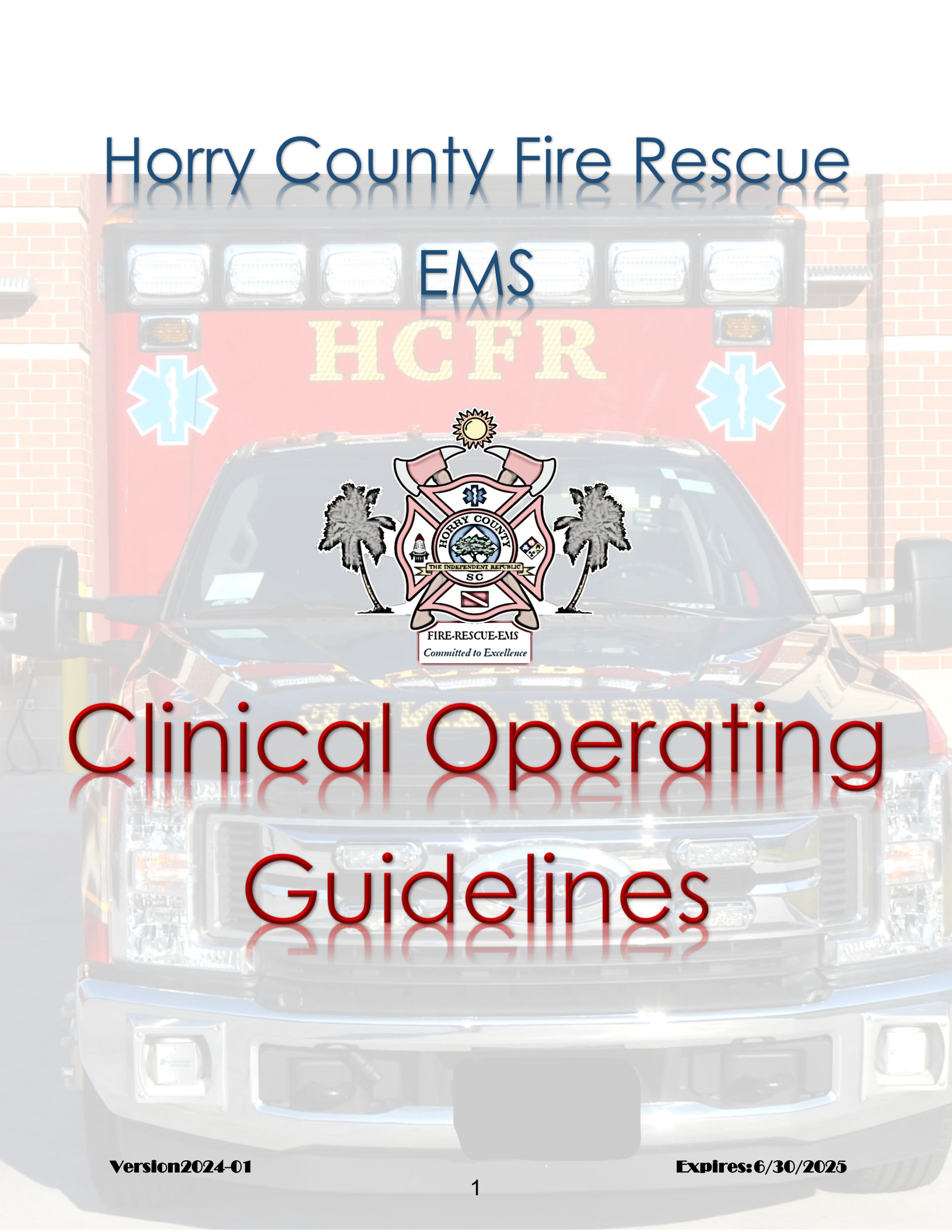
Horry County Fire Rescue

EMS



Clinical Operating Guidelines

Version2024-01 **Expires: 6/30/2025**

Medical Directors Page

Medical Director Statement

The following document represents the Clinical Operating Guidelines for the provision of out of hospital care by all levels of emergency medical care providers operating through Horry Country Fire – Rescue – EMS in Horry County, South Carolina. These Clinical Operating Guidelines serve as direction to providers in assessing and treating the patients that they will be called on to care for. Use of these guidelines will be limited to those EMT's, Advanced EMT's, and Paramedics who have completed an approved precept period which includes a skills competency verification and individual approval by the Medical Director.

The Clinical Operating Guidelines have been written with the knowledge that every situation is different; but that certain basic standards must be adhered to in order to deliver the best quality care for each resident and visitor of Horry County. The Medical Director has reviewed and approved these guidelines for use.

Medical Director

Michael Kozlowski, D.O., PA-C

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Fire Rescue Command Staff

- **Chief Joseph Tanner**
- **Deputy Chief Michael Norket**
- **Assistant Chief Douglas Cline**
- **Assistant Chief Thomas Loeper**
- **Assistant Chief Ben Lawson**
- **Assistant Chief Chris Nash**
- **Assistant Chief Kelli Finney**
- **Assistant Chief Mark Nugent**

Medical Director

- **Dr. Mike Kozlowski**

Editors

- **Captain Tim Smith**
- **Captain Bart Wagner**
- **Captain Eric Burwell**
- **Captain Kevin Anderson**
- **Lieutenant James Daugherty**
- **Lieutenant David Boulware**
- **Lieutenant John Saliba**
- **Firefighter-Paramedic Ashley Swithenbank**
- **Firefighter-Advanced EMT Marek Kruszewski**
- **Firefighter-EMT Zachary Hearn**
- **Firefighter-EMT Alton Keith**

Horry County Fire Rescue, with the approval of SC DHEC EMS and under the direct supervision of the Horry County Fire Rescue Physician Medical Director, Dr. Mike Kozlowski will for the duration of 12 month participate in an Advance Emergency Medical Technician (AEMT) Pilot Project. This Pilot Project will begin on April 1, 2024 and will conclude on March 31, 2025 with all findings being reported to SC DHEC EMS.

For additional information regarding the AEMT Pilot Project, refer to Appendix G

Preface

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The Fire Chief and Administration of Horry County Fire – Rescue – EMS have developed and follow a Standard of Care as follows:

As a member of Horry County Fire – Rescue – EMS, we are to provide the residents and visitors of Horry County with competent, timely, respectful, compassionate, and professional pre-hospital care at all times. We aim to increase the quality of living to each person who calls upon us by prompt response, assessment, and high quality treatment of all medical and traumatic incidents.

It is our belief that we are to serve with Respect, Honor, Integrity, and Compassion.

Clinical protocols (Algorithms, guidelines) identify, summarize and evaluate the highest quality evidence and most current data about diagnosis, therapy (including dosages of medications), risk/benefit and cost-effectiveness. Whereas a **Protocol** (guideline or algorithm) guide's decisions and criteria for diagnosis, management, and treatment or specific cases, a **Standing Order** is a specific written policy that prescribes a definitive action to be taken for a particular condition or situation. Standing Orders are often included within Protocols/Guidelines.

It is the option of the on-line Physician to modify the treatment of a patient from that described in the Clinical Operating Guidelines if the best interest of the patient is thereby served. Such modifications of treatment must be in accordance with the standard practice in pre-hospital care, state regulation(s), and the local and state formulary. While patient assessment, basic and advanced life support procedures have not been enumerated thoroughly here; they are always to be initiated as necessary.

Control of the medical scene is the sole responsibility of the highest level credentialed pre-hospital provider on the scene that is representing the department. Each credentialed member of Horry County Fire – Rescue – EMS operate under the supervision of the Medical Control Physician. In instances where existing Clinical Operating Guidelines need to be deviated from, On-Line Medical Control must be consulted.

In the event that a patient's private physician is present and willing to assume the responsibility for the patient's care, the patient care provider shall defer to the orders of the private physician. Furthermore, in the event the patient's private physician assumes care of the patient, the private physician must maintain patient contact at all times. In the event that the patient's private physician is no longer present, the pre-hospital provider shall revert back to On-Line Medical Control shall the need arise.

An Intervener Physician is defined as a licensed physician without a prior established patient/physician relationship wishing to take control of an emergency scene, who is willing to provide evidence of licensure, **AND** willing to accompany the patient to the hospital. If a physician is unwilling to accompany a patient to the emergency department, they are not to be regarded as acting in the role of an Intervener Physician. Intervener Physicians can be granted such control by contacting and gaining the approval of an On-Line Medical Control Physician. The Intervener Physician's assessment and treatment shall be documented on the pre-hospital e-PCR. In the event that the Intervener Physician gives the pre-hospital provider an order, it must be within the state approved formulary or with in these Clinical Operating Guidelines.

If an Intervener Physician is present and willing to assume responsibility for the patient's medical care and sign the pre-hospital e-PCR, he/she may request to become Medical Control of the emergency scene from the On-Line Medical Control Physician. The On-Line Medical Control Physician may transfer Medical Control to the Intervener Physician if he/she chooses. The On-Line Medical Control Physician maintains the right to manage the case entirely, working with the Intervener Physician or allowing him/her to assume responsibility. The Intervener Physician **MUST** sign the pre-hospital e-PCR, **AND MUST** accompany the patient to the hospital in the emergency vehicle. However, in the event of a disaster, patient care needs may require the Intervener Physician to remain at the scene. The On-Line Medical Control Physician is ultimately responsible if there is any disagreement between the Intervener Physical and the On-Line Medical Control, in that case, the pre-hospital provider shall take orders from the On-Line Medical Control Physician only.

Adult and Pediatric

Medication Administration

- Prior to administering any medication, inquire about medication allergies or adverse reactions to medications.
- Follow the 6 rights of drug administration:
  - Person
  - Drug
  - Dose
  - Time
  - Route
  - Documentation
- A true allergy to a medication can cause a rash, SOB, swelling of the tongue, face and/ or throat
- The administering paramedic shall use closed-loop communication with a second paramedic, when available, to ensure proper drug, dosage, and any contraindication prior to administration

Intraosseous Sites (EZ-IO)

- An IO should be placed for patients with conditions that require urgent vascular access in which an IV is not immediately obtainable or is deemed to have insufficient access
  - **Adult:**
    - Proximal Humerus
    - Proximal Tibia
    - Medial Malleolus
  - **Pediatric:**
    - Proximal Humerus
    - Proximal Tibia

Intramuscular (IM) Injections

- All IM injections shall be administered in the lateral thigh or proximal humerus (Deltoid) Or Gluteal area (Upper lateral aspect)
  - **Adult:**
    - 21-23 gauge 1.5 - 2 inch needle
    - 5mL maximum per site
  - **Pediatric:**
    - 23 gauge 1 inch needle
    - 1mL maximum per site
      - If >1mL needs to administered, split the dose between both sides of the body.

Mucosal Atomization Device (MAD)

- The following medications are approved to be administered via the MAD:
  - Versed
  - Narcan
  - Fentanyl
- Desired dose
  - 0.3mL-0.5mL per nostril
  - Max 1mL per nostril

Adult

Medication Dilution Instructions

- Push-Dose Pressor Epinephrine (1:100,000)
  - Discard 9mL of Epinephrine 1:10,000 (0.1mg/mL) and draw up 9mL or normal saline to create push-dose pressor epinephrine 1:100,000.
    - This will yield 10mcg/mL
- Pepcid
  - Dilute using 10mL saline flush (Administer over two (2) minutes)

Pediatric

- Patients who have not reached puberty are considered pediatric patients and shall be treated under the pediatric care guideline section
  - Utilize a commercially approved pediatric resuscitation system within its capacity
- Patients who have reached puberty shall be treated as an adult
- IO is the preferred method of vascular access during pediatric cardiac arrest

Pediatric Age Classification

- Neonates:
  - Birth to 1 month
- Infants:
  - 1 month to 1 year
- Children:
  - 1 year to puberty

Puberty Definition

- Female Puberty is defined as breast development
- Male Puberty is defined as underarm, chest or facial hair
- **Once a child reaches puberty, use the Adult Guidelines for treatment**

Information

- **A patient is defined as any person who meets ANY of the following criteria:**
  - Receives basic or advanced medical or trauma treatment
  - Is physically examined
  - Has visible signs of injury or illness or has a medical complaint
  - Requires EMS specific assistance to change location and or position
  - Identified by any party as possible patient because of some known, or reasonably suspected illness or injury
  - Has a personal medical device evaluated or manipulated by EMS
  - Request EMS assistance with the administration of personal medications or treatments
- Completion of a ePCR is required for any and all patient encounters and must be completed within 24 hours
  - Any ePCR that cannot be completed within 24 hours must get approval by the on shift medical officer.
- After Initiating care of a patient at the scene of an accident or illness, discontinued care or abandoned the patient without the patients consent or with out providing for the further administration of care by an equal or higher medcal authority

Adult and Pediatric

Scene Safety

- Ensure the scene is safe from all hazards that may endanger emergency personnel
  - If scene is unsafe, call appropriate resources to mitigate hazards
  - Consider PPE (Airborne or droplet protection with N95 mask)
- Bring all necessary equipment to patient's side
- Demonstrate professionalism and courtesy

Mental Status (AVPU)

- **A**lert: to person, place, time, and event (CAOx4)
- **V**erbal: Responds only to verbal Stimuli
- **P**ain: Responds to only painful stimuli
- **U**nresponsive

AEIOU TIPS

- **Precipitating Causes: AEIOU TIPS**
- A – alcohol,acidosis,arrythmias
- E – encephalopathy (hypertensive, hepatic), electrolytes, endocrine, environmental
- I – insulin (hypoglycemia, HHNK, DKA)
- O – opiates, oxygen (hypoxia)
- U – uremia
- T – trauma, toxins
- I – infection, increased intracranial pressure
- P – psychosis, poisoning (cyanide, carbon monoxide, etc.), porphyria
- S – stroke, shock , seizure

Vital Signs

- Blood pressure
  - A manual blood pressure shall be taken to confirm any abnormal or significant changes of an automatic blood pressure cuff reading
  - Blood pressure shall be checked before and after administration of a medication
  - Hypotension for adults is defined as Systolic BP < 90 mmHg
- Pulse (rate, rhythm, and quality)
- Respirations (rate and quality)
- Pulse oximetry
- Capillary refill
- Nasal/ End Tidal capnography ($EtCO_2$)
- Blood Glucose Level (BGL)

Adult and Pediatric

$EtCO_2$ (Nasal Capnography/ End Tidal Capnography)

- Shall be utilized for the following patients:
  - Patients requiring ventilatory support (e.g., BVM, ET tube, BIAD, CPAP)
  - Patients in respiratory distress
  - Patients with altered mental status
  - Patients who have been sedated
  - Patients who have received pain medication
  - Seizure
  - Suspected sepsis

Glucose

- A Blood Glucose Level (BGL) shall be documented for patients with any of the following:
  - History of diabetes
  - Altered mental status
  - General weakness
  - Seizure
  - Syncope and/ or lightheadedness
  - Dizziness
  - Poisoning
  - Stroke
  - Cardiac arrest

EKG Monitoring

- All ALS patients shall be continuously monitored in Lead II
- 12 lead EKG shall be performed on the following patients
  - Chest, arm, neck, jaw, upper back, shoulder, epigastric pain or discomfort
  - Palpitations
  - Syncope and/ or lightheadedness
  - Congestive heart failure, shortness of breath, hypertension or hypotension
  - Unexplained diaphoresis or nausea
- 12 lead EKG shall be repeated every 10 minutes in patients who are experiencing
  - Chest pain
  - STEMI
  - Return Of Spontaneous Circulation (ROSC)
- If the patient's chief complaint is Cardiovascular in nature and a 12 lead is applied, advanced providers shall not downgrade that transport to a BLS level

Adult and Pediatric

Patient History

- Chief complaint: Why did the person call 911?
- **S.A.M.P.L.E.** History
  - **S**igns and symptoms
  - **A**llergies
  - **M**edications: Prescribed, over the counter, or not prescribed to patient
  - **P**ast Medical History (Patient specific)
  - **L**ast oral intake
  - **E**vents leading
- History of the present illness **(O.P.Q.R.S.T.)**
  - **O**nset: Did the symptoms appear gradually or suddenly?
  - **P**alliative: What makes the symptoms better?
  - **P**rovoke: What makes the symptoms worse?
  - **P**revious: Previous similar episodes?
  - **Q**uality: What kind of pain? (Pressure, squeezing, aching, dull)
  - **R**adiation: Does the pain or discomfort radiate? Where?
  - **S**everity of Pain: 1-10 scale (utilize "FACES" pain scale for pediatrics)
  - **T**ime: What time did the symptoms begin?
  - **A**ssociated: What are the associated signs and symptoms?

***** Exit to Appropriate Guideline upon Assessment Findings*****

Information

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- **A patient is defined as any person who meets ANY of the following criteria:**
  - Receives basic or advanced medical or trauma treatment
  - Is physically examined
  - Has visible signs of injury or illness or has a medical complaint
  - Requires EMS specific assistance to change location and or position
  - Identified by any party as possible patient because of some known, or reasonably suspected illness or injury
  - Has a personal medical device evaluated or manipulated by EMS
  - Requests EMS assistance with the administration of personal medications or treatments
- Completion of an ePCR is required for any and all patient encounters
  - An ePCR must be completed for all ALS engines and QRV's, or if an advanced provider initiates assessment prior to transport unit arrives
    - By using canceled on scene with a crew disposition of incident support services provided
- The following calls **MUST** be uploaded to code-stat:
  - Cardiac Arrest
  - RSI
  - STEMI
  - Stroke
  - Sepsis
  - Defibrillation/Cardioversion/Pacing

Adult and Pediatric

Scene Safety

- Ensure the scene is safe from all hazards that may endanger emergency personnel
  - If scene is unsafe, call appropriate personnel to mitigate hazards
  - Consider PPE (Airborne or droplet protection with N95 mask)
- Bring all necessary equipment to patients side
- Demonstrate professionalism and courtesy

Assessment

- Perform age appropriate assessment to determine chief complaint
  - Consider the following:
    - Stroke Screening (R.A.C.E/ F.A.S.T)
    - Vital signs
      - Blood Pressure
      - Heart Rate
      - Respiratory Rate
      - Oxygen Saturation
      - Blood Glucose
      - Temperature
- Orthostatic vital signs shall be taken supine, sitting upright, standing with three (3) minutes in between each set
  - It is considered a positive orthostatic finding when the systolic blood pressure falls by more than 20 mmHg, the diastolic blood pressure falls by more than 10 mmHg
- Control any life threats that are discovered during assessment

Airway

- Ensure patient has a patent airway
  - Consider the following:
    - Supplemental oxygen
    - Airway adjunct (NPA, OPA, BIAD, Intubation)
    - Any patient having their airway managed must be on capnography
    - **ALL** Narcotic administration must have Capnography monitored

Adult and Pediatric

Cardiac Monitoring

- All ALS patients shall be monitored in Lead II
- 12 Lead EKG shall be obtained on patients who are experiencing:
  - Pain to any of the following areas:
    - Chest, arm, neck, jaw, non-traumatic upper back, shoulder, epigastric area.
  - Syncope
  - Lightheadedness
  - Congestive Heart Failure
  - Shortness of Breath
  - Hypertension, Hypotension
  - Unexplained Diaphoresis
  - Unexplained Nausea

***** Exit to Appropriate Guideline upon Assessment Findings*****

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WARNING

Placing patients in the prone positions is contraindicated due to the risks of asphyxiation. However, impalement or other situations may mandate the prone position. In these instances, clear documentation of justification and attention to airway maintenance is mandatory.

Adult and Pediatric

- **Standard Transport:**
  - Unless otherwise noted, patients shall be transported to the closest appropriate facility

- **Trauma Alert:**
  - Shall be transported to the closest Trauma Center
  - On-scene times for Trauma Alert patients should be < 10 minutes. On-scene times > 10 minutes shall have the reason for the delay documented in the ePCR report
  - If ground transport is expected to be > 25 minutes, consider the use of an air-medical asset
  - *'Trauma Alert' shall be made to the receiving facility during your radio report*

- **Pregnant Patients:**
  - Pregnant patients who also meet Trauma Criteria shall be transported to the closest Trauma Center
  - Pregnant patients who are > 20 weeks gestation MUST be transported to a receiving facility capable of Labor and Delivery
  - Pregnant patients who are > 20 weeks gestation shall be transported on their left side to prevent supine hypotension
  - Pregnant patients > 20 weeks gestation who was involved in a traumatic incident must be transported to a designated trauma center

- **Trauma Arrest:**
  - Trauma patients who arrest in the presence of Fire Rescue personnel and are < 15 minutes away from a trauma center shall be transported to the closest trauma center
  - Trauma patients who are in arrest and are > 15 minutes away from a Trauma Center shall be transported to the closest Emergency Department

- **STEMI Alert:**
  - Shall be transported to the closest STEMI facility Percutaneous Coronary Intervention (PCI) capable
  - If ground transport is > 45 minutes, consider the use of an air-medical asset
  - **All** *'STEMI Alerts' shall be made through Horry County E911*

- **Stroke Alert:**
  - Any patient with a positive stroke scale with a RACE score ≥ 4 **AND** a last known well time ≤ 24 hours shall be transported to a comprehensive stroke center as long as transport time is ≤ 30 minutes
    - If transport time is > 30 minutes it is appropriate to transport to a primary stroke center
  - Any patient with a RACE Score < 4 **AND** a last known well time ≤ 24 hours shall be transported to an Acute Stroke Center
    - **Exception**: Known terminal illness (DNR) or hospice care patients can still be treated as a **STROKE ALERT**. Transport these patients to the closest stroke center (Primary OR Comprehensive)
  - *'Stroke Alert' shall be made to the receiving facility during your radio report*

- **Sepsis Alert:**
  - Any patient meeting Sepsis Criteria can be transported to any Emergency Department
    - Blood draws and pre-hospital antibiotic therapy shall only be done for patients being transported to participating receiving facilities
      - *Grand Strand Health*
      - *McLeod Health*
      - *Conway Medical Center*
  - *'Sepsis Alert' shall be made to the receiving facility during your radio report*

Information

- All air-medical requests are to be made through Horry County E911
- Landing Zones (LZ) briefing, patient update, and any communication(s) with the air-medical asset being utilized is to be conducted on the 'Air-Ops' channel (TAC 10)

Adult and Pediatric

- **Air Medical Operational Criteria:**
  - Pre-hospital scene extrication time > 15 minutes
  - Pre-hospital ground transport time to a trauma center > 35 minutes (Level I or Level II trauma)
  - Pre-hospital ground transport time to a PCI center > 45 minutes (request air-medical asset early)
  - Mass Casualty Incidents (MCI) involving multiple patients with traumatic injuries
  - Provider Discretion:
    - Need for critical care, i.e. blood products, ventilator, etc.

- **Air Medical Shall Not Be Utilized For The Following:**
  - Bariatric patients known or estimated to exceed the air-medical assets capabilities
  - Patients who are unable to lay supine
  - Patients who are combative and cannot be physically and/or chemically restrained
  - Haz-Mat contaminated patient

Adult and Pediatric

Airway

- Nasopharyngeal Airway (NPA):
  - Semi-conscious patients with an intact gag reflex shall have a nasopharyngeal airway inserted, unless the following contraindications are present:
    - Signs of basilar skull fracture

- Oropharyngeal Airway (OPA):
  - Unresponsive patients without a gag reflex shall have an oropharyngeal airway inserted, unless the following contraindications are present:
    - Presence of a gag reflex

Oxygen Administration

- **DO NOT** withhold oxygen if the patient is dyspneic or hypoxic
  - Oxygen saturation
    - Maintain oxygen saturation of **94%** for **ALL** patients except:
      - COPD and Asthma
    - Maintain oxygen saturation of **90%** for:
      - COPD & Asthma
- Oxygen Administration
  - 2Lpm Nasal Cannula (NC)
    - All stroke patients in order to maintain oxygen saturation of 94%
  - 15Lpm via non-rebreather mask (NRB) regardless of oxygen saturation
    - All 3rd trimester pregnancy trauma patients
    - All head injury patients
    - Decompression sickness
    - Carbon Monoxide exposures
    - Cyanide exposures
  - If oxygen saturation cannot be maintained, ventilatory support should be provided

Circulation

- **Adult**
  - Carotid and radial pulse present, assess capillary refill, assess skin color, condition and temperature
  - If no pulse is present, refer to Cardiac Arrest Guideline
- **Pediatric**
  - Carotid and radial pulse present (brachial in infants), assess capillary refill, and assess skin color, condition and temperature
  - If no pulse is present, refer to Cardiac Arrest Guideline
  - Refer to Bradycardia Guideline for pediatric patients found with slow pulse rate and signs of poor perfusion

Adult and Pediatric

- **Allergic Reaction**
  - Allergic reactions are characterized by any of the following:
    - General urticaria
    - Airway, tongue, or facial swelling, respiratory distress, bronchospasm, nausea, vomiting, or diarrhea
    - Loss of radial pulse or SBP <90mm Hg
  - Determine the source of the allergic reaction (food, insect, medication?)
  - If patient presents with airway swelling, respiratory distress, bronchospasm, tongue and/or facial swelling, loss of radial pulse or SBP of <90 mm Hg:
    - Administer adult patients with epinephrine kit (0.3mg) intramuscular (IM)
      - Administer pediatric patients with epinephrine kit (0.15mg) intramuscular (IM)

- **Overdose/Poisoning**
  - Try to identify source of the overdose/poisoning
  - Administer 2mg Narcan via intranasal (IN) if respiratory compromise is present.
  - Call Poison Control – **1 (800) 922-1117**

- **Seizures**
  - Consider the possible causes:
    - Meningitis
    - Fever
    - Head trauma
    - Hemorrhagic stroke
    - Drugs
    - Alcohol
    - Diabetes
    - Poisoning
    - If actively seizing, protect the patient from injury.

- **Altered Mental Status**
  - Check and record Blood Glucose Level (BGL)
  - If BGL is <60mg/dL **AND** patient is able to protect their airway/swallow:
    - Oral Glucose
      - One tube if alert and able to swallow and protect airway
        - may repeat once
          - Contraindications
            - Patients who cannot maintain a patient airway
            - Patients <2 years of age

Information

- Any patient restrained by law enforcement device(s) (e.g. handcuffs, shackles) cannot be transported in the ambulance without a law enforcement officer in the patient compartment who is capable of removing the device(s)
- If an asthmatic patient is exposed to pepper spray and released to law enforcement, all parties should be advised to immediately recontact EMS if wheezing/ difficulty breathing occurs
- All patients in police custody retain the right to request transport
    - **This should be coordinated with law enforcement**

Adult and Pediatric

Basic

- ***If patient is exposed to pepper spray:***
    - Assess airway
        - If wheezing is present:
            - Coordinate transport with law enforcement officer
            - **Albuterol –** 5mg nebulized
    - Irrigate face/ eyes
        - Use sterile water or saline
    - Remove contaminated clothing
    - Assist or have patient remove any contact lenses
- ***If patient was tased:***
    - Assess the entry point of Taser probes
    - Assess for any injury from falls
        - Consider spinal precautions
    - Remove probes
        - Apply bandages or dressing if necessary
    - Cardiac monitoring with 12 lead acquisition
        - Only if patient has a history of a pacemaker **OR** if experiencing chest pain / palpitations
        - 12 lead interpretation by paramedic or transmission to receiving hospital

Vascular Access

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- Assess the need for vascular access:
  - Emergent or potentially emergent medical conditions
  - Traumatic injuries
- In the setting of cardiac arrest, any preexisting dialysis shunt or external central venous catheter may be used
- Intraosseous with the appropriate adult or pediatric should be used in the event peripheral access is unattainable
- Any prehospital fluids or medications approved for IV use, may be given through an intraosseous line
- Any venous catheter which has already been accessed prior to EMS arrival may be used
- If Vascular access is obtained by a pre-hospital advanced provider, Care/transport shall not be downgraded to a BLS level
- Lower extremity IV sites are discouraged in patients with vascular disease or diabetes
- In post-mastectomy patients avoid IV, blood draw, injection, or blood pressure in arm on affected side, if at all possible

Adult and Pediatric

Basic

- Monitor IV with saline lock:
  - Only if in place prior to EMS arrival
  - i.e. Doctor office, home health care, nursing home, free standing ER's

Advanced

- Assess and obtain a Peripheral IV
  - Upper extremity IV sites are preferable to lower extremity sites
- External Jugular (EJ) lines can be attempted initially in life-threatening events where no obvious peripheral site is noted
  - Contraindicated in pediatric patients
- Intraosseous (IO) Access should be obtained in the event that peripheral and external jugular access is unsuccessful
  - For conscious IO access consider
    - **Adult - Lidocaine -** 40mg Slow IO push (120sec)
    - **Pediatrics - Lidocaine -** 0.5mg/kg Slow IO push (120sec)
      - Max total dose 20mg
- In the event of cardiac arrest:
  - May utilize an already accessed central line catheter
- Monitor non-medicated infusions

Paramedic

- In the event of cardiac arrest:
  - May access percutaneous central catheter
- Monitor medicated infusions

Medical Control

- Must be contacted after three (3) unsuccessful attempts with **ANY** of the above methods

Indwelling Central lines

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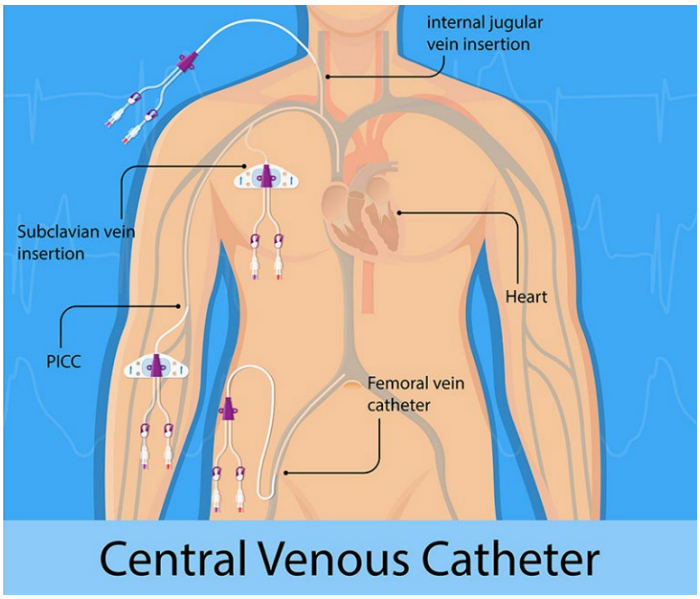
Information

- Use an aseptic technique when manipulating an indwelling catheter
- DO NOT place a tourniquet or BP cuff on the same side where a PICC line is located
- DO NOT attempt to force catheter open if occlusion evident
- Some infusions may be detrimental to stop
  - Ask family or caregiver if it is appropriate to stop or change infusion
- Hyperalimentation infusion (IV nutrition) complications:
  - If stopped for any reason, monitor for hypoglycemia
- This protocol is for the management of patients with an **EMERGENCY** that involves problems with a central Line. It is **NOT** intended for Interfacility Transport (IFT) of patients with a central line

Adult and Pediatric

Basic

- Assess airway and breathing
  - Refer to Airway Management Guideline
- Control any external bleeding
- ***STOP infusion if:***
  - Damage to catheter
    - Clamp the catheter proximal to disruption
      - May use hemostat wrapped in gauze
  - Catheter completely or partially dislodged
    - Apply direct pressure around the catheter
  - Suspected air embolus, tachypnea, dyspnea, chest pain
    - Place patient on left side in head down position
    - Clamp catheter
  - Swelling at the catheter site
    - Apply direct pressure around catheter
- ***If no signs or symptoms of the above:***
  - Continue infusion
    - Continually monitor for any changes



Central Venous Catheter

Chest Pain / STEMI

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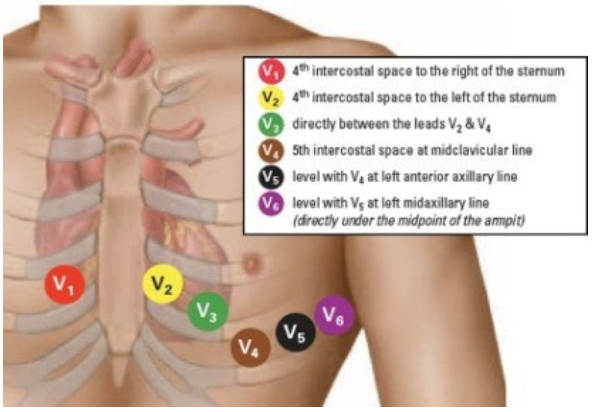
Information

- STEMI symptoms may be various and include:
  - Discomfort of the chest, arm neck, back, shoulder or jaw
  - Syncope or near syncope
  - General weakness
  - Unexplained diaphoresis
  - Shortness of breath
  - Nausea/ vomiting
- **STEMI Alert Criteria:**
  - ST-segment elevation in 2 or more contiguous leads:
    - 1mm or greater of ST-segment elevation
  - All STEMI alerts shall be transported to a Percutaneous Coronary Intervention (PCI) Center
- **Common STEMI imposters:**
  - Left Bundle Brand Block (QRS complexes > 0.12 or 3 small boxes)
  - Pacemaker with QRS complexes > 0.12 / 3 small boxes
  - Left Ventricular Hypertrophy (LVH)
    - Count the small boxes of V1 and V2 (S wave) the largest negative deflection from the isoelectric line (whichever is larger)
    - Count the small boxes of V5 or V6 (R wave) the largest positive deflection from the isoelectric line (whichever is larger)
    - Add the 2 together, if the result is >35, suspect Left Ventricular Hypertrophy (LVH)
  - Early repolarization
- Patient presentations indicative of myocardial ischemia that **DO NOT** meet STEMI Alert criteria should still be transported to a PCI Center

I Lateral	aVR	V1 Septal	V4 Anterior
II Inferior	aVL Lateral	V2 Septal	V5 Lateral
III Inferior	aVF Inferior	V3 Anterior	V6 Lateral



Adult

Basic

- Cardiac monitoring with 12 lead acquisition
  - Interpretation by paramedic or transmitted to receiving facility
  - Placement of D-Fib pads
    - ***Be sure to place pads so that the wires go behind the patient's head***
- Continuous monitoring of oxygen saturation in conjunction with Capnography
  - **Oxygen –** 1-15Lpm NC/NRB
    - Maintain oxygen saturation of > 93%
- **Aspirin –** 324mg PO
  - Administer four (4) 81mg chewable baby aspirin

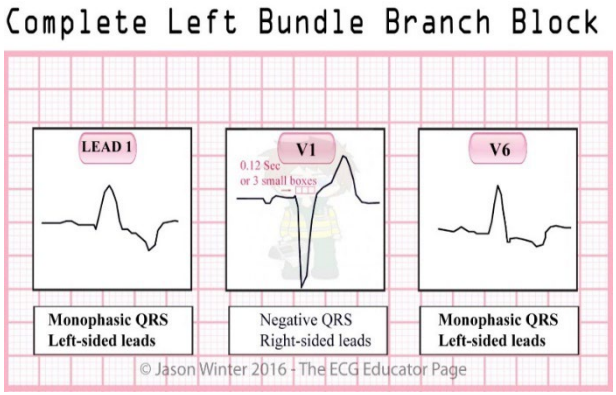
- **Nitroglycerin –** 0.4mg SL
  - Must have a SBP > 100mmHg
    - May repeat three (3) times every 3-5 minutes

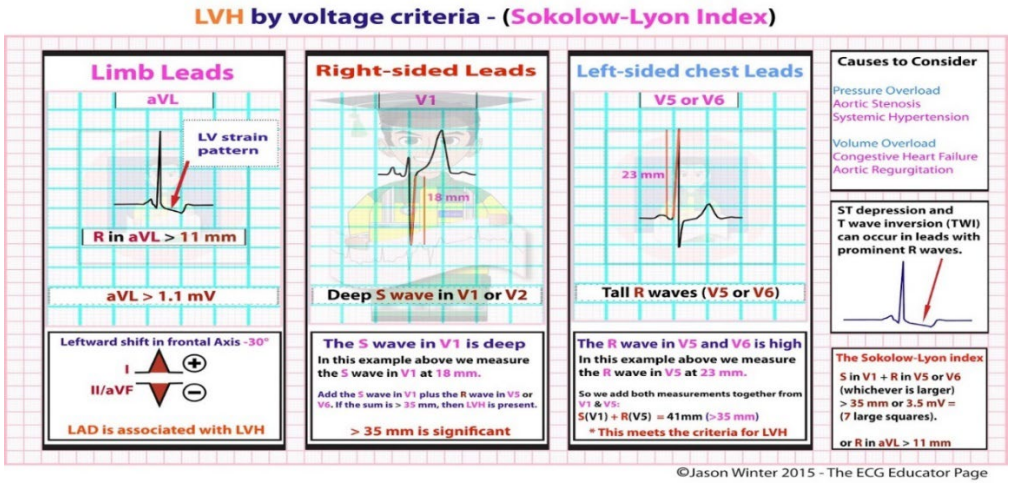
Advanced

- **Vascular Access –** IV/IO
  - Preferably two (2) large bore
    - If possible avoid right hand / wrist sites
- ***If hypotensive and lung sounds are clear:***
  - **Normal Saline –** 20mL/kg
    - Assess lung sounds and blood pressure frequently
- **Zofran –** 4mg IV/IO
  - May repeat once

Paramedic

- **Morphine** – 0.1mg/kg up to 5mg IV/IO
  - May repeat once 5 minutes
    - Patients systolic blood pressure must be ≥ 100
    - Max total dose of 10mg





CHF / Pulmonary Edema

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Information

- **Signs and Symptoms**
  - Hypertension
  - Tachycardia
  - Orthopnea (SOB while lying flat)
  - Rales
- Consider myocardial infarction in patients
  - Diabetics and geriatrics patients often have atypical pain, or only generalized complaints
- If patient is febrile or from a nursing home and pneumonia is suspected **withhold** Nitrates

Adult

Basic

- Continuous oxygen saturation monitoring in conjunction with capnography readings
  - **Oxygen –** To maintain oxygen saturation of > 94%
- **CPAP –** 5cm h_2O
  - Be sure the patient is alert and has a patent airway
    - **Adjustments made by PARAMEDIC ONLY**
- Cardiac monitoring with 12 lead acquisition
  - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Vascular access:** IV/IO

Paramedic

- **Hamilton T1 Ventilator (CPAP)**
  - Consider utilizing ventilator at PEEP of 8cm h_20
  - May Adjust PEEP as needed to a max of 15cm h_2o
- **Nitroglycerin –** 0.4mg sublingually
  - Initial dose 1.2mg in conjunction with CPAP
    - May repeat 0.4mg 2 (2) times as needed
    - Patients' blood pressure must be ≥ 110 systolic
      - Monitor blood pressure and lung sounds frequently
  - **Versed –** 2mg IV/IO
    - May repeat 3 times with a total max dose of 6mg **OR**
    - 4mg IM
      - May repeat 2mg IM after 5 minutes as needed

Medical Control

- **REQUIRED FOR ALL PEDIATRIC PATIENTS**

Hypertensive Emergency

Information

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- **Signs and Symptoms**
  - Systolic blood pressure ≥ 220

    OR

  - Diastolic Blood pressure ≥ 120

    AND one of the following:

    - Headache
    - Nosebleed
    - Blurred vison
    - Dizziness
    - Chest pain
    - Shortness of breath
    - Altered mental status
    - Hematuria
- Never treat elevated blood pressure based on one set of vital signs
- All symptomatic patients with hypertension should be transported with their heads elevated
- Hypertensive emergency is based on blood pressure along with symptoms which suggest an organ is suffering damage such as MI, CVA, or renal failure.
  - Use extreme caution when treating elevated blood pressure as it can cause more harm to the patient
  - Specific complaints such as chest pain, dyspnea, pulmonary edema or altered mental status should be treated based on specific protocols
- If respiratory distress consider respiratory distress guideline
- Check blood pressure in both arms with two (2) separate occasions, five (5) minutes apart

Adult

Basic

- Cardiac monitoring with 12 lead acquisition
  - Interpretation by paramedic or transmitted to receiving facility

Headache or Altered Mental Status

Advanced

- **Vascular Access –** IV/IO

Paramedic

Medical Control

- **Labetalol –** 10mg slow IV (over 2 minutes)
  - Only if patient has a sustained heart rate above 70bpm
  - May repeat every 10 minutes to a max of 30mg

Hypotension

Information

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- Hypotension can be defined as a systolic blood pressure of less than 90mmHg
    - This is not always reliable and should be interpreted in context and patients typical Blood pressure if known
- **Signs and Symptoms**
    - Restlessness, confusion
    - Weak, rapid pulse
    - Pale, cool, clammy skin
    - Delayed capillary refill
    - Coffee – ground emesis and/ or tarry stools
- Repeat vital signs AFTER each bolus or change in pharmacologic therapy
    - Assess lung sounds frequently
- Consider the following causes for hypotension:
    - **Hypovolemic** – Hemorrhage, trauma, GI bleeding, ruptured aortic aneurysm or pregnancy related bleeding
    - **Cardiogenic** – Heart Failure, MI, cardiomyopathy, myocardial contusion, ruptured ventricle/septum/valve, toxins
    - **Distributive** – Sepsis, anaphylactic, neurogenic (warm, dry, pink, skin with normal capillary refill time and typically alert)
    - **Obstructive** – Pericardial tamponade, pulmonary embolus, tension pneumothorax
        - Signs may include hypotension with distended neck veins, tachycardia, unilateral decreased breath sounds or muffled heart tones
    - **Acute Adrenal Insufficiency** – Body cannot produce enough steroids
        - Presents as hypotension with nausea, vomiting, dehydration, and/ or abdominal pain

Adult

Advanced

- **Normal Saline –** 20mL/kg
    - May repeat as needed max total volume or 2 liters
    - Maintain a systolic blood pressure of 90mmHg or a MAP greater than 80
        - Reassess lung sounds and blood pressure frequently

Paramedic

- If patient remains hypotensive after fluid bolus
    - **Push Dose Pressor Epinephrine (1:100,000)**
        - Dilute: Discard 9mL of Epi 1:10,000 (0.1mg/mL) and draw up 9mL of Normal saline to create push dose pressor. This will yield 10mcg/mL
            - ADMINISTER: 1mL/minute, IV/IO titrate to maintain systolic blood pressure
            - May repeat two (2) times as needed total max dose 300mcg (30mL)
    - Consider vasopressor infusion
        - **Epinephrine –** 2-10mcg/min IV/IO
- If suspected acute adrenal insufficiency:
    - **Solumedrol –** 125mg IV/IO

Pediatrics

Advanced

- **Normal Saline –** 20mL/kg
  - May repeat three (3) times, maximum total boluses 60mL/kg
  - Reassess lung sounds and blood pressure frequently

Paramedic

- If patient remains hypotensive after fluid bolus
  - **Push dose pressor epinephrine (1:100,000)**
    - Dilute: Discard 9mL of Epi 1:10,000 (0.1mg/mL) and draw up 9mL of normal saline to create push dose pressor. This will yield 10mcg/mL
      - ADMINISTER: 1mL/minute, IV/IO titrate to maintain systolic blood pressure
      - May repeat two (2) times as needed total max dose 300mcg (30mL)
  - Consider vasopressor infusion
    - **Epinephrine –** 2-10mcg/min IV/IO

General Vital Signs and Guidelines

Age	Heart Rate (beats/min)	Blood Pressure (mmHg)	Respiratory Rate (breaths/min)
Premature	110-170	SBP 55-75 DBP 35-45	40-70
0-3 months	110-160	SBP 65-85 DBP 45-55	35-55
3-6 months	110-160	SBP 70-90 DBP 50-65	30-45
6-12 months	90-160	SBP 80-100 DBP 55-65	22-38
1-3 years	80-150	SBP 90-105 DBP 55-70	22-30
3-6 years	70-120	SBP 95-110 DBP 60-75	20-24
6-12 years	60-110	SBP 100-120 DBP 60-75	16-22
> 12 years	60-100	SBP 110-135 DBP 65-85	12-20

Bradycardia

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Information

- Bradycardia is defined as a heart rate < 50 beats per minute
- Symptomatic bradycardia is defined as a heart rate < 50 beats per minute with any of the following:
    - Hypotension, altered mental status, chest pain, acute CHF, seizures, syncope
- If vascular access is problematic and the patient is symptomatic, initial therapy with external pacing may be warranted
- In the presence of Myocardial Infarction do NOT give Atropine if there is a Wide Complex rhythm
- Go directly to transcutaneous pacing for unstable bradycardia in the presence of a myocardial infarction as Atropine increases myocardial ischemia and may increase the size of the infarct
- Consider treatable causes for bradycardia:
    - Beta blocker Overdose
    - Calcium Channel Blocker Overdose

Adult

Basic

- Continuous oxygen saturation monitoring in conjunction with capnography readings
    - **Oxygen –** To maintain an oxygen saturation of > 94%
- Cardiac Monitoring with 12 lead acquisition
    - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- ***If Asymptomatic:***
    - **Vascular access:** IV/IO
- ***If Symptomatic:***
    - **Normal Saline –** 20mL/kg
        - Titrated to maintain desired blood pressure
            - Reassess lung sounds and blood pressure frequently

Paramedic

- ***If Asymptomatic:***
    - Monitor and transport
- ***If Symptomatic:***
    - **Atropine –** 1.0mg IV/IO
        - May repeat every 3-5 minutes
            - Max total dose 3mg

Adult

- ***If patient deteriorates or hypotension persists after two (2) doses of Atropine:***
  - **Transcutaneous pacing –** 60 beats per minute
    - Increase milliamps until mechanical and electrical capture is gained
      - Increase the rate as needed until the patient is hemodynamically stable
- **Versed –** 2mg IV/IO
  - May repeat 3 times with a total max dose of 6mg **OR**
  - 2mg IN (1mg per nostril) **OR**
  - 4mg IM (May repeat 2mg IM after 5 minutes as needed)
    - Use caution in persistent hypotension patients
- ***If patient remains hypotensive after atropine or transcutaneous pacing***
  - **Push Dose Pressor Epinephrine (1:100,000)** – 1mL/minute IV/IO
    - Discard 9mL of Epi 1: 10,000 (0.1mg/mL) and draw up 9mL of normal saline to create push dose pressor Epi 1: 100,000 this will yield 10mcg/mL
      - Administer 1mL/minute IV/IO titrate to maintain SBP 100mmHg
        - May repeat 2x as needed Max total dose of 300mcg (30mL)

Pediatric

Basic

If Asymptomatic:

- Continuous oxygen saturation monitoring in conjunction with Capnography readings
  - **Oxygen –** To maintain oxygen saturation of > 94%
    - Ensure adequate oxygenation first, as hypoxia is most likely to be the cause of the bradycardia
- Cardiac Monitoring with 12 lead acquisition
  - 12 lead interpretation by paramedic or transmitted to receiving facility
- ***If Symptomatic:***
  - **Oxygen –** Provide BVM ventilations
    - **Neonates –** One (1) Breath every three (3) seconds for at least 30 seconds
    - **Infants/Children –** One *(*1) breath every three (3) seconds for at least one (1) minute
  - **Chest compressions:**
    - If patient remains unstable after ventilations and the heart rate remains below 60 beats per minute

Advanced

- ***If Asymptomatic:***
  - **Vascular access:** IV/IO
- ***If Symptomatic:***
  - **Normal Saline –** 20mL/kg
    - Titrated to age appropriate blood pressure
      - Utilize commercially approved pediatric resuscitation system
    - Reassess lung sounds and blood pressure frequently

Pediatric

Paramedic

- ***If Asymptomatic:***
  - Monitor and transport
- ***If Symptomatic:***
  - **Atropine –** 0.02mg/kg IV/IO (minimum dose of 0.1mg)
    - Max single dose 0.5mg
      - May repeat once with a max total dose of 1mg
- ***If no response to oxygenation, ventilation, and chest compression:***
  - **Push Dose Pressor Epinephrine –** 1mL/minute IV/IO
    - Discard 9mL of Epi 1: 10,000 (0.1mg/mL) and draw up 9mL of normal saline to create push dose pressor Epi 1: 100,000 this will yield 10mcg/mL
      - Administer 1mL/minute IV/IO titrate to maintain SBP 100mmHg
      - May repeat 2x as needed
      - Max total dose 30mcg (30mL)
- ***If bradycardic and age appropriate hypotension persists after initial dose of Epinephrine:***
  - **Transcutaneous pacing –** 80 beats per minute
    - Increase milliamps until mechanical and electrical capture is gained
      - Increase the rate as needed until the patient is hemodynamically stable
  - **Versed –** 0.1 mg/kg IV/IO
    - May repeat 3 times with a total max dose of 6mg **OR**
    - 0.2mg IN (1mg per nostril) **OR**
    - 0.2mg IM (may need two (2) different IM sites)
      - Max total dose 6mg
      - Use caution in persistent hypotension patients

General Vital Signs and Guidelines

Age	Heart Rate (beats/min)	Blood Pressure (mmHg)	Respiratory Rate (breaths/min)
Premature	110-170	SBP 55-75 DBP 35-45	40-70
0-3 months	110-160	SBP 65-85 DBP 45-55	35-55
3-6 months	110-160	SBP 70-90 DBP 50-65	30-45
6-12 months	90-160	SBP 80-100 DBP 55-65	22-38
1-3 years	80-150	SBP 90-105 DBP 55-70	22-30
3-6 years	70-120	SBP 95-110 DBP 60-75	20-24
6-12 years	60-110	SBP 100-120 DBP 60-75	16-22
> 12 years	60-100	SBP 110-135 DBP 65-85	12-20

Supraventricular Tachycardia (SVT)

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Information

- The distinction between Sinus Tachycardia (ST) and Supraventricular Tachycardia (SVT) can be difficult at very rapid rates. Utilize the following criteria to assist in determination of Sinus Tachycardia vs SVT:
    - SVT will generally have no discernible P-waves or there may be P-waves just after the QRS complex
    - History that favors Sinus Tachycardia (e.g. Dehydration, fever, pain, anxiety, physical activity, exertional heat stroke, etc.)
    - If converted with Cardioversion:
        - If indicated, synchronized cardioversion at last joule setting
            - Increase joules for additional cardioversion attempts to a max of
                - 360J for adult
                - 2J/kg for pediatrics
- Adult:
    - QRS width < 0.12 (3 small boxes)
    - Rate > 150 beats per minute after Sinus Tachycardia has been ruled out
- Pediatric:
    - QRS width < 0.09 (2 small boxes)
    - SVT in pediatrics is considered > 180 beats per minute
    - SVT in infants is considered > 220 beats per minute

Adult

Basic

- Continuous oxygen saturation monitoring in conjunction with Capnography readings
    - **Oxygen –** To maintain oxygen saturation of > 94%
- Cardiac Monitoring with 12 lead acquisition
    - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Vascular access:** IV/IO
    - Preferably proximal antecubital large bore
- **Normal Saline –** 20mL/kg
    - Titrated to maintain desired blood pressure

Paramedic

- ***Stable (SBP > 90mmHg, AAOx4):***
    - **Valsalva or other vagal maneuver**
        - Shall be performed as initial treatment
            - Consider elevating the legs
    - **Adenosine (If rhythm is regular or undeterminable) –** 6mg Rapid IV push
        - Administer simultaneously with a 20mL normal saline flush
            - If no conversion administer second dose of 12mg Rapid IV push
        - Continuous printing of 3 lead cardiac monitoring prior to and during administration of the above medication

Adult

If SVT fails to convert OR Adenosine is contraindicated OR patient has a history of atrial dysrhythmias

- **Cardizem (Diltiazem) –** 10 - 20mg IV/IO over 2 minutes
  - May repeat once as needed

- ***Unstable (Hypotensive SBP < 90mmHg, Altered Mental Status):***
  - **DO NOT DELAY CARDIOVERSON** for vascular access
  - **Versed –** 2mg IV/IO
    - May repeat 3 times with a total max dose of 6mg **OR**
  - 2mg IN (1mg per nostril) **OR**
  - 4mg IM
    - May repeat 2mg IM after 5 minutes as needed
  - **Synchronized Cardioversion:** 100J, 200J, 300J, 360J
    - Document all rhythm changes
    - Continuous cardiac monitoring for any changes

Pediatric

Basic

- Continuous oxygen saturation monitoring in conjunction with Capnography readings
  - **Oxygen –** To maintain oxygen saturation of > 94%
- Cardiac Monitoring with 12 lead acquisition
  - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Vascular access:** IV/IO
  - Preferably proximal Antecubital large bore
- **Normal Saline –** 20mL/kg
  - Titrate to a commercially approved pediatric resuscitation system

Paramedic

- ***Stable (Normotensive, alert and oriented to person, place, and time):***
  - **Adenosine (If rhythm is regular or undeterminable) –** 0.2mg/kg rapid IV push
    - Administer simultaneously with a 20mL normal saline flush
    - Continuous printing of 3 lead cardiac monitoring prior to and during administration of the above medication
      - If no conversion noted review rhythm strip to determine if rhythm is regular/irregular

Pediatric Continued…

Pediatrics

- **Unstable (Hypotensive, Altered Mental Status):**
  - **DO NOT DELAY CARDIOVERSON** for vascular access
  - **Versed –** 0.1-0.2mg/kg IV/IO/IM/IN
    - IN administration preferred
    - May repeat 3 times with a total max dose of 6mg
    - 6mg IM (will require two (2) different IM sites)
  - **Synchronized Cardioversion:** 0.5j/kg, 1J/kg, 2J/kg
    - Document all rhythm changes
    - Continuous cardiac monitoring for any changes

Wide Complex Tachycardia

Information

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- **Signs and Symptoms**
  - Ventricular tachycardia on ECG
  - Conscious, rapid pulse
  - Chest pain, shortness of breath
  - Dizziness
  - Rate usually 150-180 bpm for sustained V-tac
  - QRS > .12 (3 small boxes)
- Polymorphic V-Tach (torsade's de points) may benefit from the administration of magnesium sulfate
- If presumed hyperkalemia (end-stage renal disease, dialysis, etc.), administer sodium bicarbonate
- Adenosine should NOT be given for unstable or for irregular or for polymorphic wide-complex tachycardia's as it may cause degeneration of the arrhythmia to ventricular fibrillation
- Adenosine should be avoided in Wolff-Parkinson-White syndrome
- If conversion to normal sinus rhythm form Wide Complex Tachycardia:
  - Obtain 12 lead
  - Monitor for any changes
  - If converted with Cardioversion
    - Continue with synchronized cardioversion at set joules
      - May increase joules as needed

Adult

Basic

- Continuous oxygen saturation monitoring in conjunction with Capnography readings
  - **Oxygen –** To maintain an oxygen saturation of > 94%
- Cardiac Monitoring with 12 lead acquisition
  - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Vascular Access:** IV/IO
  - Preferably proximal antecubital large bore
- **Normal Saline –** 20mL/kg
  - Titrated to maintain desired blood pressure

Paramedic

- ***Stable (Normotensive, alert and oriented to person, place, and time):***
  - **Adenosine –** 6mg Rapid IV/IO
    - May repeat once 12mg Rapid IV/IO
    - For regular monomorphic rhythm
    - Administer simultaneously with a 20mL normal saline flush
    - Continuous printing of 3 lead cardiac monitoring prior to and during administration of the above medication
  - **Amiodarone –** 150mg IV/IO infusion over 10 minutes

Adult

- ***Unstable (Hypotensive, Altered Mental Status):***
  - **DO NOT DELAY CARDIOVERSON** for vascular access
  - **Versed –** 2mg IV/IO
    - May repeat 3 times with a total max dose of 6mg
    - 4mg IM
      - May repeat 2mg IM after 5 minutes as needed
  - **Synchronized Cardioversion:** 100J, 200J, 300J, 360J
    - May repeat 360J until successfully converted
      - If wide complex tachycardia converts with cardioversion and later returns to a wide complex tachycardia, use the last successful energy setting and increase as needed

Pediatric

Basic

- Continuous oxygen saturation monitoring in conjunction with capnography readings
  - **Oxygen –** To maintain an oxygen saturation of > 94%
- Cardiac monitoring with 12 lead acquisition:
  - **(QRS ≥ 0.09 or 2.25 small boxes)**
  - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Vascular Access:** IV/IO
  - Preferably proximal antecubital large bore
- **Normal Saline –**20mL/kg
  - Titrated to maintain desired blood pressure

Paramedic

- **Stable (Normotensive, alert, and oriented to person, place, and time):**
  - **Adenosine –** 0.2mg/kg rapid IV/IO
    - For regular monomorphic rhythm
    - Administer simultaneously with a 20mL normal saline flush
    - Continuous printing of 3 lead cardiac monitoring prior to and during the administration of Adenosine
  - **Amiodarone –** 5mg/kg IV/IO infusion over 10 minutes
    - Max total dose of 300mg
- ***Unstable (Hypotensive, Altered Mental Status):***
  - **DO NOT DELAY CARDIOVERSON** for vascular access
  - **Versed –** 0.1-0.2mg/kg IV/IO/IM/IN
    - Max per dose 2mg
    - May repeat 3 times with a total max dose of 6mg
    - 2mg Intranasal

Pediatric

- **Synchronized Cardioversion:** 0.5j/kg, 1J/kg, 2J/kg
  - Document all rhythm changes
  - Continuous cardiac monitoring for any changes
    - If wide complex tachycardia converts with cardioversion and later returns to a wide complex tachycardia, use the last successful energy setting and increase as needed

Cardiac Arrest

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Information

- **Signs and Symptoms**
  - Unresponsive
  - Apneic
  - Pulseless
- Reassess airway frequently and with every patient move
- Adequate compressions with timely defibrillation are the keys to success
- While limiting the interruption of chest compression, deploy the LUCAS 3 device to aid in crew resource management
- Sodium Bicarbonate and Calcium Chloride / Gluconate should not be mixed
  - Give in separate IV/IO lines

Adult

Basic

- ***If witnessed cardiac arrest:***
  - Apply AED and analyze rhythm
- ***If unwitnessed cardiac arrest:***
  - Begin manual high quality CPR **OR** utilize the LUCAS 3 device (**NOT** indicated in Traumatic arrests)
    - Compression to ventilation ratio 30:2
    - 100-120 compressions per minute
- **Airway Management:**
  - Provide BVM ventilations in conjunction with one of the following:
    - OPA
    - NPA
    - King supraglottic
    - I-Gel supraglottic
  - Continuous capnography and oxygen saturation **required** for **ALL** airway devices

Advanced

- **Vascular Access –** IV/IO
  - External Jugular preferred over peripheral access
- **Normal Saline –** 20mL/kg
  - May repeat as needed
- **D_{10} -** (25G/250mL)
  - Infuse 250mL IV/IO bolus wide open (25g)
    - Administer as needed during H's & T's assessment
- **If PEA/Asystole/V-Fib/Pulsless V-Tach:**
  - **Epinephrine 1:10,000 -** 1mg IV/IO
    - First Dose only

Paramedic

- ***If pulseless V-Fib/V-Tach rhythm:***
  - **Epinephrine 1:10,000 –** 1mg IV/IO
    - Every 3-5 minutes
  - **Defibrillation –** 200J, 300J, 360J
    - Administer once rhythm has been determined during rhythm check
  - **Consider antiarrhythmic:**
    - **Amiodarone –** 300mg IV/IO
      - May repeat once at 150mg if persistent v-fib/v-tach
    - **Lidocaine –** 1.5mg/kg IV/IO
      - May repeat once half (1/2) of the initial dose
  - **Airway management –** Intubation
    - Consider Intubation when BVM ventilations are not effective with basic/supraglottic airway devices

Pediatric

Basic

- ***If witnessed cardiac arrest:***
  - Apply AED and analyze rhythm
- ***If unwitnessed cardiac arrest:***
  - Begin manual high quality CPR
    - Compression to ventilation ratio 30:2
    - 100-120 compressions per minute
- **Airway Management:**
  - Provide BVM ventilations in conjunction with one of the following:
    - OPA
    - NPA
    - King supraglottic
    - I-Gel supraglottic
  - Continuous capnography and oxygen saturation **required** for **ALL** airway devices

Advanced

- **Vascular Access –** IV/IO
  - External Jugular preferred over peripheral access
- **Normal Saline –** 10mL/kg
  - May repeat as needed
- **Dextrose 10% -** (25G/250mL) IV/IO
  - Pediatric dose of 0.5mg/kg up to 25G (5mL/kg)
    - Draw up desired volume into a syringe and administer via slow IV/IO push
      - Administer as needed during H's & T's assessment
- If **PEA/Asystole/V-Fib/Pulsless V-Tach:**
  - **Epinephrine 1:10,000** - 0.01mg/kg IV/IO
    - First Dose only

Paramedic

- ***If PEA/Asystole rhythm:***
  - **Epinephrine 1:10,000 –** 0.01mg/kg IV/IO
    - Every 3-5 minutes
- ***If pulseless V-Fib/V-Tach rhythm:***
  - **Epinephrine 1:10,000 –** 0.01mgkg IV/IO
    - Every 3-5 minutes
  - **Defibrillation –** 2J/kg, 4J/kg, 6J/kg
    - Administer once rhythm has been determined during rhythm check
  - **Consider antiarrhythmic:**
    - **Amiodarone –** 5mg/kg IV/IO
      - May repeat up to 3 total doses for refectory VF/pulseless VT
  - **Airway management –** Intubation
    - Consider Intubation when BVM ventilations are not effective with basic/supraglottic airway devices

Medical Control

- If patient meets criteria to discontinue Cardio Pulmonary Resuscitation efforts

H's			T's		
Causes	**Signs**	**Treatment**	**Causes**	**Signs**	**Treatment**
Hypovolemia	-Rapid heart rate -Narrow QRS -Blood loss	-Obtain IO/IV Access -Administer fluid/blood -Use fluid challenge	Tamponade (Cardiac)	-Rapid heart rate -Narrow QRS -JVD -No pulse -Muffled heart sounds	-Pericardiocentesis -Thoracotomy
Hypoxia/ Hypoxemia	-Slow heart rate -Cyanosis	-Ensure airway is open -Ventilate -Ensure oxygen supply is adequate	Toxins	-Prolonged QT interval	-Based on overdose agent -Supportive care
Hydrogen Ion Excess (Acidosis)	-Low amplitude QRS complex	-Atriel blood gas -Provide adequate ventilations -Sodium bicarbonate (metabolic)	Tension Pneumothorax	-Slow heart rate -Narrow QRS -Unequal breathing -JVD -Tracheal deviation	-Needle decompression -Insertion of a chest tube
Hypokalemia/ Hyperkalemia	-Flattened T waves & a U wave (Hypokalemia) -Peaked T waves & a widened QRS (Hyperkalemia)	-Ventilate (respiratory) -Sodium bicarbonate (metabolic)	Thrombosis (Pulmonary)	-Rapid heart rate -Narrow QRS -Shortness of breath -Decreased oxygen -Chest pain	-Embolectomy -Fibrinolytic therapy -Anticoagulant therapy
Hypothermia	-Shivering -Previous exposure to cold temperatures	-Active warming measures -Temperature should be above 30°C	Thrombosis (Coronary)	-Abnormal ECG	-Angioplasty -Stent placement -Coronary bypass surgery

Information

- Torsades de Points (TdP) is an uncommon form of V-Tach characterized by a changing in amplitude or "twisting" of the QRS complexes
- Risk factors of Torsades de Pointes:
  - Congenital long QT syndrome
  - Female Gender
  - Renal/ liver failure
  - Medication that cause QT interval prolongation (e.g. anti-dysrhythmic, calcium channel blockers, psychiatric drugs, antihistamines)

Adult

Basic

- Continuous oxygen saturation monitoring in conjunction with Capnography readings
  - **Oxygen –** To maintain an oxygen saturation of > 94%
    - Provide Ventilatory support as indicated
- ***Stable: (SBP >90mmHg and AAOX4)***
  - Cardiac Monitoring with 12 lead acquisition
    - 12 lead interpretation by paramedic or transmitted to receiving facility
- ***Unstable (pulseless)***
  - Refer to Cardiac Arrest Guideline

Advanced

- **Vascular access:** IV/IO

Paramedic

- ***Stable polymorphic V-Tach:***
  - **Magnesium Sulfate –** 2g IV/IO
- ***Unstable polymorphic V-Tach (hypotension)***
  - **DO NOT Delay** defibrillation to establish IV access
    - **Defibrillation –** 200J, 300J, 360J
      - If patient converts with defibrillation and later returns to a polymorphic tachycardia rhythm:
        - Use the last successful energy setting and increase as needed
          - Max energy setting 360J

Adult Continued…

Adult

- ***If unstable polymorphic V-tach converts after defibrillation and magnesium sulfate has not already been administered***
  - **Magnesium Sulfate –** 2g IV/IO

Pediatric

Basic

- Continuous oxygen saturation monitoring in conjunction with Capnography readings
  - **Oxygen –** To maintain an oxygen saturation of > 94%
    - Provide Ventilatory support as indicated
- ***Stable: (SBP >90mmHg and AAOX4)***
  - Cardiac Monitoring with 12 lead acquisition
    - 12 lead interpretation by paramedic or transmitted to receiving facility
- ***Unstable (pulseless)***
  - Refer to cardiac arrest guideline

Advanced

- **Vascular access:** IV/IO

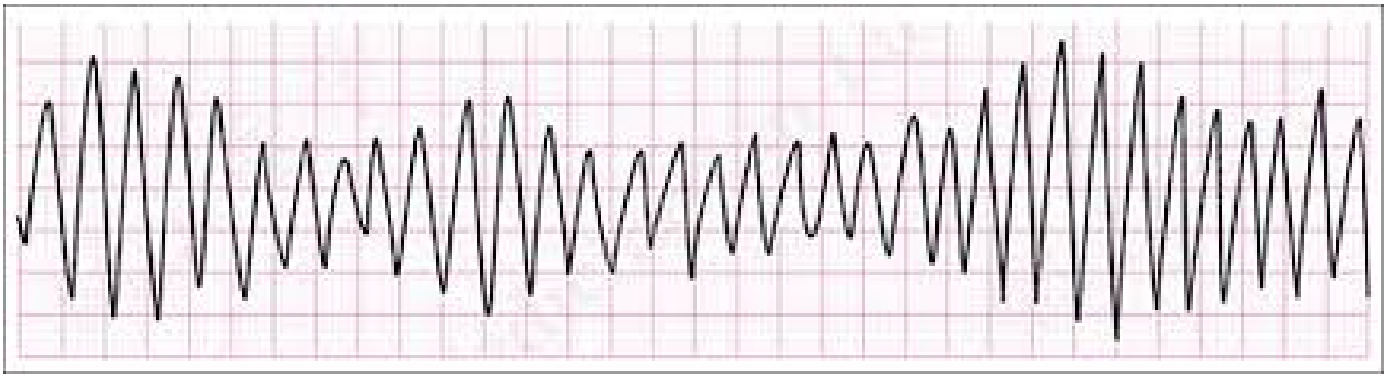
Paramedic

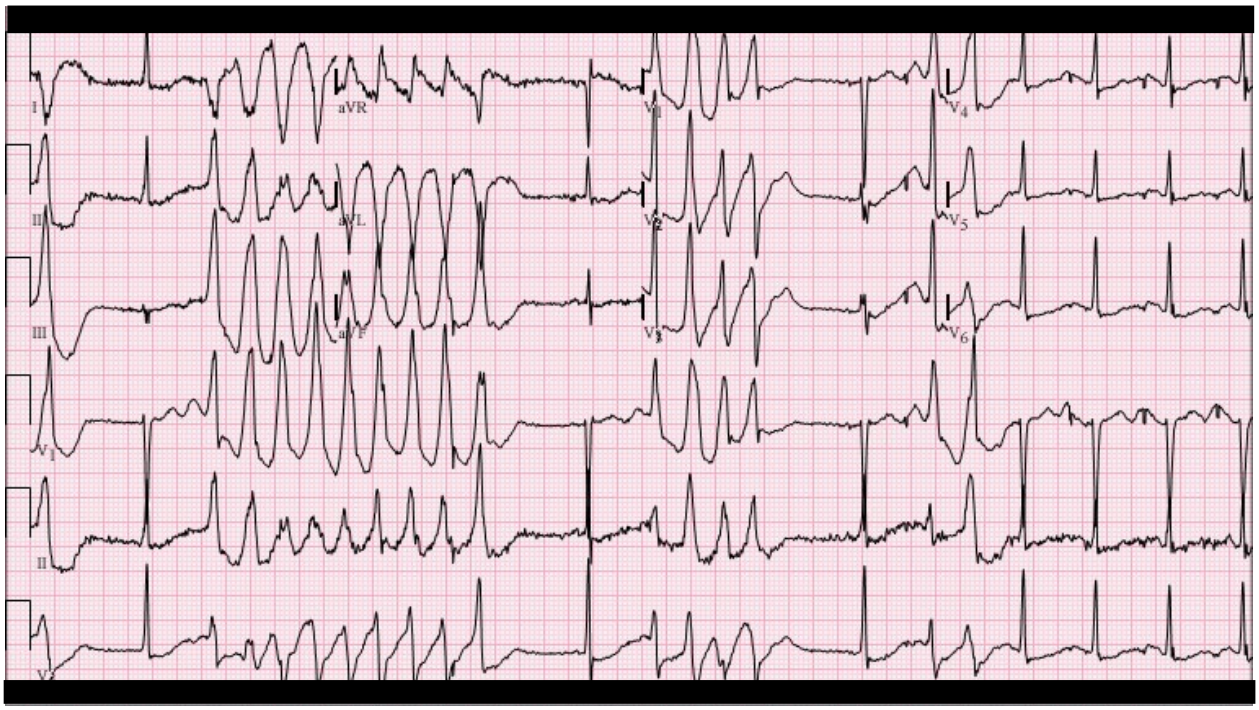
- ***Stable polymorphic V-Tach:***
  - **Magnesium Sulfate –** 25-50mg/kg IV/IO
- ***Unstable polymorphic V-Tach (hypotension)***
  - **DO NOT DELAY** defibrillation to establish IV access
    - **Defibrillation –** 2J/kg, 4J/kg
      - If patient converts with defibrillation and later returns to a polymorphic tachycardia rhythm:
        - Use the last successful energy setting and increase as needed
          - Max energy setting 4J/kg

Pediatric Continued…

Pediatric

- ***If unstable polymorphic V-tach converts after defibrillation and magnesium sulfate has not already been administered***
  - **Magnesium Sulfate –** 25-50mg/kg IV/IO





Asystole/ PEA

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Information

- **Signs and Symptoms**
  - Pulseless
  - Apneic
  - Electrical activity on ECG
  - No heart tones on auscultation

Adult

Basic

- ***If witnessed cardiac arrest:***
  - Apply AED and analyze rhythm
- ***If unwitnessed cardiac arrest:***
  - Begin continuous CPR compressions
    - Compression to ventilation ratio 30:2
    - 100-120 compressions per minute
- **Airway Management:**
  - Provide BVM ventilations in conjunction with one of the following:
    - Oropharyngeal Airway Adjunct (OPA)
    - Nasopharyngeal Airway Adjunct (NPA)
    - King supraglottic
    - I-Gel supraglottic
  - Continuous Capnography and oxygen saturation monitoring **required** for **ALL** airway devices

Advanced

- **Vascular Access –** IV/IO
  - External Jugular (EJ) preferred over peripheral access
- **Normal Saline –** 20mL/kg
  - May repeat as needed
- **Dextrose 10% -** (25G/250mL) IV/IO
- (25G/250mL)
  - Infuse 250mL IV/IO bolus wide open (25g)
    - Administer as needed during H's & T's assessment
- **Epinephrine 1:10,000 –** 1mg IV/IO
  - First Dose only

Asystole/ PEA

Table of Contents

Pediatric

Basic

- ***If witnessed cardiac arrest:***
  - Apply AED and analyze rhythm
- ***If unwitnessed cardiac arrest:***
  - Begin continuous CPR compressions
    - Compression to ventilation ratio 30:2
    - 100-120 compressions per minute
- **Airway Management:**
  - Provide BVM ventilations in conjunction with one of the following:
    - Oropharyngeal Airway Adjunct (OPA)
    - Nasopharyngeal Airway Adjunct (NPA)
    - King supraglottic
    - I-Gel supraglottic
  - Continuous Capnography and oxygen saturation monitoring **required** for **ALL** airway devices

Advanced

- **Vascular Access –** IV/IO
- **Normal Saline –** 20mL/kg
  - May repeat as needed
- **Dextrose 10% -** (25G/250mL) IV/IO
  - Pediatric dose of 0.5mg/kg up to 25G (5mL/kg)
    - Draw up desired volume into a syringe and administer via slow IV/IO push
    - If signs or symptoms resolve reassess BGL
      - Slow infusion rate to Keep Vein Open (KVO)
- **Epinephrine 1:10,000 –** 0.01mg/kg IV/IO
  - First Dose Only

Refer to Cardiac Arrest Guideline for H' and T's Causes and Treatments

Post Resuscitation

Information

Table of Contents

- The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring
    - Appropriate post-resuscitation management may best be planned in consultation with medical control
- Common causes of post-resuscitation hypotension include hyperventilation, hypovolemia, pneumothorax, and medication reaction to ALS drugs administered
- It is normal to see an increase in capnography reading before and after return of spontaneous circulation (ROSC)
    - Use caution not to hyperventilate the patient based on capnography levels
- If STEMI upon 12 lead interpretation, transport patient to interventional heart catheterization facility *(Grand Strand Medical Center, McLeod Florence, Conway Medical Center, Mcleod Seacoast)*
- If the patient is intubated, consider utilizing Hamilton T1 Ventilator **(RSI MEDICS ONLY)**

Adult

Basic

- Obtain 12 lead ten (10) minutes post ROSC
    - Interpretation by paramedic or transmitted to receiving facility

Advanced

- **Normal Saline –** 20mL/kg
    - May repeat as needed

Paramedic

- ***If Bradycardic (Hypotensive)***
    - **Transcutaneous pacing –** 60 beats per minute
        - Increase milliamps until mechanical and electrical capture is gained
            - Increase the rate as needed until the patient is hemodynamically stable

        If patient remains hypotensive: (Target SBP >100mmHg)

    - **Push Dose Pressor Epinephrine (1:100,000):**
        - **Push Dose Pressor Epinephrine (1:100,000)** – 1mL/minute IV/IO
            - Discard 9mL of Epi 1: 10,000 (0.1mg/mL) and draw up 9mL of normal saline to create push dose pressor epinephrine 1: 100,000 this will yield 10mcg/mL
                - Administer 1mL/minute IV/IO titrate to maintain SBP 100mmHg
                    - May repeat 2x as needed
                    - Max total dose of 300mcg (30mL)
        - Consider vasopressor infusion
            - **Epinephrine** – 2-10mcg/min IV/IO
- ***Post V-Fib/V-Tach considerations if no IVP amiodarone was administered and two (2) shocks have been delivered***
    - **Amiodarone –** 150mg IV/IO infusion over 10 minutes
        - Administer over 10 minutes utilizing 15gtts set delivering 75 gtts/min (1.25gtts/sec)

Pediatrics

Basic

- Obtain 12 lead ten (10) minutes post ROSC
    - Interpretation by paramedic or transmitted to receiving facility

Advanced

- **Normal saline –** 20mL/kg
    - May repeat as needed
        - Assess lung sounds and blood pressure frequently

Paramedic

- ***If Bradycardic (Hypotensive)***
    - **Transcutaneous pacing –** 60 beats per minute
        - Increase milliamps until mechanical and electrical capture is gained
            - Increase the rate as needed until the patient is hemodynamically stable

        If patient remains hypotensive: (Refer to commercially approved pediatric resuscitation system)

    - **Push Dose Pressor Epinephrine (1:100,000):**
        - **Push Dose Pressor Epinephrine (1:100,000)** – 1mL/minute IV/IO
            - Discard 9mL of epinephrine 1: 10,000 (0.1mg/mL) and draw up 9mL of normal saline to create push dose pressor epinephrine 1: 100,000 this will yield 10mcg/mL
                - Administer 1mL/minute IV/IO titrate to maintain SBP 100mmHg
                    - May repeat 2x as needed
                    - Max total dose of 300mcg (30mL)
        - Consider vasopressor infusion
            - **Epinephrine** – 2-10mcg/min IV/IO

- ***Post V-Fib/ V-Tach considerations if no IVP amiodarone was administered and two (2) shocks have been delivered***
    - **Amiodarone –** 5mg/kg IV/IO infusion over 10 minutes
        - Administer over 10 minutes utilizing 15gtts set delivering 75 gtts/min (1.25gtts/sec)
        - Max total dose 300mg

Respiratory Distress

Table of Contents

Information

- **Signs and Symptoms**
  - Shortness of breath
  - Pursed lip breathing
  - Decreased ability to speak
  - Increased respiratory rate and effort
  - Wheezing, rhonchi
  - Use of accessory muscles
  - Fever, cough
  - Tachycardia
- The most important component of respiratory distress is airway control
- **Bronchiolitis is a viral infection typically affecting infants which results in wheezing which may not respond to beta-agonists**
  - Consider epinephrine if patient is > 18 months and not responding to beta-agonists
- **Croup typically affects children < 2 years of age**
  - Croup is viral, fever is possible with gradual onset and no drooling
- **Epiglottitis typically affects children > 2 years of age**
  - Epiglottitis is bacterial with rapid onset, fever, possible stridor, drooling is common
    - Airway manipulation may worsen the condition.
    - Avoid direct laryngoscopy unless intubation is imminent

Adult

Basic

- Cardiac monitor with 12 lead acquisition
  - 12 lead to be interpreted by paramedic or transmitted to receiving facility
- Pulse oximetry
  - Wave form capnography if patients initial oxygen saturation is ≤ 90%
- Assess lung sounds
- Oxygen administration
  - Nasal Cannula
  - Non-Rebreather
  - CPAP

Asthma induced Wheezing

- **Albuterol** – 5mg nebulized
  - Reassess lung sounds and ventilatory effort

Stridor

- **Normal Saline** – Nebulized
  - Use a normal saline flush dispense 2mL in nebulizer
    - May repeat as needed

Advanced

Asthma Induced *Wheezing*

- **Albuterol** – 5mg May repeat a second dose if basic initiated treatment
- **DuoNeb –** 2.5mg albuterol mixed with 0.5mg Ipratropium
  - Can be utilized as first round if no treatment has been initiated
- **Solumedrol –** 125mg IV/IO

Stridor

- **Solumedrol –** 125mg IV/IO

Paramedic

Asthma Induced Wheezing

- **Magnesium Sulfate** – 2 Grams IV/IO
  - Mix 2G in a 50mL Normal Saline utilizing a 60gtts set
- **Epinephrine (1: 1,000)** – 0.3mg IM
  - If there is no improvement with other medication interventions
    - Consider Anaphylaxis guideline
- Consider early intubation if no improvement to patients ventilatory effort
  - Refer to airway management guideline

Stridor

- **Nebulized Epinephrine**
  - Mix 1mg of Epinephrine 1:1,000 with 2mL normal saline into a nebulizer
- **Magnesium Sulfate** – 2 Grams IV/IO over 10 minutes
  - Mix 2G in a 50mL Normal Saline utilizing a 15gttss set

Medical Control

- Prior to administering epinephrine for any patient who is > 50 years of age who have a history of cardiac disease, or if the patient's heart rate is >150bpm

Respiratory Distress

Pediatric

Table of Contents

Basic

- Cardiac monitor with 12 lead acquisition
  - 12 lead to be interpreted by paramedic or transmitted to receiving facility
- Pulse oximetry
  - Wave form capnography if patients initial oxygen saturation is ≤ 90%
- Assess lung sounds
- Oxygen administration
  - Nasal Cannula
  - Non-Rebreather Mask

Asthma Induced Wheezing

- **Albuterol** – 2.5mg nebulized
  - May repeat once with a max total dose 5mg
- Consider CPAP (Adolescent)

Stridor

- **Normal Saline** – Nebulized
  - Use a normal saline flush dispense 2mL in nebulizer
    - May repeat as needed

Advanced

Asthma Induced Wheezing / Stridor

- Vascular access if oxygen saturation < 94% after first treatment
- **Solumedrol –** 2mg/kg IV/IO
  - Max dose of 125mg

Stridor

Solumedrol – 2mg/kg IV/IO

- Max dose of 125mg

Paramedic

Asthma Induced Wheezing

- Consider early intubation if no improvement to patients ventilatory effort
  - Refer to airway management guideline

Stridor

- **Nebulized Epinephrine**
  - Mix 1mg of Epinephrine 1:1,000 with 2mL Normal Saline into a nebulizer

*****Medical Control*****

- Repeat albuterol after three (3) doses
- **Magnesium Sulfate** – 0.4gm/kg IV/IO over 20 minutes
  - Mix 0.4gm/kg in 50mL Normal Saline with a 60gtts
- Repeat Nebulized Epinephrine if no improvement with first treatment

Formula:

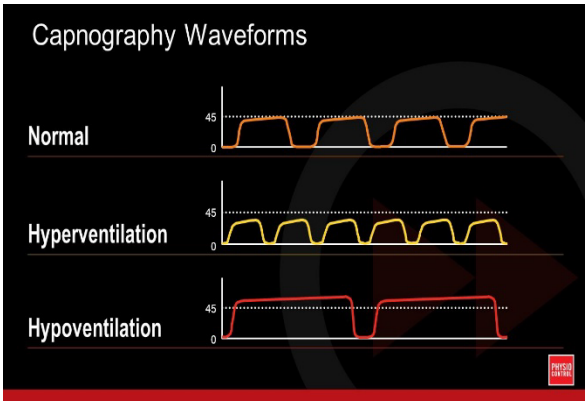
$$\frac{\text{Volume (mL)}}{\text{Time (min)}} \times \text{Drop Factor (gtts/mL)} = \text{Y (Flow Rate in gtts/min)}$$

Airway Management

Information

Table of Contents

- Capnography is **required** for ANY patient receiving basic or advanced airway management OR has an oxygen saturation of < 90%
  - Capnogrpahy **MUST** be applied to all patients when requesting RSI
- If an effective airway is being maintained by BVM with continuous pulse oximetry values of > 94% in conjunction with capnography, it is acceptable to continue with basic airway measures instead of using a BIAD or Intubation
- An intubation attempt is defined as passing the laryngoscope blade past the teeth or an endotracheal tube inserted past the nasal opening
- Ventilatory rate should be sufficient enough to attempt to keep $EtCO_2$ of 35-45; **Avoid hyperventilation**
  - In deteriorating head traumas, titrate assisted ventilatory rate to maintain an $EtCO_2$ of 30-35 mmHg
- Consider using a BIAD if oral-tracheal intubation is unsuccessful
- Do not assume hyperventilation is psychogenic, use oxygen not a paper bag
- BURP maneuver may be used to assist with difficult intubations
- After two (2) unsuccessful attempts at orotracheal intubation move to failed airway guideline
- When considering post intubation sedation, the patient may still be unresponsive or paralyzed and still be able to feel pain. Paramedics should consider post sedation with Versed or ketamine, in addition to pain management



Adult

Basic

- Supplemental oxygen for all patients who have an oxygen saturation of ≤ 94%
- Nasal Capnography is **required** on patients who:
  - Have an oxygen saturation of ≤ 90% and are experiencing acute Shortness of Breath
- If patient has inadequate Ventilations:
  - Manually open airway
    - Evaluate oropharynx for obstructions
  - Insert Nasal or Oral Airway to maintain an open airway
  - Initiate Bag-Valve-Mask (BVM) ventilations
    - If patient is unresponsive with no gag reflex consider insertion of a BIAD device
      - Capnography is required on all ventilated patients

Paramedic

- ***Consider intubation for patients who:***
  - Are unable to be effectively ventilated or have their airway managed with a BVM in conjunction with a nasal or oral adjunct or a with a BIAD in place

Adult

- ***Consider Post intubation sedation:***
  - **Versed –** 2-4mg slow IV / IO
    - Every 3-5 minutes as needed, max total dose of 10mg
      - 4mg if given IM
        - Second dose 2mg 3-5 minutes max total dose 6 mg
- **Fentanyl –** 2mcg/kg IV / IO
  - Max single dose 100mcg
  - May repeat as needed to max total dose of 200mcg
- **Ketamine –** 1.5-2mg/kg IV / IO (**Must** monitor Capnography attached)
  - May repeat once, 0.5-1mg/kg to a total max dose of 300mg

Pediatric

Basic

- Supplemental oxygen for all patients who have an oxygen saturation of ≤ 94%
- Nasal capnography is **required** on patients who:
  - Have an oxygen saturation of ≤ 90% and are experiencing acute shortness of breath
- If patient has inadequate ventilations:
  - Manually open airway
    - Evaluate oropharynx for obstructions
  - Insert nasal or oral airway adjunct to maintain an open airway
  - Initiate Bag-Valve-Mask (BVM) ventilations
    - If patient is unresponsive with no gag reflex consider insertion of a BIAD device
      - Capnography is required on all ventilated patients

Paramedic

- Consider intubation for patients who:
  - Are unable to be effectively ventilated or have their airway managed with a BVM in conjunction with a nasal or oral airway adjunct or with a BIAD in place
- Consider Post intubation sedation:
- **Versed –** 0.1-0.2mg/kg IV/ IO / IN
  - Max total dose 2mg
- **Fentanyl –** 1mcg/kg IV / IO
  - Max single dose of 50mcg
  - May repeat once every five (5) minutes with a total max dose of 100mcg
- **Ketamine –** 1-2mg/kg slow IV / IO *** **OLMC** *** (**Must** monitor Capnography)
  - 2-4mg/kg IM

Information

- Aggressive positive pressure ventilation can impair:
  - Venous return
  - Cardiac output
  - Cerebral perfusion
  - Gastric distension
- The patient's oxygen saturation and $EtCO_2$ should determine the ventilation rate for the patient ($EtCO_2$ should be 35-45 mmHg)
  - Do not attempt to aggressively normalize capnometry/$EtCO_2$ readings in the following:
    - Cardiac arrest pre/post ROSC
    - Bronchospasm (COPD/Asthma)
    - High $EtCO_2$ levels are desired in these patients
- Continuous pulse oximetry and capnography monitoring must be utilized during assessment and transport
- Use **DOPE** pneumonic to determine cause of ventilator issues:
  - **D**isplacement – check tracheostomy tube/ ET tube
  - **O**bstruction – of the tracheostomy tube (mucus plug, secretions, blood)
  - **P**neumothorax – Diminished lung sounds on one side (tracheal deviation/ muffled heart tones)
  - **E**quipment failure – tracheal tube deflated, loss of power to ventilator
- If unable to correct ventilator problems:
  - Remove patient from ventilator and manually ventilate using BVM.
    - Take patients ventilator to hospital even if not functioning properly

Adult

Ventilatory Rates

- Patients with a pulse:
  - 1 breath every 6 seconds
- Patients without a pulse:
  - 1 breath every 10 seconds. Must coordinate compressions and ventilations to avoid simultaneous delivery
- Patients with ICP and/or herniation:
  - Attempt to maintain an $EtCO_2$ between 30-35mm Hg and oxygen saturation > 90% while continuously monitoring BP

Pediatric

Ventilatory Rates

- Patients with a pulse:
  - 1 breath every 3 seconds
- Patients without a pulse:
  - 1 breath every 6 seconds. Must coordinate compressions and ventilations to avoid simultaneous delivery
- Patients with ICP and/or herniation:
  - Maintain $EtCO_2$ between 30-35 mmHg and oxygen saturation > 90% while continuously monitoring BP

Rapid Sequence Intubation

Information

ADULTS ONLY

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Rs

- Indication for RSI
  - Failure to protect the airway
  - Unable to oxygenate
  - Unable to ventilate
  - Impending airway compromise
- Contract Indicated in pediatric patients
  - Pediatric defined as ≤ 12 years of age **AND** ≤ 55kg
- Assemble equipment:
  - Airway equipment
  - Suction equipment
  - Alternative airway device
- Rapid Sequence Intubation will remove the ability for the patient to protect his or her own airway
  - You must be sure of your ability to intubate before beginning this procedure
- Rapid Sequence Intubation requires at least one (1) EMT-Paramedic and a second credentialed / licensed medical provider
  - Horry County Fire Rescue requires 2 paramedics
    - 1 credentialed RSI paramedic, and 1 additional South Carolina credentialed paramedic
      - Divide the workload – ventilate, suction, cricoid pressure, drugs, intubation
- Before administrating any paralytic drug, screen for any contraindications with a thorough neurologic exam
- Protect the patient from self-extubation when the medications wear off
  - Longer acting paralytics may be needed post-intubation
- Rapid Sequence Intubation is not recommended in urban setting (short transport) when able to maintain oxygen saturation ≥ 94%
- **Calculating dose, drawing, and administration of "RSI" Medication shall be the responsibility of any credentialed RSI paramedic**

Basic

- Apneic oxygenation with a BVM in conjunction with a basic adjunct
- Attempt to Pre oxygenate to maintain an oxygen saturation of 100%

Approved RSI Paramedics

- **Non-combative**
  - **Sedatives**
    - **Etomidate –** 0.3 mg/kg, IV/IO
      - May repeat once as needed

OR

    - **Ketamine –** 1.5-2mg/kg, IV/IO **(preferred as first line in combative patients)**
      - May Repeat once as needed
      - **Must** monitor Capnography

Adult Continued…

Table of Contents

Rs

- **Paralytics**
  - **Succinylcholine –** 1.5mg/kg, IV/IO **(MAX 150mg per dose)**
    - Rapid onset about 1 minute, short lasting about 15 minutes
    - May repeat once as needed

    OR

  - **Rocuronium –** 1mg/kg, IV/IO
    - Rapid onset about 1 minute, long lasting about 45 minutes
    - May repeat once as needed
- **Intubation**
  - Once sedative and paralytic has been administered proceed with intubation only two (2) attempts allowed (attempt is defined in failed airway section)
    - Confirm tube placement in the following ways
      - Visualize the tube passing through the cords
      - Look for equal chest rise
      - Auscultation over epigastrium, apex, and bases of lungs bilaterally
        - If lungs sounds are absent on left side check depth of tube to rule out right main stem intubation
      - Capnography readings with waveform (must be printed)
      - Oxygen saturation Readings
- **Consider longer acting sedation if patient is awakening or moving after intubation**
  - **Versed –** 2-4mg, IV/IO (in conjuction with Fentanyl)
    - May repeat every 3-5 minutes as needed with a total max of 10mg
    - **Fentanyl – 2mcg/kg, IV/ IO**
      - Max single dose 100mcg
      - May Repeat as needed to max total dose of 200mcg
        - contact on-line medical control to exceed max dose
  - **Ketamine –** 1.5-2mg/kg, IV (Must Monitor Capnography)

- **Consider longer acting paralytic for extended transport post sedation**
  - **Rocuronium –** 1mg/kg, IV/IO

RSI DRUG DOSAGES

Medication:	50 kg pt.		60 kg pt		70 kg pt		80 kg pt.		90 kg pt.		100 kg pt.		Med
Etomidate (0.3 mg/kg)	15mg	7.5ml	18mg	9ml	21mg	10.5ml	24mg	12ml	27mg	13.5ml	30mg	15ml	*Etom*
Ketamine (1.5-2 mg/kg)	100mg	10ml	120mg	12ml	140mg	14ml	160mg	16ml	180mg	18ml	200mg	20ml	*Keta*
Succinylcholine (1.5 mg/kg)	75mg	3.8ml	90mg	4.5ml	105mg	5.3ml	120mg	6ml	135mg	6.75ml	150mg	7.5ml	*Succ*
Post intubation	*Post intubation*				*Post intubation*				*Post intubation*				
Versed (2mg q 3-5min Max 10mg	2mg	2ml	2mg	2ml	2mg	2ml	2mg	2ml	2mg	2ml	2mg	2ml	*Vers*
Ketamine (0.1-0.3 mg/kg IV)	10mg	1ml	12mg	1.2ml	14mg	1.4ml	16mg	1.6ml	18mg	1.8ml	20mg	2ml	*Keta*
Rocuronium (1 mg/kg)	50mg	5ml	60mg	6ml	70mg	7ml	80mg	8ml	90mg	9ml	100mg	10ml	*Roc*

****PEARLS****

Succinylcholine **150mg max per dose: May repeat** *ONCE May repeat Rocuronium as needed to continue chemical paralysis Versed dose above 10mg requires OLMC*

- Contract Indicated in pediatric patients

Pediatric defined as ≤ 12 years of age **AND** ≤ 55kg

Airway Failed

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Information

- An Intubation attempt is defined as passing the laryngoscope blade past the teeth or an endotracheal tube inserted past the nasal opening
    - After a total of two (2) failed intubation attempts by the most experienced provider on scene airway management will need to continue with bag-valve mask (BVM) ventilations in conjunction with nasal/ oral pharyngeal adjunct (NPA/ OPA) or with a Blind Insertion Airway Device (BIAD)

- If first intubation attempt fails consider the following adjustments:
    - Different laryngoscope blade
    - Gum Elastic Bougie (GEB)
        - **Must utilize pediatric Bougie with any pediatrics**
    - Different endotracheal tube size (bigger/smaller)
    - Change in cricoid pressure
    - Apply BURP maneuver (Push trachea **BACK**, **UP**, and to the patients **RIGHT** with constant **PRESSURE**)
- Continuous oxygen saturation monitoring in conjunction with capnography is **REQUIRED** in all patients with an inadequate respiratory ventilation/ respirations

Adult and Pediatric

Basic

- Supplemental oxygen for all patients who have an oxygen saturation ≤ 94%
- Nasal capnography is **required** on patients who:
    - Have an oxygen saturation ≤ 90% and are experiencing acute shortness of breath
- If patient has inadequate ventilations:
    - Manually open airway
        - Evaluate oropharynx for obstructions
    - Insert nasal or oral airway adjunct to maintain an open airway
    - Initiate Bag-Valve-Mask (BVM) ventilations
        - If patient is unresponsive with no gag reflex, consider insertion of a BIAD device.
            - Capnography is required on **ALL** ventilated patients

Paramedic

- Consider the following in failed airway sequence
    - Insertion of a BIAD and monitor capnography in conjunction with pulse oximetry reading > 94%
    - Early notification to receiving hospital on difficult airway
    - Call for assistance of a trained RSI medic
    - Cricothyrotomy only by trained RSI medic *__ADULT ONLY__*

Mechanical Ventilation: Adult

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Rs

Information

- Use for patients that require ventilation support post-RSI procedure
- Ensure to get an accurate height of the patient to determine Ideal Body Weight (IBW)
- **D.O.P.E**
  - Displaced ETT, Obstructed ETT, Pneumothorax, Equipment failure (vent)
- **Mode:**
  - In all patients, use Volume/APV
  - This mode requires adequate sedation as it can be uncomfortable for an awakening patient
- **Tidal Volume:**
  - Tidal volume is extremely important in preventing lung injury. Tidal Volume is calculated by ideal body weight, NOT by actual body weight
    - High Tidal Volumes are known to cause alveolar damage and lung injury
      - **Male IBW =** 50+(2.3x(ht$^{(in)}$ - 60))
      - **Female IBW =** 45.5+(2.3x(ht$^{(in)}$ - 60))
- **FiO_2 and PEEP adjustments:**
  - When SPO_2 is less than < 94% increase FiO_2
  - When FiO_2 is > 50% and SPO_2 remains <95% consider adjusting PEEP (max of 10cmH2o)
- **$EtCO_2$:**
  - Use caution when adjusting the respiratory rate to reach a goal of 35-45 mmHg
    - For Patients with a suspected head injury, the respiratory rate should be adjusted to target 30-35mmHg
- **Alarms:**
  - **High Pressure:**
    - The measured inspiratory pressure exceeds the set high pressure
      - Check the artificial airway of the patient for kinks and occlusions
      - Switch to pressure mode
  - **Low Pressure:**
    - The set pressure during inspiration was not reached
      - Check the breathing circuit for a disconnection between the patient and the flow sensor or for other large leaks
  - **Low Minute Volume:**
    - Measured ExpMinVol is below the set alarm minute
      - Check the breathing circuit and artificial airway of the patient for leaks and or disconnection
  - **Low Oxygen:**
    - The measured oxygen is more than 5% below the current oxygen control setting
      - Check the oxygen supply, and provide an alternative source of oxygen
  - **Vt High:**
    - Measured VTE exceeds the set limit for 2 consecutive breaths
      - Check the pressure and volume settings for potential leaks and or disconnections
  - **Vt Low:**
    - Measured VTE is below the set limit for 2 consecutive breaths
      - Check the breathing circuit and artificial airway of the patient for leaks, kinked limbs or tubing, or disconnection

Rs

Adult

RSI Medic

- **No Obstructive airway disease history (COPD/Asthma)**
  - **Capnography –** Required to be monitored before and after vent application
  - **Mode –** Volume/APV
  - **FiO_2 –** 100%
  - **Peep –** 5cmH_2O
  - **Tidal Volume –** Enter height in inches in start up the menu (this will calculate the IBW)
    - Refer to the IBW reference chart to confirm the tidal volume setting
  - **Respiratory Rate (B/min) –** 18 breaths per minute

- **History of Obstructive Airway Disease (COPD, Asthma, CHF, Pneumothorax) with NO alarms**
  - **Capnography –** Required to be monitored before and after vent application
  - **Mode –** Volume/APV
  - **FiO_2 –** 100%
  - **Peep –** 5cmH_2O
  - **Tidal Volume –** Enter height in inches in start up the menu (this will calculate the IBW)
    - Refer to the IBW reference chart to confirm the tidal volume setting
  - **Respiratory Rate (B/min) –** 12 breaths per minute

- **History of Obstructive Airway Disease (COPD, Asthma, CHF, Pneumothorax) WITH High-Pressure alarms**
  - **Capnography –** Required to be monitored before and after vent application
  - **Pressure Mode**
  - **Mode –** AC-PCV **OR** PCV+ in menu section
  - **Pcontrol –** Increase by 3cmH2O until achieved tidal volume is based on patients' IBW

- **After every 10 minutes with an initial FiO2 setting of 100% and adequate oxygenation, do the following:**

Time after initial FiO2 setting of 100%	FiO2 Setting Change
10-minute	90%
20-minute	80%
30-minute	70%
40-minute	60%
50-minute	50%
60-minute	40%
70-minute	40%

Tidal Volume - Men

Ht (Ft)	Ht (in)	IBW (Kg)	Total Volume (mL/Kg) 4	5	6	7
4.8	56	40.8	163	204	245	286
4.9	57	43.1	172	216	259	302
4.10	58	45.4	182	227	272	318
4.11	59	47.7	191	239	286	334
5	60	50	200	250	300	350
5.1	61	52.8	211	264	317	369
5.2	62	55.5	222	278	333	389
5.3	63	56.9	228	285	341	398
5.4	64	59.2	237	296	355	414
5.5	65	61.5	246	308	369	431
5.6	66	63.8	255	319	383	447
5.7	67	66.1	264	331	397	463
5.8	68	68.4	274	342	410	479
5.9	69	70.7	283	354	424	495
5.10	70	73	292	365	438	511
5.11	71	75.3	301	377	452	527
6	72	77.6	310	388	466	543
6.1	73	79.9	320	400	479	559
6.2	74	82.2	329	411	493	575
6.3	75	84.5	338	423	507	592
6.4	76	86.8	347	434	521	608
6.5	77	89.1	356	446	535	624
6.6	78	91.4	366	457	548	640
6.7	79	93.7	375	469	562	656
6.8	80	96	384	480	576	672
6.9	81	98.3	393	492	590	688
6.10	82	101	402	503	604	704
6.11	83	103	412	515	617	720
7.0	84	105	421	526	631	736

Tidal Volume - Women

Ht (Ft)	Ht (in)	IBW (Kg)	Total Volume (mL/Kg) 4	5	6	7
4.8	56	36.3	145	182	218	254
4.9	57	38.6	154	193	232	270
4.10	58	40.9	164	205	245	286
4.11	59	43.2	173	216	259	302
5.0	60	45.5	182	228	273	319
5.1	61	47.8	191	239	287	335
5.2	62	50.1	200	251	301	351
5.3	63	52.4	210	262	314	367
5.4	64	54.7	219	274	328	383
5.5	65	57	228	285	342	399
5.6	66	59.3	237	297	356	415
5.7	67	61.6	246	308	370	431
5.8	68	63.9	256	320	383	447
5.9	69	66.2	265	331	397	463
5.10	70	68.5	274	343	411	480
5.11	71	70.8	283	354	425	496
6.0	72	73.1	292	366	439	512
6.1	73	75.4	302	377	452	528
6.2	74	77.7	311	389	466	544
6.3	75	80	320	400	480	560
6.4	76	82.3	329	412	494	576
6.5	77	84.6	338	423	508	592
6.6	78	86.9	348	435	521	608
6.7	79	89.2	357	446	535	624
6.8	80	91.5	366	458	549	641
6.9	81	93.8	375	469	563	657
6.10	82	96.1	384	481	577	673
6.11	83	98.4	394	492	590	689
7.0	84	101	403	504	604	705

Mechanical Ventilation: CPAP

Table of Contents

Information

- Use for patients requiring noninvasive ventilatory support after failed supplemental oxygen delivery for respiratory pathologies to include but not limited to CHF, COPD, or pneumonia
    - With the presence of Wheezing, utilize in-line nebulizer
- Barotrauma – results from a pressure imbalance between gas-filled spaces inside the body and the external atmosphere
    - Can develop when PEEP is increased rapidly and/or when it is increased beyond its therapeutic effect
        - Signs and symptoms – Chest pain, Hypoxia, Pneumothorax, Hypotension, subcutaneous emphysema
- **Mode:**
    - In all patients, use CPAP/NIV
        - This Mode does not require height or sex to be selected
- **Alarms:**
    - **Low Minute Volume:**
        - Measured ExpMinVol is below the set alarm minute
            - Select alarms and change the lower alarm limit as low as it can go
                - May indicate a patient declining to respiratory failure
                    - Reassess patient frequently
    - **High Minute Volume:**
        - Measured ExpMinVol is higher the set alarm minute
            - Select alarms, change the upper alarm limit as high as it can go
    - **Vt High:**
        - Measured VTE exceeds the set limit for 2 consecutive breaths
            - Select alarms, change the upper alarm limit as high as it can go
    - **Vt Low:**
        - Measured VTE is below the set limit for 2 consecutive breaths
            - Select alarms change the lower alarm limit as low as it can go
- **Monitoring:**
    - **Vleak %:**
        - Can indicate leaks on the patient side of the flow sensor (mask). Does include leakage between the ventilator and flow sensor
            - Use VLeak and to assess the fit of the mask ensure it is < 25%

Adult

Basic

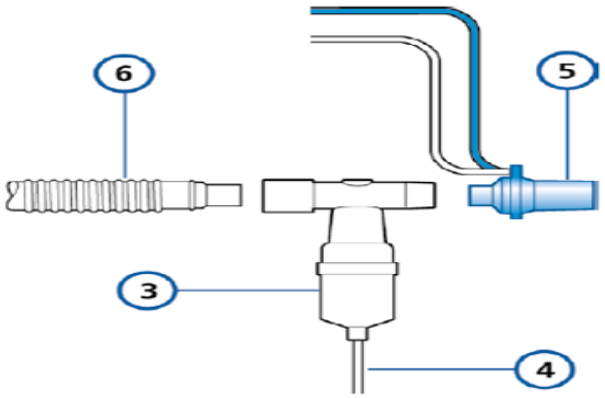
- Select Vent Circuit
- Visually inspect exhalation valve
    - Make sure the seal (diaphragm) is in place and seated properly
- Connect the circuit and perform a flow test
    - This is to be completed whenever a new vent circuit is opened and ready to be used
- Ensure a non-ventilated mask is being used
- Select mode
    - CPAP/NIV

Paramedic

- Start ventilation
  - Vent defaults:
    - Peep – 8cm H_2o
      - May increase peep as needed to a max of 15cm H_20
        - Titrate pressures slowly to ensure tolerance and avoid barotrauma
    - Oxygen – 50%
- Continue monitoring the patient for any changes and mitigate any alarms sounding

If Wheezing Present

- **In-Line Nebulizer**
  - Prepare traditional Nebulizer
    - Discard the mouthpiece, T-piece, and corrugated tubing
  - Hamilton T1 Specific T-piece (Blue)
    - Attach Nebulizer to the blue T-piece provided in the vent box
  - Connect Vent specific T-piece to vent circuit
    - Remove the flow sensor from the vent circuit
    - Place the T-piece with neb to the end of the corrugated tubing
    - Reconnect the flow sensor to the other side of the nebulizer
  - Connect Oxygen tubing
    - Ensure the vent is attached to an oxygen supply
      - Utilize the provided pigtail to attach to the main oxygen supply if needed
    - Connect the nebulizer oxygen tubing to the yellow port on the right side of the vent
  - Press the nebulizer button on ventilator
    - This will administer medication only during the inhalation phase



Narcotic Overdose

Table of Contents

Information

- **Signs and Symptoms**
  - Mental status changes
  - Hypotension/Hypertension
  - Decreased respiratory rate
  - Tachycardia / cardiac arrhythmias
  - Seizures
  - Pin point pupils
- Narcan to be used as needed to improve intrinsic airway patency, ventilations and oxygenation
- The **GOAL** is to restore spontaneous respirations! **NOT** to wake the patient up

Examples of Narcotics

Narcotic Drugs	Common Names	Most Common Uses
Heroin	Horse, Smack, Junk (Street Names)	Abuse
Morphine	Several	Analgesia
Methadone	Dolophine	Treat Narcotic Dependence
Meperidine	Demerol	Analgesia
Oxycodone	Percodone, Oxycontin	Analgesia
Propaxyphene	Darvon	Analgesia
Codeine	Several	Analgesia, Antitussive
Loperamide	Imodium A-D	Anidiarrheal
Diphenoxylate	Lomotil	Antidiarrheal
Opium Tincture	Paregoric	Antidiarrheal
Buprenorphine	Suboxone	Treat Narcotic Dependence

Focus on Ventilatory Assistance

Adult

Basic

- ***If patient is NOT ventilatory depressed > 10 breaths per minute OR*** oxygen saturation of ***> 90%***
  - ***Oxygen –*** maintain an oxygen saturation of > 94%
    - Continuous monitoring of oxygen saturation and capnography
  - Monitor and transport patient
    - Monitor for any changes in ventilatory / respiratory effort
- ***If patient IS ventilatory depressed, < 10 breaths per minute with an oxygen saturation of < 90%***
  - Provide oxygen: NRB 15Lpm
    - Agonal or irregular ventilations:
      - Bag valve mask with oxygen
    - **Narcan –** 2mg IN
      - Utilizing a MAD device administer 1mg (1mL) in each nostril
        - Focus on ventilatory assistance after administration of Narcan
- ***If patient IS ventilatory depressed, < 10 breaths per minute with an oxygen saturation of 90% AND Narcan was administered by first responder prior to arrival***
  - Focus on BVM ventilations and maintaining oxygen saturation of **>** 94%

Adult

Advanced

- **Vascular Access:** IV / IO

- ***If patient IS ventilatory depressed, < 10 breaths per minute with an oxygen saturation of < 90%***
  - **Narcan –** 0.4mg IV/IO
    - May repeat as needed when ventilatory effort is depressed

Pediatric

- ***If patient is NOT ventilatory depressed > 10 breaths per minute OR oxygen saturation of > 90%***
  - ***Oxygen –*** maintain an oxygen saturation of > 94%
    - Continuous monitoring of oxygen saturation and Capnography
  - Monitor and transport patient
    - Monitor for any changes in ventilatory / respiratory effort
- ***If patient IS ventilatory depressed, < 10 breaths per minute with an oxygen saturation of < 90%***
  - Provide oxygen: NRB 15Lpm
    - Agonal or irregular ventilations:
      - Bag valve mask with oxygen
    - **Narcan –** 1mg IN
      - Utilizing a MAD device 0.5mg (0.5mL) per nostril
        - Focus on ventilatory assistance after administration of Narcan

Advanced

- **Vascular Access:** IV / IO
- ***If patient IS ventilatory depressed, < 10 breaths per minute with an oxygen saturation of < 90%***
  - **Narcan –** 0.01mg/kg IV/IO
    - May repeat as needed when ventilatory effort is depressed

Stimulant Overdose

Table of Contents

Information

- **Signs and Symptoms**
  - Tachycardia
  - Supraventricular arrhythmias
  - Ventricular arrhythmias
  - Chest pain / STEMI
  - Hypertension
  - Seizures
  - Excited delirium
  - Hyperthermia

Common Street Names

- Amphetamines
  - R-ball
  - Skippy
  - The smart drug
  - Vitamin R
  - Kibbles and bits
  - Speed
  - Truck drivers
  - Bennies
  - Black beauties
  - Crosses
  - Hearts
  - LA turnaround
  - Uppers
  - Amps
  - Pick-me-ups
- Cocaine and Crack
  - coke
  - Snow
  - 8-ball
  - flake
  - powder
  - dust
  - candy
  - white
  - kryptonite
  - cookies
  - strong
  - Speedball is cocaine + heroin

Adult

Basic

- Consider restraints and/or utilize law enforcement if scene is unsafe
  - Crew safety is of the upmost importance
- Cardiac monitoring with 12 lead acquisition
  - Perform procedure only if it is safe to do so for crews and patient
  - 12 leads to be interpreted by paramedic or transmitted to receiving facility
- Monitor Pulse oximetry and Capnography
  - Administer oxygen to maintain $SPO_2 \geq 93\%$

Advanced

- **Normal Saline –** 20mL/kg fluid bolus IV/IO
  - Perform procedure only if it is safe to do so for crews and patient
  - May repeat once as needed
    - Assess lung sounds and blood pressure frequently

Paramedic

- Consider sedation:
  - **Haldol and Benadryl –** 5mg, 50mg, IM
    - Mix 5mg Haldol with 50mg Benadryl in a syringe administered IM
  - **Versed –** 2mg IV/IO **OR** 4mg IM
    - If given IV/IO
      - May repeat three (3) times as needed with a max total dose of 6mg.
    - If given IM
      - May repeat 2mg IM after 5 min as needed

*** Medical Control ***

- **Ketamine –** 2-4mg/kg IM (**Must** Monitor Capnography)

Beta Blocker Overdose

Table of Contents

Information

- **Signs and Symptoms:**
  - Bradycardia
  - Hypotension
  - Cardiac arrhythmias
  - Hypothermia
  - Hypoglycemia
  - Seizures

Beta Blocker Table

Brand Name	Generic Name
BETA ADRENERGIC BLOCKERS	
Betapace Betapace AF	Sotalol
Blocadren	Timolol
Brevibloc	Esmolol
Cartrol	Carteolol
Coreg Coreg CR	Carvedilol
Corgard	Nadolol
Inderal Inderal LA Innopran XL	Propanolol
Kerlone	Betaxolol
Levatol	Penbutolol
Lopressor Toprol XL	Metoprolol
Sectral	Acebutolol
Tenormin	Atenolol
Trandate Normodyne	Labetalol
Visken	Pindolol
Zebeta	Bisoprolol
BETA BLOCKERS-COMBINATION PRODUCTS	
Corzide	Nadolol-Bendroflumethiazide
Inderide	Propanolol-HCT
Tenoretic	Atenolol-Chlorthalidone
Ziac	Bisoprolol-HTC

Adult

Basic

- Cardiac Monitoring with 12 lead acquisition
  - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Normal Saline –** 20mL/kg IV/IO
  - Titrated to maintain a systolic blood pressure > 90mmHg
    - Assess lung sounds and blood pressure frequently

Paramedic

- **Glucagon –** 2mg IV/IO/IM
- ***If persistent hypotensive and bradycardic:***
  - **Push Dose Pressor –** 1mL/minute
    - Discard 9mL of Epi 1:10,000 (0.1mg/mL) and draw up 9mL of Normal Saline to create push-dose pressor Epi 1:100,000. This will yield 10mcg/mL
      - May repeat 2x as needed, with a total max dose of 300mcg(30mL)
  - Consider external pacing if continued bradycardia and hypotensive

Beta Blocker Overdose

Table of Contents

Adult

Basic

- Cardiac monitoring with 12 lead acquisition
    - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Normal Saline –** 20mL/kg IV/IO
    - Titrated to maintain a systolic blood pressure > 90mmHg
    - Assess lung sounds and blood pressure frequently

Paramedic

- **Glucagon –** 2mg IM
    - May repeat once in 15 minutes as needed
- ***If persistent hypotensive and bradycardic:***
    - **Push Dose Pressor –** 1mL/minute
        - Discard 9mL of Epi 1:10,000 (0.1mg/mL) and draw up 9mL of normal saline to create push-dose pressor Epi 1:100,000. This will yield 10mcg/mL
            - May repeat 2x as needed, with a total max dose of 300mcg (30mL)

Pediatric

Basic

- Cardiac monitoring with 12 lead acquisition
    - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Normal Saline –** 20mL/kg IV/IO
    - Titrated to maintain a systolic blood pressure > 90mmHg
    - Assess lung sounds and blood pressure frequently

Paramedic

- **Glucagon –** 0.1mg/kg IM
    - Max total dose of 1mg
- ***If persistent hypotensive and bradycardic:***
    - **Push Dose Pressor –** 1mL/minute
        - Discard 9mL of Epi 1:10,000 (0.1mg/mL) and draw up 9mL of normal saline to create push-dose pressor Epi 1:100,000. This will yield 10mcg/mL
            - May repeat 2x as needed, with a total max dose of 300mcg (30mL)

Calcium Channel Blocker

Table of Contents

Information

- **Signs and Symptoms**
  - Hypotension
  - Syncope
  - Seizure
  - AMS
  - Non-Cardiogenic pulmonary edema
  - Bradycardia

Calcium Channel Blockers

Check if your drug is on this list:

- amlodipine (Norvasc)
- amlodipine and atorvastatin (Caduet)
- amlodipine and benazepril (Lotrel)
- amlodipine and valsartan (Exforge)
- amlodipine and telmisartan (Twynsta)
- amlodipine and olmesartan (Azor)
- amlodipine and perindopril (Prestalia)
- clevidipine (Cleviprex)
- diltiazem (Cardizem)
- nicardipine (Cardene, Cardene SR)
- nisoldipine (Sular)

Adult

Basic

- Cardiac monitoring with 12 lead acquisition
  - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Normal Saline –**20mL/kg IV/IO
  - Titrated to maintain a systolic blood pressure > 90mmHg
    - Assess lung sounds and blood pressure frequently

Paramedic

- **Calcium Gluconate –** 3gm IV/IO
  - Administer over 10-15 minutes
- ***If persistent hypotensive and bradycardic:***
  - **Push Dose Pressor –** 1mL/minute
    - Discard 9mL of Epi 1:10,000 (0.1mg/mL) and draw up 9mL of normal saline to create push-dose pressor Epi 1:100,000. This will yield 10mcg/mL
      - May repeat 2x as needed, with a total max dose of 300mcg (30mL)
  - Consider external pacing If continued bradycardia and hypotension

Tricyclic Antidepressant Overdose

Table of Contents

Information

- **Signs and Symptoms**
  - Mad as a hatter
  - Red as a beet
  - Hot as hell
  - Dry as a bone
  - Blind as a bat
  - Coma
  - Seizure
  - Cardiac Arrhythmia
  - Acidosis

Drugs
Amitryptiline
Amitriptylinoxide
Dibenzepine
Dosulepine/ dothiepin
Doxepin
Imipramine
Melitracen
Protriptyline
Clomipramine

- TCA's cause death primarily through lethal cardiac arrhythmias. Wide QRS complexes are an ominous sign and must be treated with **Sodium Bicarbonate Immediately**

Adult

Basic

- Cardiac Monitoring with 12 lead acquisition
  - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- ***For Isolated hypotension:***
  - **Normal Saline –** 20mL/kg IV/IO
    - Titrated to maintain a systolic blood pressure > 90mmHg
      - May repeat once
        - Assess lung sounds and blood pressure frequently

Paramedic

- ***For patients with a QRS complex 0.12 seconds (3 small boxes):***
  - **Sodium Bicarbonate –** 50mEq IV/IO
    - Followed by a **Sodium Bicarbonate Infusion –** 200mL/hr IV/IO
      - Dilute 50mEq in 500mL normal saline using a 15gtts
        - May repeat once with a total max of 100mEq administered

Abdominal Pain

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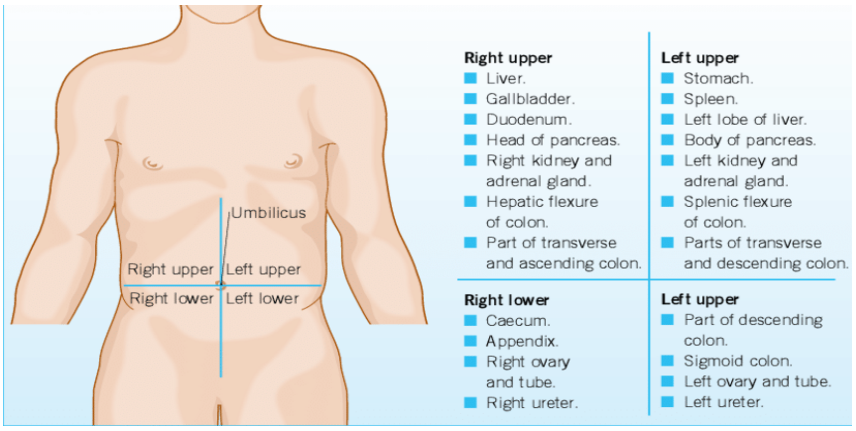
Information



- **Signs and Symptoms**
  - Pain (location/ radiation)
  - Tenderness
  - Nausea
  - Vomiting
  - Diarrhea
  - Dysuria
  - Constipation
  - Vaginal bleeding/ discharge
  - Pregnancy
- Abdominal pain in females of childbearing age should be treated as an ectopic pregnancy until proven otherwise
- The diagnosis of abdominal aneurysm dissection should be considered with abdominal pain in patients over 50 years of age
- Appendicitis may be present with vague, peri-umbilical pain which migrates to the Right Lower Quadrant (RLQ) over time

Adult

- ***If Hypotensive (SBP <90mmHg) with or without nausea/vomiting:***

Basic

- Palpate all four (4) quadrants looking for distension or rigidity in the event of internal bleeding
- Assess blood glucose levels (BGL)
- **Cardiac Monitoring** – with 12 lead acquisition (to rule out cardiac pain above the umbilicus)
  - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Vascular access –** IV/IO
- **Normal saline** – 20mL/kg IV/IO
  - May repeat as necessary
    - Reassess lung sounds and blood pressure frequently
- **If nausea/vomiting present:**
  - **Zofran** – 4mg IV/IO/IM
    - May repeat once as needed
      - Max total dose 8mg

Pediatric

- ***If Hypotensive (SBP <90mmHg) with or without nausea/vomiting:***

Basic

- Palpate all four (4) quadrants looking for distension or rigidity in the event of internal bleeding
- Assess blood glucose levels (BGL)
- **Cardiac Monitoring** – with 12 lead acquisition (to rule out cardiac pain above the umbilicus)
    - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Vascular access –** IV/IO
- **Normal saline** – 20mL/kg IV/IO
    - May repeat as necessary
- Reassess lung sounds and blood pressure frequently
- **If nausea/vomiting present:**
    - **Zofran** – 0.15mg/kg IV/IO/IM
        - May repeat once as needed
            - Max total dose 4mg

Back Pain

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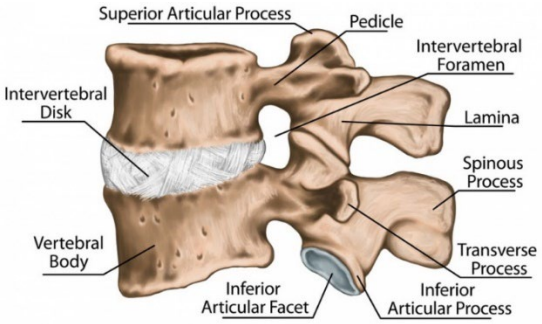
Information



- **Signs and Symptoms**
  - Pain (para-spinous, spinous process)
  - Swelling
  - Pain with range of motion
  - Extremity weakness
  - Extremity numbness
  - Shooting pain into an extremity
  - Bowel / bladder dysfunction
- Abdominal aneurysm dissections are a concern in patients over the age of 50
- Kidney stones typically present with an acute onset of flank pain which radiates around to the groin area
- Any bowel or bladder incontinence is a significant finding which requires immediate medical evaluation

Adult

Basic

- Consider spinal motion restriction in any patient who:
  - Has para-spinous pain
  - Has spinous process pain
  - Pain with range of motion of head
- Evaluate abdomen for any pulsating masses
  - If pulsating mass is present, **DO NOT** palpate abdomen
- Cardiac monitoring with 12 lead in all patients who have non-traumatic upper back pain
  - Paramedic interpretation
  - Transmit to receiving hospital

Advanced

- **Normal Saline -** 20mL/kg IV/IO in patients who are hypotensive
  - May repeat as necessary
    - Reassess lung sounds and blood pressure frequently
- **Toradol** – 30mg IM (preferred in suspected kidney stone)

Paramedic

- Consider opioid administration for severe traumatic and non – traumatic back pain
  - **Fentanyl –** 2mcg/kg IV/IO/IN up to 100mcg
    - Max single dose 100mcg
      - May repeat as need to max total dose of 200mcg
  - **Morphine –** 0.1mg/kg IV/IO up to 5mg
    - May repeat once as
      - Max total dose of 10mg

Back Pain

Table of Contents

Pediatrics

Basic

- Consider spinal motion restriction in any patient who:
  - Has para-spinous pain
  - Has spinous process pain
  - Pain with range of motion of head
- Evaluate abdomen for any pulsating masses
  - If pulsating mass is present, **DO NOT** palpate abdomen
- Cardiac monitoring with 12 lead in all patients who have upper non-traumatic back pain
  - Paramedic interpretation
  - Transmit to receiving hospital

Advanced

- **Normal Saline –** 20mL/kg IV/IO in patients who are hypotensive
  - May repeat as necessary
    - Reassess lung sounds and blood pressure frequently

Paramedic

Consider opiate administration for severe traumatic and non-traumatic back pain

- **Fentanyl –** 1mcg/kg IV/IO/IN up to 50mcg
  - May repeat once
    - Max total dose of 100mcg
- **Morphine –** 0.1mg/kg IV/IO up to 5mg
  - May repeat once
    - Max total dose of 10mg

Medical Control

- **Patients who are less than 5 years of age for the following medications:**
  - **Morphine**
  - **Fentanyl**

Anaphylaxis / Allergic Reaction

Information

Table of Contents

- **Mild Symptoms**
  - Flushing, hives, itching, erythema with normal blood pressures and perfusion
- **Moderate Symptoms**
  - Flushing, hives, itching, erythema plus symptomatic respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with **normal blood pressure and perfusion**
- **Severe Symptoms**
  - Flushing, hives, itching, erythema **PLUS** symptomatic respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) **with hypotension and poor perfusion**
- Determine the source of the allergic reaction (insect, food, medication, etc.)
- Patients with moderate and severe reactions should receive cardiac monitoring with a 12 lead, this shall **NOT** delay administration of epinephrine/ adrenaline

Adult

Basic

- ***Mild Symptoms (generalized urticaria only)***
  - Cardiac monitoring with 12 lead acquisition
    - 12 lead to be interpreted by paramedic or transmitted to receiving facility
  - Oxygen Saturation with capnography
    - Provide oxygen as needed
- ***Moderate & Severe (Airway swelling, respiratory distress, bronchospasm, tongue and/or facial swelling)***
  - **Epinephrine –** 0.3mg IM
    - Utilize Epinephrine Kit which includes:
      - Tuberculin syringe 1mL
      - 20 & 22 gauge 1" & 1.5" needles
      - Alcohol preps
      - Adrenaline vial (Epi 1:1,000) 1mg/1mL
  - **Albuterol –** 2.5mg nebulized
    - May repeat once as needed

Advanced

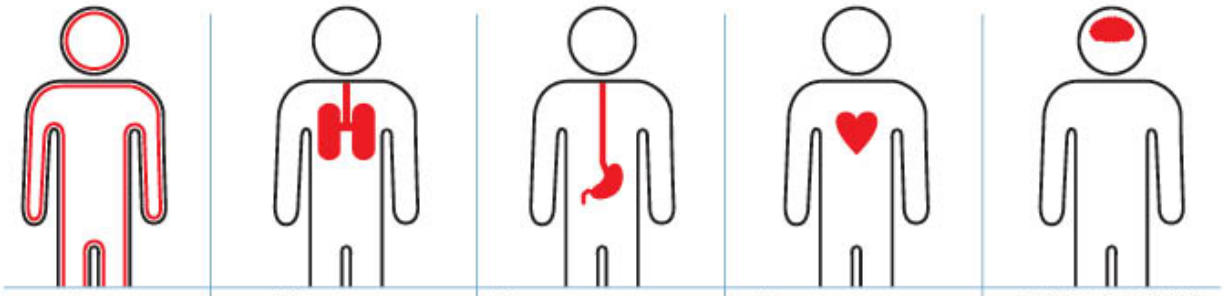
- ***Severe Symptoms***
  - **Benadryl** – 25-50mg slow IV/IO/IM
    - Max dose of 50mg
  - **Solumedrol** – 2mg/kg IV/IO
    - Max dose 125mg
- ***If Hypotensive***
  - **Normal Saline** – 20mL/kg IV/IO
    - Titrate to desired blood pressure
    - May repeat as needed while assessing blood pressure and lung sounds frequently

Adult

Paramedic

- ***Severe Symptoms***
  - **Pepcid –** 20mg IV push
    - Dilute using 10mL saline flush (Administer over two (2) minutes)

- ***If Hypotensive***
  - **Push-Dose Pressor Epinephrine (1:100,000):** 1mL/minute IV/IO titrate to maintain systolic blood pressure (SBP) of 100mmHg
    - Discard 9mL of Epi 1:10,000 (0.1mg/mL) and draw up 9mL or normal saline to create push dose pressor Epi 1:100,000. This will yield 10mcg/mL



SKIN	RESPIRATORY	GASTROINTESTINAL	CARDIOVASCULAR	NEUROLOGICAL
hives, swelling, itching, warmth, redness	coughing, wheezing, shortness of breath, chest pain or tightness, throat tightness, trouble swallowing, hoarse voice, nasal congestion or hay fever-like symptoms, (sneezing or runny or itchy nose; red, itchy or watery eyes)	nausea, stomach pain or cramps, vomiting, diarrhea	dizziness/ lightheadedness, pale/blue colour, weak pulse, fainting, shock, loss of consciousness	anxiety, feeling of "impending doom" (feeling that something really bad is about to happen), headache

OTHER[23]
uterine cramps

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Pediatric

Basic

- ***Mild Symptoms (generalized urticarial only)***
    - Cardiac monitoring with 12 lead acquisition
        - 12 lead to be interpreted by paramedic or transmitted to receiving facility
    - Oxygen saturation with capnography
        - Provide oxygen as needed
    - **Albuterol** – 2.5mg nebulized
        - May repeat once as needed

- ***Moderate & Severe (Airway swelling, respiratory distress, bronchospasm, tongue and/or facial swelling)***
    - **Epinephrine –** 0.15mg IM
        - Utilize Epinephrine Kit which includes:
            - Tuberculin syringe 1mL
            - 20 & 22 gauge 1" & 1.5" needles
            - Alcohol preps
            - Adrenaline vial (Epi 1:1,000) 1mg/1mL

Advanced

- ***Severe Symptoms***
    - **Benadryl** – 1mg/kg slow IV/IO
        - Max dose of 50mg
    - **Solumedrol** – 2mg/kg IV/IO
        - Max dose 125mg
- ***If Hypotensive***
    - **Normal Saline** – 20mL/kg IV/IO
        - Titrate to desired blood pressure
        - May repeat as needed while assessing blood pressure and lung sounds frequently

Paramedic

- ***If Hypotensive:***
    - **Push-Dose Pressor Epinephrine (1:100,000):** 1mL/minute IV/IO titrate to maintain Systolic Blood Pressure (SBP) of 80mmHg
        - Discard 9mL of Epi 1:10,000 (0.1mg/mL) and draw up 9mL or normal saline to create push dose pressor Epi 1:100,000. This will yield 10mcg/mL

Information

Table of Contents

- **Signs and Symptoms**
  - Altered Mental Status
  - Combative / Irritable
  - Diaphoresis
  - Seizures
  - Abdominal Pain
  - Nausea / Vomiting
  - Weakness
  - Dehydration
  - Deep / Rapid Breathing
- Thiamine may be given in the presence of an alcoholic induced hypoglycemia. It is no longer recommended to administer Thiamine unless you suspect the patient may have consumed alcohol prior to the patient becoming hypoglycemic.
- **Oral Glucose Agents: (e.g. Glyburide, Glimepiride, and Glipizide)**
  - Patients taking oral diabetic medications should be strongly encouraged to allow transportation to a medical facility.
- **Insulin Agents:**
  - Longer acting insulin places the patients at risk of recurrent hypoglycemia even after a normal blood glucose is established
- Patients who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal

Adult

Hypoglycemia BGL < 60mg/dL

Basic

- **Oral Glucose –** One tube Buccally
  - May repeat one tube as needed max total dose 2 tubes
    - Contraindicated in patients who are not conscious and unable to protect their airway.

Advanced

- **Dextrose 10% -** (25G/250mL)
  - Infuse 250mL IV/IO bolus wide open (25g) while observing patient for improvement.
  - Reassess every 50mL for patient improvement
  - At reassessment:
    - If blood glucose level is > 60mg/dL in patients who do not have history of diabetes
      - Slow infusion rate to keep vein open (KVO)
    - If blood glucose level is > 80mg/dL in a known diabetic
      - Slow infusion rate to keep vein open (KVO)
    - Glucagon if no vascular access 1-2mg IM
      - May repeat in 15 minutes as needed
- **Glucagon –** 1-2mg IM
  - If unable to establish IV access

Adult

Paramedic

- **Thiamine –** 100mg IV/IO/IM
  - Known alcoholism or malnourished

Hyperglycemia BGL > 350mg/dL

Advanced

- Establish IV/IO access
- 500mL IV/IO normal saline
  - Titrate to desired effect
  - Assess lung sounds and blood pressure every 10 minutes
  - Use caution in patients with coronary heart disease, congestive heart failure and renal failure.

Pediatric

Hypoglycemia BGL < 60mg/dL

Basic

- **Oral Glucose –** One tube Buccally, If able to swallow and follow commands
  - Contraindicated in patients who:
    - Are not conscious and unable to swallow
    - Patients < 2 years old

Advanced

- **Dextrose 10%** (25G/250mL) IV/IO
  - Pediatric dose of 0.5g/kg up to 25G (5mL/kg)
    - Draw up desired volume into a syringe and administer via slow IV/IO push
    - If signs or symptoms resolve reassess BGL
      - Slow infusion rate to Keep Vein Open (KVO)
- **Glucagon -** 0.1mg/kg IM, max dose of 1mg
  - If unable to establish IV access

Hyperglycemia BGL > 200mg/dL

Advanced

- **Normal Saline –** 20mL/kg IV/IO
  - Assess lung sounds and blood pressure frequently

Peds dosing DEXTROSE 10% (25 g/250 mL) Dose: 0.5 g/kg (5 mL/kg) (0.1 g/1 mL in solution) Max initial dose: 25 g					
Weight	**Dose g = mL**	**Weight**	**Dose g = mL**	**Weight**	**Dose g = mL**
6.6 lbs = 3 kg	1.5 g = 15 mL	41.8 lbs = 19 kg	9.5 g = 95 mL	77 lbs = 35 kg	17.5 g / 175 mL
8.8 lbs = 4 kg	2 g = 20 mL	44 lbs = 20 kg	10 g = 100 mL	79.2 lbs = 36 kg	18 g = 180 mL
11 lbs = 5 kg	2.5 g = 25 mL	46.2 lbs = 21 kg	10.5 g = 105 mL	81.4 lbs = 37 kg	18.5 g = 185 mL
13.2 lbs = 6 kg	3 g = 30 mL	48.4 lbs = 22 kg	11 g = 110 mL	83.6 lbs = 38 kg	19 g = 190 mL
15.4 lbs= 7 kg	3.5 g = 35 mL	50.6 lbs = 23 kg	11.5 g = 115 mL	85.8 lbs = 39 kg	19.5 g = 195 mL
17.6 lbs = 8 kg	4 g = 40 mL	52.8 lbs = 24 kg	12 g = 120 mL	88 lbs = 40 kg	20 g = 200 mL
19.8 lbs = 9 kg	4.5 g = 45 mL	55 lbs = 25 kg	12.5 g = 125 mL	90.2 lbs = 41 kg	20.5 g = 205 mL
22 lbs = 10 kg	5 g = 50 mL	57.2 lbs = 26 kg	13 g = 130 mL	92.4 lbs = 42 kg	21 g = 210 mL
24.2 lbs = 11 kg	5.5 g = 55 mL	59.4 lbs = 27 kg	13.5 g = 135 mL	94.6 lbs = 43 kg	21.5 g = 215 mL
26.4 lbs = 12 kg	6 g = 60 mL	61.6 lbs = 28 kg	14 g = 140 mL	96.8 lbs = 44 kg	22 g = 220 mL
28.6 lbs – 13 kg	6.5 g = 65 mL	63.8 lbs = 29 kg	14.5 g = 145 mL	99 lbs = 45 kg	22.5 g = 225 mL
30.8 lbs = 14 kg	7 g = 70 mL	66 lbs = 30 kg	15 g = 150 mL	101.2 lbs = 46 kg	23 g = 230 mL
33 lbs = 15 kg	7.5 g = 75 mL	68.2 lbs = 31 kg	15.5 g = 155 mL	103.4 lbs = 47 kg	23.5 g = 235 mL
35.2 lbs = 16 kg	8 g = 80 mL	70.4 lbs = 32 kg	16 g = 160 mL	105.6 lbs = 48 kg	24 g = 240 mL
37.4 lbs = 17 kg	8.5 g = 85 mL	72.6 lbs = 33 kg	16.5 g = 165 mL	107.8 lbs = 49 kg	24.5 g = 245 mL
39.6 lbs = 18 kg	9 g = 90 mL	74.8 lbs = 34 kg	17 g = 170 mL	110 lbs = 50 kg	25 g = 250 mL

Seizure

Information

Table of Contents

- **Signs and Symptoms**
  - Decreased mental status
  - Sleepiness
  - Incontinence
  - Observed seizure activity
  - Evidence of trauma
  - Unconscious
- **Status Epilepticus** – is defined as two or more successive seizures without a period of consciousness or recovery
- **Grand Mal Seizure (Generalized)** – are associated with loss of consciousness, incontinence, and tongue trauma
- **Focal Seizure** – affect only a part of the body and are not usually associated with a loss of consciousness
- **Jacksonian Seizure** – seizures which start as a focal seizure and become generalized
- Be prepared for airway problems and continued seizures
- Assess possibility of occult trauma and substance abuse
- Be prepared to assist ventilations especially if Versed is used
- Refer to Obstetrical Emergency Guideline for any seizure patient who is pregnant or may think they are pregnant

Adult

Basic

- Protect the patient from further harm during seizure activity
- Cardiac monitor with 12 lead acquisition
  - Interpretation by paramedic or transmitted to receiving facility
  - If patient is actively seizing, wait to apply cardiac leads until seizure activity is completed
- Assess airway and ventilatory effort
  - Suction any blood and remove any objects that may cause an obstruction
- Obtain Blood Glucose Levels along with an oxygen saturation

Paramedic

Actively Seizing

- **Versed** – 2mg IV/IO
  - May repeat every 3-5 minutes with a total max dose of 6mg
    - Do not delay treatment for IV access.
  - 4mg IM
    - May repeat 2mg IM after 5 minutes if seizure activity continues
  - 2mg IN
    - May Repeat after 5 min if seizure activity continues
      - Administer Versed IM or IN to control seizure activity
- Known or suspected pregnancy > 20 weeks consider:
  - **Magnesium Sulfate** – 4g IV/ IO over 2-3 minutes
    - Mix 4g in a 50mL normal saline with a 60gtts

Pediatric

Basic

- Protect the patient from further harm during seizure activity
- Cardiac monitor with 12 lead acquisition
    - Interpretation by paramedic or transmitted to receiving facility
    - If patient is actively seizing, wait to apply cardiac leads until seizure activity is completed
- Assess airway and ventilatory effort
    - Suction any blood and remove any objects that may cause an obstruction
- Obtain Blood Glucose Levels (BGL) along with an oxygen saturation
- Obtain temperature

Febrile Seizure

- Perform active cooling by removing the patients clothing
    - **DO NOT** cover the patient with a wet towel or sheet
    - **DO NOT** apply ice or cold packs to the patient's body

Paramedic

Actively Seizing

- **Versed** – 0.1-0.2mg/kg IV/IO/IM/IN
    - May repeat once in five (5) minutes
        - Do not delay treatment for IV access
        - Administer Versed IM or IN to control seizure activity

Information

Table of Contents

- **Onset of Symptoms** – Is defined as the last time the patient was symptom free.
- **Witnessed**
  - Spouse, family, friends, or bystanders can identify that the signs and symptoms have developed < 24 hours
  - Witnessed symptoms ≥ 24 hours shall not be considered stroke alerts
- **Unwitnessed**
  - Onset of signs and symptoms are unable to be determined
  - Awakening stroke symptoms would will have an onset time of the previous night when patient was symptom free
- In all suspected stroke patients, providers shall use the Cincinnati Stroke Scale for the initial assessment
  - If Cincinnati stroke scale has positive findings a RACE score shall be calculated
- Transport ALL patients with a RACE score > 0 and last known well time < 24 hours emergently to closest acute stroke center
- South Carolina RACE Score ≥ 4 suggestive of Large Vessel Occlusion (LVO)
  - All patients who have a RACE score ≥ 4 and a last known well ≤ 24 hours are to be transported to a comprehensive stroke center as long as transport times is not > 30 minutes
    - If transport time is > 30 minutes transport patient to an primary stroke center
- Limit scene time to 10 minutes – (Provide early notification to receiving facility)
- All patients that are suspected of stroke should have the SC EMS R.A.C.E Stroke Scale form completed
  - A copy of the form shall be left at the receiving facility
- Be alert of airway problems (difficulty swallowing, aspiration)

Adult

Basic

- **Obtain the following information:**
  - Last time seen normal
  - Patient's medications
  - Contact information for family member
- **Obtain Cincinnati Stroke Scale**
  - If positive finding, calculate R.A.C.E. score
- **Obtain blood glucose readings**
  - Refer to Glucose Management Guideline, if abnormal readings
- **Cardiac monitor with 12 lead acquisition**
  - 12 lead interpretation by paramedic or transmitted to receiving hospital
- **Oxygen** – 2Lpm via nasal cannula
  - To maintain oxygen saturation of 94%

Advanced

- **IV access**
  - Preferred bilateral large bore catheter (18g) in the antecubital or higher
  - IO access **IF** unable to obtain peripheral access
- **Normal Saline** – 20mL/kg, fluid bolus IV/IO
  - As need to maintain adequate perfusion
    - Reassess lung sounds and blood pressure frequently

Pediatric

Basic

- **Obtain the following information:**
  - Last time seen normal
  - Patient's medications
  - Contact information for family member
- **Obtain Cincinnati Stroke Scale**
  - If positive finding, calculate RACE score
- **Obtain Blood Glucose readings**
  - Refer to Glucose management guideline if abnormal readings
- **Cardiac monitor with 12 lead acquisition**
  - 12 lead interpretation by paramedic or transmitted to receiving hospital
- **Oxygen** – 2Lpm via nasal cannula
  - Regardless of pulse oximetry readings

Advanced

- **IV Access**
  - Preferred bilateral IV access in the antecubital or higher
  - IO access if unable to obtain peripheral access
- **Normal Saline** – 10mL/kg, fluid bolus IV/IO max dose 250mL
  - Regardless of blood pressure

Patient Name: _____ DOB: _____ Date: _____

South Carolina EMS R.A.C.E. Stroke Scale

Rapid **A**rterial o**C**clusion **E**valuation Scale

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		

Any score above **4** is a Stroke Alert and high likelihood of an LVO

Adult and Pediatric

Destination by Stroke Center Capability

Comprehensive Stroke Centers

- Grand Strand Medical Center
  - 809 82nd Parkway Myrtle Beach, SC 29572
    - **843-692-1183**

Primary Stroke Centers

- Conway Medical Center
  - 300 Singleton Ridge Rd. Conway, SC 29526
    - **843-347-8014**
- McLeod Regional Medical Center Florence
  - 555 East Chaves St. Florence, SC 29506
    - **843-777-6695**
- Tidelands Health Georgetown Memorial Hospital
  - 606 Black River Rd. Georgetown, SC 29440
    - **843-527-7476**
- Tidelands Health Waccamaw Community Hospital
  - 4070 Highway 17 Bypass South Murrells Inlet, SC 29576
    - **843-652-1167**

Acute Stroke Ready Hospital

- McLeod – Seacoast
  - 4000 East Highway 9 Little River, SC 29566
    - **843-390-8117**
- McLeod – Loris
  - 3655 Mitchell St. Loris, SC 29526
    - **843-716-7752**

*****For ALL Stroke Alerts, call the receiving hospital with the following information*****

- Patients name
- Date of birth
- Last known well time

Information

Table of Contents

- **Sources, signs and symptoms of sepsis include, but are not limited to:**
  - Hyperthermia (>100.4°F / 38°C)
  - Hypothermia (<95°F / 35°C)
  - Tachypnea
  - Tachycardia
  - Acute Mental Status Change
  - Urinary Tract Infection
  - Pneumonia
  - Skin / Soft Tissue Infection
  - Abdominal Infection
  - Wound Infection
  - Suspected meningitis, endocarditis, or osteomyelitis
- **Collecting Cultures**
  - **You cannot obtain blood cultures from an IO**
  - Maintain aseptic technique at all times
  - Put on a new set of clean gloves
  - Prepare site with chloraprep
    - Clean two (2) inch site for minimum of 30 sec
    - Allow site to air dry
    - **DO NOT TOUCH ONCE CLEANED**
  - Remove cap from culture bottles
  - Clean bottle diaphragm with alcohol and allow to dry
  - Venipuncture and blood draw
  - Add 10mL of blood in each blood culture bottle
- If unable to obtain cultures, DO NOT administer antibiotics
- Lactate needs to be drawn no more than 10 minutes from receiving facility and must be wrapped with an ice pack
- Determine the receiving facility destination prior to drawing cultures
  - Use appropriate blood culture kit for the appropriate receiving hospital

Suspected Source of Infection	Antibiotic
Pneumonia	Rocephin
Urinary Tract Infection	Rocephin
Altered Mental Status	Rocephin
Blood Stream / PICC	Cefepime
Abdominal (vomiting and/or diarrhea)	Rocephin
Wounds	Cefepime
Skin	Cefepime

Modified qSOFA Criteria

1. ***Are any two of the following symptoms present AND new to the patient?***
    - Hyperthermia (>100.4° F or 38° C) or Hypothermia (<95° F or 35° C)
    - Heart Rate > 90 beats per minute
    - Respiratory Rate > 20 breaths per minute or mechanical ventilation
    - Signs of poor perfusion (such as SBP < 90 mmHg)
2. ***Is the patient's presentation suggestive of any of the following infections?***
    - Pneumonia (cough/thick sputum)
    - Urinary Tract Infection
    - Blood Stream / Catheter related
    - Abdominal Pain and/or vomiting / diarrhea
    - Wound Infection
    - Skin / Soft Tissue Infection
3. ***Notify receiving facility with a Sepsis Alert***

*****Complete Sepsis check sheet after transfer of care and leave with hospital staff*****

Sepsis

Table of Contents

Adult

Basic

- ***Is patient complaining of dyspnea?***
  - **Oxygen –** maintain an oxygen saturation of > 94%
    - Continuous monitoring of oxygen saturation and Capnography
      - *A patient with an $ETCO_2 \leq 25$ mmHg is predicted to have severe sepsis*
  - Cardiac Monitoring with 12 lead acquisition
    - 12 lead interpretation by Paramedic or transmitted to receiving facility
  - Monitor and transport patient

Advanced

- **Vascular Access** – IV
  - With an aseptic technique
  - Draw Blood Cultures for appropriate receiving facility in this order:
    - Aerobic (Blue/Gray/Green)
    - Anaerobic (Purple/Orange)
  - Draw lactic acid no more than 10 minutes from receiving facility
    - Wrap an ice pack around lactic vacutainer
- **Normal Saline –** 30mL/kg
  - May repeat as needed max total volume or 2 liters
  - Maintain a systolic blood pressure of 90mmHg or a MAP greater than 80
    - Reassess lung sounds and blood pressure frequently
- **Rocephin (Ceftriaxone)** – 2g IV/IO over 10 minutes (mixed in 50 mL NS)
  - Pneumonia
  - Urinary Tract Infection
  - Altered Mental Status
  - Abdominal (Diarrhea/Nausea/Vomiting)
- **Cefepime –** 2g IV/IO over 10 minutes (mixed in 50 mL NS)
  - Blood stream/PICC
  - Wounds
  - Skin

*****If the patient has an allergy to 'cillin' medications, contact On-Line Medical Control for direction in antibiotic therapy*****

Paramedic

- ***If patient remains hypotensive after fluid bolus:***
  - **Push dose presser Epinephrine (1:100,000)**
    - Dilute: Discard 9mL of Epi 1:10,000 (0.1mg/mL) and draw up 9mL of normal saline to create push dose presser. This will yield 10mcg/mL
      - **ADMINISTER**: 1mL/minute, IV/IO titrate to maintain systolic blood pressure
      - May repeat two (2) times as needed total max dose 300mcg (30mL)

Pediatric

Basic

- ***Is patient complaining of dyspnea?***
  - **Oxygen –** maintain oxygen saturation of > 94%
    - Continuous monitoring of oxygen saturation and Capnography
      - *A patient with an $ETCO_2 \leq 25$ mmHg is predicted to have severe sepsis*
  - Cardiac Monitoring with 12 lead acquisition
    - 12 lead interpretation by Paramedic or transmitted to receiving facility
  - Monitor and transport patient

Advanced

- **Vascular Access –** IV
  - With an aseptic technique
- **Normal Saline –** 30mL/kg
  - May repeat as needed max total volume or 2 liters
  - Maintain a systolic blood pressure of 90mmHg or a MAP greater than 80
    - Reassess lung sound and blood pressure frequently

Paramedic

- ***If patient remains hypotensive after fluid bolus:***
  - **Push dose presser Epinephrine** (1:100,000)
    - Dilute: Discard 9mL of Epi 1:10,000 (0.1mg/mL) and draw up 9mL of normal saline to create push dose presser. This will yield 10mcg/mL
      - **ADMINISTER**: 1mL/minute, IV/IO titrate to maintain systolic blood pressure
      - May repeat two (2) times as needed total max dose 300mcg (30mL)

Behavioral / Chemical Restraint

Information

Table of Contents

- **Signs and Symptoms**
  - Affect change, hallucinations
  - Combative/ violent - are agitated patients who place themselves and/or crew in danger
  - Expression of suicidal / homicidal thoughts (Does the patient have a plan?)
  - Excited delirium (bizarre, aggressive behavior which may be associated with the use of cocaine, PCP, bath salts, flakka, methamphetamines, and amphetamines)
    - **Use extreme caution with these patients**
- **SAFETY FIRST** - Utilize the law enforcement to secure scene prior to entry
- Consider medical and trauma causes for abnormal behavior
- Do not irritate the patient with prolonged exams
- All patients who receive either physical or chemical restraint should be continuously monitored for any changes (cardiac monitor, Spo_2, Capnography)
- Any patient who is handcuffed or restrained by law enforcement and is transported by EMS **MUST** be accompanied by law enforcement in the ambulance
- Restrained patients shall NOT be placed in a prone position
  - Position restrained patients so the position does not impede your assessment
- Chemical restraints may be used in addition to physical restraint

Adult

Basic

- Remove patient from stressful environment
- Use verbal calming techniques
  - Communication is very important
  - Reassure, calm, and establish a rapport
- Calculate a GCS on all patients
- Assess blood glucose levels (refer to Glucose Management Guideline if reading is not in normal limits)
- Check temperature
  - If hyperthermic, aggressive cooling may be required
- Consider physical restraints for crew and patient safety

Advanced

Hypotensive

- **Normal Saline –** 20mL/kg IV/IO
  - Reassess lung sounds and blood pressure frequently

Paramedic

- Consider chemical restraint with the following:
  - **Haldol and Benadryl**
    - Mix 5mg of Haldol with 50mg of Benadryl, IM
  - **Versed –** 2 mg IV/IO/IN/IM

Medical Control

- **Ketamine –** 2-4mg/kg IM (**Must** Monitor Capnography)

Altered Mental Status

Table of Contents

Information

- **Signs and Symptoms**
  - Decreased mental status or lethargy
  - Change in baseline mental status
  - Bizarre behavior
  - Hypoglycemia (Cool, diaphoretic skin)
  - Hyperglycemia (warm, dry skin, fruity breath, Kussmaul respirations, signs of dehydration)
  - Irritability
- Be aware of altered mental status (AMS) as a presenting sign of an environmental toxin or Haz-Mat exposure and protect personal safety
- Do not let alcohol confuse the clinical picture
  - Alcoholics frequently develop hypoglycemia and may have unrecognized injuries
- Consider restraints if necessary for patients and/or personnel's protection.
- In pediatric/ neonate altered mental status with a suspicion of opiate overdose use extreme caution in administrating Narcan to avoid withdraws

AEIOU TIPS

- A- alcohol, acidosis/alkalosis
- E- endocrine, electrolytes, encephalopathy
- I- insulin (surplus or deficit)
- O- opiates
- U- uremia
- T- trauma (head injury, hemorrhagic shock)
- I- intracranial pressure, infection
- P- poisoning, psychiatric
- S- seizure, syncope

Adult

Basic

- Assess airway:
  - BVM ventilations if patient is ventilatory depressed
  - Continuous capnography in conjunction with oxygen saturation monitoring
  - Narcan 2mg, IN only if ventilatory depressed in conjunction with pinpoint pupils
  - 1mL per nostril
- Obtain blood glucose readings
  - Refer to Glucose Management Guideline if readings are not within normal limits.
- Perform Cincinnati Stroke Scale and R.A.C.E. score (if applicable)
- 3 lead monitoring with 12 lead acquisition
  - Interpretation by arriving ALS provider or transmission to a receiving facility
- Assess temperature
  - Passive warming if patient is hypothermic
  - Apply ice packs to neck and groin in patients who are hyperthermic

Advanced

- Ventilatory depressed patients
  - **Narcan –** 0.4mg IV
    - May repeat five (5) times until ventilatory rate improves

Advanced

- Vascular Access
  - **Normal Saline –** 20mL/kg if signs of dehydration or hypotensive
    - Assess lung sounds and blood pressure frequently

Paramedic

- Cardiac monitoring
  - 12 lead interpretation
  - Refer to AEIOU TIPS for other potential causes (refer to appropriate guideline as needed)

Pediatric

Basic

- Assess airway
  - BVM ventilations
  - Continuous capnography in conjunction with oxygen saturation monitoring
- Obtain blood glucose readings
  - Refer to Glucose management guideline if readings are not within normal limits.
- 3 lead monitoring with 12 lead acquisition
  - Interpretation by arriving ALS provider or transmission to a receiving facility
- Assess temperature
  - Passive warming if patient is hypothermic
  - Apply ice packs to neck and groin in patients who are hyperthermic

Advanced

- Ventilatory depressed patients if ventilatory depressed
  - **Narcan –** 0.1mg/kg IV/IO/IM/IN
    - Total max dose of 2mg
- Vascular Access
  - **Normal Saline –** 20mL/kg if signs of dehydration or hypotensive
    - Assess lung sounds and blood pressure frequently

Paramedic

- Cardiac Monitoring
  - 12 lead interpretation
  - Refer to AEIOU TIPS for other potential causes (refer to appropriate guideline as needed)

Information

Table of Contents

- **Signs and Symptoms**
  - Loss of consciousness with recovery
  - Lightheadedness, dizziness
  - Palpitations, slow or rapid pulse
  - Pulse irregularity
  - Decreased blood pressure
- Assess for signs and symptoms of trauma if associated or questionable fall with syncope
- Consider dysrhythmias, GI bleed, ectopic pregnancy, and seizure as possible causes of syncope

Adult and Pediatric

Basic

- Consider spinal motion restriction if suspected trauma
- Assess blood glucose
  - Refer to Glucose Management Guideline, if abnormal readings
- Cardiac monitoring with 12 lead acquisition
  - 12 lead interpretation by paramedic or transmitted to receiving facility
- Orthostatic vitals

Advanced

- **Normal Saline Fluid** – 20mL/kg, IV/IO (if patient is hypotensive)
  - Maintain a systolic blood pressure of 90mmHg or a MAP greater than 80
  - Reassess lung sound frequently
  - If no changes, refer to Hypotensive Guideline

Neurally mediated	Neurocardiogenic syncope Carotid hypersensitivity syndrome
Orthostatic hypotension	Parkinson's disease with autonomic failure Multiple system atrophy Pure autonomic failure Diabetic neuropathy Drug induced
Cardiac arrhythmia	Atrial fibrillation High-degree atrioventricular block Sick sinus syndrome Ventricular tachycardia Drug induced
Cardiovascular nonarrhythmic	Myocardial infarction or ischemia Aortic stenosis Pulmonary embolus

Dialysis/ Renal Failure

Information

Table of Contents

- Do not take blood pressure or start IV in extremity which has a shunt/ fistula in place
- Access of shunt is indicated in the deceased or near-deceased patient only with no other available access
  - Establish IO access if available
- Always consider hyperkalemia in all dialysis or renal failure patients
- Sodium Bicarbonate and Calcium Chloride / Gluconate should not be mixed
  - Give in separate IV/IO lines
- Renal dialysis patients have numerous medical problems such as
  - Hypertension
  - Cardiac disease

Adult

Basic

Shunt / Fistula Bleeding

- Apply firm fingertip pressure to bleeding site
- Apply dressing
  - Avoid bulky dressing
  - Dressing must not compress shunt/ fistula as this will cause clotting

Congestive Heart Failure / Pulmonary Edema

- Assess airway (breathing rate, rhythm quality)
  - Apply oxygen as necessary
  - Continuous monitoring of capnography in conjunction of an oxygen saturation
- Assess lung sounds
  - If crackles/ rhonchi present consider CPAP (refer to CHF Guideline)
- Cardiac Monitoring with 12 lead
  - Interpretation by Paramedic or transmission to receiving facility

Altered Mental Status/ Hypotension (Systolic < 90)

- Assess blood glucose level (refer to Glucose Management Guideline)

Cardiac Arrest

- Initiate CPR
  - 30 compressions to 2 Breaths via BVM
  - Apply AED

Advanced

Altered Mental / Hypotension

- **Normal Saline –** 20mL/kg IV/IO, if hypotensive
  - Reassess lung sounds and blood pressure frequently,
    - repeat as necessary

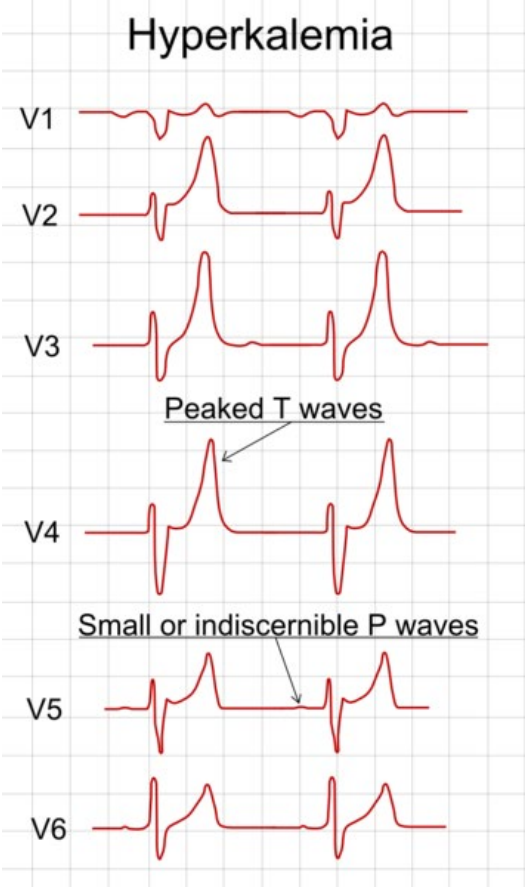
Paramedic

Altered Mental / Hypotension (Systolic < 90)

- Peaked T wave, QRS ≥ 0.12 sec
  - **Calcium Gluconate –** 2gm IV/IO
  - **Sodium Bicarbonate –** 1mEq/kg IV/IO
  - **Albuterol –** 10mg Nebulized

Cardiac Arrest

- Refer to Cardiac Arrest Guideline in addition to:
  - **Calcium Gluconate –** 2gm IV/IO
  - **Sodium Bicarbonate –** 1mEq/kg IV/IO



Deceased Persons

Table of Contents

Information

- There is no scientific basis in trying to resuscitate an unwitnessed asystolic patient who has succumbed to the dying process of a terminal illness
    - Consideration should be given to not starting resuscitation efforts in these cases
- Hospice / DNR patients should not receive cardiopulmonary resuscitation
    - Unless requested by hospice Doctor / Nurse

Adult and Pediatric

Basic

- Determine that the patient is dead/non-salvageable and decide not to resuscitate if:
    - **At least 1:**
        - Lividity
        - Rigor mortis
        - Tissue decomposition
        - A valid DNR is presented
        - Injuries not compatible with life (Decapitation)
        - Drowning > 45 minutes

OR

    - **If ALL of the following are present:**
        - Known down time > 45 minutes
        - Asystole
        - Pupils fixed and dilated
        - Apneic

Medical Control

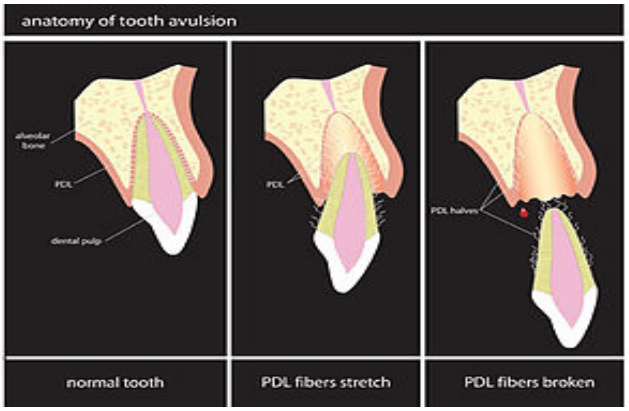
- To terminate cardiopulmonary resuscitation efforts If:
    - Persistent asystole with no rhythm changes
        - Five (5) rounds ACLS care **OR**
        - Efforts > 20min

Dental Problems

Information

Table of Contents

- Significant soft tissue swelling to the face or oral cavity can represent a cellulitis or abscess
- Scene and transport times should be minimized in complete tooth avulsions.
  - Reimplantation is possible within four (4) hours if the tooth is properly cared for
- All tooth disorders typically need antibiotic coverage in addition to pain control
- Occasionally cardiac chest pain can radiate to the jaw
- All pain associated with teeth should be associated with a tooth which is tender to tapping or touch or sensitive to cold or hot
- DO NOT replace tooth if:
  - Obtunded patient
  - At risk for aspiration
  - Spinal Immobilization
  - AMS
  - Multiple teeth missing



Adult

Basic

- Assess airway for any of the following:
  - Blood or fluid that may cause a compromise to airway
  - Risk of aspiration of tooth or fragments of a tooth
    - Suction the oropharynx as needed
- Determine the area of pain: Jaw OR Dental
  - If pain is in the jaw consider:
    - Cardiac monitoring with 12 lead acquisition
      - 12 lead interpretation by paramedic or transmitted to receiving hospital
- Control any bleeding with pressure
- ***If the tooth is avulsed:***
  - Place tooth back in socket if feasible
  - Secure to surrounding teeth utilizing tape to avoid aspiration of tooth
- ***If tooth cannot be placed in the socket:***
  - Place tooth in milk OR normal saline
    - **DO NOT** rub or scrub the tooth

Advanced

- Consider pain management
  - **Toradol –** 30mg IM
- Consider anti-nausea medication
  - **Zofran** – 4mg IV/IO/IM
    - ➢ May repeat once as needed
      - Max total dose 8mg

Paramedic

- Consider pain management
  - **Fentanyl** – 2mcg/kg up to 100mcg IV/IO/IN/IM
    - Max single dose 100mcg
      - May repeat as need to max total dose of 200mcg

Fever / Febrile Seizure

Information

Table of Contents

- Febrile seizures are more likely in children with a history of febrile seizures and with a rapid elevation in temperature
- Patients with a history of liver failure should not receive Acetaminophen (Tylenol)
- NSAIDs should not be used in the setting of environmental heat emergencies
- Any children ≤ 1 year of age, utilize a rectal thermometer if available
- **Signs and Symptoms**
    - Warm, flushed, sweaty skin
    - Chills (shivering)
    - Cough
    - Rash
    - Generalized seizure activity (convulsions)
- Ensure the patient has an airway and is able to swallow without difficulty before administering anything per oral route
- **Febrile Seizure –** Use caution administering acetaminophen (Tylenol) during the postictal state
    - If seizure activity is present, document characteristics along with the duration of the seizure activity

Adult

*If oral temperature > 100.4*F*

Basic

- **Oxygen -** maintain oxygen saturation ≥ 94%
    - Utilize blow-by with a non-rebreather
- Obtain a detailed history including duration of illness, medications administered
- Assess blood glucose level (BGL)

Advacned

- **Normal Saline –** 20mL/kg IV/IO
    - May repeat as necessary
        - Reassess lung sounds and blood pressure frequently

Paramedic

- **Acetaminophen -** 15mg/kg IV/IO
    - Max total dose 1,000mg
        - Consider utilization of Sapphire IV pump for dosages less than 1,000mg

Fever / Febrile Seizure

Pediatric

Table of Contents

If Suspected febrile seizure and/or oral/rectal temperature > 100.4*F

Basic

- **Oxygen -** maintain oxygen saturation ≥ 94%
  - Utilize blow-by with a non-rebreather
- Obtain a detailed history including duration of illness, medication
- Ensure the patient has a patent airway
- Assess blood glucose level (BGL)
- **Acetaminophen –** 15mg/kg up to 1,000mg PO
  - Put the syringe into the infant's mouth between their tongue and the inside of their cheek
  - Gently administer a small amount of acetaminophen into this space.
    - **Do not** administer the medicine to the back of the throat. This will lead to gagging

Advanced

- **Normal Saline** - 20mL/kg IV/IO
  - May repeat as necesary
    - Reassess lung sounds and blood pressure frequently

Paramedic

- ***If patient does NOT have a patent airway or risk of aspiration***
  - **Acetaminophen** - 15mg/kg IV/IO infusion over 15min
    - Max total dose 1,000mg
      - Consider utilization of Sapphire IV pump for dosages less than 1,000mg
- ***If seizure activity persists***
  - Refer to seizure guideline

Pounds	Kilograms	Dose (mg)	Dose (mL)	Dose Administered
10	5	75 mg	2.25 mL	72 mg
15	7	105 mg	3.25 mL	104 mg
20	9	135 mg	4.25 mL	136 mg
25	11	165 mg	5 mL	160 mg
30	14	210 mg	6.5 mL	208 mg
35	16	240 mg	7.5 mL	240 mg
40	18	270 mg	8.5 mL	272 mg
45	20	300 mg	9.25 mL	296 mg
50	23	345 mg	10.75 mL	344 mg
55	25	375 mg	11.75 mL	376 mg
60	27	405 mg	12.5 mL	400 mg
65	29	435 mg	13.5mL	432 mg
70	32	480 mg	15 mL	480 mg
75	34	510 mg	16 mL	512 mg
80	37	555 mg	17.25 mL	552 mg
85	39	585 mg	18.25 mL	584 mg
90	41	615 mg	19.25 mL	616 mg
95	43	645 mg	20 mL	640 mg
100	45	675 mg	21 mL	672 mg

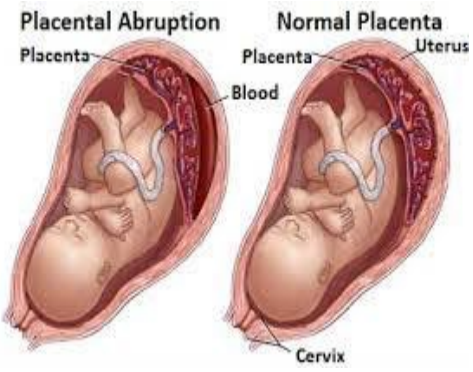
Pounds	Kilograms	Dose (mg)	Dose (mL)	Dose Administered
110	50	750 mg	23.5 mL	752 mg
115	52	780 mg	24.5 mL	784 mg
120	54	810 mg	25.25 mL	808 mg
125	57	855 mg	26.75 mL	856 mg
130	59	885 mg	27.75 mL	888 mg
135	61	915 mg	28.5 mL	912 mg
140	64	960 mg	30 mL	960 mg
145	66	990 mg	30 mL	960 mg
150	68	1000 mg	30 mL	960 mg
155	70	1000 mg	30 mL	960 mg
160	73	1000 mg	30 mL	960 mg
165	75	1000 mg	30 mL	960 mg
170	77	1000 mg	30 mL	960 mg
175	79	1000 mg	30 mL	960 mg
180	82	1000 mg	30 mL	960 mg
185	84	1000 mg	30 mL	960 mg
190	86	1000 mg	30 mL	960 mg
195	88	1000 mg	30 mL	960 mg
200	91	1000 mg	30 mL	960 mg

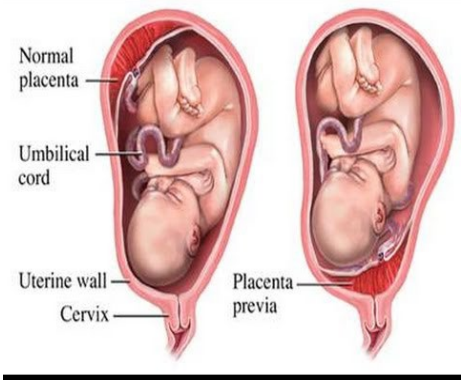
Obstetrical Emergency

Table of Contents

Information

- **Obstetrical patients are defined as gestation > 20 weeks**
  - *First trimester* – weeks 1-12 of pregnancy
  - *Second Trimester* – weeks 13-27 of pregnancy
  - *Third Trimester* – weeks 28-delivery
- **Physiological changes during pregnancy**
  - Mothers heart rate increases
  - By the third trimester, the heart rate can be 15-20 beats per minute above normal
  - Both the systolic and diastolic blood pressures drop 5 – 15 mm Hg during the second trimester
  - Supine hypotension usually occurs in the third trimester
- **Ectopic Pregnancy (usually first trimester)**
  - Sudden onset of sever lower abdominal pain
  - Vaginal bleeding
  - Amenorrhea (absence of menstruation
  - Referred pain to the left shoulder
  - Cullen's sign (periumbilical ecchymosis) / Grey Turner's sign (ecchymosis of the flanks
  - Abdominal distention and tenderness
- **Spontaneous abortion (usually before 20 weeks)**
  - Abdominal cramping
  - Vaginal bleeding
  - Passage of tissue or fetus
- **Placenta Abruptio (usually third trimester)**
  - Sudden onset of severe abdominal pain and tenderness
  - Painful uterine contractions
  - Vaginal bleeding with dark red blood
  - Patient may present as shock
- **Placenta Previa (usually third trimester)**
  - Painless vaginal bleeding (bright red blood)
- **Uterine rupture(usually third trimester)**
  - Sudden, intense abdominal pain
  - Vaginal Bleeding





Adult

Basic

- Assess signs and symptoms of shock
- Prepare patient for rapid transport to a labor and delivery facility

For active bleeding

- Loosely palace trauma pads over the vagina in an effort to stop the flow of blood
  - **DO NOT** pack the vagina

Advanced

- **Normal Saline –** 20mL/kg titrate to maintain desired blood pressure
  - May repeat once
  - Assess lung sounds and BP frequently

Pre-Eclampsia/ Eclampsia

Table of Contents

Information

- **Pre-Eclampsia**
  - A rare pregnancy complication characterized by high blood pressure that usually begins after 20 weeks of pregnancy
    - **Signs and Symptoms include:**
      - Blood Pressure > 160mmHg systolic or a diastolic > 110mmHg with one of the following:
      - Altered mental status
      - Visual disturbances
      - Headache
      - Pulmonary edema
- **Eclampsia**
  - **Signs and Symptoms**
    - Any of the pre-eclampsia signs and symptoms associated with:
      - Seizures

Adult

Basic

- Obtain BGL and medical history
- Cardiac monitoring with 12 lead acquisition
  - 12 lead to be interpreted by paramedic or transmitted to receiving facility

Paramedic

Pre-eclampsia

*****Medical Control*****

- **Labetalol –** 10mg slow IV/IO over 2 minutes
  - Only if patient has a sustained heart rate above 70 BPM

Eclampsia

- **Versed –** 2mg IV, IO, IM
  - May repeat once with a max total dose of 4mg
- **Magnesium Sulfate –** 4G slow IV/IO over 10 minutes
  - Diluted in a 50mL bag of normal saline
  - Administer utilizing a 60 gtts set, run wide open

Childbirth/ Labor

Information

Table of Contents

- Document all times (Delivery, contraction frequency, and length)
- If maternal seizures occur, refer to obstetrics emergency guideline
- Signs of imminent deliver include but not limited to
    - Urge to push or bare down (Urge to make a bowel movement)
    - Water breaking
    - Crowning
- Some perineal bleeding is normal with any birth.
    - Large quantities of blood or free bleeding is abnormal and treatment is required
- Record APGAR at one (1) minute and five (5) minutes after birth

Adult and Pediatric

Basic

Signs of imminent delivery:

- Place the patient on her back with knees flexed and feet flat on the floor
- Control delivery of head, with gentle perineal pressure
- **DO NOT** apply manual pressure to the uterine fundus prior to birth of the child
- **DO NOT** pull or push on the neonate
- **DO NOT** allow sudden hyperextension of the neonate's head

Once the head is delivered:

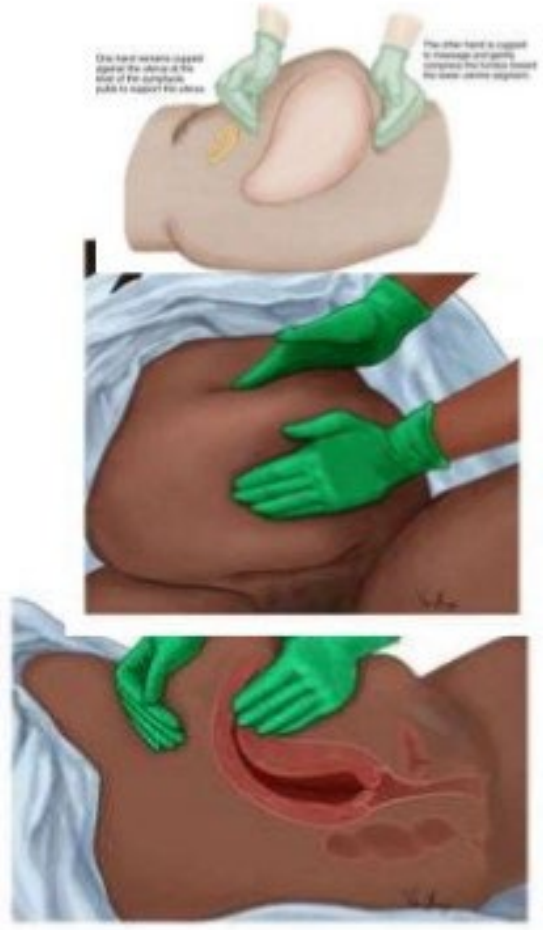
- Suction the mouth and then the nose
- Support the neonate's head as it rotates to align with the shoulders. Gently guide the neonate's head downward to deliver the anterior shoulder
- And the anterior shoulder is delivered, gently guide the neonate's head upward to deliver the posterior shoulder and the rest of the body

Once the neonate is fully delivered:

- Dry, warm, and stimulate the neonate
- Keep the neonate at the same level of the placenta
- Once the umbilical cord stops pulsating (usually 3-5min)
    - Clamp the cord:
        - Place the first clamp four (4) inches from the neonate's body
        - Place the second clamp six (6) inches from the neonate's body
        - Cut the cord in between clamps utilizing the scalpel from the OB kit
- Place the neonate on the mother's chest, preferred skin to skin contact, and cover with dry blanket
- Record and calculate APGAR score, and document delivery time
    - If neonate is not breathing provide BVM ventilations and refer to airway management
    - If neonate has a pulse < 60 per minute provide CPR and refer to cardiac arrest management
- Apply firm continuous pressure, manually massaging the uterine fundus after the placenta delivers
- Preserve the placenta in a bag, provided in the OB kit, for inspection by receiving hospital

CRITERIA	SCORES		
	0	1	2
Activity (muscle tone)	*No movement*	*Some movement*	*Active movement*
Pulse	*No Pulse*	*Less than 100 bpm*	*Greater than 100 bpm*
Grimace (reflex, irritability)	*No response to stimulation*	*Grimace or feeble cry w/stimulation*	*Active motion w/stimulation*
Appearance (skin color)	*Blue all over*	*Body pink, extremities blue*	*Completely pink*
Respiration	*No Breathing*	*Slow, irregular breathing*	*Strong Cry*

APGAR SCORE INTERPRETATION:	
0-3	**Severely Depressed:** Major Resuscitation Needed
4-6	**Moderately Depressed:** Moderate Resuscitation Needed
7-10	**Excellent Condition:** Minimal/No Resuscitation Needed

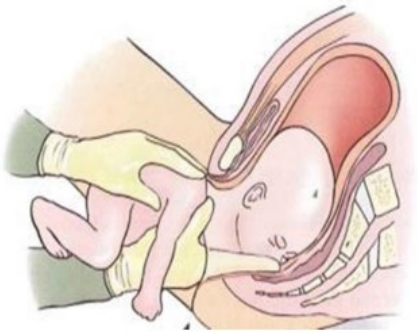


Adult and Pediatric

Basic

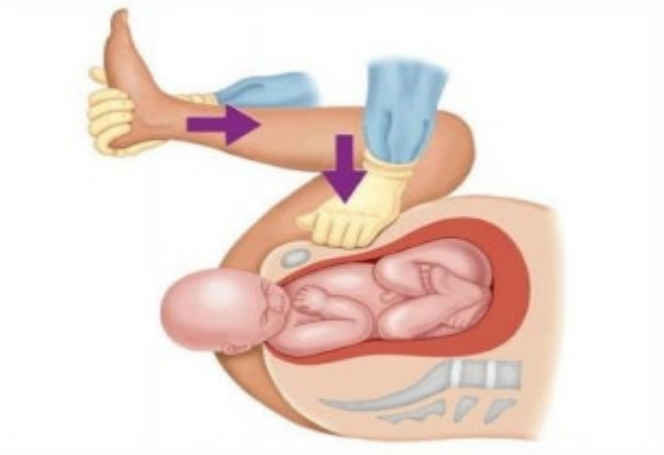
Breech Birth (Feet or buttocks presentation):

- ***If the head does not deliver within 3 minutes of the body:***
  - Elevate the mothers hips (Knee to chest position)
  - Insert a gloved hand into the vagina
  - Push the vaginal wall away from the neonates nose and mouth
    - Expedite transport while maintaining the knee to chest position and the neonates airway
      - **Oxygen –** 15Lpm Non-rebreather mask
        - Blow-by for the neonate



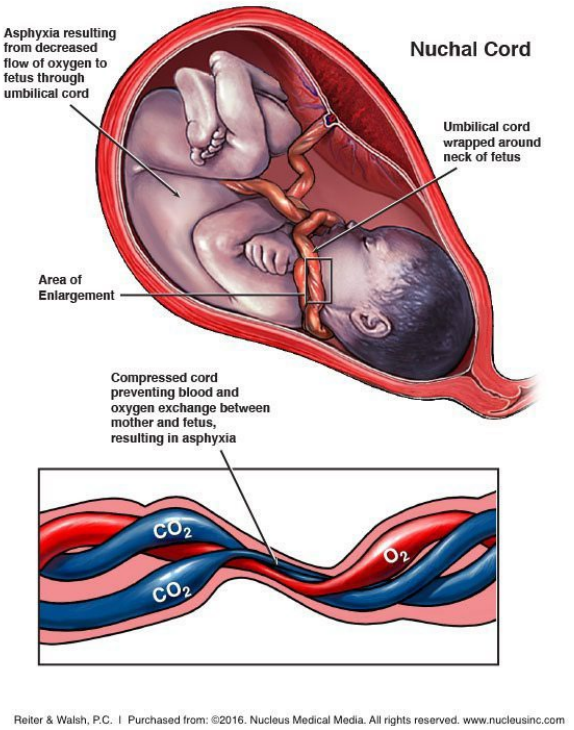
Shoulder Dystocia (Difficulty in delivering the shoulders):

- ***McRobert's Maneuver:***
  - Hyper flex the mother's legs tightly to her abdomen
  - It may be necessary to apply suprapubic pressure (Mothers lower abdomen)
  - Gently pull on the neonates head



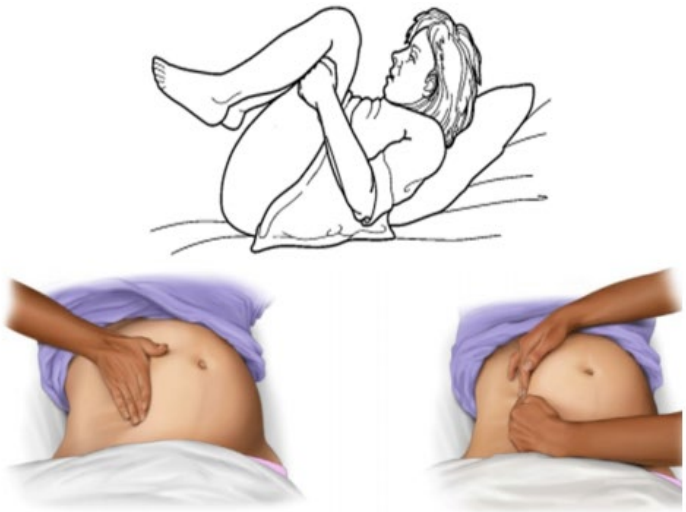
Nuchal Cord

- ***If the cord is around the neck:***
  - Gently hook your finger under the loop
  - Pull it over the neonates head
  - You may have to repeat this if there is more than one (1) loop present
- ***If unable to free the cord:***
  - Clamp the cord in two (2) places
    - Cut the cord between the clamps



Prolapsed Umbilical Cord

- Place mother in the knee to chest position
- Manually displace the uterus to the left
  - Insert a gloved hand into the vagina
    - Push the neonate up and away from the umbilical cord regardless if there is a pulse present or not
    - Maintain this pressure throughout transport
- Frequently reassess the umbilical cord for the presence of a pulse, as contractions are likely to compress the umbilical cord
- Wrap the exposed cord in a moist sterile dressing



Manual displacement of the uterus

Adult START

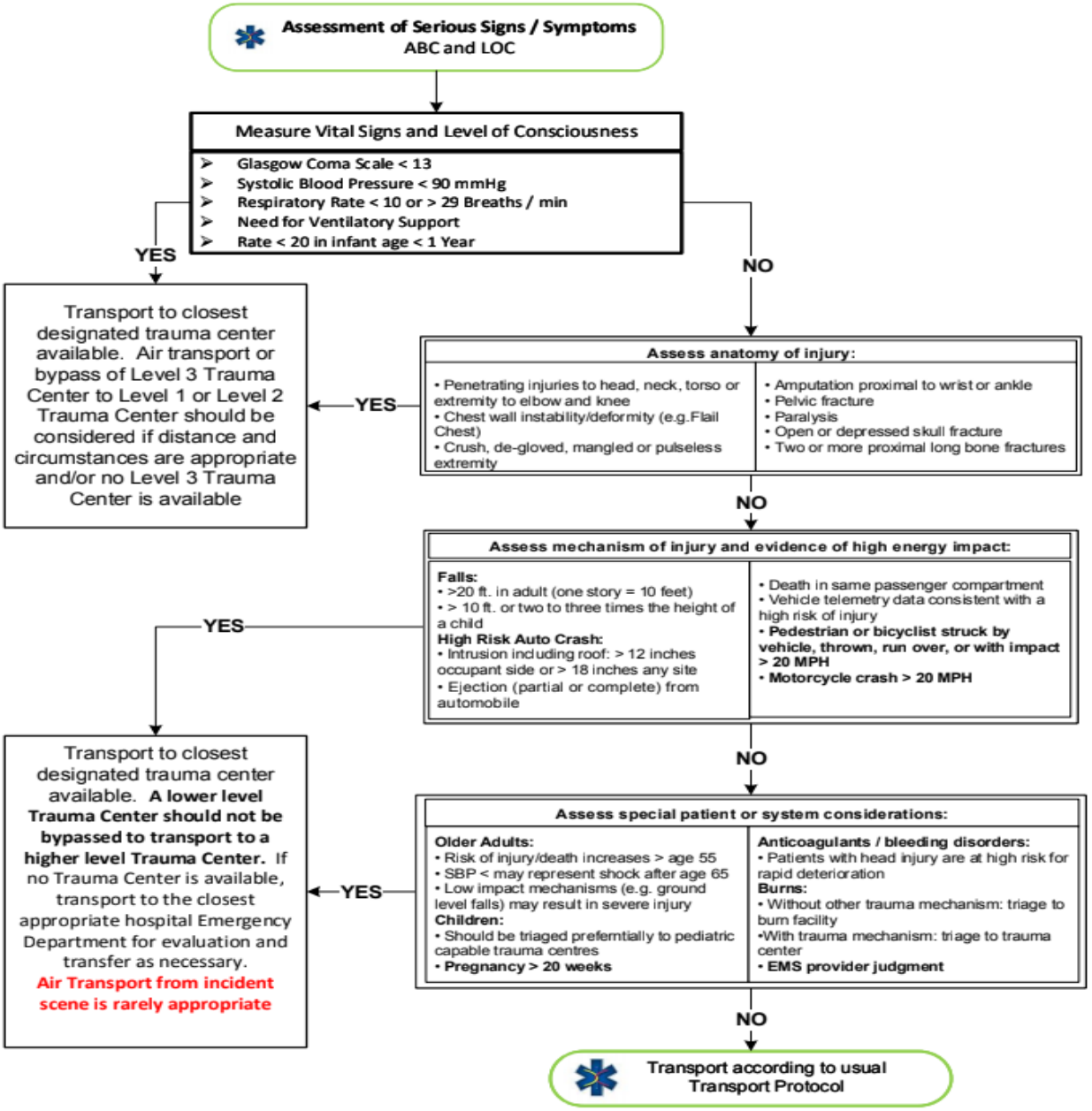
- Move the walking wounded → MINOR
- No respirations after head tilt → DECEASED
- Respirations over 30/min → IMMEDIATE
- Perfusion – No radial pulse
  Cap refill>2 sec → IMMEDIATE
- Mental Status: Unable to
  Follow simple commands → IMMEDIATE
- Stable RPM → DELAYED

Child JumpSTART

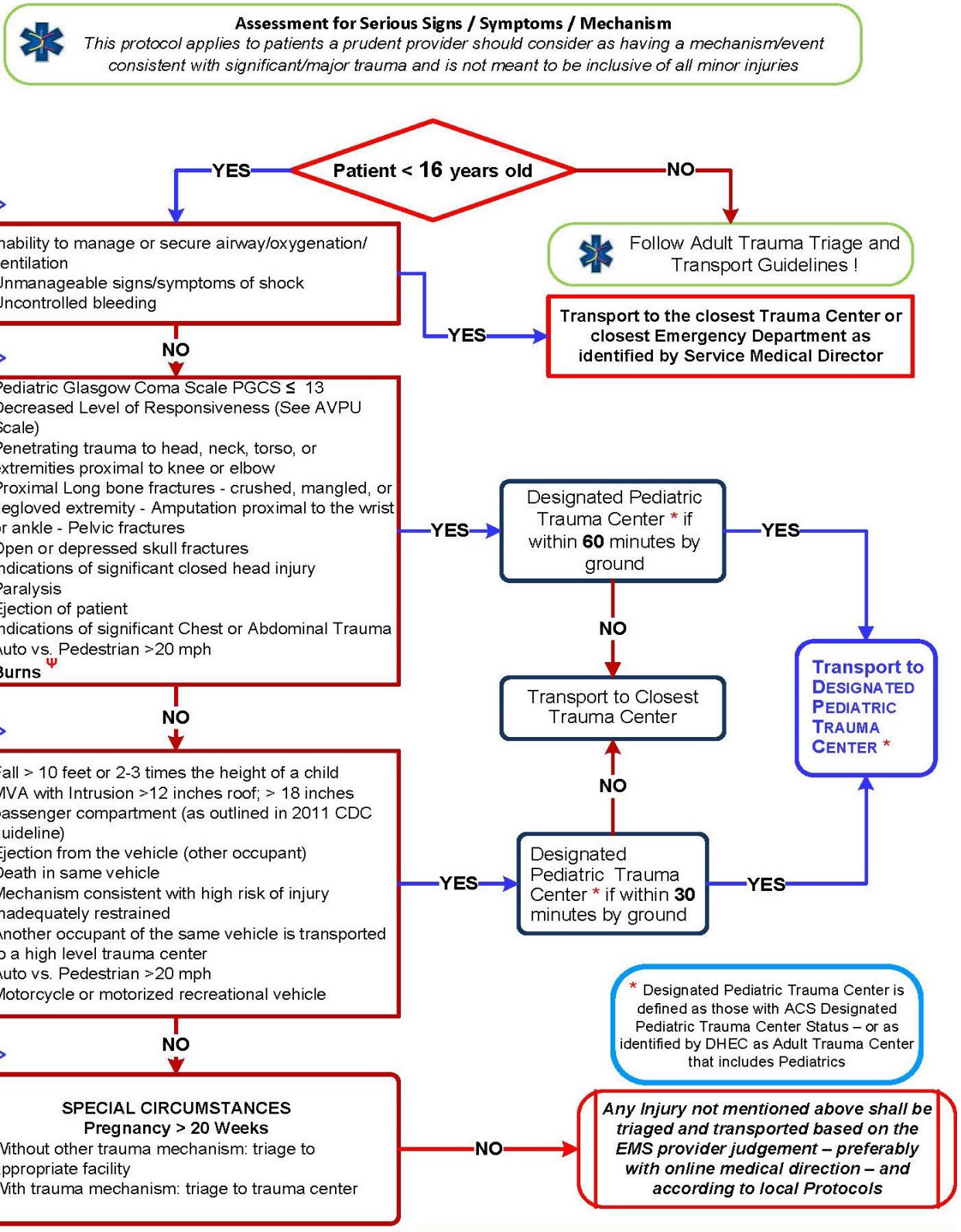
- Move the walking wounded → MINOR
- Respirations
  - No respirations → DECEASED
  - No peripheral pulse
- Respirations <15 >45 → IMMEDIATE
- No Respirations
  With peripheral pulse
  Give 5 ventilations via barrier
  Respirations resume → IMMEDIATE
- No Spontaneous respirations → DECEASED
- Perfusion
  - No peripheral pulse → IMMEDIATE
  - Cap refill > 2 sec.
- Mental status AVPU
  - AV → DELAYED
  - PU → IMMEDIATE

Information

- SC DHEC mandates this protocol for all trauma patients
  - This is currently under review for revision
- Continue to use the flow chart when determining the transport destination
  - Please use the multiple trauma triage criteria listed on Pg. 120-123, when navigating the flow chart below



Pediatric Trauma Triage & Transport



PEDIATRIC GLASGOW COMA SCALE (PGCS)				
	>1 year		< 1 year	SCORE
EYE OPENING	Spontaneously		Spontaneously	4
	To Verbal Command		To Shout	3
	To Pain		To Pain	2
	No Response		No Response	1
MOTOR RESPONSE	Obeys		Spontaneous	6
	Localizes Pain		Localizes Pain	5
	Flexion-Withdrawal		Flexion-Withdrawal	4
	Flexion-Abnormal (Decorticate rigidity)		Flexion-Abnormal (Decorticate rigidity)	3
	Extension (Decerebrate rigidity)		Extension (Decerebrate rigidity)	2
	No Response		No Response	1
	>5 Years	2 – 5 Years	0 – 23 months	
VERBAL RESPONSE	Oriented	Appropriate words/phrases	Smiles/coos appropriately	5
	Disoriented/confused	Inappropriate words	Cries and is consolable	4
	Inappropriate words	Persistent cries and screams	Persistent inappropriate crying and/or screaming	3
	Incomprehensible sounds	Grunts	Grunts, agitated, and restless	2
	No Response	No Response	No response	1
			TOTAL PEDIATRIC GLASGOW COMA SCORE (3-15):	

Age	Heart Rate	Respiratory Rate	Systolic BP mm/Hg
Infant – 1 year	<100 or > 180	<30 or > 60	< 70
Toddler (1-2 yrs)	<80 or >150	<20 or > 40	<75
Preschooler (3-5 yrs)	<75 or >110	<20 or >34	<80
School Age (6-9 yrs)	<70 or >100	<16 or >25	<85
Adolescent (10-17 yrs)	<60 or >100	<12 or >20	<90

AVPU Scale	
A	Patient **A**lert
V	Patient responds to **V**oice
P	Patient responds to **P**ain
U	Patient **U**nresponsive

***** WHEN IN DOUBT – TRANSPORT TO PEDIATRIC TRAUMA CENTER.**
*** * * DO NOT HESITATE TO CONTACT MEDICAL CONTROL FOR QUESTIONS OR ADVICE !**

*** DESIGNATED PEDIATRIC TRAUMA CENTERS (SC)**

- Grand Strand Medical Center [F00004780]
- PRISMA Health Greenville Memorial [F00004703]
- McLeod Regional Medical Center – Florence [F00045381]
- MUSC Children's Health [F00004807]
- PRISMA Health Richland [F00004741]

*** DESIGNATED PEDIATRIC TRAUMA CENTERS (Out of State)**

- CMC Charlotte (NC)
- Augusta UMC / Children's Hospital of Georgia (GA)
- Savannah Children's (GA)

Pearls

- **Items in Red Text (below) are key performance measures used in the EMS Acute Trauma Care Toolkit**
- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro**
- **Transport Destination is chosen based on the EMS System Trauma Plan with EMS pre-arrival notification.**
- Examine all restraints / protective equipment for damage.
- In prolonged extrications or serious trauma consider air transportation for extended transport times.
- Do not overlook the possibility for child abuse.
- Consider non-accidental trauma in situations where injuries are inconsistent with mechanism, unexplained injuires exist, or there are conflicting reports of injury
- See considerations for Non-accidental trauma in Pediatric Head/Spine Trauma Protocol
- Scene times should not be delayed for procedures. These should be performed en route when possible.
- Bag valve mask is an acceptable method of managing the airway if pulse oximetry can be maintained above 90%.
- Ψ Burns with 2nd degree or greater (Partial Thickness or greater) regardless of BSA – if within 60 minutes drive time or air medical is available – transfer directly to a burn center.
  - Ψ Where burns are involved as noted above - transport to a burn center is preferable - but if time does not permit - then transport to a Designated Pediatric Trauma Center is the next best option

Pain Control

Information

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- Pain severity (0-10 pain scale) is a vital sign to be recorded pre and post IV or IM medication delivery and at disposition
- Vital signs should be obtained pre, 15 minutes post and at disposition with all pain medications
- Relative contraindications to the use of a narcotic include, Hypotension, Head injury, Respiratory distress, Severe lung disease
- Ibuprofen should not be used in patients with known renal disease or renal transplant, in patients who have known drug allergies to NSAID with active bleeding, or in patients who may need surgical intervention such as open fractures or fracture deformities
    - Do not administer ibuprofen to patients who have headaches, abdominal pain, gastritis, stomach ulcers, or any patient who will require sedation
- All patients should have drug allergies documented prior to administering pain medications
- All patients should who receive IM or IV medications must be observed 15 minutes for drug reactions
- Do not administer any PO medications for patients who may need surgical intervention such as open fractures or fracture deformities, headaches, or abdominal pain
- Do not administer Acetaminophen to patients who have history of liver disease
- Morphine and Fentanyl doses listed in this protocol may be used prior to contact with Online Medical Control

Adult

Basic

- Assess patients pain using a 0-10 pain scale
    - 0 equals no pain at all
    - 10 equals severe pain
- Assess patients pulse oximetry in conjunction with capnography
- Any patient with pain > 6 consider:
    - **Acetaminophen** – Not available at this time

Advanced

- Any patient with pain > 6 consider:
    - **Toradol** – 30mg IM
- Consider anti – nausea medications
    - **Zofran** – 4mg IV/IO/IM
        - May repeat once as needed
            - Max total dose 8mg

Paramedic

- Any patient with pain > 6 consider:
    - **Acetaminophen** - 15mg/kg IV/IO Infusion over 15 min
        - Max total dose 1,000mg
            - Consider utilization of sapphire IV pump for doses less than 1,000mg
    - **Morphine** – 0.1mg/kg up to 5mg IV/IO
        - May repeat once 5 minutes
            - Max total dose of 10mg
    - **Fentanyl** – 2mcg/kg IV/IO/IN/IM
        - Max single dose 100mcg
            - May repeat as needed to max total dose of 200mcg

Medical Control

- **Ketamine (Must** Monitor Capnography)
  - 25mg in a 50mL bag of Normal saline
    - Administer IV/IO **MUST** utilize IV pump for infusion over 10 minutes
    - Reassess pain scale after half of the infusion has been administered
    - Continue infusion as needed

Pediatric

Basic

- Assess patients pain using a 0-10 scale (utilize Wong-Baker faces to properly assess)
  - 0 equals no pain at all
  - 10 equals sever pain
- Assess patients pulse oximetry in conjunction with capnography
- Any patient with pain > 6 and who are ≥ 6 months consider:
  - **Acetaminophen** – 15mg/kg up to 1,000mg PO
    - Put the syringe into the infant's mouth between their tongue and the inside of their cheek
    - Gently administer a small amount of acetaminophen into this space.
      - **Do not** administer the medicine to the back of the throat. This will lead to gagging

Advanced

- Any pa tient with pain > 6 consider:
  - **Toradol** – 30mg IM
- Consider anti – nausea medications
  - **Zofran** – 0.15mg IV/IO/IM
    - Max total dose 4mg

Paramedic

- Any patient with pain > 6 consider:
  - If patient does **NOT** have a patent airway or risk of aspiration
    - **Acetaminophen** - 15mg/kg IV/IO Infusion over 15 min
      - Max total dose 1,000mg
        - Consider utilization of sapphire IV pump for doses less than 1,000mg
  - **Morphine** – 0.1mg/kg up to 5mg
    - May repeat once 5 minutes
      - Max total dose of 10mg
  - **Fentanyl** – 1mcg/kg up to 50mcg
    - May repeat once 5 minutes
      - Max total dose of 100mcg

Medical Control

- **Patients who are less than 5 years of age for the following medications:**
  - **Morphine**
  - **Fentanyl**


0-10 NUMERIC PAIN RATING SCALE
0
1
2
3
4
5
6
7
8
9
10
NONE
MILD
MODERATE
SEVERE


Wong-Baker FACES Pain Rating Scale
0
NO HURT
2
HURTS
LITTLE BIT
4
HURTS
LITTLE MORE
6
HURTS
EVEN MORE
8
HURTS
WHOLE LOT
10
HURTS
WORST

Spinal Motion Restriction

Information

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- **Spinal Immobilization:**
  - Placement of cervical collar in conjunction of a long spine board, scoop stretcher or HID
- **Spinal Motion Restriction (SMR):**
  - Cervical collar placement only
    - Patient remains in position of comfort with assisted movement to prevent extremes of spinal motion
    - Consider spinal motion restriction in any patient with arthritis, cancer or other underlying spinal or bone disease
- **Range of motion should not be assessed if patient has midline spinal tenderness.**
  - Patient should be able to touch their chin to their chest, extend their neck (look up), and turn their head from side to side (shoulder to shoulder) without assistance and without the pain
- **The acronym N.S.A.I.D.S should be used to remember the steps of the exam**
  - **N**eurologic exam – Look for focal defects (Tingling, reduced strength, or numbness)
  - **S**ignificant mechanism or extreme age
  - **A**lertness – Is the patient alert and oriented to person, place, time and situation?
  - **I**ntoxication – Is there any indication that the person is intoxicated? Impaired decision making?
  - **D**istracting injury – Is there any other injury which is capable to producing significant pain?
  - **S**pinal Exam – Look for point tenderness in any spinal process or spinal process tenderness with range of motion

Adult and Pediatric

Spinal Immobilization

- Full spinal Immobilization is required on all patients who:
  - Have any neurologic focal defects (Tingling, numbness, or weakened strength in extremities)
  - Patients who are not alert to either Person, Place, or Time
  - Patients who appear to be intoxicated and unable to make decisions for themselves

Spinal Motion Restriction (SMR)

- The placement of a cervical collar with no long spine board immobilization on patients who:
  - Are greater than the age of 65 or less than 5 with significant mechanism of injury
  - Presence of distracting injury (Another significant injury that is causing pain)
  - Any patient who has point tenderness and pain with Range of motion

*****If the criteria is not met for either spinal immobilization or spinal motion restriction, then cervical spine stabilization is not indicated*****

Multiple Trauma

Information

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- Geriatric patients should be evaluated with a high index of suspicion.
    - Often occult injuries are more difficult to recognize and patients can decompensate unexpectedly with little warning
- Mechanism of injury is the most reliable indicator of serious injuries
- In prolonged extrications or serious trauma, consider air transportation for transport times and the ability to give blood
- Do not overlook the possibility of domestic violence or abuse
- Scene times should not be delayed for procedures. These should be performed enroute when possible
    - Rapid transport of an unstable patient is the goal
- Bag Valve Mask is an acceptable method of managing the airway if pulse oximetry can be maintained above 94%
- Lucas device is **ABSOLUTELY** contraindicated in any traumatic arrest

Adult and Pediatric

Basic

- ***Signs of shock***
    - Assess airway:
        - Provide airway management if necessary
    - Consider spinal motion restriction:
        - Prepare for rapid transport
    - Cardiac Monitor with 12 lead acquisition:
        - Interpretation by paramedic or transmitted to receiving facility
- ***No signs of shock***
    - Consider spinal motion restriction
    - Splint suspected fractures:
        - Consider pelvic binding (if pelvis is unstable)
    - Hemorrhage Control:
        - Control any major bleeding:
            - Direct pressure
            - If extremity trauma apply tourniquet
            - If junctional trauma wound packing
                - Utilize sterile gauze or vacuum seal trauma pacing

Advanced

- ***Hypotensive***
    - Establish two (2) Large bore IV or IO access if no peripheral access
    - **Normal Saline** – 30 mL/kg bolus IV/IO
        - maintain a MAP of 60-70 mmHg
        - Reassess lung sounds and blood pressure frequently

Multiple Trauma

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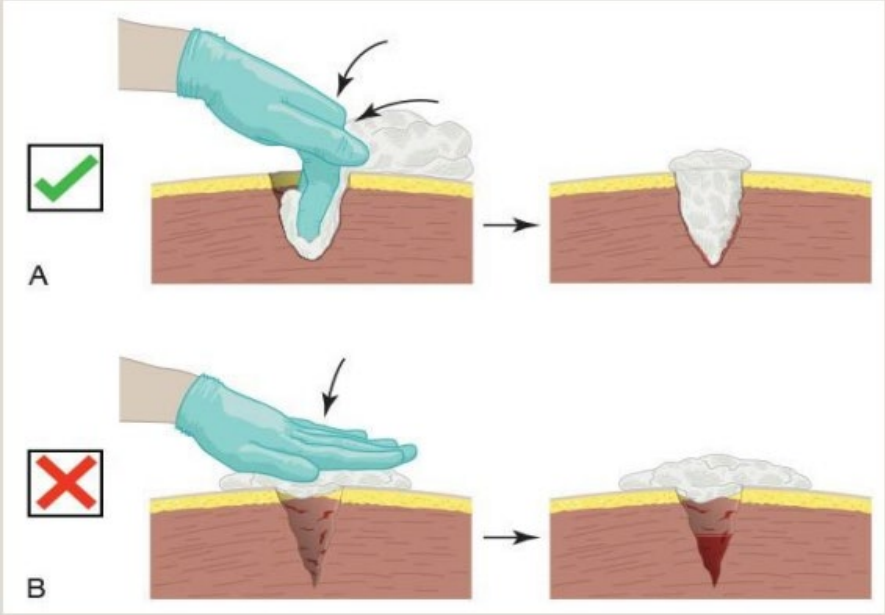
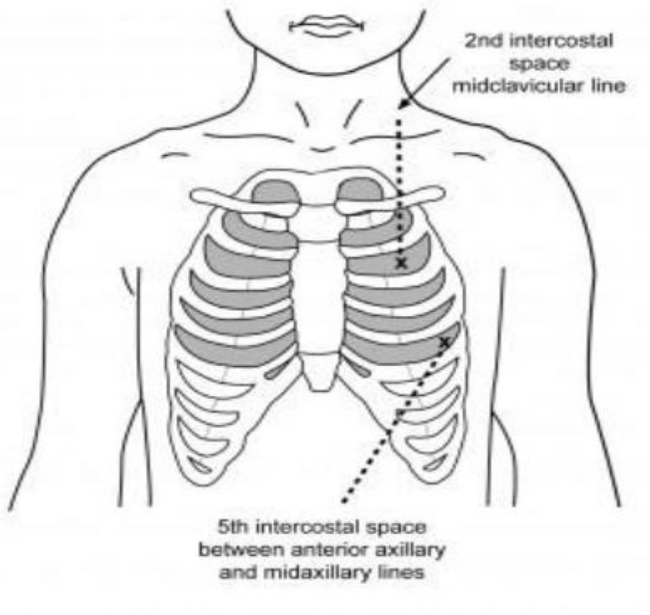
Adult

Paramedic

- ***Life Threatening non-compressible bleeding***
  - **TXA –** 1G IV/IO Over 10 minutes
    - Remove 10mL from a 50mL normal saline
      - Mix 1g TXA into remaining 40mL administer at 300mL/hr utilizing IV pump
- ***Pneumothorax***
  - Needle decompression
    - 10g catheter, fifth intercostal space mid axillary
- ***Traumatic Arrest***
  - Refer to Cardiac Arrest Guideline
  - Consider bilateral needle decompression immediately





Multiple Trauma

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New Level 1 Trauma Criteria	
Injury Pattern	**Mental Status & Vital Signs**
Penetrating injury to head, neck, torso, or extremitites proximal to elbow or knee	***All Patients:***
Skull deformity, suspected skull fracture	Unable to follow commands (motor GCS < 6)
Suspected spinal injury with new motor or sensory loss	RR < 10 or > 29 breaths/min
Chest wall instability, deformity, or suspected flail chest	Respiratory distress or need for respiratory support
Suspected fracture of two or more proximal long bones	Room-air pulse oximetry < 90%
Crushed, degloved, mangled, or pulseless extremity	***Age 0-9 years***
Amputation proximal to wrist or ankle	SBP < 70 mmHG + (2 x age in years)
Active bleeding requiring a tourniquet or wound packing with continuous pressure	***Age 10-64 years***
Suspected Pelvic Fracture	SBP < 90 mmHg
	OR
	HR > SBP
	Age ≥ 65 years
	SBP < 110 mmHG
	OR
	HR > SBP
Patients meeting any one of the above RED criteria should be transported to the highest-level trauma center	

SHOCK INDEX CALCULATION	
HEART RATE / SYSTOLIC BP = SHOCK INDEX	
No Shock	**< 0.6**
Mild Shock	**≥ 0.6 to < 1.0**
Moderate Shock	**≥ 1.0 to < 1.4**
Severe Shock	**≥ 1.4**

New Level 2 Trauma Criteria	
Mechanism of Injury	**EMS Judgement**
Partial or complete ejection	***Consider risk factors, including:***
Significant intrusion (including roof) - > 12 inches occupant site or > 18 inches any site	Low-level falls in young children (age ≤ 5 years) or older adults (age ≥ 65 years) with significant head impact
Need for extrication for entrapped patient	Anticoagulant & Antiplatelet use - if there are outwards signs of trauma present, e.g. hematoma, ecchymosis, laceration, etc., this patient can be called a Level 2 trauma; however, it is at the sole discretion of the provider
Death in same passenger compartment	suspicion of child abuse
Child (age 0-9 years) unrestrained or in an unsecured child safety seat	special, high-resource healthcare needs
Vehicle telemetry data consistent with severe injury	Pregnancy > 20 weeks
Rider separated from transport vehicle with significant impact (eg, motorcycle, ATV, horse, etc.)	Burns in conjuction with trauma
Pedestrian/bicycle rider thrown, run over, or with significant impact	Children should be triaged Preferentially to pediatric capable centers
Fall from height > 10 feet (all ages)	**If concerned, take to a trauma center**

Patients meeting any one of the YELLOW criteria who do not meet red criteria should be preferentially tranported to a trauma center.
Grand Strand Medical Center - Level 1 Truama Center - Pediatric Level II Trauma Center
Conway Medical Center - Level 3 Trauma Center
McLeod Florence - Level 2 Trauma Center

Head Trauma

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Information

- Patients with depressed level of consciousness may be unable to protect their airway
- Adequate oxygenation of the injured brain is critical to preventing secondary injury
    - Hyperventilate (**Adult** 20 breaths/min, **Child** 30 breaths/min, **Infant** 35 breaths/min) the patient only if ongoing evidence of brain herniation (blown pupils, decorticate or decerebrate posturing, or bradycardia)
- Consider advanced airway management
    - Especially for patients with GCS <9
- If patient becomes combative refer to sedation guideline
- Concussions are periods of confusion or loss of consciousness associated with trauma which may have resolved by the time EMS arrives
    - Any prolonged confusion or mental status abnormality which does not return to normal within fifteen (15) minutes or any documented loss of consciousness shall be transported to the hospital emergent
- **Intracranial pressure/ herniation signs include**
    - A decline in the GCS of two (2) or more
    - Development of a sluggish or nonreactive pupil
    - Paralysis or weakness on one (1) side of the body
    - Cushing's Triad
        - A widening pulse pressure (increasing systolic, decreasing diastolic)
        - Change in respiratory pattern (Irregular Respirations)
        - Bradycardia

	1	2	3	4	5	6
Eye Opening	None	To Pain	To sound	Spontaneous	------	------
Verbal Response	None	Incomprehensible	Inappropriate	Confused	Orientated	------
Motor Response	None	Extending	Abnormal flexing*	Flexing	Localizing	Obeying

*Abnormal flexion was not in the initial GCS score but was added in 1976 during the score's first revision to improve prognostic value [2]

Adult and Pediatric

Basic

All Head Injuries

- Consider spinal motion restriction
- Calculate GCS
- Monitor oxygen saturation in conjunction with capnography readings
- **Oxygen** – 15Lpm via NRB to maintain an oxygen saturation of > 94%
    - In patients who are ventilatory depressed provide BVM ventilations
- Assess blood Glucose levels
    - Refer to Glucose Management Guideline if abnormal readings

Depressed Skull Fracture

- Dry sterile dressing over the site if bleeding is present
    - Pressure dressings should not be applied to depressed or open skull fractures unless there is significant hemorrhage present, as this can cause an increase in ICP

ICP/Herniation

- Position head at 30° elevation
- Maintain $EtCO_2$ between 30-35 mm Hg and oxygen saturation of >94% while continuously monitoring BP

Advanced

- **Vascular access –** IV/IO
- **Normal Saline**
  - Adult – 20 mL/kg titrated to maintain SBP of 90mm/Hg or a MAP of 70-80mm/Hg
    - May Repeat as needed
    - Reassess BP and lung sounds frequently
  - Pediatric – 20mL/kg titrate to maintain an age appropriate SBP
    - May repeat bolus once
    - Reassess BP and lung sounds frequently

Years of Age	Boys†		Girls†		Boys and Girls‡	
	SBP	DBP	SBP	DBP	SBP	DBP
	mm Hg					
3	100	59	100	61	≥100	>60
4	102	62	101	64	≥100	>60
5	104	65	103	66	≥100	>60
6	105	68	104	68	≥105	>70
7	106	70	106	69	≥105	>70
8	107	71	108	71	≥105	>70
9	109	72	110	72	≥110	>75
10	111	73	112	73	≥110	>75
11	113	74	114	74	≥110	>75
12	115	74	116	75	≥115	>75
13	117	75	117	76	≥115	>75
14	120	75	119	77	≥115	>75
15	120	76	120	78	≥120	>80
16	120	78	120	78	≥120	>80
17	120	80	120	78	≥120	>80
≥18	120	80	120	80	≥120	>80

* The threshold for further evaluation or intervention is based on cutoff points for hypertension from the fourth report of the National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents.[4] DBP denotes diastolic blood pressure, and SBP systolic blood pressure.
† Data are from Kaelber and Pickett.[11]
‡ Data are from Mitchell et al.[13]

Information

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- If the trauma appears to be minor and not the root cause of the condition, and a medical condition appears to be the cause of the cardiac arrest, follow the appropriate cardiac arrest protocol
- If the traumatic cardiac arrest is witnessed by EMS provider, or there is evidence that the patient had any signs of life within 10 minutes before the arrival of EMS personnel, proceed with this protocol
- Unless there is an immediately correctable cause victims of traumatic cardiac arrest must arrive at a hospital within the shortest time possible to have any chance of survival
    - Placement of an advanced airway (ETT or Alternative Airway Device) or decompression of a tension pneumothorax may increase this very short time window for survival
    - Consider placement and utilization of a pelvic binder / tensioned sheet wrap of the pelvis
- On scene time should be limited. **This is a LOAD AND GO incident** requiring minimal scene times
    - Try to complete ALL non critical interventions in route to the hospital
- Change rescuer doing compressions every two (2) minutes to avoid fatigue
- Monitor CPR Quality with waveform capnography – in cardiac arrest level of ETCO2 correlates with perfusion/cardiac output from CPR. A SUDDEN increase in ETCO2 by >10 mmHg may indicate return of spontaneous circulation (ROSC)
- Transport immediately if patient can arrive at a trauma center (preferred destination) or the closest hospital in ≤ (less than) 15 minutes
- If the patient can arrive at the closest trauma center within 15 minutes, the patient should be taken to the trauma center even if another hospital is closer
- Air medical transport of patients in traumatic cardiac arrest is generally not indicated
- Consider extrication times for Traumatic arrest patients (vehicles, structural collapse, or extrication from scene to transporting unit) when deciding on initiating this protocol

Adult and Pediatric

Basic

- Airway
    - Continuous monitoring of oxygen saturation in conjunction with Capnography
        - BVM ventilations with one of the following
            - Oropharyngeal Airway (OPA)
            - Nasopharyngeal Airway (NPA) (**without presence of head trauma**)
        - Supraglottic Airway
            - i-gel
- High quality CPR - (LUCUS 3 is **ABSOLUTLEY** contraindicated)
    - Push hard and fast (100-120 compressions/minute)
        - Allow for full recoil of chest after every compression
    - Chest compressions should be continuous with an upstroke ventilation every 10 compressions
        - Change rescuer doing compressions every two (2) minutes to avoid fatigue

Advanced

- **Vascular Access –** IV/IO
  - Consider external jugular access
- **Normal Saline –** 30mL/kg
  - May repeat as needed
  - Reassess lung sounds and blood pressure frequently

Paramedic

- **Intubation –**
  - Avoid endotracheal intubation unless unable to ventilate with BVM or alternative airway
    - Confirm and document tube placement with the following:
      - Absence of gastric sounds AND
      - Presence of bilateral breath sounds AND
      - Confirmatory device (like wave-form ETCO2 detector)

Medical Control

- Field termination of resuscitation if the patient:
  - Remains in cardiac arrest after initial resuscitation attempt AND
  - Cannot arrive at the closest receiving facility within 15 minutes

Refer to Cardiac Arrest and Multiple Trauma Guideline

Thermal Burns

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Information

- Advanced airway procedures shall be considered for patients with respiratory involvement (e.g. hoarse voice, singed nasal hairs, carbonaceous sputum in the nose or mouth, stridor or facial burns)
- Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling
- Burn patients are prone to hypothermia
    - **NEVER** place ice or cool burns
- **First Degree Burns:**
    - Involves only the epidermis and are characterized as red and painful
- **Second Degree Burns:**
    - Involves the epidermis and varying portions of the underlying dermis with blistering
- **Third Degree Burns:**
    - Involves deep tissue damage and will appear as thick, dry, white, leathery burns (regardless of skin color)

Adult

Basic

- Stop the burning process by irrigating with copious amounts of room temperature water or normal saline for two (2) minutes
- Determine the Total Body Surface Area percentage of burn
    - Utilize rule of 9's or palm method
- Do not attempt to remove clothing that is adhered to the skin
- Remove jewelry and watches from burned area
- ***First and Second Degree burns <15% TBSA OR Third Degree <5% TBSA:***
    - Apply a dry sterile dressing
- ***Second Degree Burns >15% TBSA OR Third Degree Burns >5% TBSA:***
    - Apply a dry sterile burn sheet

Advanced

- ***Second Degree Burns >15% TBSA OR Third Degree Burns >5% TBSA:***
    - **Normal Saline –** 500mL IV/IO Regardless of blood pressure
        - Assess lung sounds and blood pressure frequently

Adult

Paramedic

- Consider advanced airway if signs and symptoms of inhalation burns
  - Call for RSI early
- **DO NOT** use IM route for medication administration
- Consider pain management:
  - **Morphine** – 0.1mg/kg up to 5mg IV/IO
    - May repeat once every five (5) minutes
      - Max total dose of 10mg
  - **Fentanyl** – 2mcg/kg IV/IO
    - Max single dose 100mcg
      - May repeat as needed to max total dose of 200mcg

Medical Control

- **Ketamine** (**Must** monitor Capnography)
  - 25mg in a 50mL bag of Normal saline
    - Administer IV/IO, **MUST** utilize IV pump for infusion over 10 minutes
    - Reassess pain scale after half of the infusion had been administered
    - Continue infusion as needed

Thermal Burns

Pediatric

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Basic

- Stop the burning process by irrigating with copious amounts of room temperature water or normal saline for two (2) minutes
- Determine the Total Body Surface Area percentage of burn
    - Utilize rule of 9's or palm method
- Do not attempt to remove clothing that is adhered to the skin
- Remove jewelry and watches from burned area
- ***First and Second Degree burns <15% TBSA OR Third Degree <5% TBSA:***
    - Apply a dry sterile dressing
- ***Second Degree Burns >15% TBSA OR Third Degree Burns >5% TBSA:***
    - Apply a dry sterile burn sheet

Advanced

- ***Second Degree Burns >15% TBSA OR Third Degree Burns >5% TBSA:***
    - **Normal Saline –** 10mL/kg IV/IO Regardless of blood pressure
        - Total max fluid 250mL

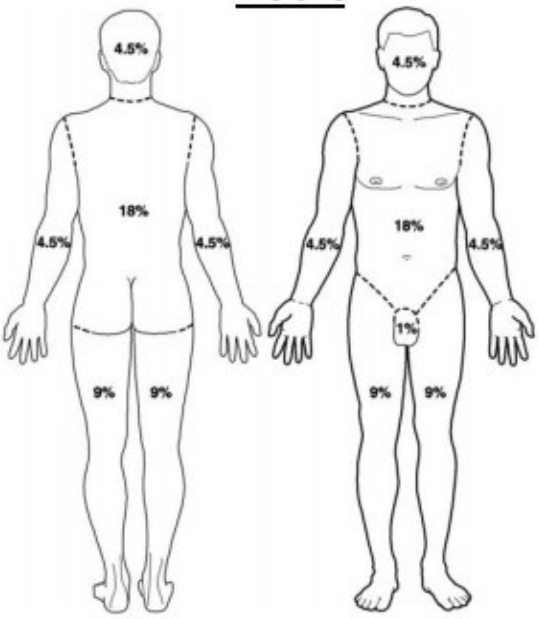
Paramedic

- **Morphine (patients who are > 5 yrs)** – 0.1mg/kg up to 5mg
    - May repeat once every five (5) minutes
        - Max total dose of 10mg
- **Fentanyl** – 1mcg/kg up to 50mcg
    - May repeat once every (5) minutes
        - Max total dose of 100mcg

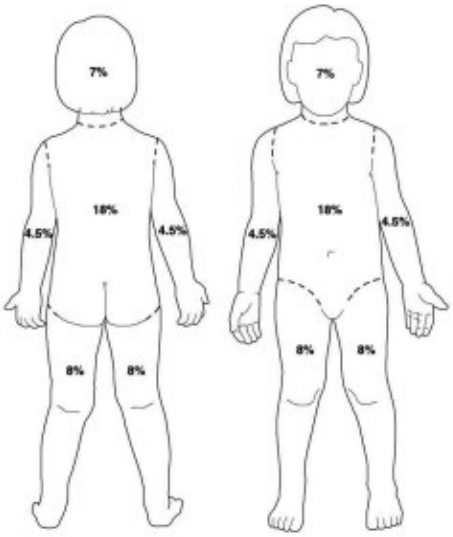
Medical Control

- **Patients who are less than five (5) years of age for the following medications:**
    - Morphine
    - Fentanyl

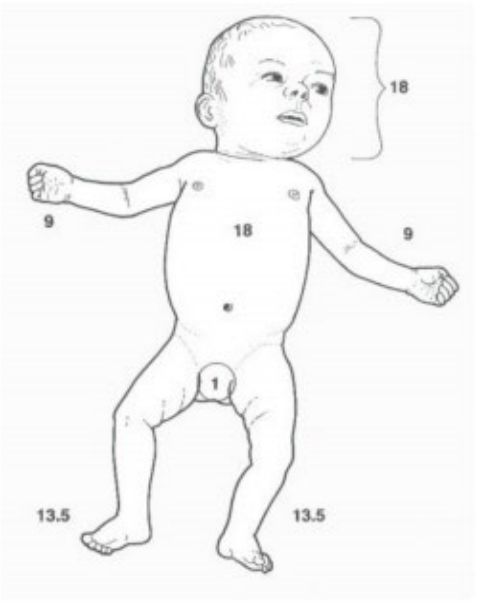
Adult

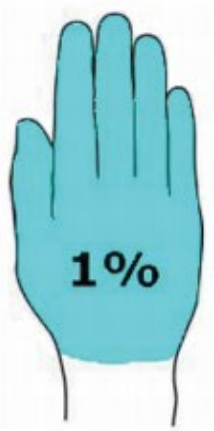


Child



Infant





Palm and fingers of **patient** = **1% TBSA**

Chemical and Electrical Burns

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Information

- **Chemical Burns**
  - Normal saline or sterile water is preferred, however if not available, do not delay irrigation. Other water sources may be used based on availability
  - Using copious amounts, flush the area with clean water or saline solution
- **Electrical Burns**
  - **DO NOT** contact patient until you are certain the souce of the electrical shock is disconnected. Attempt to locate contact points (generally there will be two or more). A point where the patient contacted the source and a point where the patient is grounded. Sites will generally be full thickness. (Do not refer to as entry and exit sites of wounds)
- Cardiac monitoring: Anticipate ventricular or atrial irregularity including VT, VF, atrial fibrilation and/ or heart blocks
- Attempt to identify the nature of the electrical source (AC/DC) the amount of voltage and the amperage the patient may have been exposed to during electrical shock

Adult and Pediatric

Basic

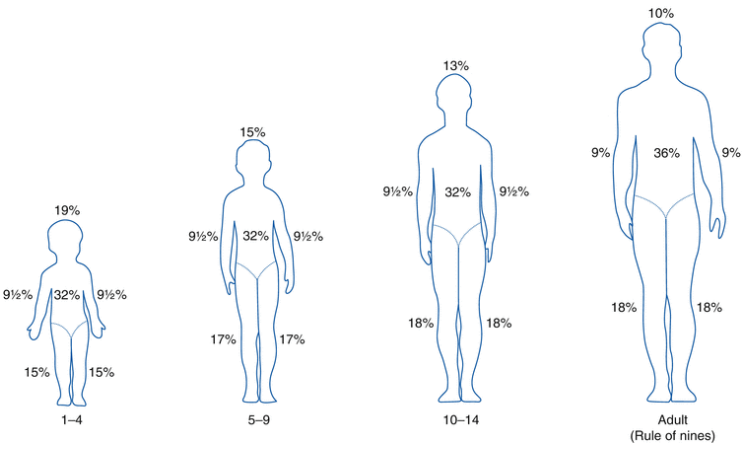
- ***Chemical Burns***
  - Brush off any DRY chemicals
  - Irrigate copiously for at least 15 minutes
    - Utilizing clean water (normal saline OR sterile water)
  - Assess airway
    - Refer to Airway Management Guideline if any intervention is required
  - Cover burn with dry sterile dressing
- ***Electrical Burns***
  - Ensure the electricity is secured (shut off) and scene is safe
  - Remove metal objects **OR** source of electricity
  - Cardiac monitoring with 12 lead acquisition
    - 12 lead to be interpreted by paramedic or transmitted to receiving facility
  - Pulse oximetry with capnography
    - Provide oxygen as needed
  - Cover burns with dry sterile dressing

Advanced

- **Vascular access –** IV/IO
  - Avoid affected limbs if at all possible

Paramedics

- Consider Pain Control Guideline



Crush Injury

Information

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- A crush injury is a direct injury resulting from crush. Crush syndrome is the manifestation of rhabdomyolysis caused by prolonged continuous pressure on muscle tissue.
- Can lead to hypovolemic shock, hyperkalemia, metabolic acidosis, compartment syndrome or acute renal failure
- Administration of Sodium Bicarbonate and Calcium Gluconate shall be delivered through separate IV sites
    - One IV access can be used only after copious flushing of IV tubing with normal saline to avoid reaction

Adult

Basic

- Coordinate extrication time with rescue crews
    - Request additional resources as needed
- Assess extremity or body part for neurovascular status
    - Check PMS
- Cardiac monitoring with 12 lead acquisition
    - 12 lead interpretation by paramedic or transmitted to receiving facility
        - Application of cardiac monitor only if it poses no danger for crews and/or patient
- Continuously monitor oxygen saturation and capnography readings
    - Oxygen administration – non-rebreather mask 15Lpm

Advanced

- **Vascular Access** – IV or IO
    - Preferably two (2) large bore in the unaffected extremity
        - Vascular access only if it poses no danger for crews and/or patient
- **Normal Saline –** 20mL/kg IV/IO
    - If hypotensive and extrication > 1 hour may repeat once

Paramedic

- ***If the crush injury is isolated to an extremity/extremities:***
    - Application of tourniquet to the affected extremity prior to the release of the compression

- ***If Peaked T waves, QRS ≥ .012 seconds, QT ≥ 0.46 seconds, loss of P wave:***
    - **Sodium Bicarbonate –** 50mEq/, IV/IO
    - **Calcium Gluconate –** 1gm, IV/IO
        - Must be administered through separate IV than Sodium Bicarb, unless 200mL normal saline flushed through line after administration of sodium bicarb
    - **Albuterol –** 5mg nebulized

- ***If Asystole / PEA / VF / VT***
  - **Sodium Bicarbonate –** 50mEq/ IV/IO
  - **Calcium Gluconate –** 1gm IV/IO
    - Must be administered through separate IV than sodium bicarbonate, unless 200mL normal saline flushed through line after administration of sodium bicarbonate

Adult

- **Pain control**
  - **Fentanyl Citrate -** 2mcg/kg IV/IO/IN/IM
    - Max single dose 100mcg
      - May repeat as needed to max total dose of 200mcg

*****Medical Control*****

- **Sedation**
  - **Ketamine –** 25mg IV/ IO (**Must** Monitor Capnography)
    - Dilute in a 50mL IV/IO, **MUST** utilize IV pump for infusion over 10 minutes
    - 2-4mg/kg IM
      - If no vascular access in place
  - **Versed –** 2mg IV/IO **OR** 4mg IM
    - If given IV/IO
      - May repeat three (3) times as needed with a max total dose of 6mg
    - If given IM
      - May repeat 2mg IM after five (5) minutes as needed

Pediatric

Basic

- Coordinate extrication time with rescue crews
  - Request additional resources as needed
- Assess extremity or body part for neurovascular status
  - Check PMS
- Cardiac monitoring with 12 lead acquisition
  - 12 lead interpretation by paramedic or transmitted to receiving facility
    - Application of cardiac monitor only if it poses no danger for crews and/or patient
- Continuously monitor oxygen saturation and capnography readings
  - **Oxygen administration –** non-rebreather mask 15Lpm

Advanced

- **Vascular access** – IV/ IO
  - Preferably two (2) large bore in the unaffected extremity
    - Vascular access only if it poses no danger for crews and/or patient
- **Normal Saline –** 20mL/kg IV/IO
  - If hypotensive and extrication > 1 hour may repeat once

Paramedic

- ***If the crush injury is isolated to an extremity / extremities:***
  - Application of tourniquet to the affected extremity prior to the release of the compression

- ***If Peaked T waves, QRS ≥ .012 seconds, QT ≥ 0.46 seconds, loss of P wave:***
  - **Sodium Bicarbonate –** 1mEq/kg, IV/IO
  - **Calcium Gluconate –** 0.02gm/kg, IV/IO
    - Must be administered through separate IV than sodium bicarbonate, unless 200mL normal saline flushed through line after administration of sodium bicarb
  - **Albuterol –** 2.5mg nebulized

- ***If Asystole / PEA / VF / VT:***
  - **Sodium Bicarbonate –** 1mEq/kg IV/IO
  - **Calcium Gluconate –** 0.02gm/kg IV/IO
    - Must be administered through separate IV than sodium bicarbonate, unless 200mL normal saline flushed through line after administration of sodium bicarbonate
- **Pain control**
  - **Fentanyl Citrate -** 1mcg/kg up to 50mcg IV/IO/IN/IM
    - May repeat once 5 minutes
      - Max total dose of 100mcg
- **Sedation**
  - **Versed –** 0.1 – 0.2mg/kg IV/IO/IM/IN

*****Medical Control*****

- **Patients who are less than 5 years of age for the following medication**
  - **Fentanyl**

Drowning

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Information

- Drowning is the process of experiencing respiratory impairment from submersion/ immersion in a liquid
- Regardless of water temperature – resuscitate all patients with known submersion time of ≤ twenty five (25) minutes
- Regardless of water temperature – if submersion time ≥ one (1) hour consider moving to recovery phase instead of rescue
- Cardiac arrest in drowning is caused by hypoxia. Airway and ventilations are equally important to high quality CPR
- Encourage transport of all symptomatic patients (cough, foam, dyspnea, abnormal lung sounds, and/ or hypoxia) due to potential worsening over the next six (6) hours
- Hypothermia is often associated with drowning and submersion injuries even with warm ambient conditions
- Consider spinal motion restriction in the presence of trauma (e.g. Diving, rough surf, vehicle accident with subsequent submersion etc.)

Adult and Pediatric

Basic

- **Oxygen –** 15Lpm non-rebreather mask (Maintain an oxygen saturation of >94%)
    - **Consider CPAP –** For pulmonary edema secondary to near drowning without hypotension
    - **BVM Ventilations –** If patient is ventilatory depressed
- Remove wet clothing:
    - Dry patient and keep warm to avoid hypothermia
- Cardiac Monitoring with 12 lead acquisition:
    - 12 lead interpretation by paramedic or transmitted to receiving facility

Advanced

- **Vascular Access –** IV/IO
    - ***If patient is hypotensive with clear lung sounds:***
        - **Normal Saline –** 20mL/kg
            - titrate to maintain blood pressure > 90mmHg
                - Assess lung sounds and blood pressure frequently

Hypothermia

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Information

- No patient is dead until they are warm and dead
  - Body temperature ≥ 93.2°F or 32°C
- **Hypothermia categories:**
  - **Mild** 90-95°F
  - **Moderate** 82-90°F
  - **Severe** 82°F and Below
- Active warming includes:
  - Hot packs placed in the axillae and groin area
    - Care should be taken not to place the packs directly against the patients skin
- Severe hypothermia may cause cardiac instability
  - Rough handling can cause ventricular fibrillation
    - **DO NOT** withhold CPR in severe hypothermia patients

Adult

Basic

- ***All cold emergencies:***
  - Move patient to a warm area
  - Remove wet clothing and dry the patient
  - Obtain temperature
  - Passive rewarming
    - Cover with blanket
    - Cover patient with a mylar blanket
  - Assess blood glucose
- ***Localized cold injury:***
  - Assess localized area
    - Provide wound care as needed
    - **DO NOT** rub the skin to warm
    - **DO NOT** allow refreezing of the injured site
- ***Moderate and severe hypothermia:***
  - Active rewarming measures
    - Hot packs placed in the axillae and groin area
  - Cardiac monitoring with 12 lead acquisition
    - 12 lead interpretation by paramedic or transmitted to receiving hospital

Advanced

- ***Moderate and severe hypothermia:***
  - **Vascular Access –** IV/IO
  - **Normal Saline –** 20mL/kg IV/IO
    - Utilize warm fluids to assist in active rewarming
      - Reassess lung sounds and blood pressure frequently

Pediatric

Basic

- ***All cold emergencies:***
  - Move patient to a warm area
  - Remove wet clothing and dry the patient
  - Obtain temperature
  - Passive rewarming
    - Cover with blanket
    - Cover patient with a Mylar blanket
  - Assess blood glucose level
- ***Localized cold injury:***
  - Assess localized area
    - Provide wound care as needed
    - **DO NOT** rub the skin to warm
    - **DO NOT** allow refreezing of the injured site
- ***Moderate and severe hypothermia:***
  - Active rewarming measures
    - Hot packs placed in the axillae and groin area
  - Cardiac monitoring with 12 lead acquisition
    - 12 lead interpretation by paramedic or transmitted to receiving hospital

Advanced

- ***Moderate and severe hypothermia:***
  - **Vascular Access –** IV/IO
  - **Normal Saline –** 20mL/kg IV/IO
    - Utilize warm fluids to assist in active rewarming
      - Reassess lung sounds and blood pressure frequently

Hyperthermia

Information

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- **Signs and Symptoms**
  - Altered Mental Status
  - Seizures
  - Hypotension
  - Sweating may be absent
- Patients with heat related illness associated with an altered mental status should be considered to have heat stroke once all the other possibilities for the AMS have been ruled out (hypoglycemia, drugs / alcohol, trauma etc.)
- **Heat Cramps –** consistent of benign muscle cramping form dehydration and is not associated with an elevated temperature
- **Heat Exhaustion –** Consists of dehydration, salt depletion, dizziness, fever, mental status changes, headache, cramping, nausea, and vomiting
  - Vital signs usually consist of tachycardia, hypotension, and an elevated temperature
- **Heat Stroke –** Consists of dehydration, tachycardia, hypotension, temperature > 104°F
- Rapid cooling takes precedence over transport as early cooling decreased morbidity and mortality
  - Goal temperature is about 102.5° F
  - Delay of transport may be necessary when responding to local school sports events
    - This will require both school athletic trainers and EMS providers to agree on treatment plan (rapid cooling)

Adult

Basic

- ***For all Heat Emergencies:***
  - Move patient to a cooler areas as soon as possible
    - If moved to the ambulance decrease the air conditioning temperature in the patient compartment
  - Obtain temperature
  - Remove excessive clothing
- ***IF patient has a patient airway (able to swallow and follow commands):***
  - Provide oral hydration with water (if available)
- ***Heat Stroke with temperature of > 104°F OR Altered Mental Status:***
  - Apply ice packs to axilla and groin area

Advanced

- ***Heat cramps & heat exhaustion:***
  - **Normal Saline –**20 mL/kg IV/IO
    - May repeat as needed
      - Reassess lung sounds and blood pressure frequently
- ***Heat Stroke with temperature of > 104°F OR Altered Mental Status:***
  - **Normal Saline –** 500mL IV/IO
    - May repeat as needed
      - Reassess lung sounds and blood pressure frequently

Hyperthermia

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Pediatric

Basic

- ***For all Heat Emergencies:***
  - Move patient to a cooler area as soon as possible
    - If moved to the ambulance decrease the air conditioning temperature in the patient compartment
  - Obtain temperature
  - Remove excessive clothing
- ***IF patient has a patent airway (able to swallow and follow commands):***
  - Provide oral hydration with water (if available)
- ***Heat Stroke with temperature of > 104°F OR Altered Mental Status:***
  - Apply ice packs to axilla and groin area

Advanced

- ***Heat cramps & heat exhaustion:***
  - **Normal Saline –** 20 mL/kg IV/IO
    - May repeat as needed
      - Reassess lung sounds and blood pressure frequently
- ***Heat Stroke with temperature of > 104°F OR Altered Mental Status:***
  - **Normal Saline –** 30mL/kg IV/IO
    - May repeat as needed
      - Reassess lung sounds and blood pressure frequently

Carbon Monoxide Exposure

Information

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- **Carbon Monoxide Properties:**
  - Chemical Asphyxiant
  - Colorless
  - Odorless
  - Tasteless
  - Slightly less dense than air
  - Toxic to humans when encountered in concentrations above 35 ppm
- **Signs and Symptoms:**
  - Altered Mental Status
  - Dyspnea
  - Dizziness
  - Nausea/ Vomiting
  - Syncope
  - Reddened Skin
  - Chest pain
- All rescuing crew members shall wear their SCBA if the patient is in a hazardous environment

Adult and Pediatric

Basic

- Continuous monitoring of oxygen saturation along with capnography
  - Carbon Monoxide poisoning will give false readings on oxygen saturation monitors
    - Utilize rainbow sensors in place of oxygen saturation, if available
- **Oxygen –** 15Lpm via non-rebreather mask (NRB)
  - Regardless of oxygen saturation readings
  - ***If patient is ventilatory depressed:***
    - Provide ventilatory support (BVM Ventilations)

Advanced

- **Normal Saline –** 20mL/kg IV/IO
  - May repeat as needed
    - Reassess lung sounds and blood pressure frequently

Symptoms of CO Poisoning

SpCO Level	Clinical Manifestation
0 – 10 %	Mild headache, SOB with exertion
10 – 20%	Moderate headache, SOB at rest
20 – 30%	Worsening headache, nausea, dizziness, fatigue
30 – 40%	Severe headache, vomiting, vertigo, altered judgment
40 – 50%	Confusion, syncope, tachycardia
50 – 60%	Seizures, shock, apnea, coma

Normal SpCO for non-smoker : <5%
Normal SpCO for smoker: <10%

Cyanide Exposure

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Information

- **Signs and Symptoms**
  - Altered mental status
  - Pupil dilation
  - General weakness
  - Confusion
  - Bizarre behavior
  - Excessive sleepiness
  - Coma
  - Shortness of breath
  - Headache
  - Dizziness
  - Seizure
- Cyanide exposures may result from inhalation, ingestion or absorption from various cyanide containing compounds, including exposure to fire or smoke in an enclosed space
- Direct cyanide exposure (non-inhalation) is a Hazardous Materials incident
- Cyanokits are located on all Battalion Chief vehicles

Adult

Basic

- ***Confirmed or suspected cyanide exposure***
  - **Oxygen –** 15Lpm via Non-Rebreather Mask (NRB)
    - Regardless of the patients oxygen saturation
      - If patient is ventilatory depressed provide ventilatory support

Advanced

- **Normal Saline –** 20mL/kg IV/IO
  - May repeat as needed
    - Reassess lung sounds and blood pressure frequently

Paramedic

- ***Confirmed or suspected cyanide exposure***
  - **Cyanokit –** 5gm IV/IO over 15 minutes
    - Reconstitute 5gm vile by adding 200mL of normal saline to the vial by using the transfer spike
    - Mix the solution by rocking or rotating the vial for 30 seconds. **DO NOT SHAKE**
    - The cyanokit should be administered through a separate/dedicated IV/IO line
      - May repeat once as needed with a total max dose of 10gm

Marine Envenomations / Injury

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Information

- Ensure your safety, avoid the organism or fragments of the organism as they may impart further sting
- Patients can suffer cardiovascular collapse form both venom and or anaphylaxis even in seemingly minor envenomation's
- Ensure good wound care, immobilization and pain control as needed

Adult and Pediatric

Basic

- ***If Jellyfish, Anemone, Man-O-War Sting:***
  - Immobilize the injury site
  - **Vinegar –** Spray site of injury evenly and let air dry
  - Cleanse site with fresh seawater
    - **DO NOT** use freshwater or ice to clean site
- ***If Sting Ray, Lions Fish, Urchin/Starfish Sting:***
  - Immobilize the injury site
  - Attempt Remove barb or spine
    - ***If large barb in thorax or abdomen***
      - **DO NOT REMOVE**
      - Stabilize barb in place
  - Immerse in hot water 110-114°F (if available)
- ***If Large Organism:***
  - Immobilize the injury site
  - Refer to Multiple Trauma Guideline

Man-O-War	Sting Ray	Lions Fish
		

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Preface:

The Horry County Fire - Rescue - EMS Prehospital Medication Formulary has been designed to serve as a guide to the most common medications used in prehospital emergency care. It is acceptable to utilize length based resuscitation devices on calculating pediatric medication dosages. It is our hope that this formulary will be a useful addition to your medical reference and a helpful aid to your study of pre-hospital pharmacology.

Disclaimer:

This formulary follows current trends in prehospital care at the national, state, and local levels. Consideration was given to those indications and dosages as given in the South Carolina DHEC State Protocols as well as the Horry County Fire - Rescue - EMS Patient Clinical Operating Guidelines. Efforts have been made to assure that the information included in this Medication Formulary is accurate and up-to-date. Even though the review process for this Medication Formulary has been extensive, inaccuracies may be present. It is the responsibility of the individual provider to be familiar with medications in which they may administer at their currently credentialed level. This is to include but not limited to all indications, contraindications, precaution, dosages, and routes of administration. The medications found in this medication formulary should only be administered under explicit direct or indirect Medical Control. Each individual provider shall always refer to local protocols and policies at all times regarding the administration of prehospital medications.

Pharmacology:

The branch of medicine concerned with the uses, effects, and modes of action of drugs

Drug:

A medicine or other substance, which has a physiological effect when ingested or otherwise, introduced into the body

Pharmacokinetics:

The branch of pharmacology concerned with the movement of drugs within the body

- Absorption
- Distribution
- Biotransformation
- Elimination

Pharmacodynamics:

The branch of pharmacology concerned with the effects of drugs and the mechanism of their action

To cause a biochemical or physiological response, a drug must bind to a receptor site via proteins on the cells surface membrane, often by the lock and key method. An agonist has a positive, excitatory effect on a receptor and an antagonist has a negative, inhibitory effect on a receptor.

To be effective, a drug must reach its therapeutic threshold (its minimum concentration for effect) and stay within its therapeutic index (above therapeutic threshold, but below the toxic level)

Special Considerations for Drug Therapy:

Pediatric Patients:

- Decreased GI absorption
- Newborns' metabolism is slower than that of an adult
- Child's metabolism is greater than that of an adult
- Newborns have immature hepatic and renal function
- May use an commercially approved length or weight based resuscitation system

Geriatric patients:

- May have decreased GI absorption
- Decreased muscle mass may decrease IM absorption
- May have hepatic or renal insufficiency
- Possibility of polypharmacy

Pregnant patients:

- Medications administered to mother may be transferred to a nursing child

Six Rights of Medication Administration:

1. Right Patient
2. Right Medication
3. Right Dose
4. Right Route
5. Right Time
6. Right Documentation

Administration Routes:

- **Enteral Route –** By mouth (PO), buccal, sublingual (SL), rectal (PR), orogastric or nasogastric tube (OG/NG)
- **Parenteral Route –** Topical (TD), Intradermal (ID), subcutaneous (SQ), Intramuscular (IM), Intravenous (IV), Intraosseous (IO), Endotracheal Tube (ET), Inhalation / Nebulized, Umbilical, Intranasal (IN)

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Common Metric Conversions:

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- 1 kg = 2.2 pounds
- 1 g = 1000 mg
- 1 mg = 1000 mcg
- 1 cm^3 (=cc) = 1 mL
  - The use of "cc" for "mL" is strongly discouraged

Basic Bolus Formula:

(Desired Dose)(Volume on Hand) / (Drug on Hand)	= Volume to Administer

Example: Give 2 mg of a medication. Supply: 0.4mg/mL	
(2 mg)(1mL) / (0.4 mg)	= 5 mL

Weigh-based Bolus Formula:

(Desired Dose)(Volume on Hand)(Pt weight in kg) / (Drug on Hand)	= Volume to Administer

Example: Give 0.5 mg/kg of a medication to a 70 kg patient. Supply: 100mg/10mL	
(0.5mg)(10mL)(70) / (100mg)	= 3.5

Medication Infusion:

(Desired Dose)(Volume on Hand)(Drip Set Factor)	=gtts/minute
(Drug on Hand)	

Example: Administer 2 mg/min of medication via 60 gtts/mL set. Supply: 2 g in 500 mL	
(2 mg/mL)(500 mL)(60 gtts/mL)	= 30 gtts/minute
(2000 mg)	

Weight-based Medication Infusion:

(Desired Dose)(Volume on Hand)(Pt weight in kg)(Drip Set Factor)	=gtts/minute
(Drug on Hand)	

Example: Administer 5 mcg/kg/min to an 80 kg patient via 60 gtts set. Supply: 800 mg in 500 mL	
(5 mcg/kg/min)(500 mL)(80 kg)(60 gtts set)	15 gtts/minute
(800,000 mcg)	

Volume over Time:

(Volume to be infused)(Drip Set Factor)	=gtts/minute
(Time in Minutes)	

Example: Administer 200 mL over 90 minutes via 10 gtts set	
(200 mL)(10 gtts set)	22.2 gtts/minute
(90 minutes)	

Sapphire IV Pump

IV pump shall be used to assist with medication infusions when possible. It shall not be common practice to utilize general programming when infusing medications. Only the medications in the drug library shall be infused unless otherwise directed by your the Shift Medical Officer.

Sapphire IV pump Drug library list

- Amiodarone
- Sodium Bicarb
- Calcium Gluconate
- Cefepime
- D10
- Epi Infusion
- Ketamine
- Magnesium Sulfate
- Rocephin
- Traexamic Acid (TXA)

Acetaminophen (Tylenol)

Indications:

Pediatric/Adult Fevers > 100.4, Pain Relief, Febrile Fever

Administration:

Oral (PO)

- Pediatrics who can protect their airway

IV/IO Infusion over 15min

- Adults and pediatrics who do not have a patent airway or have a risk of aspiration

Adult:

15mg/kg max dose of 1,000mg

Pediatric:

15mg/kg max dose of 1,000mg

Therapeutic Effect:

Increases pain threshold and reduces fever by acting on the hypothalamus

Contraindications:

Hypersensitivity and use caution in patients with liver disease

Side Effects:

Nausea/vomiting, Hepatotoxicity

Adenosine (Adenocard)

Indication:

PSVT, SVT, Atrial Fibrillation, Ventricular Tachycardia (With a pulse)

Administration:

Rapid IV/IO

Adult Dose:

Initial dose 6mg Rapid IV/IO push followed by a 20mL flush, may repeat 12mg 1-2 minutes with a total maximum dose of 18mg

Pediatric Dose:

0.1mg/kg Rapid IV/IO followed by 20mlL flush max first dose 6mg, may repeat once 0.2mg/kg 1-2 minutes with a max second dose of 12mg

Therapeutic Effects:

Slows conduction time through the Atrioventricular node, Interruption of reentry pathways through the Atrioventricular node, Restoration of Normal Sinus Rhythm in patients with PSVT

Contraindication:

Presence of second or third degree A-V block

Side Effects:

Short – lasting, second or third degree AV block, transient asystole, various arrhythmias lasting only a few seconds

Special notes:

The onset of the effect is generally within one minute

Albuterol Sulfate (Ventolin)

Indication:

Acute Bronchospasm, Cardiac Arrest associated with Asthma, Renal Failure

Administration:

Nebulized

Adult Dose:

Paramedic:

- **Asthma** – 5mg nebulized, may repeat as need total max dose of 10mg
- **Renal Failure** – 10mg nebulized

Basic:

- **Asthma** – 5mg nebulized
- **Pediatric Dose:** 2.5mg, may repeat as needed total max dose 5mg

Amiodarone (Cordarone)

Indication:

Shock resistant ventricular Fibrillation or pulseless ventricular tachycardia; Unstable ventricular tachycardia; Rapid atrial arrhythmias with impaired Left Ventricle function

Administration:

IV/IO push/infusion

Adult Dose:

- **Pulseless VT/VF –** 300mg rapid push
  - May repeat once at 150mg rapid IV push
- **Unstable VT –** 150mg Infusion over 10 minutes
- **Rapid Atrial Arrhythmias with impaired LF function –** 150mg infusion over 10 minutes

Pediatric Dose:

- **Pulseless VT/VF** – 5mg/kg, Rapid push
  - May repeat up to three (3) total doses for refractory pulseless VT/VF
- **VT** – 5mg/kg Infusion over 20 minutes

Therapeutic Effects:

Increase action potential and refractory period, Reduces Ventricular Dysrhythmia

Contraindications:

Hypersensitivity to the medication, Cardiogenic Shock, Marked Sinus Bradycardia, Second or Third Degree AV block (unless pacemaker is available)

Side effects:

Hypotension, Bradycardia, AV Block, Asystole, PEA, Hepatoxicity

Aspirin

Indications:

Myocardial Infarction, Chest pain suspicious of cardiac origin

Administration:

PO

Adult Dosage:

324mg (Four (4) chewable aspirin 81mg x 4= 324mg)

Pediatric:

Not indicated

Therapeutic Effect:

Given as an early potent anticoagulant, Blocks formation of thromboxane A2. Thromboxane A2 causes platelets to aggregate and arteries constrict, Reduce overall mortality of acute MI, Reduce nonfatal re-infarction

Contraindication:

Active ulcer, hypersensitivity to the medication

Side Effects:

Allergic reaction, Nausea/vomiting, indigestion, heartburn, tinnitus

Atropine Sulfate

Indication:

Sinus Bradycardia with hypotension, second or third degree block, organophosphate poisoning

Administration:

IV/IO

Adult Dosage:

- **Bradycardia –** 1.0mg may repeat every 3-5 minutes with a max total dose of 3mg
- **Organophosphate Poisoning –** Patients > 12 years old2mg initial dose, followed by 1-2mg every 20-30 minutes until symptoms resolve

Pediatric Dosage:

- **Bradycardia –** 0.02mg/kg minimum dose of 0.1mg
    - max single dose of 0.5 mg
        - May repeat once with a max total dose of 1mg

Organophosphate Poisoning:

- Patient < 12 years of age, 0.2-.05mg/kg initial dose, and repeat every 20-30 minutes until symptoms resolve

Therapeutic Effect:

Blocks acetylcholine receptor site, Increases SA and AV node conduction, Dries secretions form organophosphate poisoning

Contraindications:

Tachycardia, glaucoma, Atrial Fibrillation/Atrial Flutter with rapid ventricular response

Side Effects:

Tachycardia, Dry Mouth, Thirst, Flushing of the skin, Blurred vison, Headache, Pupillary dilation, Urine retention

Atrovent (Ipratropium Bromide)

Indications:

Bronchospasm, COPD

Administration:

Nebulized

Adult Dose:

500mcg

May repeat once with max total of 2 doses

Therapeutic Effects:

Inhibits ACTH receptor sites on Bronchial Smooth Muscle.

Contraindications:

Hypersensitivity to Atrovent and or atropine and their derivatives.

Side Effects:

Tachycardia, Palpitations, Eye Pain, Urinary Retention, UTI, Urticari,

Bronchitis

Benadryl (Diphenhydramine)

Indication:

Anaphylaxis, Moderate to severe allergic reactions

Administration:

IV/IO/IM

Adult Dose:

25-50mg slow push

Pediatric Dose:

1mg/kg, slow push with a max of 50mg

Therapeutic Effect:

Inhibits histamine release and effects, mild sedative, inhibits motion sickness

Contraindications:

Hypersensitivity, newborns, and nursing mothers

Side Effects:

Hypotension, nausea/vomiting, tachycardia, bradycardia, sedation, palpitations, drowsiness, disturbed coordination, dry mouth

Calcium Gluconate

Indication:

Cardiac arrest result from dialysis, Overdose of Calcium channel blockers, Crush injuries

Administration:

IV/IO

Adult Dose:

- **Cardiac Arrest –** 2gm Slow Push
- **Crush Injury –** 1gm Slow Push
- **Overdose –** 3gm mixed in a 50mL normal saline, infuse of 10-15 minutes

Pediatric Dose:

- **Crush Injury –** With online Medical Control, 0.02gm/kg Slow Push

Therapeutic Effect:

Reverses overdoses with magnesium sulfate or calcium channel blockers, relieves some types of muscle spasm, Replaces electrolytes necessary for the contractile function of the heart

Contraindications:

V-Fib, Hypercalcemia, Digitalis Toxicity

Side Effects:

Arrhythmias including bradycardia or cardiac arrest, syncope, Nausea/vomiting, hypotension, necrosis with extravasation

Cardizem (Diltiazem)

Indication:

SVT refectory to adenosine, A-Fib or A-Flutter with Rapid Ventricular Response

Administration:

IV/IO

Adult Dose:

10-20mg over 2 minutes and may repeat once as needed. *If over the age of 55 or if they have a recent cardiac history, administer 10mg over 2 minutes*

Pediatric dose:

Not approved

Therapeutic Effect:

Inhibits calcium ion influx through slow channels into cell of myocardial and arterial smooth muscles. Reduces peripheral vascular resistance by inhibiting the contractility of vascular smooth muscle, which dilates the coronary arteries

Contraindications:

Hypersensitivity, sick sinus syndrome, 2nd or 3rd degree AV block, Hypotension, WPW, Wide complex tachycardia

Side Effects:

Chest pain, bradycardia, Hypotension, syncope, CHF, Dysrhythmias, Nausea/vomiting, headache, sweating, dizziness and dyspnea, 2nd and 3rd degree heart block

Cefepime

Indications:

Sepsis (Blood Stream/PICC, wounds, skin)

Administration:
IV/IO

Adult:

2g in 50 mL over 10 minutes

Pediatric:

Not Indicated

Therapeutic Effect:

Semi-synthetic, broad-spectrum cephalosporin antibiotic that is active against both Gram-Positive and Gram-Negative bacteria

Contraindications:

Hypersensitivity to the drug, allergy to any 'cillin' medication (Contact On-Line Medical Control)

Side Effects:

Allergic reaction, stomach cramps, irregular heartbeats, muscle cramps, nausea, and vomiting

CyanoKit (Hydroxocobolamin)

Indication:

Treatment of known or suspected cyanide poisoning

Administration:

IV/IO

Adult Dose:

5gm in 200mL of Normal Saline over 15 minutes, May repeat once as needed with a maximum total dose of 10gm

Pediatric Dose: Not indicated

Therapeutic Effect:

Binds cyanide ions for excretion

Contraindications:

Hypersensitivity to any component of the medication to include cobalt

Side Effects:

Hypertension, chromaturia, anaphylaxis, chest tightness, edema, urticaria, pruritus, dyspnea, and rash

Dextrose 10% (D10)

Indication:

Confirmed hypoglycemia blood glucose <60mg/DL OR blood glucose level < 80mg/DL in symptomatic known diabetic.

Administration:

IV/IO

Adult Dose:

Infuse 250mL (25g) while observing patient for improvement

Pediatric dose:

Infuse 0.5gm/kg up to 25g (5mL/kg) while observing patient for improvement

Therapeutic Effect:

Immediate source of glucose and water

Contraindications:

None in patients with known hypoglycemia

Side Effects:

Tissue necrosis, phlebitis, pain at injection site

Epinephrine (Adrenaline)

Indication:

Bronchospasm, Anaphylaxis, Croup, Asthma, Cardiac Arrest, Hypotension

Administration:

IV, IO, IM, Nebulized

Adult Dose:

- 1:1,000 – 0.3mg, may repeat every 15 minutes as need with a max total dose of 1.0mg
- 1:10,000 – 1mg every 3-5 minutes
- 1:100,000 – 10mcg per minute as needed to achieve desired systolic blood pressure max total dose 300mcg
- Infusion Drip - 2-10mcg/min titrate as needed to maintain desired systolic blood pressure

Pediatric Dose:

- 1:1,000 – 0.15mg
- 1:1,000 – 1mg mixed in 2 mL of 0.9% NS and nebulized
- 1:10,000 – 0.01mg/kg every 3-5 minutes
- 1:100,000 – 10mcg per minute as needed to achieve desired systolic blood pressure max total dose 300mcg
- Infusion Drip - 2-10mcg/min titrate as needed to maintain desired systolic blood pressure

Therapeutic Effect:

Positive inotropic, dromotropic, and chronotropic effects as well as increased systemic vascular resistance and BP

Contraindication:

There is none in an emergent situation

Side Effect:

Palpitations, Hypertension, dysrhythmias, anxiety, tremors

Etomidate (Amidate)

Rs

Indication:

Rapid Sequence Intubation

Administration:

IV/IO

Adult Dose:

0.3mg/kg over 30-60sec

Pediatric Dose: Not indicated

Therapeutic Effect:

Acts on the Central Nervous System to stimulate (GABA) receptors. This depresses the reticular activating system.

Contraindications:

Known hypersensitivity to the drug

Side Effects:

Transient venous pain, skeletal muscle movement

Fentanyl Citrate (Sublimaze)

Schedule II

Indication:

Pain Management

Administration:

IV/IO/IM/IN

Adult Dose:

2mcg/kg max single dose 100mcg, may repeat as needed max total dose 200mcg

Pediatric Dose:

1mcg/kg **(On-Line Medical Control REQUIRED)** for patients < 5 years of age

Therapeutic effect:

Potent short acting, synthetic narcotic agonist analgesic. Principle actions are analgesia and sedation. Inhibits ascending pain pathways in CNS, increasing pain threshold, and alters pain perception by binding to opiate site.

Contraindications:

History of Myasthenia gravis (droopy eyelid and mouth, difficulty swallowing, double vision, unsteady walk), hypersensitivity to opiates

Side Effects:

Respiratory depression, bronchoconstriction, chest wall rigidity, sedation, bradycardia, diaphoresis, Nausea/vomiting, meiosis, blurred vision, hypotension, cardiac arrest

Glucagon (GlucaGen)

Indication:

Hypoglycemia without IV access, Beta-blocker overdose

Administration:

IV, IO, IM

Adult Dose:

- **Glucose Management** – 1-2mg, May repeat one in 25 minutes as needed
- **Beta-Blocker overdose** – 2mg May repeat once in 15 minutes as needed

Pediatric Dose:

- **Glucose Management** – 0.1mg/kg with a max dose of 1mg
- **Beta-Blocker overdose** – 0.1mg/kg with a max of 1mg

Therapeutic Effect:

Glucagon converts stored glycogen in the liver to glucose. It inhibits the synthesis of glycogen from glucose. It enhances conventional treatments for calcium channel blocker and beta-blocker overdose by producing a positive inotropic and chronotropic effect on the heart via stimulation of glucagon specific receptors in the myocardium. These receptors are not affected by the even massive doses of beta-blockers, thereby reversing hypotension and bradycardia.

Contraindications:

Known hypersensitivity

Side Effects:

Hypotension, Headache/dizziness, Nausea/Vomiting, Hyperglycemia, Hypokalemia

Haldol (lactate)

Indications:

Psychotic disorders, chronic psychosis

Administration:

IM

Adult:

5mg

Therapeutic Effect:

Antagonizes dopamine D1 and D2 receptors in the brain; depresses reticular activating system and inhibits release of hypothalamic and hypophyseal hormones. On set 30-60min.

Contraindications:

Hypersensitivity to the drug, Parkinsonism, coma, CNS depression. Prolonged QT syndrome.

Side Effects:

Severe extrapyramidal reactions, sedation, drowsiness, lethargy, headache, insomnia, confusion, vertigo, prolonged QT

Ketamine (Ketalar)

Class III

Indications:

RSI, refractory pain AFTER opiate administration, sedation of severely agitated psychosis, excited delirium

Administration:

IV/IO/IM

Adult Dose:

- Pain Control – 25 mg in 50 mL NS over 10 minutes **(On-Line Medical Control REQUIRED)**
  - IV Pump **REQUIRED** for pain control infusions
- RSI – 1.5-2 mg/kg
- Agitated Delirium – 2-4 mg/kg IM **(On-Line Medical Control REQUIRED)**

Pediatric Dose:

- Airway – 1-2 mg/kg **(On-Line Medical Control REQUIRED)**

Therapeutic Effects:

Interacts with opioid receptors, monoamine, cholinergic, purinergic, and adrenoreceptor systems as well as having local anesthetic effects. The hypnotic effects of ketamine is caused by a combination of immediate channel blockade of NMDA and hyperpolarization-activated cation channels. The immediate analgesic affects are mediated predominantly by a combination of opioid system sensitization and antinociception

Contraindications:

Known allergy or sensitivity, relative contraindication in penetrating eye injury, and a relative contraindication in patients with known cardiovascular disease

Side Effects:

Laryngospasm (rare), nausea, vomiting, hypersalivation, and when used in sub-anesthetic doses, ketamine provokes imaginative, dissociative resembling schizophrenia

Special Notes:

Potential Increase in heart rate and blood pressure; May provoke hyper-salivation, typically controlled by suctioning) not usually seen at analgesic dose); May cause hallucinations, euphoria, and dysphoria

Labetalol (Normodyne)

Indications:

Hypertension

Administration:

IV (Slow Push over 2 minutes), IV Infusion, IO

Adult Dose:

10 mg every 10 minutes for a max of 30 mg **(On-Line Medical Control REQUIRED)**

Pediatric Dose:

Not Recommended

Therapeutic Effect:

Dose related decrease in blood pressure without reflex tachycardia and without significant decrease in heart rate. Less decrease in cerebral perfusion than with nitroprusside

Contraindications:

Asthma; Cardiogenic Shock; Cocaine Induced Hypertension; Hypotension; Heart Block > 1st Degree

Side Effects:

Mild & Transient Hypotension

Lidocaine (Xylocaine)

Indications:

Ventricular Fibrillation, Ventricular tachycardia, malignant PVC's, combative head injuries (before intubation), Conscious IO access

Administration:

IV, IV Infusion, IO

Adult Dose:
1.5 mg/kg repeated 3-5 minutes. Max loading dose of 3mg/kg

Conscious IO - 40mg Slow IO push over 2 min

Pediatric Dose:

Conscious IO - 0.5mg/kg Slow IO push over 2 min max total dose 20mg

Therapeutic Effect:

Suppresses ventricular ectopic activity; Elevates threshold for V-Fib; Suppresses reentry dysrhythmias

Contraindications:

PVCs in conjunction with bradycardia; High degree AV blocks; Ventricular escape rhythms; Allergy to *–caine* drugs

Side Effects:

Hypotension, Decreased LOC, irritability, muscle spasm, eventually seizures

Magnesium Sulfate

Indications:

Antiarrhythmic in Torsade de pointes associated with prolonged QT interval. Severe bronchospasm unresponsive to continuous albuterol and ipratropium. Eclampsia in pregnancy > 20 weeks gestation or post-partum.

Administration:

IV/IO

Adult Dose:

- Respiratory – 2g in 50 mL NS over 10 minutes
- Pre-eclampsia – 4g in 50 mL NS over 10 minutes
- Torsades de Pointes – 2 g in 50mL NS over 10 minutes

Pediatric Dose:

- Respiratory – 0.4g/kg (2g max) in 50 mL over 20 minutes
- V-Fib and Pulseless V-Tach – 25-50mg/kg bolus Max does of 2.0g (2000mg) IV/IO
- Torsades de Pointes with pulse – 0.4g/kg (2g max) over 20 minutes

Therapeutic Effects:

Essential for enzyme activity, neurotransmission and muscular excitability, CNS and muscular depressant

Contraindications:

Hypermagnesemia, hypocalcemia, anuria, heart block, active labor

Side Effects:

Bradycardia, Hypotension, Hyporeflexia, Diaphoresis and Drowsiness, Decreased respiratory rate, flaccid paralysis

Morphine Sulfate

Class II

Indications:

AMI, acute pulmonary edema, combative head injuries (before intubation), severe pain in selected situations, premedication for cardioversion and transcutaneous pacing

Administration:

IV, IM, IO

Adult Dose:

0.1mg/kg up to 5mg. Max dose of 10mg.

Pediatric Dose:

0.1mg/kg up 5mg. Max dose of 10mg. **(On-Line Medical Control REQUIRED)** for patients less than 5 years of age

Therapeutic Effects:

CNS Depressant, Peripheral vasodilation/venous pooling, decreases sensitivity to pain

Contraindications:

Head injury, hypotension, asthma, COPD, respiratory depression not caused by pulmonary edema, undiagnosed abdominal pain, hypersensitivity to the drug\

Side Effects:

Respiratory depression, hypotension, bradycardia, nausea/vomiting

Narcan (Naloxone)

Indications:

Overdose/toxic ingestion

Administration:

IV, IO, IM, IN

Adult Dose:

IV/IO – 0.4mg ever 1-2 minutes until spontaneous ventilations are achieved

IM/IN – 2mg

Pediatric Dose:

0.01mg/kg with a max dose of 2mg

Therapeutic Effects:

Reverses most effects of nearly all narcotic and/or synthetic narcotic agents

Contraindications:

Hypersensitivity to the drug

Side Effects:

Vomiting with rapid administration, ventricular dysrhythmias precipitate acute narcotic withdrawal syndrome, seizures, and hypertension

Nitroglycerin (Nitrostat)

Indications:

Chest pain (Cardiac and STEMI), CHF/Pulmonary Edema

Administration:

SL

Adult Dose:

0.4mg. Repeat 5 minutes x 3 as needed.

Pediatric Dose:

Not Recommended

Therapeutic Effects:

Dilates coronary and systemic arteries

Contraindications:

Increased intracranial pressure, hypotension/shock, glaucoma, use of erectile dysfunction medication

Side Effects:

Headache, dizziness, hypotension

Normal Saline 0.9%

Indications:

Heat exhaustion and related heat problems, diabetic disorders, freshwater drowning, hypovolemia

Administration:

IV, IO

Adult Dose:

Dependent upon patient condition, size, and situation being treated

Pediatric Dose:

Dependent upon patient condition, size, and situation being treated

Therapeutic Effects:

Provides fluid and sodium replacement

Contraindications:

Pulmonary edema

Side Effects:

Volume overload, pulmonary edema, diuresis

Oral Glucose

Indication:

Hypoglycemia

Administration:

Buccal

Dose:

1-2 tubes if awake and no risk of aspiration

Therapeutic Effects:

Increases serum glucose

Contraindications:

Hyperglycemia, altered level of consciousness, hypersensitivity to any ingredient

Side Effects:

Hyperglycemia

Oxygen

Indication:

All Protocols

Administration:

NC, NRB, BVM, ETT, BIAD, CPAP

Dose:

- 1-6 liters NC
- 10-15 liters NRB
- 15 liters BVM, ETT, BIAD, CPAP

Therapeutic Effects:

Saturates the hemoglobin with oxygen molecules

Contraindications:

None in the pre-hospital setting

Side Effects:

Pepcid (Famotidine)

Indication:

Allergic reaction

Administration:

IV

Adult:

20 mg

Therapeutic Effect:

Competitively inhibits action of histamine on the H2-receptor sites of parietal cells, decreasing gastric acid secretions.

Contraindications:

Hypersensitivity to the drug.

Side Effects:

Headache, dizziness, constipation, diarrhea.

Rocephin (Ceftriaxone)

Indications:

Sepsis (Pneumonia, urinary tract infection, altered mental status, and abdominal signs (diarrhea & vomiting)

Administration:
IV/IO

Adult:

2g in 50 mL over 10 minutes

Pediatric:

Not Indicated

Therapeutic Effect:

Semi-synthetic, broad-spectrum cephalosporin antibiotic that is a bactericidal agent that acts by inhibition of bacterial cell wall synthesis

Contraindications:

Hypersensitivity to the drug, allergy to any 'cillin' medication (Contact On-Line Medical Control)

Side Effects:

Allergic reaction, stomach cramps, irregular heartbeats, muscle cramps, nausea, and vomiting

Formulary Table of Contents

Rocuronium Bromide (Zemuron)

Table of Contents

Rs

Indications:

Rapid Sequence Intubation

Administration:

IV, IO

Adult Dose:

1mg/kg

Pediatric Dose:

Not Indicated

Therapeutic Effects:

Prevents neuromuscular transmission by blocking the effects of acetylcholine

Contraindications:

Hypersensitivity

Side Effects:

Bronchospasm

Sodium Bicarbonate (NaHCO3)

Indications:

Severe metabolic acidosis, cardiac arrest (after ventilation problems are corrected), certain medication overdoses, hyperkalemia

Administration:

IV, IO, Infusion

Adult Dose:

Cardiac Arrest - 1mEq/kg

Tricyclic Antidepressant overdose – 50mEq followed by 50mEq in 500mL normal saline infusion at 200mL /hr

Crush syndrome – 50mEq

Pediatric Dose:

1mEq/kg

Therapeutic Effects:

Provides bicarbonate ion to buffer strong acids, increases PH

Contraindications:

CHF, Hypokalemia

Side Effects:

Metabolic alkalosis, increased vascular volume, pulmonary edema, Dysrhythmias through serum potassium depletion, transiently raises the arterial PCO2

Solumedrol (Methylprednisolone)

Indications:

Anaphylaxis, COPD exacerbation

Administration:

IV

Adult:

125mg Slow

Pediatric:

Anaphylaxis - 2mg/kg max total dose 125mg

Asthma Induced wheezing - 2mg/kg max dose 60mg

Therapeutic Effect:

Decreases inflammation, mainly by stabilizing leukocyte lysosomal membranes, suppresses immune response, Influences protein, fat, carbohydrate metabolism.

Contraindications:

Hypersensitivity to the drug, systemic fungal infection, premature infants, patients receiving immunosuppressive doses together with live virus vaccines.

Side Effects:

Headache, hypertension, sodium and water retention, hypokalemia, alkalosis.

Succinylcholine (Anectine)

Indications:

Rapid Sequence Intubation

Administration:

IV, IO

Adult Dose:

1.5mg/kg over 30 seconds, max total dose 150mg

Pediatric Dose:

Not Indicated

Therapeutic Effects:

Prevents neuromuscular transmission by blocking the effect of acetylcholine at the myoneural junction

Contraindications:

Hypersensitivity to the drug, history of malignant hyperthermia, skeletal muscle myopathies, penetrating eye injury

Side Effects:

Apnea, cardiac arrhythmias, increased intraocular pressure, muscle fasciculation's,

Special notes / Restrictions:

Has no effect on consciousness, pain threshold or cerebration. Must be used only with adequate sedation, in elderly time of onset may be delayed due to slower circulation time in cardiovascular disease, use extreme caution in patients with severe burns, electrolyte imbalance, hyperkalemia, and those receiving digitalis

Tranexamic Acid (TXA)

Indications:

Adult patients 18 years or older, who presents with traumatic, life-threating, non-compressible bleeding with any of the following:

- Systolic Blood Pressure <90mmHg
- Heart Rate > 120 beats per minute
- Bleeding or presumed bleeding that is NOT controllable by direct pressure, wound packing, or tourniquet application
- Major amputations of any extremity proximal to the wrist or ankle
- Significant blood loos (>500mL)

Administration:

IV, IO

Adult Dose:

1 Gram mixed into 50mL normal saline over 10 minutes

Pediatric Dose:

Not Indicated

Therapeutic Effects:

Competitive inhibitor of plasminogen activation

Contraindications:

Time of injury is >3hr; active CVA, MI, or PE in the past 24 hours; traumatic arrest > 5 minutes; know allergy to TXA; penetrating cranial injury; TBI with exposed brain matter; isolated hanging or drowning victims; cervical cord injury with motor deficits

Side Effects:

N/A

Thiamine (Biamine)

Indications:

Coma and seizure of unknown origin, especially if alcohol use is suspected, Delirium tremens

Administration:

IV, IO, IM

Adult Dose:

100mg

Pediatric Dose:

10-25 mg

Therapeutic Effects:

Provides the appropriate thiamine levels to allow glucose to be utilized in sufficient amounts, thus reversing cellular hypoglycemia secondary to thiamine deficiency

Contraindications:

Known hypersensitivity to Thiamine

Side Effects:

Be alert for sensitivity (allergic Reaction) in patients

Toradol (Ketorolac)

Indications:

Moderate to severe acute pain

Administration:

IV, IO, IM

Adult Dose:

- **IM** – 30mg

Pediatric Dose:

Not indicated

Therapeutic Effect:

Reversibly blocks the action of cyclooxygenase, which in turn prevents the formation of prostaglandins. Ketorolac causes analgesia equivalent to that of morphine sulfate

Contraindications:

NSAID allergy, ASA sensitive asthma, known peptic ulcer disease, recent GI Bleed, renal failure, cerebrovascular bleeding, any head trurama, recent CABG, pregnancy, any patient taking or on any anticoagulation medications

Side Effects:

GI bleeding, inhibition of platelet aggregation, acute renal failure, Nausea/Vomiting, diarrhea, upset stomach

Versed (Midazolam)

Class IV

Indications:

Major seizures, status epilepticus, pre-medication prior to cardioversion to Transcutaneous Pacing, skeletal muscle relaxant, acute anxiety states, medication for combative patients and difficult intubations

Administration:

IV slow, IM, IO, IN

Adult Dose:

- 2mg SIVP/IO every 3-5 minutes as needed up to 6mg
- 4mg IM
    - May repeat 2mg IM after 5 minutes as needed
- 2mg IN 1mg in each nostril
    - May Repeat after 5 min if seizure activity continues

Pediatric Dose:

- 0.1-0.2 mg/kg up to 2mg initial dose. Repeat every 3-5 minutes to a max of 3 doses. IV/IO/IM/IN

Therapeutic Effects:

Short-acting benzodiazepine CNS depressant, short-term sedation, postoperative amnesia

Contraindications:

Hypersensitivity, Glaucoma, Shock, ETOH, Coma, Pregnancy, Renal Failure

Side Effects:

Apnea, Cardiac arrhythmias, Hypotension

Zofran (Ondansetron)

Indications:

Abdominal pain, nausea/vomiting/diarrhea, chest pain (Cardiac and STEMI), pain control (Pediatric), epistaxis

Administration:

IV, IM, IO

Adult Dose:

4mg with a max dose of 8mg

Pediatric Dose:

0.15mg/kg with a max dose of 4mg

Therapeutic Effects:

Prevents nausea and vomiting

Contraindications:

Hypersensitivity to the drug

Side Effects:

N/A

BUREAU OF EMS AND TRAUMA
INTERFACILITY TRANSPORT FORM
PART A - DRUG REPORT

Electronic EMS Patient Care Record #: _____

Patient Name: _____ DOB: _____
LAST FIRST MI MM/DD/YYYY

Referring Physician: _____ Transferring Facility: _____

Accepting Physician: _____ Receiving Facility: _____

****

Instructions: Part A (Drug Report), Part B (Device Report) and Part C (Ventilator Settings) shall be completed as indicated, signed by the sending facility, and attached to the EMS ePCR once transport is complete.

****

DIAGNOSIS: **(1)**_____

(2)_____

(3)_____

LAST VITAL SIGNS: Time: _____ Initials: _____

HR: _____ B/P: _____/_____ RR: _____

SpO2:_____ BGL: _____ Other: _____

IV Fluids: _____ Rate: _____

Medications: _____

Dosage / Rate/Concentration:_____

Comments/Additional Orders: _____

IV Fluids:_____ Rate: _____

Medications:_____

Dosage / Rate/Concentration:_____

Comments/Additional Orders: _____

IV Fluids:_____ Rate: _____

Medications:_____

Dosage / Rate/Concentration: _____

Comments/Additional Orders: _____

PLEASE CHECK THE INTERFACILITY DEVICES BEING USED IN THIS TRANSPORT ON DEVICE REPORT, PART B AND VENTILATOR SETTINGS, PART C.

This report was given by (**Print name**):_____RN / PA / NP / MD / DO

Signature: _____ Date: _____ Time: _____

(None of the drugs being sent with this patient are part of an experimental program.)

This report was accepted by (**EMT-P signature**):_____ Date:_____

EMS Service must retain a copy of this form for their records.

If any problems are experienced en route, the EMT-P must contact on-line medical control.

Original Copy: Sending Facility Copy 2: Accepting Facility Copy 3: Transport agency

DHEC 3485 (02/2018) SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Interfacility Transport Form

Table of Contents

PART B - DEVICE REPORT

Electronic EMS Patient Care Record #: _____

Patient Name: _____ DOB: _____
LAST FIRST M MM/DD/YYYY

Referring Physician: _____ Transferring Facility: _____

Accepting Physician: _____ Receiving Facility: _____

****

Instructions: Part A (Drug Report), Part B (Device Report) and Part C (Ventilator Settings) shall be completed as indicated, signed by the sending facility, and attached to the EMS ePCR once transport is complete

****

INTERFACILITY INVASIVE/IMPLANTED DEVICES USED IN THIS TRANSPORT

Check all devices being used: ☐ **Not Applicable**

- ☐ Automatic Internal Cardiac Defibrillator (AICD)
- ☐ Arterial Lines, Arterial Sheathes
- ☐ Tube Thoracostomy/Chest Tube
- ☐ Percutaneously Placed Central Venous Catheters (does not include Swan-Ganz catheters)
- ☐ Peritoneal Dialysis Catheters
- ☐ Epidural Catheters
- ☐ Urethral/Suprapubic Catheter
- ☐ Implantable Central Venous Catheters
- ☐ Nasogastric/Orogastric Tubes
- ☐ Surgically Placed Gastrointestinal Tubes
- ☐ Percutaneous Drainage Tubes
- ☐ Completely Implantable Venous Access Port
- ☐ Surgical Drains

Comments/Additional Orders:

This report was given by (print name): _____ RN / PA / NP / MD/ DO

Signature: _____ Date : _____ Time: _____

This report was accepted by (EMT-Paramedic) Signature: _____ Date: _____ Time: _____

Original Copy: Sending Facility Copy 2: Accepting Facility Copy 3: Transport agency

DHEC 3485 (02/2018) SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

PART C – VENTILATOR SETTINGS

Electronic EMS Patient Care Record #:_____

Patient Name: _____DOB:_____
LAST FIRST MI MM/DD/YYYY

Referring Physician: _____Transferring Facility:_____

Accepting Physician:_____ Receiving Facility:_____

****

Instructions: Part A (Drug Report), Part B (Device Report) and Part C (Ventilator Settings) shall be completed as indicated, signed by the sending facility, and attached to the EMS ePCR once transport is complete.

****

If a ventilator is used during interfacility transport the following information MUST be reported to the receiving Paramedic and attested to by the RT / NP / PA / MD / DO turning over the patient.:

Facility Settings: to be filled out by RT/NP/PA/MD/DO

Mode (check one): ☐AC ☐SIMV ☐PSV

☐PRVC ☐BiPAP ☐Other:_____

Patient Sedated: ☐No ☐Induction ☐Maintenance

Patient Paralyzed: ☐No ☐Induction ☐Maintenance

ET Tube Size: _____ Depth: _____ @ Teeth/Lip

Respiratory Set Rate: _____ Actual Rate: _____

Tidal Volume (VT): _____

Fraction of Inspired Oxygen (FiO2): _____

Insp. Press/PS: _____ PEEP: _____

I:E ratio:_____ PIP: _____

SpO2: _____ ETCO2: _____

Additional Orders/ Comments:

Initial Transport Settings: to be filled out by EMS Provider

Mode (check one): ☐AC ☐SIMV ☐PSV

☐PRVC ☐BiPAP ☐Other:_____

Patient Sedated: ☐No ☐Induction ☐Maintenance

Patient Paralyzed: ☐No ☐Induction ☐Maintenance

ET Tube Size: _____ Depth: _____ @ Teeth/Lip

Respiratory Set Rate: _____ Actual Rate: _____

Tidal Volume (VT): _____

Fraction of Inspired Oxygen (FiO2): _____

Insp. Press/PS: _____ PEEP: _____

I:E ratio:_____ PIP: _____

SpO2: _____ ETCO2: _____

Our equipment is able to meet the above settings and I attest to my competency to operate this equipment during transport

_____
Paramedic Signature Date Time

This report was given by (print name): _____ RN / PA / NP / MD/ DO

Signature: _____ Date : _____ Time: _____

This report was accepted by (EMT-Paramedic) Signature: _____ Date: _____ Time: _____

Original Copy: Sending Facility Copy 2: Accepting Facility Copy 3: Transport agency

DHEC 3485 (02/2018) SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

HORRY COUNTY FIRE RESCUE

(843) 915 5190

CONTROLLED SUBSTANCE ADMINISTRATION FORM

DATE: _____ MEDIC UNIT: _____

CAD #: _____ RECEIVING HOSPITAL: _____

PATIENT NAME: _____

PATIENT ADDRESS: _____

(NEEDS TO MATCH PCR) _____

DRUG ADMINISTERED: _____

(CIRCLE ONE)

CONCENTRATION OF DRUG: _____ mg / mcg _____ ml

AMOUNT ADMINISTERED: _____ mg / mcg _____ ml

AMOUNT WASTED: _____ mg / mcg _____ ml

DOE, JANE
DOB: 1/1/1900 115 F
DOS: 1/1/16
ACCT#: F01234567

AFFIX HOSPITAL LABEL HERE

WASTE WITNESSED BY: _____ (PRINT) (NURSE OR PHYSICIAN ONLY)

WASTE WITNESS SIGNATURE: _____

ADMINISTERING PARAMEDIC NAME: _____ (PRINT)

ADMINISTERING PARAMEDIC SIGNATURE: _____

NAME OF ORDERING / ACCEPTING PHYSICIAN: _____ (PRINT)

SIGNATURE OF ORDERING / ACCEPTING PHYSICIAN: _____

OTHER THAN SIGNATURES, ALL INFORMATION MUST BE PRINTED

☐ ON-LINE CONTROLLED SUBSTANCE FORM SUBMITTED

☐ FAX COMPLETED FORM TO 843 248 1695

OFFICE USE ONLY :

HCFR QA DONE: _____ # _____

MED CONTROL QA: _____

REPLACEMENT BY: _____

ON-LINE CS FORM QR

CONTROLLED SUBSTANCE ADMINISTRATION CHECKSHEET

When a controlled substance is administered the following steps must take place.

☐ Waste any unused drug in witness of a nurse or physician.

☐ Entered the witnesses name on the CS form and obtain their signature

☐ Complete the CS form in its entirety, with all required signatures in place.
If the patient's demographics are not available, then the crew is required to affix the hospital identification label to the form in the box provided. It is acceptable to affix the label for all Patients.

☐ Complete the PCR as soon as possible. Must be completed before the end of your shift.

☐ Obtain the ordering/accepting physician's signature on the CS form with the name clearly printed. Signature and name are required regardless if the drug was given by Protocol or by OLMC.

☐ Fax the completed CS form to the Supervisor of Materials Management at 843-248-1695 **prior** to leaving the ER.

☐ Immediately place the completed CS form the ambulance lock box.

☐ Ensure that the CAD number for this call is noted on the comment column of the daily log form that particular drug.

☐ Complete the on-line CS usage form on line immediately upon returning to your station.

https://horryfirerescue.wufoo.com/forms/wdwfuk0squlft/

☐ Notify the Supervisor of Materials Management (business hours) or your Battalion Chief (after hours only) if you are now below critical levels on any controlled substance.

☐ If a drug is prepared for usage (i.e., seal broken) and the no drug is given, then the entire amount must be wasted in witness of a nurse or doctor and all other steps must be completed as normal, including a physician's signature. Make sure you note the reason for this issue in your PCR.

Supervisor of Materials Management 843-455-1683
Battalion 1 843-915-7284
Battalion 2 843-915-7294
Battalion 3 843-915-7295

Controlled Drug Policy SOP 711
<10-14>

RSI Time Out Sheet

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RSI Time Out

Indications — **PATINETS WEIGHT IN KG :**

- ☐ Patient requires immediate airway control and has an intact gag reflex
- ☐ Age greater than 12 or > 55kg
- ☐ 2 Paramedics are present

Procedure

- ☐ Oxygenate the patient via NC @ 15lpm for spontaneous respiration or BVM for apnea. (Goal is > 95% SpO2)
- ☐ Complete an airway exam and collect an airway history
- ☐ Intubation appears possible
- ☐ Bougie is easily accessible and ready for use
- ☐ Suction is ready for use
- ☐ Appropriately sized i-gel easily accessible

Prepare Medications

	Etomidate 0.3mg/kg	**OR** **Ketamine 1.5-2mg/kg**

- ☐ Etomidate or Ketamine- drawn up, labeled

	Succinylcholine 1.5mg/kg - MAX 150 mg (7.5 cc)	**OR** **Rocuronium 1mg/kg**

- ☐ Succinylcholine - drawn up and labeled
- ☐ **All medications verified by another Paramedic**

******Reevaluate the patient**** is RSI necessary ???**

Conduct RSI

- ☐ Administer **Etomidate OR Ketamine**
- ☐ Administer **Succinylcholine OR Rocuronium**
- ☐ Ensure chemical paralysis (30-60 sec) ➡ Intubate
- ☐ If unsuccessful after 2-3 attempts - place i-gel

ETT/i-gel verified by

- ☐ Auscultation of lung sounds and negative epigastric sounds
- ☐ Capnography - waveform must be present

Post intubation and confirmation

Administer Versed 2-4mg (max of 10mg) / Fentanyl 2mcg/kg (max 200mcg)
OR
Ketamine 1.5-2mg/kg

- ☐ If awakening/moving after adequate sedation Consider **Rocuronium 1mg/kg - May Repeat as necessary**
- ☐ **Rocuronium** - drawn up, labeled, and verified by a second Paramedic
- ☐ Administer **Rocuronium**
- ☐ **Reassess**

Call Medical Control. Consider Rx for pain management

AFFIX PATIENT LABEL HERE

Sepsis Drop Sheet

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EMS EVALUATION AND TREATMENT OF SEPSIS – TOOL

Date:	EMS Arrival Time:	Unit #:
Lead Medic:	Culture Drawn by:	

Evaluation for Sepsis:

1. Are any two of the following symptoms present AND new to the patient?
   - ☐ Hyperthermia (> 100.4 ^{o} F or 38 ^{o} C) or Hypothermia (< 95^{o} F or 35 ^{o} C)
   - ☐ Heart Rate > 90 beats per minute
   - ☐ Respiratory Rate > 20 breaths per minute OR Mechanical Ventilation
   - ☐ Signs of poor perfusion (such as SBP < 90 mmHg)
2. **Is the patient's presentation suggestive of any of the following infections?**
   - ☐ Pneumonia (cough/thick sputum)
   - ☐ Urinary Tract Infection
   - ☐ Acutely AMS / change
   - ☐ Blood stream / Catheter related
   - ☐ Abdominal pain and/or diarrhea
   - ☐ Wound Infection
   - ☐ Skin / Soft Tissue Infection

Glucose
Result: mg/dL
Normal Range 80 – 120 mg/dL
Temperature
Result:

If positive for sepsis, call a **SEPSIS ALERT** and follow the directions on the below:

TREATMENT FOR SEPSIS

Confirm NO PENICILLIN ALLERGY. If PENICILLIN ALLERGY DO NOT ADMINISTER ANTIBIOTICS

Draw Blood Culture (8cc – 10cc of blood in each vial) Time Drawn: _____

- Prepare a 2 inch site area with ChloraPrep and allow to dry
- Disinfect the top of each culture bottle with alcohol and allow to dry
- Inoculate the aerobic (Blue Cap) bottle first and then the anaerobic (Purple Cap) bottle
- Minimum of 3 cc of blood in aerobic bottle is required to proceed with antibiotic therapy
- If unable to draw cultures **DO NOT ADMINISTER ANTIBIOTICS**

Draw point of care lactate (only good for 30 minutes)	Time Drawn:	
Begin fluid resuscitation:	Total Given:	
Presumed sepsis antibiotic selection:	Antibiotic:	
Antibiotic	Dose:	
Antibiotic Time Initiated	Time **Initiated**	

TXA ADMINISTRATION GUIDELINES

Date _____ Call # _____

Patient Name _____

ALL of the following criteria must be met for TXA administration:

- ☐ Age ≥ 18 years
- ☐ Traumatic mechanism
- ☐ Life-threatening hemorrhage
- ☐ Unresponsive to standard treatment

AND the addition of one or more of the following:

- ☐ SBP < 90 mmHg
- ☐ HR > 120 bpm (sustained)
- ☐ Bleeding not controlled with other measures
- ☐ Major amputation proximal to wrist or ankle
- ☐ Significant estimated blood loss of > 500 ml

The following are EXCLUSION criteria.
For ANY YES ANSWER – WITHHOLD TXA ADMINISTRATION.

Yes	No	
☐	☐	Time of injury with duration > 3 hours
☐	☐	Traumatic arrest duration > 5 minutes
☐	☐	Active thromboembolic event in last 24 hours
☐	☐	Known allergy or hypersensitivity to TXA
☐	☐	Penetrating cranial injury
☐	☐	Blunt TBI with exposed brain matter
☐	☐	Isolated hanging or drowning victims
☐	☐	Cervical cord injury with motor deficits

Time of Administration:_____

Horry County Fire Rescue
Approved Skills by Certification Level

The following checklist provides the approved Skills / Scope of practice for all levels of certification within South Carolina as deemed appropriate by Horry County Fire Rescue Medical Director.

Skill - Airway/Ventilation/ Oxygenation	EMT	AEMT	PARAMEDIC	RSI Medics
Airway – supraglottic (BIAD)	X	X	X	X
Airway – nasal	X	X	X	X
Airway – oral	X	X	X	X
Bag-valve-mask (BVM)	X	X	X	X
BiPAP/CPAP	X	X	X	X
Chest decompression - needle			X	X
Chest tube – monitoring and management			X	X
Cricoid pressure (Sellick's Maneuver)	X	X	X	X
Cricothyrotomy – needle				X
Cricothyrotomy – percutaneous				X
End tidal CO2 monitoring/capnography	X	X	X	X
Head tilt - chin lift	X	X	X	X
Intubation – nasotracheal			X	X
Intubation - orotracheal			X	X
Jaw-thrust	X	X	X	X
Jaw-thrust - Modified (trauma)	X	X	X	X
Obstruction – direct laryngoscopy			X	X
Obstruction – Manual	X	X	X	X
Oxygen therapy – Humidifiers	X	X	X	X
Oxygen therapy – Nasal cannula	X	X	X	X
Oxygen therapy – Non- rebreather mask	X	X	X	X
Oxygen therapy – partial rebreather mask	X	X	X	X
Oxygen therapy – simple face mask	X	X	X	X
Oxygen therapy – Venturi mask	X	X	X	X
Pulse oximetry	X	X	X	X
Suctioning – Upper airway	X	X	X	X
Suctioning – tracheobronchial		X	X	X

Horry County Fire Rescue
Approved Skills by Certification Level

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Skill – Advanced Airway/Ventilation/ Oxygenation	EMT	AEMT	PARAMEDIC	RSI Medic
Ventilator – Automated Analog or Digital Transport (AATV / ADTV) BiAD or Stoma with no other interventions				X
Ventilator – Automated Digital Transport (ADTV) Endotracheal tube				X
Trachea tube replacement / change			X	X
Skill- Cardiovascular/Circulation	**EMT**	**AEMT**	**PARAMEDIC**	
Cardiac monitoring – (Any Interpretive)			X	
12-lead placement, capture and transmission only	X	X	X	
Cardiopulmonary resuscitation (CPR)	X	X	X	
Cardioversion – electrical			X	
Defibrillation – automated / semi- automated	X	X	X	
Hemorrhage control – direct pressure	X	X	X	
Hemorrhage control – tourniquet	X	X	X	
Hemorrhage control – wound pack	X	X	X	
Internal; cardiac pacing – monitoring only			X	
Mechanical CPR device	X	X	X	
Transcutaneous pacing - manual			X	
Accepted Vagal Man.			X	
Skill-Immobilization	**EMT**	**AEMT**	**PARAMEDIC**	
Spinal motion restriction – cervical	X	X	X	
Spinal immobilization – long board	X	X	X	
Spinal immobilization – manual	X	X	X	
Spinal immobilization – seated patient (KED, etc)	X	X	X	
Spinal immobilization – rapid manual extrication	X	X	X	
Extremity stabilization - manual	X	X	X	
Extremity splinting	X	X	X	
Splint – traction	X	X	X	
Mechanical patient restraint	X	X	X	
Emergency moves for endangered patients	X	X	X	

Horry County Fire Rescue
Approved Skills by Certification Level

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Skill-Medication Administration Routes	EMT	AEMT	PARAMEDIC
Aerosolized/nebulized (beta agonist)	X	X	X
Buccal	X	X	X
Endotracheal tube		X	X
Inhaled – self-administered (nitrous oxide)		X	X
Intranasal / auto-injector(naloxone)	X	X	X
Intravenous push (dextrose solutions)		X	X
Intravenous piggyback			X
Oral (glucose)	X	X	X
Oral (aspirin)	X	X	X
Oral (Acetaminophen)	X	X	X
Rectal			X
Sublingual (nitroglycerin)	X	X	X
ChemBio Auto-injector (self or peer care)	X	X	X
Intramuscular Epinephrine Kit	X	X	X
Auto-injector (patient's own prescribed meds)	X	X	X
Epi-pen Administration (for anaphylaxis only)	X	X	X
Transdermal Med Admin.			X
Opthalmic Med Admin.			X
IV/Intraosseous Meds		X	X
Skill - – IV Initiation/Maintenance Fluids	**EMT**	**AEMT**	**PARAMEDIC**
Access indwelling percutaneous catheters			X
Central line – monitoring			X
Intraosseous – initiation		X	X
Intravenous access		X	X
Intravenous initiation - peripheral		X	X
Utilize CURRENTLY accessed implanted central IV ports		X	X
Intravenous – maintenance of non-medicated IV fluids (Preexisting)	X	X	X
Intravenous – maintenance of medicated IV fluids			X
Maintenance of Blood Products (Initiation NOT authorized)			X

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Skill - Miscellaneous	EMT	AEMT	PARAMEDIC
Assisted delivery (childbirth)	X	X	X
Blood glucose monitoring	X	X	X
Blood pressure automated	X	X	X
Blood pressure – manual	X	X	X
Eye irrigation	X	X	X
Eye irrigation – Morgan® lens			X
Thrombolytic therapy – initiation			X
Thrombolytic therapy – monitoring			X
Urinary catheterization			X
Venous blood sampling		X	X
Blood chemistry analysis	X	X	X

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1) EMT Basic

- Aspirin may be administered by Standing Orders*
- Oral Glucose may be administered by Standing Orders*
- Anaphylaxis Epi KIts may be administered by Standing Orders for anaphylaxis only*
- Beta-Agonist may be administered by standing order, single treatment only, multiple treatments require online medical control**
- Nitroglycerin (sublingual) may be administered by Standing Orders*
- Ibuprofen may be administered by Standing Orders*
- Acetaminophen may be administered by Standing Orders*
- Naloxone (nasal or auto-injector) may be administered by Standing Orders*
- Diphenhydramine (oral) may be administered by Standing Orders*
- Afrin Nasal Spray may be administered by Standing Orders*

3) Advanced EMT

- All drugs as stated under EMT Basic
- Dextrose solutions may be administered by Standing Orders*
- Nitrous Oxide may be administered by Standing Orders*
- Naloxone (any route) may be administered by Standing Orders*
- Glucagon (IM) may be administered by Standing Orders*
- Nebulized Beta-Agonist, Nitrous Oxide, and Glucagon may be administered by Standing Orders*
- May assist in the administration of non-controlled medications with onsite, direct supervision of a Paramedic.

4) Paramedic

- All drugs as approved in the SC Pre-hospital Drug Formulary with the exception of the RSI medication represented within the Horry County Fire Rescue Clinical Operating Guidelines.

Horry County Fire Rescue
Approved Skills by Certification Level

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~ Agency must have protocols indicating approval and maintain record of local training and medical control endorsement. Protocols shall dictate indications, dosages, and routes as approved by agencies Medical Control Physician.

~ All levels of practice (EMT – Paramedic) must have documented training for any equipment they, or may reasonably be expected to use. You as a practitioner are expected to be well trained and proficient in the use of any equipment you utilize in the course of patient care.

~ This approved skills list is to be used a reference only. Pursuant to Regulation 61-7, Section 901(B) EMTs (EMT, AEMT, or Paramedic) shall only engage in those practices for which they have been trained and are within the scope of Horry County Fire Rescue. Students currently enrolled in a Department-approved EMT, AEMT, or Paramedic program under the supervision of an appropriately credentialed preceptor may practice advanced skills for which they have been authorized in their respective training program.

~ It is a Class One violation to deviate from this approved skills list and may be punishable up to and including revocation of the individuals EMT credential.

Reviewed by:
Fire Chief
Joeseph Tanner

Approved by:
Medical Director
Dr. Michael Kozlowski D.O., PA-C

Statement of Purpose:

An Advanced Emergency Medical Technician (AEMT) is a prehospital health professional who's focus is to respond to, assess, triage, manage, and safely transport patients utilizing learned advanced knowledge; therefore, the purpose of this Pilot Program and Scope of Practice increase is to enhance the ability and capability of currently and future credentialed AEMTs in the State of South Carolina by broadening the EMS scope of practice to better serve those who call upon them.

Perceived Need:

With an increased number of calls for service taxing many EMS Systems and a critical need for advanced care in the prehospital setting, expanding the AEMT scope of practice will enhance the care and treatment offered prior to the arrival of a Paramedic (If Needed).

The percentage of providers seeking and obtaining initial credentialing at the AEMT level has increased each year over the last five years.

Having an increased scope of practice would further increase interest in the AEMT program for those perspective students not quite ready to commit to a Paramedic Program.

Expected Benefit:

Currently, the AEMT scope of practice limits credentialed providers' ability to offer much needed advanced care statewide. With a broadened Scope of Practice and an ability to properly administer the medications found within this proposal, a credentialed AEMT provider will have an ability to better serve the public.

In geographical areas where there is little to no Paramedic availability, an AEMT may be the next highest level of care available prior to arriving at a receiving facility.

Formulary

For the duration of one year beginning on April 1, 2024 and ending on March 31, 2025, all trained and approved Advanced EMTs in Horry County Fire Rescue, under the direct supervision of the Horry County Fire Rescue Physician Medical Director, Dr. Mike Kozlowski are permitted to use the following drugs as outlined in the Clinical Operating Guidelines:

- Ipratropium (Atrovent)
- Diphenhydramine (Benadryl)
- Epinephrine 1:10,000 (1st dose in cardiac arrest)
- Methylprednisolone (Solumedrol)
- Ketorolac (Toradol)
- Ondansetron (Zofran)
- Cefepime
- Ceftriaxone (Rocephin)

ALL MEDICATION INDIACATED FOR AEMT USE IN THIS PILOT ARE HIGHLIGHTED AS ABOVE

Atrovent (Ipratropium Bromide)

Indications:

Bronchospasm, COPD

Administration:

Nebulized

Adult Dose:

500mcg

Therapeutic Effects:

Inhibits ACTH receptor sites on Bronchial Smooth Muscle.

Contraindications:

Hypersensitivity to Atrovent and or atropine and their derivatives.

Side Effects:

Tachycardia, Palpitations, Eye Pain, Urinary Retention, UTI, Urticaria, Bronchitis

Benadryl (Diphenhydramine)

Indication:

Anaphylaxis, Moderate to severe allergic reactions

Administration:

IV/IO/IM

Adult Dose:

25-50mg slow push

Pediatric Dose:

1mg/kg, slow push with a max of 15mg

Therapeutic Effect:

Inhibits histamine release and effects, mild sedative, inhibits motion sickness

Contraindications:

Hypersensitivity, newborns, and nursing mothers

Side Effects:

Hypotension, nausea/vomiting, tachycardia, bradycardia, sedation, palpitations, drowsiness, disturbed coordination, dry mouth

Cefepime

Indications:

Sepsis (Blood Stream/PICC, wounds, skin)

Adult:

2g in 50 mL over 10 minutes

Pediatric:

Not Indicated

Therapeutic Effect:

Semi-synthetic, broad-spectrum cephalosporin antibiotic that is active against both Gram-Positive and Gram-Negative bacteria

Contraindications:

Hypersensitivity to the drug, allergy to any 'cillin' medication (Contact On-Line Medical Control)

Side Effects:

Allergic reaction, stomach cramps, irregular heartbeats, muscle cramps, nausea, and vomiting

Epinephrine (Adrenaline)

Indication:

Anaphylaxis, Cardiac Arrest

Administration:

IV, IO, IM, Nebulized

Adult Dose:

• 1:1,000 – 0.3mg, may repeat every 15 minutes as need with a max total dose of 1.0mg

• 1:10,000 – 1mg (first dose only)

Pediatric Dose:

• 1:1,000 – 0.15mg

• 1:10,000 – 0.01mg/kg (first dose only)

Therapeutic Effect:

Positive inotropic, dromotropic, and chronotropic effects as well as increased systemic vascular resistance and BP

Contraindication:

There is none in an emergent situation

Side Effect:

Palpitations, Hypertension, dysrhythmias, anxiety, tremors

Rocephin (Ceftriaxone)

Indications:

Sepsis (Pneumonia, urinary tract infection, altered mental status, and abdominal signs (diarrhea & vomiting)

Adult:

2g in 50 mL over 10 minutes

Pediatric:

Not Indicated

Therapeutic Effect:

Semi-synthetic, broad-spectrum cephalosporin antibiotic that is a bactericidal agent that acts by inhibition of bacterial cell wall synthesis

Contraindications:

Hypersensitivity to the drug, allergy to any 'cillin' medication (Contact On-Line Medical Control)

Side Effects:

Allergic reaction, stomach cramps, irregular heartbeats, muscle cramps, nausea, and vomiting

Solumedrol (Methylprednisolone)

Indications:

Anaphylaxis, COPD exacerbation

Administration:

IV

Adult:

125mg Slow

Pediatric:

Anaphylaxis - 2mg/kg max total dose 125mg

Asthma Induced wheezing - 2mg/kg max dose 60mg

Therapeutic Effect:

Decreases inflammation, mainly by stabilizing leukocyte lysosomal membranes, suppresses immune response, Influences protein, fat, carbohydrate metabolism.

Contraindications:

Hypersensitivity to the drug, systemic fungal infection, premature infants, patients receiving immunosuppressive doses together with live virus vaccines.

Side Effects:

Headache, hypertension, sodium and water retention, hypokalemia, alkalosis.

Toradol (Ketorolac)

Indications:

Moderate to severe acute pain

Administration:

IV, IO, IM

Adult Dose:

• IM – 30mg

Pediatric Dose:

Not indicated

Therapeutic Effect:

Reversibly blocks the action of cyclooxygenase, which in turn prevents the formation of prostaglandins. Ketorolac causes analgesia equivalent to that of morphine sulfate

Contraindications:

NSAID allergy, ASA sensitive asthma, known peptic ulcer disease, recent GI Bleed, renal failure, confirmed cerebrovascular bleeding, recent CABG, pregnancy

Side Effects:

GI bleeding, inhibition of platelet aggregation, acute renal failure, Nausea/Vomiting, diarrhea, upset stomach

Zofran (Ondansetron)

Indications:

Abdominal pain, nausea/vomiting/diarrhea, chest pain (Cardiac and STEMI), pain control (Pediatric), epistaxis

Administration:

IV, IM, IO

Adult Dose:

4mg

Pediatric Dose:

0.15mg/kg with a max dose of 4mg

Therapeutic Effects:

Prevents nausea and vomiting

Contraindications:

Hypersensitivity to the drug

Side Effects:

N/A