, treat PRN (see Adult Protocol 2.3 or Pediatric Protocol 3.3).
3. If patient is seizing, administer one of the following benzodiazepines:
   a. **Midazolam** (**Versed**®)

i. Adult: 2 mg IV. If unable to start IV, administer **Midazolam (Versed)** 2 mg intranasal. May repeat once PRN (4 mg maximum dose) (b).
ii. Pediatric: 0.1 mg/kg (maximum 2mg) IV (b).

4. If hypotension persists, treat PRN (see Adult Protocol 2.4.1). For Pediatric patients administer 20 ml/kg Normal Saline IV PRN (Maximum 60 ml/kg total).
5. Do not induce vomiting.

ALS LEVEL 2:

1. If cyanosis persists, administer **Methylene Blue** (1%) 1-2 mg/kg slow IV over 5 minutes, followed by a NS 30 ml flush to decrease pain at site.
2. Call Medical Control or Medical Director for any questions or concerns.

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

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Adult/Pediatric Chemical Treatment Guide 4: Green

- CARBAMATE - INSECTICIDE POISONING
- ORGANOPHOSPHATE - INSECTICIDE POISONING AND NERVE AGENTS (GA, GB, GD, GF, VX)

Signs and symptoms:

The **muscarinic effects** are described as the classic **SLUDGE** syndrome (excessive **S**alivation, **L**acrimation, **U**rination, **D**iarrhea, **G**astrointestinal distress, and **E**mesis). Additional muscarinic effects include: bronchorrhea, bronchospasm, and bradycardia. The patient will have constricted pupils (miosis, which may last up to two months—despite appropriate ate treatment) with inhalation or skin exposure. Ingestion may or may not cause myosis. However, stimulation of **nicotinic receptors** will produce tachycardia, muscle paralysis (apnea), muscle twitching/fasciculations, and seizures.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Avoid exposure to patient's sweat, vomit, stool, and vapor emitting from soaked clothes.
3. Medical Supportive Care Protocol 2.1.3 (adult) or 3.1.3 (pediatric), administer high-flow O_2.
4. If patient was exposed externally, remove clothing and decontaminate as appropriate (place clothes in sealed bag).
5. **Contact Poison Information Center (1-800-222-1222)** for guidance or questions if time permits.

ALS LEVEL 1:

If treating 1 to 4 patients:

1. If patient is bradycardic (patient is usually tachycardic) or has excessive pulmonary secretions, administer **Atropine:**
   a. Adult: 0.03 mg/kg IV (2 mg/70 kg). Repeat 5-10 min till atropinization occurs
   b. Pediatric:

   < 2 yr old: 0.05 mg/kg (max. 3 mg) IM or 0.02 mg/kg IV, repeat q 5-10 minutes until atropinization occurs. (If nerve agent, Start 0.05 mg/kg IM x 1 for mild/moderate sx. Start 0.1 mg/kg IM for severe sx).

   2 – 10 yrs: 1 – 2 mg IM/IV q 10 – 30 min prn; Start 1 mg IM/IV x 1. (If nerve agent, Start 1 mg/kg IM x 1 for mild/moderate sx. Start 2 mg/kg IM for severe sx).

   > 10 yrs: 1-2 mg IV/IV q 10 – 30 min prn; Start 2 mg IM/IV x 1. (If nerve agent, Start 2 mg/kg IM x 1 for mild/moderate sx. Start 4 mg/kg IM for severe sx).

Note: Give Atropine first if also using Pralidoxime (2 PAM). (b) (c).

2. If Organophosphate.
    a. Consider **Pralidoxime** (**Protopam®**, **2-PAM®**) 1 -2 gm mixed in 100 ml NS IV drip over 30 minutes. In severe cases, 2-PAM® may be given IV at a maximum rate of 200 mg/minute or 1 gm/5 minutes (used when nicotinic effects are present as evidenced by fasciculation of large muscles). Observe patient for hypertension. (May be needed with high exposure to Carbamates) (c).
3. If patient is seizing, administer one of the following benzodiazepines:

    a. **Midazolam (Versed®)**
        i. Adult**:** 2 mg IV. If unable to start IV, administer **Midazolam** 2 mg intranasal. May repeat once PRN (4 mg maximum dose) (d).
        ii. Pediatric: 0.1 mg/kg (maximum 2mg) IV (d).

If treating 5 or more patients OVER 8 YEARS OF AGE or self-exposure (with PINPOINT PUPILS):

4. Administer either a Duodote Kit or Mark I kit(s) (two autoinjectors containing Atropine 2mg in one and Pralidoxime 600mg in the other) (see Medical Procedure 4.2) as follows:
    a. For early symptoms (severe rhinorrhea or mild to moderate dyspnea}, administer one (1) DuoDote or Mark 1 autoinjector kit. If no improvement in patient's status in 10 minutes, administer another DuoDote or Mark I autoinjector kit (c) (f).
    b. For severe respiratory distress, coma. or seizures, administer three (3) DuoDote or Mark I autoinjectors and one (1) CANA autoinjector (Diazepam l0mg IM) (c) (f).

For all patients meeting above criteria:

5. Alert emergency department to prepare for contaminated patient.
6. Do not induce vomiting or give Furosemide (Lasix®) or Morphine.
7. If patient is experiencing eye pain and/or blephrospasm, administer Scopolamine 1 drop in each eye if available.

ALS EVEL 2:

1. Call Medical Control or Medical Director for any questions or concerns

NOTE

(a)) Risk of exposure from fumes is high, call HAZMAT team. PPE (usually Level A) with SCBA must be worn in hazardous area. PPE with minimum of Level C protection must be worn for treatment outside of the hazardous areas.

(b) If advised by Poison Information Center/ every other dose of Atropine can be increased to 0.06 mg/kg IV.

(c) End point for treatment is manifested by patient improvement with clear lung sounds.

(d) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

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- CYANIDE—HYDROGEN CYANIDE, HYDROCYANIC ACID (AC), CYANOGEN CHLORIDE (CK)
- HYDROGEN SULFIDE, SULFIDES & MERCAPTANS
- AZIDES

Signs and symptoms include:

Cardiovascular - Initially, pulse decreases and BP rises, in later stages, possible tachycardia, dysrhythmias and cardiovascular collapse can occur, there may also be palpitations and/or chest tightness.

Respiratory—can cause immediate respiratory arrest, although initially there is usually an increase in the rate and depth of respirations, and later becoming slow and gasping, possible irritation of the respiratory tract, cough, dyspnea, tachypnea, and pulmonary edema.

CNS—can cause immediate coma, although initially there is usually weakness, headache, and confusion; seizures are common.

GI—nausea/vomiting, salivation may be profuse, possible garlic taste in mouth.

Skin—pale, cyanotic or reddish color, dermatitis, sweating.

Good Medical Supportive Care, including airway management, is paramount and should precede the use of the Cyanide Antidote Kit. However, the rapid administration of the Cyanide Antidote Kit will be the only therapy that will reverse the life-threatening symptoms.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Avoid exposure to vapor emitting from soaked clothes.
3. Medical Supportive Care Protocol 2.1.3 (adult) or 3.1.3 (Pediatric), administer high-flow O_2.
4. If patient was exposed externally, remove clothing quickly and decontaminate
5. **Contact Poison Information Center (1 -800-222-1222)** for guidance or questions if time permits.
6. For oral ingestion, if conscious, administer Activated Charcoal
   a. Adult: 50 gm PO.
   b. Pediatric: 1gm/kg (maximum 50 gm) PO
7. **Only a physician or the Poison Information Center can authorize treatment beyond Supportive Care for exposure to azides**.

ALS LEVEL 1:

1. If unconscious, administer **Sodium Bicarbonate** 1 mEq/kg IV.

2. If patient is exhibiting life-threatening symptoms (severe respiratory compromise or arrest, shock, seizures, coma), administer **one** of the following

Rescue Supervisor and HAZMAT Paramedic:

(1) **Amyl Nitrite** (break pearls into gauze sponge and hold under patient's nose or BVD intake valve) for 15 to 30 seconds of each minute, until sodium nitrite solution is ready (b).

(2) **Sodium Nitrite 3%** (300 mg/10ml)

a. Adult: 10 ml (or 0.35 ml/kg) at 2.5 to 5 ml/minute IV.
b. Pediatric: 0.33 ml/kg slow IV over 5 minutes

All Paramedics:

(3) **Sodium Thiosulfate** 25%

a. Adult: 12.5 gm (50 ml) IV.
b. Pediatric: 1.65 ml/kg IV.

(**Contraindicated for Hydrogen Sulfide exposure**)

3. If patient has dysrhythmias, treat PRN (see Adult Protocol 2.3).

4. If hypotension persists, treat PRN (see Adult Protocol 2.4.1).
5. Alert emergency department to prepare for contaminated patient.
6. Do not induce vomiting.
7. If patient is seizing, administer one of the following benzodiazepines:

or

a. **Midazolam (Versed®)**
   i. Adult: 2mg IV. If unable to start IV, administer **Midazolam** 2 mg intranasal. May repeat once PRN (4 mg maximum dose) (c).
   ii. Pediatric: 0.1 mg/kg (maximum 2mg) IV (c).

ALS LEVEL 2:

1. If symptoms persist after 20 minutes, repeat Cyanide Antidote Kit at 50% of initial dose.
2. If patient becomes cyanotic after the cyanide antidote kit. **Contact Poison Information Center (1-800-222-1222) for further instructions**.

NOTE:

(a) If risk of exposure from fumes is high, call HAZMAT team. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

(b) If patient has IV access and received supportive care, step 1 may be by-passed for step 2.

(c) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

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- ETHYLENE GLYCOL
- METHANOL

The clinical manifestations of ethylene glycol poisoning are described in three phases:

Phase I (30 minutes to 12 hours)—ethanol-like inebriation, metabolic acidosis, seizures, and coma.

Phase 2 (12 to 36 hours)—tachycardia, tachypnea, hypertension, pulmonary edema.

Phase 3 (36 to 48 hours)—crystalluria, acute tubular necrosis with oliguria—renal failure.

Signs and symptoms of methanol exposure include:

Cardiovascular— dysrhythmias and hypotension.

Respiratory—respiratory insufficiency or arrest, pulmonary edema, chemical pneumonitis, and bronchitis.

CNS— CNS depression and coma, seizures, headache, muscle weakness, and delirium.

GI— GI bleeding, nausea/vomiting, and diarrhea.

Eye— chemical conjunctivitis.

Skin— irritation to full thickness burns.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area.
2. Medical Supportive Care Protocol 2.1.3 (adult) or 3.1.3 (pediatric).
3. **I** for guidance or questions if time permits.

ALS LEVEL 1:

1. If patient is seizing, administer one of the following benzodiazepines:

   or

   a. **Midazolam** (**Versed**®)

      i. Adult: 2 mg IV. If unable to start IV, administer **Midazolam** 2 mg intranasal. May repeat once PRN (4 mg maximum dose) (a).

ii. Pediatric: 0.1 mg/kg (maximum 2mg) IV (a).

2. If lungs are clear, administer Normal Saline:
   i. Adult: @ 100 ml/hr IV
   ii. Pediatric: 2 ml/kg/hr IV
3. If respiratory rate is twice normal rate, administer **Sodium Bicarbonate** 8.4% l-2 mEq/kg lV
4. If patient has dysrhythmias, treat PRN (see Adult Protocol 2.3 or Pediatric Protocol 3.3).
5. Administer ~~**Thiamine** 100 mg IV, if available~~.

ALS LEVEL 2:

1. Contact medical control or medical director for any concerns or questions.

NOTE:

(a) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

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- HYDROFLUORIC ACID (HF)
- VICANE

Signs and symptoms of exposure include:

Hypovolemic shock and collapse, tachycardia with weak pulse, acute pulmonary edema, asphyxia, chemical pneumonitits, upper airway obstruction with stridor, pain and cough, decreased LOC, nausea/vomiting, diarrhea, possible GI bleeding, and possible blindness. HF also causes severe skin burns. The damage may be severe with no outward signs, except that the patient will complain of severe pain.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Medical Supportive Care Protocol 2.1.3 (adult) or 3.1.3 (pediatric) (Ipecac is contraindicated).
3. If patient was exposed externally, remove clothing and jewelry and decontaminate with copious amounts of water.
4. **Contact Poison Information Center (1-800-222-1222)** for guidance or questions if time permits.
5. If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. Noncardiogenic pulmonary edema should not be treated with Furosemide (Lasix®), but with positive end expiratory pressure (PEEP) or CPAP mask (see Medical Procedure 4.8).

ALS LEVEL 1:

1. **If patient has burns to eye(s):**
   a. Immediately flush with copious amounts of water or normal saline (may use Morgan Lens).
   b. Prepare an eye wash solution by mixing Calcium Gluconate (10%) 50 ml in NS 500 ml (b).
   c. Apply Calcium Gluconate eye wash using the Morgan Therapeutic Lens (see Medical Procedure 4.22) and continue until arrival at receiving facility (b).
2. **If patient has burns to the skin:**
   a. Immediately flush with copious amounts of water.
   b. Prepare skin gel by mixing **Calcium Gluconate (10%)** 10 ml into a 2 oz tube of KY jelly (making a 2.5% gel)(b).
   c. Apply a 2.5% **Calcium Gluconate Gel** on burned area. For burns to hand(s) place hand in glove filled with this gel (b).
   d. If pain continues: calcium gluconate in a 5% solution is injected subcutaneously in a volume of 0.5 ml / cm to every ¼ inch into

burned area and is also injected subcutaneously ½ inch around the circumference of the burned area.

3. **For inhalation injury**:
   a. Immediately support ventilations.
   b. Administer **Calcium Gluconate (10%)** 1 ml mixed with 3 ml NS via nebulizer (b).
   c. For severe respiratory depression/arrest and/or cardiac toxicity (dysrhythmia—prolonged QT interval, hypotension), administer **Calcium Gluconate (10%);**
      i. Adult: 1-2 g slow IV over 5 minutes (b).
      ii. Pediatric: 100 mg/kg (maximum 1 gm) slow IV over 5 minutes (b).
4. If patient has dysrhythmias, provide additional treatment PRN (see Adult Protocol 2.3 or Pediatric protocol 3.3).
5. If hypotension persists, treat PRN (see Adult Protocol 2.4.1). For pediatric patient, administer 20 ml/kg IV PRN (maximum 60 ml/kg total).

ALS LEVEL 2:

1. If systemic symptoms persist, repeat **Calcium Gluconate (10%)**
   i. Adult: 1-2 g slow IV over 5 minutes (b).
   ii. Pediatric: 100 mg/kg (maximum 1 gm) slow IV over 5 minutes (b)

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

(b) DO NOT USE Calcium Carbonate as the outcome can be disastrous.

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• PHOSPHINE

Signs and symptoms of phosphine exposure include:

Cardiovascular—cardiovascular collapse with weak and rapid pulse. It can show a reflex bradycardia.

Respiratory—a mild and transient cough is the only symptom at the time of exposure to most agents. A delayed onset of dyspnea, tachypnea, violent coughing and pulmonary edema follows. Some agents work immediately on the upper airway, resulting in pain and choking, spasm of the glottis, temporary reflex arrest of breathing and possible upper airway obstruction spasm or edema of the glottis.

CNS—fatigue, restlessness, and decreased LOC are usually delayed signs.

GI— burning of the mucous membranes, nausea/vomiting, and abdominal pain.

Eye—chemical conjunctivitis.

Skin—irritation of moist skin areas, pallor and cyanosis. Note: symptoms may be immediate or may be delayed for 5 to 72 hours.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Avoid exposure to vapor emitting from soaked clothes.
3. Medical Supportive Care Protocol 2.1.2 (adult) or 3.1.3 (pediatric), administer 100% high-flow oxygen (Ipecac is contraindicated).
4. If patient was exposed externally, remove clothing and decontaminate as appropriate (do not use water as an initial irrigating solution for Phosphine exposure due to possible reactivity). Provide ocular irrigation with normal saline (see Medical Procedure 4.21 Morgan Therapeutic Lens).
5. **Contact Poison Information Center (1-800-222-1222)** for guidance or questions if time permits.
6. For Phosphine ingestion, administer **Activated Charcoal**:
    i. Adult: 50 gm PO.
    ii. Pediatric: 1 gm/kg (maximum 50 gm) PO
7. If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. Noncardiogenic pulmonary edema should not be treated with Furosemide (Lasix®), but with positive end expiratory pressure (PEEP) or CPAP mask (see Medical Procedure-4.8 CPAP).

ALS LEVEL 1:

1. If patient is seizing, administer **one** of the following benzodiazepines:
    a. **Midazolam** (**Versed**®)
        i. Adult: 2 mg IV. If unable to start IV, administer **Midazolam** 2 mg

intranasal. May repeat once PRN (4 mg maximum dose) (b).

ii. Pediatric: 0.1 mg/kg (maximum 2mg) IV (b).

2. If patient has dysrhythmias, treat PRN (see Adult Protocol 2.3 or Pediatric Protocol 3.3).
3. If hypotension persists, treat PRN (see Adult Protocol 2.4.1). For pediatric patients, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total).

ALS LEVEL 2:

1. Call medical control or medical director for any concerns or questions.

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. PPE (usually Level A) with SCBA must be worn in hazardous area. PPE with minimum of Level C protection must be worn for treatment outside of the hazardous areas.

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

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• PHENOL (CARBOLIC ACID)

Signs and symptoms of exposure include:

Nausea/vomiting, diarrhea, excessive sweating, headache, dizziness, ringing in the ears, seizures, loss of consciousness, coma, respiratory depression, inflammation of the respiratory tract, shock, and death. Exposure to skin can result in severe burns, which will cause the skin to have a white, red or brown appearance. Failure to decontaminate the skin may allow the Phenol to absorb into the system and result in death.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Avoid exposure to vapor emitting from soaked clothes.
3. Medical Supportive Care Protocol 2.1.3 (adult) or 3.1.3 (pediatric) (Ipecac is contraindicated).
4. If patient was exposed externally, remove clothing and decontaminate with copious amounts of water.
    a. After thoroughly rinsing skin, apply vegetable oil or mineral oil or Polyethylene glycol (PEG) to exposed areas. (Isopropyl alcohol may be used for very small skin burns only.)
    b. Provide ocular irrigation with normal saline (see Medical Procedure 4.21 Morgan Therapeutic Lens).
5. **Contact Poison Information Center (1-800-222-1222)** for guidance or questions if time permits.

ALS LEVEL 1:

1. Assess need for intubation (Medical Procedure 4.34 SMART Airway management).
2. If patient is seizing, administer one of the following benzodiazepines:
    b. **Midazolam** (**Versed**®)
        i. Adult: 2 mg IV. If unable to start IV, administer **Midazolam** 2 mg intranasal. May repeat once PRN (4 mg maximum dose) (b).
        ii. Pediatric: 0.1 mg/kg (maximum 2mg) IV (b).

3. If hypotension persists, treat PRN (see Adult Protocol 2.4.1). For pediatric patients, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total)

ALS LEVEL 2:

1. Call medical control or medical director for any questions or concerns.

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(c) .

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8.2 Hazardous Material Exposure (Biological Agents)

8.2 HAZARDOUS MATERIAL EXPOSURE (BIOLOGICAL AGENTS)

Overview: This protocol is to be used for those patients suspected of exposure to biological agents via any route of exposure (e.g. inhalation, absorption, etc.). The protocols will give specific considerations for each type of exposure, as well As general treatment guidelines. Scene safety should be of primary concern, with attention to the need for personal protective equipment. Additional assistance may be necessary (e.g. hazardous materials team, police, etc.). Since many biological agents are spread through an airborne route, scene safety must include use of protective masks by all personnel, and must include containment of the unknown substance to prevent airborne spread. Any victim who has a cough, respiratory symptoms, or a flu-like syndrome should be considered as potentially infectious to others by a respiratory route until proven otherwise. Both patient and healthcare workers should wear protective masks. If the patient needs low-flow oxygen therapy, it may be given by nasal cannula under a protective mask. If the patient needs high-flow oxygen therapy, it may be given by non-rebreather mask which should not be covered by a protective mask; but the healthcare workers must wear protective masks.

Symptoms that would develop after a biological weapon (BW) attack would be delayed and nonspecific, making the initial diagnosis difficult.

A BW attack should be considered If any of the following are present:

- Large epidemic with unprecedented number of ill or dying.
- HIV (+) individuals may have first susceptibility ("canary in a coal mine")
- High volumes of patients complaining primarily of respiratory symptoms that are severe and are associated with an unprecedented mortality rate.
- The cause of infection is unusual or impossible for the particular region (such as the Ebola virus which is rarely seen outside of Africa)
- Multiple, yet simultaneous outbreaks
- The epidemic is caused by a multi-drug-resistant pathogen, previously unknown
- Sick or dead animals of multiple types are encountered
- The delivery vehicle for the agent is identified
- Prior intelligence reports or claims by aggressors of a BW attack

SIGNS AND SYMPTOMS

After a characteristic incubation period following aerosol exposure, most BW agents present as an initial influenza syndrome with:

- Fever
- Chills
- Malaise
- Headache
- Myalgia

Some BW agents rapidly develop into a pulmonary syndrome with:

- Dyspnea
- Cyanosis
- Chest pain

- Radiological abnormalities
- Liver involvement indicated by rising liver enzymes, with or without jaundice
- Encephalitis may occur with some select viral agents, typified by photophobia, confusion, nuchal rigidity (stiff neck)
- Maculopapular, vesicular pustular, or ulcerative skin lesions with or without bleeding abnormalities may occur with some agents
- Unexplained death or flaccid paralysis may indicate a biological toxin

A history should be obtained from the patient and bystanders, to include:

- Duration of symptoms
- Pertinent medical history
- Patient's recent history of travel
- Infectious contacts
- Employment
- Activities over the preceding 3 to 5 days

If a biological agent exposure is suspected, call the HAZMAT team. In this instance, refer to the appropriate Hazmat PPE protocol, to protect against secondary contamination. All patients who have been exposed to hazardous materials must be properly decontaminated prior to initiation of extensive medical treatment and transportation to the hospital.

Contact the Poison Information Center (1-800-222-1222) for consultation regarding specific therapy and then contact the receiving emergency department for confirmation of Level 2 orders.

It is imperative that the emergency department is made aware early that a contaminated patient is being transported in order for proper preparations to be made to receive the patient.

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8.2.1 ANTHRAX

Purpose: Bacillus anthracis is a gram-positive, rod shaped organism that becomes infectious when it converts into a spore and enters the host. The spore germinates inside a macrophage, which is then transported to regional lymph nodes where local production of toxins causes edema and necrosis of the tissue leading to bacteremia, toxemia, and death. Symptoms vary with the method of exposure as follows:

Cutaneous Anthrax: skin lesions appear in 1 to 5 days, 1 to 2 cm vesicles with regional edema and lymphadenitis, most patients with small lesions may be afebrile, lesions develop into a painless necrotic ulcer with a black eschar base.

Gastrointestinal Anthrax: fever, nausea/vomiting, abdominal pain, bloody diarrhea, sometimes rapidly developing ascites, possible acute abdomen, and oropharyngeal cases show primary involvement of the tonsils.

Inhalation Anthrax: 6-day incubation period followed by fever, myalgias, cough and fatigue, initial improvement followed by abrupt onset of respiratory distress, shock, and death in 24-36 hours. Physical findings are non-specific, pneumonia is rare and 50% of cases have associated hemorrhagic meningitis.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. If patient was exposed externally, remove clothing and decontaminate as appropriate.
3. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3.
4. Contact Poison Information Center (I -800-222-1222) for guidance or questions if time permits.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. If there is a high suspicion of significant exposure to anthrax, then Medical Control or Poison Information may order preventive treatment for the adult with oral ciprofloxacin (Cipro®) 500 mg p.o. b.i.d or Doxycycline 100 mg p.o. b.i.d.

NOTE:

(a) If risk of exposure is high, call HAZMAT team. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

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8.2.2 BOTULISM

Purpose: The botulinum toxins are a group of seven related neurotoxins produced by the bacillus Clostridium botulinum. When inhaled, these toxins produce a clinical picture very similar to foodborne intoxication, although the time to onset of paralytic symptoms may actually be longer than for foodborne cases, and may vary by type and dose of toxin. The clinical syndrome produced by one or more of these toxins is known as "botulism." Botulism toxin is also a licensed medicine that is used for the treatment of dystonias and can be found in some hospital pharmacies.

Signs and symptoms: The onset of symptoms of inhalation botulism may vary from 24 to 36 hours, to several days following exposure. These symptoms are:

- Bulbar palsies that produce loss of function in nerve originating in the brainstem causing the following symptoms:
- Blurred vision
- Mydriasis (dilated pupils)
- Diplopia (double vision)
- Ptosis (drooping eyelid)
- Photophobia (light sensitivity)
- Dysphagia (difficulty swallowing)
- Dysphonia (hoarseness, phonation disorder)
- Following bulbar palsies, skeletal muscles become weak, leading to a symmetrical descending paralysis (head-to-toe)
- These symptoms may progress acutely to respiratory failure and death within 24 hours
- Patients usually remain awake and alert

Procedure:

BASIC LEVEL:

1. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3.
2. Contact Poison Information Center (I -800-222-1222) for guidance and questions if time permits.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. Call medical control or medical director if any questions or concerns.

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8.2.3 CHOLERA

Purpose: Vibrio cholerae is a short, curved, motile, gram-negative non-sporulating rod. Cholera is the prototype toxigenic diarrhea, which is secretory in nature. Transmission is made through direct and indirect fecal contamination of water or foods, and by heavily soiled hands or utensils. It can survive up to 24 hours in sewage, and as long as 6 weeks in certain types of relatively impure water containing organic material. Since cholera does not easily spread from human to human, to be an effective biological weapon, major drinking water supplies would have to be heavily contaminated. Cholera is an acute infectious disease, characterized by sudden onset with nausea, vomiting, profuse diarrhea with 'rice water" appearance, rapid loss of body fluids, toxemia, and frequent collapse. If untreated, mortality may by 50%.

Signs and symptoms occur within 12 to 72 hours of exposure and include:

- Intestinal cramping
- Painless diarrhea
- Vomiting
- Malaise
- Headache
- Low-grade fever

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area.
2. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3. Consider fluid replacement.
3. Contact Poison Information Center (I -800-222-1222) for guidance or questions if time permits.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. Treatment in-hospital for the adult may include the use of **tetracycline** 500mg q.i.d. for 3 days or **doxycycline** 300 mg once or 100 mg b.i.d. for 3 days. If tetracycline resistant, use **ciprofloxacin** 500 mg b.i.d. for 3 days or **erythrocmycin** 500 mg q.i.d. for 3 days.
2. Call medical control or medical director if any questions or concerns.

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8.2.4 Plague

Purpose: The plague is spread to humans from either the bite of an infected flea or by inhaling the organism. Infection occurs in three forms:

1. Bubonic—involves lymph nodes closest to the bite of infected flea
2. Pneumonic—an infection of the lungs
3. Septicemia—a generalized infection in the blood from the bacteria escaping through the lymph nodes or lungs

Two to three days after inhaling the plague organism, the patient will develop:

- High fever
- Myalgia
- Chills
- Headache
- Cough with bloody sputum
- Signs of overwhelming infection (including pneumonia)
- Chest x-ray may show patchy infiltrates or consolidation, with a rapidly progressing pneumonia causing dyspnea, stridor, and cyanosis
- Eventual respiratory failure, circulatory collapse, and laboratory evidence of disseminated intravascular coagulation (DIC) develop

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Respiratory isolation is mandatory for the first 48 hours of treatment.
3. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3
4. **Contact Poison Information Center (I -800-222-1222)** for guidance or questions if time permits.

ALS LEVE 1:

1. None

ALS LEVEL 2:

1. Antibiotic treatment must be started within 24 hours of the onset of symptoms. Treatment in-hospital for the adult may include the use of streptomycin 15 mg/kg IM b.i.d. for 10 days, doxycycline 200 mg IV initially, followed by 100 mg b.i.d. for 10 days. For plague meningitis administer chloramphenicol 12.5-18.75mg/kg q.i.d.
2. If there is a high suspicion of significant exposure to plague, then Medical Control or Poison Information may order preventive treatment for the adult with oral ciprofloxacin (Cipro®) 500 mg p.o. b.i.d or doxycycline 100 mg p.o. b.i.d.
3. Call medical control or medical director for any questions or concerns.

NOTE

(a) If risk of exposure is high, call HAZMAT team. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

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8.2.5 Q FEVER

Purpose: Q fever is caused by a rickettsia Coxiella burnetii, which is highly infectious and resistant to heat and drying. Its natural reservoir is sheep, cattle, and goats. Humans acquire the disease by inhalation of aerosols contaminated with the organism. Following a 10 to 20 day incubation, Q fever generally occurs as a self-limiting febrile illness lasting 2 days to 2 weeks with headaches, fatigue, and myalgias. Pneumonia occurs in 50 of all patients with half of these (25 total) presenting with a cough (usually non-productive) or rales.

Signs and symptoms include:

- High-grade fever
- Rigors
- Severe headache
- Photophobia
- Myalgias
- Nausea/vomiting
- Diarrhea

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area.
2. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3
3. Contact Poison Information Center (I -800-222-1222) for reference or any questions if time permits.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. Most cases will resolve even without antibiotic therapy. However, to shorten the duration of the illness, treatment in-hospital for the adult may include the use of tetracycline 500mg q.i.d. or doxycycline 100 mg b.i.d. for 5 to 7 days.
2. Contact medical control or medical director if any questions or concerns.

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8.2.6 RICIN

Purpose: Ricin is a potent cytotoxin that is derived from the beans of the castor plant and is a by-product in castor oil production. When inhaled as a small particle aerosol, this toxin may produce pathologic changes within 8 hours and severe respiratory symptoms followed by acute hypoxic respiratory failure in 36-72hours. When ingested, ricin causes severe gastrointestinal symptoms followed as well by vascular collapse and death. This toxin may also cause disseminated intravascular coagulation, microcirculatory failure and multiple organ failure if given intravenously.

Signs and symptoms:

After inhalation:

- Fever
- Chest tightness
- Cough
- Shortness of breath
- Nausea
- Joint pain within 4 to 8 hours of exposure
- Necrosis of the lower airway epithelium and severe pulmonary edema
- Death within 36 to 72 hours

After ingestion:

- Nausea
- Vomiting
- Severe diarrhea
- Gastrointestinal hemorrhage with necrosis of the liver, spleen, and kidneys
- Shock leading to death within 3 days

After injection:

- Marked death of muscles and lymph nodes near site of injection
- Multiple organ failure leading to death

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3. Decontaminate as appropriate.
3. Contact Poison Information Center (I -800-222-1222) for guidance or questions if time permits.

ALS LEVEL l:

1. None

ALS Level 2

1. If ingested, aggressive gastric lavage and activated charcoal should be administered in the hospital.
2. Contact medical control or medical director if any questions or concerns.

NOTE

(a) Risk of exposure via airborne route is high. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

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8.2.7 SMALLPOX

Purpose: Smallpox is caused by the Variola virus. Although the fully-developed cutaneous eruption of smallpox is unique, earlier stages of the rash could be mistaken for varicella. Secondary spread of infection constitutes a nosocomial hazard from the time of onset of a smallpox patient's exanthem (rash) until scabs have separated. Quarantine with respiratory isolation should be applied to secondary contacts for 17 days post-exposure.

Signs and symptoms include:

- Fever
- Rigors
- Headache
- Malaise
- Nausea/vomiting
- Back ache
- 15% of patients develop delirium
- 10% of light-skinned patients exhibit an erythematous rash
- 2 to 3 days later, an enanthem appears concomitantly with a discrete rash about the face, hands and forearms
- Following eruptions on the lower extremities, the rash spreads to the trunk over the next week
- Lesions quickly progress from macules to papules, and eventually to pustular vesicles
- With smallpox, lesions are more abundant on the extremities and face, as opposed to varicella (chickenpox), in which lesions on various segments of the body remain generally synchronous in their stage of development and primarily start on the trunk and spread to the extremities

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3.
3. Contact Poison Information Center (I -800-222-1222) for guidance or questions if time permits.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. Immune globulin for variola and the vaccines (vaccinia and VIG) may be obtained through the CDC.
2. Contact medical control or medical director for any questions or concerns.

NOTE:

(a) Risk of exposure via airborne route is high. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

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8.2.8 STAPHYLOCOCCAL ENTEROTOXIN B

Purpose: Staphylococcal Enterotoxin B (SEB) is a fever producing exotoxin produced by the bacteria, Staphylococcus aureus. This toxin commonly causes food poisoning in improperly handled foods that have an overgrowth of the staph organism and then are ingested. SEB symptoms will vary with the route of exposure (inhaled versus ingested).

Signs and symptoms:

- From 3 to 12 hours after aerosol exposure, there will be a sudden onset of:
  - Fever (103° to 106° F) lasting 2 to 5 days
  - Chills
  - Headache
  - Myalgia
  - Nonproductive cough which may persist for up to 4 weeks
  - Some patients may develop shortness of breath and retrosternal
  - chest pain
- If ingested, symptoms include:
  - Nausea
  - Vomiting
  - Diarrhea
- High exposure can lead to septic shock and death

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area.
2. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3.
3. Contact Poison Information Center (I -800-222-1222) for guidance or questions if time permits.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. Contact medical control or medical director for any questions or concerns.

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8.2.9 TRICHOTHECENE MYCOTOXIN (T2)

Purpose: The trichothecene mycotoxins are nonvolatile compounds produced by filamentous fungi (molds) that are relatively insoluble in water but highly soluble in ethanol, methanol, and propylene glycol. Exposure usually occurs through inhalation, ingestion, and/or absorption. Aerosol attack in the form of "yellow rain" will present as droplets of yellow fluid contaminating clothes and the environment.

Signs and symptoms:

Exposure to skin:

- Skin pain
- Pruritus
- Redness
- Vesicles
- Necrosis
- Sloughing of epidermis

Exposure to airway:

- Nose and throat pain
- Nasal discharge
- Itching and sneezing
- Cough
- Dyspnea
- Wheezing
- Chest pain
- Hemoptysis

Severe poisoning by any route:

- Prostration
- Weakness
- Ataxia
- Collapse
- Shock
- Death

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area.
2. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3. Decontaminate as appropriate.
3. Contact Poison Information Center (I -800-222-1222) for guidance and questions if time permits.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. If ingested, aggressive gastric lavage and activated charcoal should be administered in the hospital.
2. Contact medical control or medical director if any questions or concerns.

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8.2.10 TULAREMIA

Purpose: Francisella tularensis is a non-motile, gram-negative coccobacillus that typically causes disease in animals. Humans can become infected by either handling diseased animal fluids or by being bitten by infected deerflies, mosquitoes, or ticks. The organism can also remain viable for weeks in a number of mediums and easily spread by aerosol. After infection, bacteremia results with a secondary spread to the lungs and other organs.

Signs and symptoms will result within 2 to 10 days of inhalational exposure to include:

- Fever
- Chills
- Headache
- Generalized muscle pain
- Nonproductive cough
- Pneumonia

If the organism was ingested or inoculated, symptoms will also include regional lymphadenopathy, with or without cutaneous ulcers.

Clinical diagnosis is both difficult and problematic. Physical findings are usually nonspecific, although chest x-ray may reveal pneumonic process, mediastinal lymphadenopathy or pleural effusion. Routine culture is possible but hazardous to lab personnel. Diagnosis can be established retrospectively by serology.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3.
3. Contact Poison Information Center (I -800-222-1222) for guidance or questions if time permits.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. Antibiotic therapy for 10 days for the adult includes either streptomycin 1 gm q 12 hours IM; 15 mg/kg IM b.i.d. If not available, administer Gentamicin 3 mg/kg/day.
2. Prophylaxis with tetracycline or doxycycline is effective if warning of BW attack is provided or if there is a high suspicion of significant exposure, as ordered by Medical Control or Poison Information.
3. Contact medical control or medical director if any questions or concerns.

NOTE

(a) If risk of exposure is high, call HAZMAT team. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

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8.2.11 VENEZUELAN EQUINE ENCEPHALITIS (VEE)

Purpose: VEE virus is a mosquito-borne alphavirus that is endemic in certain parts of the world (Central and South America, Mexico, and Florida) infecting horses, mules, and donkeys. If this agent was intentionally released as an aerosol, disease might occur simultaneously in both horses and humans, but this pattern would not be commonly recognized.

Signs and symptoms: After exposure, a sudden onset of symptoms begin in 1 to 5 days, which consist of: generalized malaise, spiking fever (up to 104° F), rigors, severe headache, photophobia, myalgias in the legs and lumbosacral area, nausea, vomiting, cough, sore throat, and diarrhea. These symptoms last up to 3 days followed by a period of weakness and lethargy. Most patients recover in 1 to 2 weeks. Some patients, especially children may develop signs of CNS infection, with meningismus, convulsions, coma, and paralysis. There is a 20% mortality rate in children who develop encephalitis.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3.
3. Contact Poison Information Center (1-800-222-1222) for guidance or questions if time permits.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. Contact medical control or medical director if any questions or concerns.

NOTE:

(a) Risk of exposure via airborne route is low. However, patient should be isolated from mosquitoes for 72 hours to prevent spread by vectors.

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8.2.12 VIRAL HEMORRHAGIC FEVERS

Purpose: The VHF is a diverse group of illnesses caused by a variety of RNA viruses with a wide range of morbidity and mortality. Each of these viruses has a unique history and is capable of being spread in most cases by an aerosol or formite (except dengue virus). VHF agents especially Marburg and Ebola have allegedly been considered for weaponization. The clinical syndrome which these viruses cause in humans is called VHF.

These viruses include:

- Ebola
- Marburg
- Dengue
- Yellow Fever
- Crimean-Congo Fever
- Hantaan Viruses
- Lassa Fever

Signs and symptoms:

- Fever
- Easy bleeding
- Petechiae
- Hypotension and shock
- Flushing of the face and chest
- Edema
- Malaise
- Myalgias
- Headache
- Vomiting
- Diarrhea

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a)(b).
2. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3
3. Contact Poison Information Center (I -800-222-1222).

ALS LEVEL l:

1. None

ALS LEVEL 2:

1. Contact medical control or medical director if any questions or concerns.

NOTE

(a)) Risk of exposure via airborne route is high. Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.

(b) Risk of exposure from symptomatic patient via blood or body secretions is high. Full PPE with masks, goggles, sleeves, and gowns are appropriate. If the patient is not severely ill, IV access should be delayed until hospital arrival. If IV access is needed for immediate patient resuscitation, extra care is appropriate to protect the healthcare worker, and IV attempts should not be made on combative patients or in a moving vehicle.

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8.3 Hazardous Material Exposure (Radiological Agents)

May 2019 Version 1.0

8.3 HAZARDOUS MATERIAL EXPOSURE (RADIOLOGICAL AGENTS)

Overview: This protocol is to be used for those patients suspected of exposure to radiological agents via any route of exposure (e.g. ingestion, absorption, etc.). The protocols will give specific considerations for each type of exposure, as well as general treatment guidelines. **Scene safety should be of primary concern, with attention to the need for personal protective equipment. If a radiological agent exposure is suspected, call the HAZMAT team.** In this instance, refer to the appropriate Hazmat PPE protocol to protect against secondary contamination. All patients who have been exposed to hazardous materials must be properly decontaminated prior to initiation of extensive medical treatment and transportation to the hospital.

Contact the Poison Information Center (1-800-222-1222) for consultation regarding specific therapy and then contact the receiving emergency department for confirmation of Level 2 orders.

It is imperative that the emergency department is made aware early that a contaminated patient is being transported in order for proper preparations to be made to receive the patient.

TYPES OF RADIATION INJURY

- ***External Irradiation*** occurs when all or part of the body is exposed to penetrating radiation from an external source. Following external exposure, an individual is not radioactive and can be treated like any other patient.
- ***Contamination*** means that radioactive materials in the form of gases, liquids, or solids are released into the environment and contaminate people externally, internally, or both. An external surface of the body, such as the skin, can become contaminated, and if radioactive materials get inside the body through the lungs, gut, or wounds, the contaminant can become deposited internally.
- ***Incorporation*** refers to the uptake of radioactive materials by body cells, tissues, and target organs such as bone, liver, thyroid, or kidney.

Incorporation cannot occur unless contamination has occurred.

These three types of accidents can happen in combination and can be complicated by physical injury or illness.

Irradiation of the whole body or some specific body part does not constitute a medical emergency even if the amount of radiation received is high. The effects of irradiation usually are not evident for days or weeks and while medical treatment is needed, it is not needed on an emergency basis. However, **contamination accidents must be considered medical emergencies**, since they might lead to internal contamination and subsequent incorporation. Incorporation can result in adverse health effects several years later if the amount of incorporated radioactive material is high. Treatment priorities include:

- Treat life-threatening problems first
- Limit the radiation dose to both victim and personnel (time, distance, shielding)
- Control the spread of radioactive contaminants

Serious medical problems should have priority over concerns about radiation, such as radiation monitoring, contamination control, and decontamination. However, attention should be given to PPE for medical personnel.

8.3.1 RADIATION EXPOSURE/CONTAMINATION

Purpose: Radiation exposure/contamination may be a health risk to the patient and the rescuer depending on the type of radiation, time of exposure, distance from the radioactive source and level of shielding from the radioactive source. It should be noted that not all exposures will require medical treatment. In exposures where traumatic injuries are not present, the following steps should be taken.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area (a).
2. Decontaminate as appropriate (b).
3. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3 PRN.
4. Contact Poison Information Center (**1 -800-222-1222**) for guidance or questions if time permits.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. Additional treatment should be administered in the hospital.
2. Contact medical control or medical director for questions or concerns.

NOTE

(a) Use of radiological monitoring devices is essential as risk of exposure may be high. Call HAZMAT team.

(b) In mild to moderate exposures without traumatic injuries, self-DECON may be recommended for the patient at his/her home. Self-DECON should include removal of clothing and placing clothes into plastic bag and showering with soap and water.

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8.3.2 ACUTE RADIATION SYNDROME

Purpose: An acute illness, which follows a roughly predictable course over a period of time ranging from a few hours to several weeks after exposure to ionizing radiation. The acute radiation syndrome is produced if enough radiation reaches enough sensitive tissue. Important factors are:

- High dose
- High dose rate
- Whole body exposure
- Penetrating irradiation

Other factors to be considered include: age (young and old), sex, genetics, medical history, etc. Regardless of the source of radiation, if the dose is high enough, it will produce the same effect.

Signs and symptoms that develop in the ARS occur through four distinct phases:

- ***Prodromal phase***. Depending on the total amount of radiation absorbed, patients may experience a variety of symptoms including:
  - Loss of appetite
  - Nausea
  - Vomiting
  - Fatigue
  - Diarrhea

After high radiation doses, additional symptoms which may develop include:

- Prostration
- Fever
- Respiratory difficulties
- Increases excitability

This is the stage at which most victims seek medical care.

- ***Latent phase***. This is the transitional period in which many of the initial symptoms resolve, and may last for up to three weeks depending on the original dose. This time interval decreases as the initial dose increases.
- ***Illness phase***. The period of time when overt illness develops, often characterized by:
  - Infection
  - Bleeding
  - Electrolyte imbalance
  - Diarrhea
  - Changes in mental status
  - Shock
- ***Recovery or death phase***. This follows the period of overt illness, which may take weeks or months to resolve.

Procedure:

BASIC LEVEL:

1. Remove patient from hazardous area.
2. Medical Supportive Care Protocol 2.1.3 or Pediatric Medical Supportive Care 3.1.3. Decontaminate as appropriate.
3. Contact Poison Information Center (**1-800-222-1222**) for guidance or questions.

ALS LEVEL 1:

1. None

ALS LEVEL 2:

1. Additional treatment should be administered in the hospital.
2. Contact medical control or medical director for any questions or concerns

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8.4 Special/Specific Exposure Situations

8.4.1 Closed Space Fire (Smoke Inhalation)

Purpose: These protocols are designed to guide the medics in caring for patients/victims in specific exposure settings such as a closed space fire. This type of setting can expose patients and fire/rescue personnel to harmful gases and chemicals and can be life threatening.

Description: Closed space fires produce many toxic substances, including cyanide, carbon monoxide, and numerous respiratory irritating gases. CYANIDE is one of the most rapidly acting poisons which can be found in the productions of combustion. Increasingly, cyanide has been recognized as a threat at the scene of a closed space fire and hazardous materials incidents. CO in combination with Cyanide rapidly removes the ability of the blood to transport oxygen. This combined with the severe swelling of the bronchioles and bronchospasms related to the exposure to respiratory irritants creates a patient that will rapidly decompensate. The mechanism of injury during a fire is three fold, Thermal damage, pulmonary irritation, and chemical asphyxiation (HCN, CO). Anyone exposed from a close space fire should be considered to have inhalation chemical asphyxiation.

Criteria for use of this protocol:

1. Patient pulled from a closed space fire that is unresponsive with evidence of smoke inhalation (soot in oral cavity, burns to face).

Treatment:

2. Remove patient/victim from dangerous environment
3. Immediately administer 100% oxygen if conscious, if unconscious secure airway to deliver 100% oxygen.
4. If airway compromised, preferably, perform endotracheal intubation and monitor end tidal CO_2 ($ETCO_2$).
5. Start IV of 1000 cc normal saline, age appropriate maintenance rate.
6. Treat unconscious patients per the Altered Mental Status 2.5.1 Protocol in the Standing Medical Protocols by evaluating glucose levels, correcting hypoglycemia, administering **naloxone (Narcan**®) ~~and administering thiamine.~~ As called for by local medical protocols.
7. **Hydroxocobalamin (CyanoKit)** 5 grams
    a. Start a dedicated IV line
    b. Reconstitute each 2.5 gram vial with 100 ml sodium chloride
    c. Invert or rock the vial. Do not shake.
    d. Administer 5 grams (both vials in the kit) at 15 ml/min.
    e. Repeat doses can be administered over 15 – 120 minutes
7. If hydroxocobalamin is not available, then give **sodium thiosulfate** 50ml of a 25% solution. Monitor BP.

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Chemical Burns to the Eyes

Purpose: This protocol will guide the medic in caring for a patient with an exposure of chemicals or other material to the eye(s)

Protocol:

Note: Watch water run-off so other parts of the body do not become contaminated (especially other parts of the face, ears, and back of neck). Eye burns are almost always associated with contamination of other parts of the face or body.

1. Immediately start eye irrigation by whatever means possible
2. Insure all particulate matter or contact lenses are out of the eyes by digitally opening the lids and pouring irrigation fluid across the globe
3. Prepare the Morgan Lens by attaching an IV solution of normal saline, insure that fluid continues to flow at steady rate

a. Morgan Lens is not to used when trauma is observed to the eye (or if the eye has visible solid debris present that is not removed during the initial irrigation process) Foreign materials must be irrigated out of the eye before inserting a Morgan Lens)

b. Contact lens that may have been adhered to the eye must remain without removal and Morgan Lens cannot be used.

4. Apply 1 to 2 drops of ponticaine, opthalmicaine or tetracaine Ophthalmic drops into the injured eye
5. Morgan lens cannot be used if trauma to the globe is observed or a contact lens is adhered to the eye.
6. If Morgan Lens cannot be used a nasal cannula can be used to irrigate the eyes. (If a nasal cannula is used the eyes must be held open digitally to effectively irrigate the eyes).
7. Adjust the flow so that a continuous solution is flowing from the eye
8. Continue irrigation until arrival at the emergency department.
9. Consider sedation to reduce anxiety

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Bronchospasm Secondary to Toxic Inhalation

DESCRIPTION: Wheezing due to exposure of the respiratory system to an irritant. The condition of wheezing may be caused by both bronchospasms and bronchial swelling because of the inhalation of an irritating gas or vapor. To adequately treat this condition both bronchodilation and antiinflammation pharmaceuticals must be considered.

TREATMENT:

a) Immediately give 100% humidified oxygen

b) Initiate an updraft of either **Atrovent** or **Proventil**/**Albuterol**, 1 dose

c) Consider high levels of steroids (**Solu-medrol** 125 mg IV) to decrease respiratory swelling.

d) Wheezing due to exposure to fluorine or fluorine containing product follow Hydrofluoric Acid exposure protocol.

e) Wheezing due to exposure to chlorine or chloramines follow chlorine and chloramine protocol.

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8.4.2 Exposure to Bleach/Ammonia-(Chlorine and Chloramine)

DESCRIPTION: Chloramine gas is produced by the mixture of household bleach and household ammonia. Chloramine and Chlorine is an irritant that converts to hydrochloric acid in the lining of upper airway. Chloramine is toxic and flammable. The patient will typically complain of a burning sensation to the upper respiratory system, coughing, wheezing and hoarseness.

TREATMENT:
After the patient is removed from the atmosphere and appropriate decontamination is completed, give:

a) 100% oxygen via NRB mask

b) Assemble a nebulizer and administer 5 ml of sterile water

c) If burning persists, mix 2.5 ml pediatric strength bicarbonate solution (adult strength sodium bicarbonate can be use in half strength) with 2.5 ml of normal saline and administer the mixture (5 ml) through a nebulizer.

d) Consider high levels of steroids (**Solu-medrol** 125 mg IV) to decrease respiratory swelling

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8.4.3 Lacrimators (pepper spray)

DESCRIPTION: The patient will usually present with severe burning of the eyes and nose, as well as congestion due to increased mucous production. Exam will find the patient suffering from increased tear production and blephrospasm.

TREATMENT:
Since the agent does not cause significant tissue damage the treatment is aimed at relieving the pain caused by nerve stimulation.

a) Initially determine the history of the injury. If a determination can be established that the pain is caused secondary to Capsicum Spray, the eyes should be immediately anesthetized.

b) Once it has been determined that the patient is not allergic to local anesthetics ("caine" derivatives), apply Tetracaine, Alcaine, or Opthalmacaine drops

c) When the blephrospasm is relieved, a visual exam is performed to evaluate for eye trauma

d) Consider and be prepared for anaphylactic reactions related to an exposure to lacrimators.

e) Assess for clear lung sounds and BP changes to insure that sensitivity has not occurred.

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[i] Adapted from Region One Protocol Effort (New Orleans EMS) and from Wake County EMS