



EMERGENCY MEDICAL PROTOCOLS

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MEDICAL DIRECTOR APPROVAL

These protocols are approved by the Alachua County Fire Rescue Medical Director and are effective as of May 1st, 2017.

A handwritten signature in black ink, reading "Jason Jones" with "M.D." written below it.

Jason M. Jones, M.D.



24.1 – STANDARDS OF CARE PROTOCOL

24.1.1 - STANDARD OF CARE

GENERAL CONSIDERATIONS

All patients are to be treated with respect.

An individual becomes a patient when presenting with a chief complaint, evidence of a medical condition or injury, or upon discovery of vital signs outside the normal values.

Consultation with an OLMCP (online medical control physician) prior to initiation of non-life threatening therapeutic modalities outside the context of these protocols remains the standard. The sole exception is life-saving care, defined as any or all measures which have the purpose of immediate preservation of life and/or the establishment of means by which life might be preserved. The medical control physician shall be defined as the emergency department attending physician at UF Health Shands Hospital.

Patient care is unpredictable by nature, and patients may require care derived from multiple protocols, or in the absence of these, online medical control. The following protocols are written with this reality in mind. Deviations from protocol will be tolerated only when intended to further patient care. Such deviations must in no way detract from the high level of patient care expected from Alachua County's pre-hospital care providers.

All patients transported will be secured to the stretcher with three (3) straps, one of which must be the torso/waist restraint.

The CAB's (Circulation, Airway, Breathing) will always take priority in patient management. Maneuvers required to establish adequate tissue perfusion, secure the airway, and ensure adequate gas exchange should always supersede specific protocol statements.

The patient's condition will mandate how often vital signs are obtained:

- For a CRITICAL patient, every 5 minutes
- For a NON-CRITICAL patient, every 10 minutes
- If transport is greater than one hour, every 15 minutes

Two sets of vital signs shall be obtained on all transported patients. Temperatures are required on the following: abdominal pain, altered mental status, apparent life threatening event, heat illness, hypertension, hypothermia, overdose and poison ingestion, sepsis, STEMI, and stroke.

Orders communicated directly from OLMCP to the paramedics caring for the patient may supersede established protocols, and should be reflected in the run report with the doctor's name included.

The Company Officer of each unit is responsible for the completion of a patient care report on every patient contact, regardless of treatment administered. Paramedics will complete ALS reports and EMTs may complete BLS reports at the discretion of the Company Officer, who is responsible for the report and its content.

Complications, problems, or requests for additional orders during treatment will be directed to the OLMCP. Additional questions or problems should be directed to the Medical Director after the incident

24.1.2 - RADIO REPORT

GENERAL CONSIDERATIONS

Include the following information when calling in radio report to the appropriate facility and/or online medical control physician:

- Unit ID number
- Patient's age and gender
- Patient's chief complaint and time of onset
- Brief history relevant to the chief complaint / illness, medications used, allergies
- Vital signs (as appropriate for circumstances)
- Mechanism of injury for trauma patients
- General appearance, including GCS
- Pertinent physical findings
- Treatment rendered and response to treatment
- Request for orders needed and confirmation of any orders given
- Estimated time of arrival (ETA)

Information about the arriving patient is to be relayed to the receiving facility in a timely manner.

If the transporting paramedic is occupied treating the patient, an abbreviated report may be given by the paramedic or driver to the facility and/or CCC (Combined Communications Center) to relay to the facility.

Include at least the following:

- Estimated time of arrival, ETA
- Chief complaint
- Age and gender of patient

No contact made with receiving facility via radio:

- If the receiving facility cannot be reached, relay a brief report to the CCC to relay to the receiving facility

Online medical control physician calls:

- For online medical control or to request orders: contact CCC, ask them to connect you with online medical control. This can be done by calling **352-955-1818** or contacting CCC by radio.
 - If calling by phone, request the conversation to be on a recorded line
 - Document in your report the name of the physician, time, and orders given
- Start your request with the reason for calling, followed by a full report as detailed above
 - **Example:** *"This is Rescue 10 calling to request additional Fentanyl orders. The patient is a 60 year old male with concerns of a right hip deformity after a fall. He has received 100 mcg of Fentanyl but reports that his pain is 10/10. His vital signs are..."*

24.1.3 - INITIATION OF CPR / TERMINATION OF RESUSCITATION

INFORMATION

CPR will be initiated for adults, children, or infants when a patient is found to be:

- Unresponsive
- Pulseless
- Apneic (except agonal respirations)

AND

- Does NOT meet the requirements for Determination of Death (See [24.1.4 - Determination of Death](#))
- Does NOT have in his or her possession / at the bedside a completed, legal, yellow State of Florida Do Not Resuscitate Order (DNR) (HRS Form 1896)

CPR may be terminated when:

- A patient has in his or her possession (or at the bedside) a completed, legal, yellow State of Florida Do Not Resuscitate Order (DNR) (HRS Form 1896)
 - If there is any doubt to the validity of the DNR form, initiate or continue CPR and contact OLMCP
- Spontaneous circulation has been restored (return of spontaneous circulation, ROSC) and effective spontaneous or assisted ventilations are achieved, per current AHA guidelines
- Resuscitation efforts have been transferred to person(s) of no less skill than the initial providers
- Rescuers are exhausted and physically unable to continue resuscitation
- Patient meets requirements for Determination of Death protocol (See [24.1.4 - Determination of Death](#))
- The online medical control physician (OLMCP) advises termination of resuscitation

Additionally, the paramedic may terminate resuscitative efforts for cardiac arrest — without contacting OLMCP — if ALL of the following criteria exist:

- The patient is 18 years or older
- EMS has provided > 20 minutes of CPR
- Initial rhythm is Asystole or PEA, confirmed in two leads on a printed rhythm strip
- Rhythm remains in Asystole or PEA throughout resuscitative efforts (no VFib or VTach)
- No return of spontaneous circulation (ROSC)
- No defibrillation is performed
- Arrest was not witnessed by EMS
- Secure airway is confirmed by digital waveform capnography (ETT, I-Gel, or King LT)
- Quantitative end-tidal CO₂ (ETCO₂) value is < 10 mmHg despite effective CPR

For all other cardiac arrests, the OLMCP must provide authorization prior to termination of resuscitation.

Do not terminate resuscitation efforts if transport has been initiated.

SPECIAL CONSIDERATIONS

Key determinants of survival:

- High-quality chest compressions with minimal interruptions
- Earliest possible defibrillation of VF or VT
- Reduce time between CPR pause, defibrillation, and CPR start
 - When possible, continue CPR while charging defibrillator
- Avoid hyperventilation (only 8 to 10 breaths / min)
- Identify and treat reversible causes (H's and T's)

When to consider a request for termination of resuscitation:

- Use the team leader's best clinical judgment, in consultation with other team members
- Always maintain initial resuscitation efforts until adequate information is available
- Based on outcomes research, our general approach is to consider termination of CPR after 20 minutes of EMS resuscitation if there is no ROSC or viable cardiac rhythm, and no reversible factors are present

Critical information for the OLMCP and your report:

- Witnessed arrest?
- Was bystander CPR performed?
- Initial rhythm? (VF, VT, PEA, asystole)
- Subsequent rhythms?
- Number of shocks?
- Intubated?
- Any other measures? (ACLS meds, H's & T's considered and addressed)
- Time since arrest?
- Time to first defibrillation?
- Total CPR time?
- Time to ROSC?

Important principles in cardiac arrest:

- Initiate CPR immediately to ensure the best possible prognosis
- Waveform capnography (ETCO₂) is required on every patient with an ETT, I-Gel, or King LT in place
- When asystole is seen on the cardiac monitor, verification of the rhythm shall include a printed rhythm strip as well as interpretation of the rhythm in more than one lead
 - Low amplitude VF or PEA may be difficult to distinguish from asystole when using only the cardiac monitor display for interpretation
- Patients in a hypothermic environment may respond to resuscitation measures for a longer period of time. Hypothermic patients should be resuscitated until normal body temperature is achieved.
- Advanced age is not an independent predictor of survival

Note: The Paramedic may continue resuscitation efforts even if Termination of Resuscitation criteria are met if scene safety, location, patient's age, time of arrest, or bystander input compels this decision.

In the case of extenuating circumstances, contact Medical Control for direction.

24.1.4 - DETERMINATION OF DEATH

ALS

The EMS team does not pronounce death; rather, it is determined to exist.

If CPR has been initiated but ALL of the components below have been confirmed, CPR may be discontinued. Contact Medical Control as needed.

Death is **DETERMINED** to be present if **ALL** of the following exist:

- Non-responsive — Does not respond to any external stimulus; pupils are non-reactive
- Pulseless — No palpable arterial pulses; evaluate for 30 seconds
- Apneic — Absence of respirations confirmed by looking, listening, and feeling for 30 seconds
- Absence of electrical activity on the cardiac monitor in two leads or more — confirmed by printing a rhythm strip and looking for at least 30 seconds

AND

ONE of the following must be present to determine that death has occurred:

- **Dependent lividity** — diffuse purple-red discoloration of gravity-dependent areas, occurring hours after death, from blood pooling in areas of the body lower than the heart
- **Rigor mortis** — rigid stiffening of the muscles
- **Decapitation** — separation of the head from the body
- **Incineration** — to burn or reduce to ashes
- **Decomposition** of body tissue

When in doubt, resuscitate and transport.

These criteria do not apply in a mass-casualty incident (MCI).

If death has been determined to exist:

- Contact CCC and request that LEA (appropriate Law Enforcement Agency) be contacted and requested
- The body will not be left unattended until LEA is present
- Treat the area as a crime scene. Nothing in and around the immediate area should be disturbed.

SPECIAL CONSIDERATIONS

- Patients in a hypothermic environment may respond to resuscitation measures for a longer period of time. Hypothermic patients should be resuscitated until normal body temperature is achieved.

24.1.5 - SUSPECTED CHILD / ELDER ABUSE

INFORMATION

- Assess the scene closely, make mental notes, and document thoroughly
- Upon arrival at the Emergency Department (ED), a verbal report summarizing your findings should be given to the responsible medical personnel. Complete any appropriate paperwork in compliance with organizational and administrative procedures.
- Do NOT delay transport to obtain information
- Do NOT make accusatory, confrontational, angry, or threatening statements to any parties present

Reporting information to the Abuse Hotline:

- Rescue Lieutenant or Paramedic should report information to the Department of Children and Families (DCF) directly, as well as to the hospital staff
- If we can report exactly what we saw at the home, DCF and the hospital can be more accurate in their reports and serve the patient better
- For any non-transported patient, if you have concerns about the possible abuse, it will need to be reported to the appropriate local or state agency (Department of Children and Families or LEA)
 - District Chief or supervisor should also be notified

Florida Department of Children and Families (DCF) Abuse Hotline: 1-800-962-2873

24.1.6 - DETERMINATION OF HOSPITAL DESTINATION

INFORMATION

Patients may choose their destination hospital (when operationally feasible), unless the patient is unstable, meets alert criteria, or is unable to make a destination judgment:

- Transport all **Trauma Alerts** — pediatric and adult — to the South Tower ED at UF Health Shands Hospital (See [24.5.1 – Trauma](#) protocol for criteria)
- Transport all **Alerts** (STEMI, Stroke, Sepsis) to the nearest designated receiving facility for that alert
- Patients whose condition is judged to be **unstable** (high acuity or critical) shall be transported to the closest appropriate hospital-based emergency department
- If the patient is **unable to make a destination judgment**, transport to the ED selected by a responsible party acting on their behalf (e.g. parent or guardian), or the closest appropriate facility

Free Standing Emergency Department (FSED) policy:

Patients exhibiting or complaining of any of the following will be excluded and not considered eligible for transport to a free-standing emergency department (FSED):

- Alerts (Stroke, STEMI, Sepsis, Trauma)
- Cardiac arrest
- Chest pain
- Shortness of breath / hypoxia
- Abdominal pain
- Abnormal vital signs
- Altered mental status or GCS < 15
- Concern for pulseless / ischemic extremity
- Violent patient
- Any patient potentially requiring admission in the paramedic's best judgment (Ex: elderly, weakness, dizziness, dialysis, etc.)

Pregnant patients:

- Pregnant and meeting **Trauma Alert** criteria, transport to the UF Health Shands South Tower ED
- Pregnant and en route to UF Health Shands Hospital:
 - If < 20 weeks gestation, transport to South Tower (Adult ED)
 - If ≥ 20 weeks gestation, transport to North Tower (Pediatric ED):
 - Ask CCC to notify UF Health L&D and Pediatric ED charge nurse of OB patient arrival
 - Security will be available at the Pediatric ED to escort EMS to the patient transport elevators and to the 3rd floor L&D
 - L&D charge nurse will meet with EMS, advise appropriate room number, and assume transfer of care

Pediatric patients:

- Transport the patient to the emergency department of the parent or guardian's choice unless the patient meets Trauma Alert criteria
- If the pediatric patient meets Trauma Alert criteria, transport to the UF Health South Tower

SPECIAL CONSIDERATIONS

- No paramedic is to influence the patient's choice of hospital, nor assume that any hospital cannot offer its usual range of services, thereby preferentially re-routing patients to select facilities
- However, paramedics may educate patients regarding their specific type and acuteness of emergency, and related hospital services available, consistent with recognized local practice

For patients requesting transport from one hospital ED to another due to prolonged wait times:

- You may inform the patient that you will instead assist them back to the present facility if ALL of the following are true:
 - The patient is currently in or within 250 yards of the hospital facility
 - The hospital facility considers them to be a current patient (checked in / registered)
 - The hospital facility can provide the requisite level of care for the patient's complaint
 - You have measured vital signs and performed an appropriate assessment
 - Vital signs are within normal range

24.1.7 - HOSPITAL EMERGENCY DEPARTMENT EMS BYPASS GUIDELINES

INFORMATION

The only complete hospital bypass is a result of:

- Hospital disaster (fire, power failure, HAZMAT incident, flooded ED, etc.), or
- Security lockdown (armed and dangerous subject in the ED)

EMS bypass may only be initiated by authorized ACFR officials (hospital designee request approved by the ACFR Medical Director).

EMS bypass is a courtesy granted by ACFR to provide the emergency department temporary relief from incoming EMS patients. Any hospital on EMS bypass status must notify CCC when the ED has been re-opened.

EMS crews will make every effort to honor the EMS bypass status, except for:

- **Patients whose condition is unstable**, life-threatening, or deteriorating may be taken to the closest appropriate facility, regardless of bypass status. The paramedic attending the patient, not the hospital, is the sole arbiter of the patient's status (stable or unstable).
- **The patient insists on transport to a facility on bypass**, or a responsible party insists it on their behalf
 - Contact medical control as needed for assistance

If two or more receiving facilities request bypass status at the same time, all bypasses will be terminated.

Each facility's administrators will be notified, and the CCC will issue an administrative page to ACFR and the Medical Director. In this event, the hospitals and ACFR will make a joint status decision and notify CCC.

These guidelines apply to patients transported by ACFR units only. Extensions of these guidelines to patients transported by EMS units of other agencies may be permitted.

24.1.8 - REFUSAL OF SERVICE

BACKGROUND

A patient is any individual requesting or in need of medical attention or medical assistance of any kind. An individual becomes a patient when presenting with a chief complaint, evidence of a medical condition or injury, or upon discovery of vital signs outside normal values.

All patients shall be assessed and offered ambulance transport to the nearest appropriate hospital, regardless of the nature of their complaint.

A written run report is required for all patient encounters. The written report must include thorough documentation describing the situation, physical assessment findings, the suspected chief complaint, vital signs, treatment or care rendered, reactions noted, and disposition of the patient, including any instruction given. Consider any traumatic injury or medical illness that may represent a threat to the patient's wellbeing.

The assumption should ALWAYS be that the patient requires medical care and transport.

INFORMATION

If a patient or guardian refuses transport to the hospital, a documented refusal process MUST be performed:

To provide "informed consent for refusal," a person must legally be one of the following:

- Over 18 years of age
- A court emancipated minor
- A legally married person of any age
- An unwed pregnant female under age 18, only for medical issues related to her pregnancy
- A parent (of any age) on behalf of their child's medical care
 - Only when the refusal of care does not put the child at risk of harm
- When a parent is unavailable, other adult relatives (step-parent, grandparent, aunt, uncle, adult sibling) may refuse care on behalf of the minor
 - Consider contacting Medical Control if the parent cannot be contacted

Additionally, to provide "informed consent for refusal," a person must meet ALL of the following:

- Awake, alert, and fully oriented to person, place, time, and situation
- Has no alterations in mental status or level of consciousness
- Has no signs of injury or illness which may limit the ability to make an informed decision
- Is not exhibiting clinical signs of intoxication by alcohol or drugs (licit or illicit)
- Has no mental illness altering their decision-making ability
- Appears to understand all risks of refusal, including death or permanent disability
- Demonstrates appropriate **decision-making capacity** (*see below*)

Assess decision making capacity:

- Decision making capacity is a clinical judgment that must be **performed** and **documented** on all refusals.
- Many conditions can alter the patient's capacity to properly make medical decisions, including intoxication, head injury, hypoxia, stroke, infection, or mental illness.

- The goal is to be reasonably certain that the patient **understands the risks of refusal and can make an informed decision** at the time of refusal
- Assess and document all of the following:
 - **Orientation** — to refuse, a patient must be awake, alert, and oriented to person, place, time, and situation. Even if the patient is at their baseline, failure at this step prevents a refusal.
 - **Gait / coordination** — unsteady gait may indicate an impairment that alters capacity
 - **Speech** — slurred, incoherent, or inappropriate speech may indicate an impairment
 - **Insight and judgment** — the patient must express good insight into the nature of their condition, the risks of refusal, and a reasonable plan to deal with their condition
 - **Evidence of psychiatric decompensation** — assess for suicidal or homicidal thoughts, hallucinations, delusions, thought disorders, or other mental illness that alter capacity

If the patient (or parent or guardian) is judged competent to refuse transport:

- Emphasize the need for care, the risks of refusal of care, and our wish to transport the patient
- If patient, parent, or guardian declines care and EMS personnel do not feel hospital transport is required, the patient, parent, or guardian must **sign the written refusal form** in front of two witnesses
- If the patient, parent, or guardian judged competent **refuses to sign the refusal form**:
 - Reassess the competency of the individual
 - If still considered competent to decline care, **a verbal statement must be documented** on the run report and the **verbal waiver form completed**
- **Document carefully your refusal process**—patient/parent/guardian’s alertness, orientation, presence or absence of alcohol or drug intoxication, evidence or absence of head injury, decision making capacity assessment, and informed consent for risks of refusal

If the patient (or parent or guardian) is judged NOT competent to refuse transport:

- When a patient does **not** demonstrate appropriate medical decision making capacity, the patient is deemed **medically incapacitated**, and should be transported to the hospital for further assessment
 - In this case, **paramedics are authorized to transport against the patient’s will**, using no unreasonable force. Refer to Florida Statute 401.445 for further details.
- Explain to the patient (or parent/guardian) the need for transport
- Reassure the patient that no harm will result from transport but that risks—up to and including death—may result from a delay in treatment
- If patient, parent, or guardian continues to refuse care, enlist the OLMCP or law enforcement personnel to help secure the patient for transport

All episodes involving refusal of care or assessment of decision making capacity must be documented fully.

High risk refusals:

No refusal of care will occur in the patient who, after evaluation by rescue personnel, is judged to be at risk of or suffering from a serious illness or injury, without the involvement of OLMCP and/or law enforcement (LEO).

Refusals deemed high risk, requiring OMLCP involvement, include:

- Patients age < 1, or > 65
- Trauma patients
- Intoxicated patients
- Chest pain
- Abnormal vital signs
- Mental health concerns
- Status post treatment (seizure, asthma, hypoglycemia, Narcan)

There are six situations where efforts to obtain consent from the patient may be discontinued:

1. Patient decides to consent
2. Patient's level of consciousness deteriorates to the point that they are no longer able to refuse care
3. Patient demonstrates appropriate decision making capacity and undergoes a fully documented refusal process involving informed consent (see above)
4. Patient continues to refuse, physical restraint with law enforcement assistance is needed, law enforcement refuses to assist (document), and OLMCP approves discontinuation of efforts
5. Patient has left the scene and efforts to detain the patient would be inappropriate or dangerous
6. Contact with medical direction has occurred

Contact with OLMCP for patients refusing care is helpful in many ways. Patients often decide to consent after they hear your consultation with OLMCP, and you can ask the OLMCP speak directly with the patient. Even if the patient refuses, the call records the patient's own voice on the recorded line as additional documentation of your sincere efforts to provide informed consent and to encourage the patient to seek medical care.

SPECIAL CONSIDERATIONS

- It is recommended to call Medical Control for pediatric refusals and refusals by patients for whom the paramedic has concerns of serious illness or injury
- If EMS is summoned by a third party and either the patient is not found, or no EMS assistance is required, there is "No Patient Found" and no refusal form is required
 - If patient contact is made, a patient care report must be completed

Special considerations for refusal of treatment/transport of minors:

- Although care may be refused by a responsible parent or legal guardian—if they meet the criteria described above—every effort will be made to transport minors if they exhibit any findings consistent with injury, alteration in mental status, or intoxication
- If the parents or guardian are not on scene, they may make the refusal over the telephone. Two witnesses must confirm the telephone conversation by both signing the waiver form.
- If no parent or guardian is available, and there are reports or findings of injury or illness, intoxication, and/or alterations in mental status, level of consciousness, or vital signs, the minor will be transported
- If the minor is a college student, the paramedic will contact OLMCP prior to obtaining a refusal

Specific refusal of transport — bronchospasm resolved after nebulizer treatment:

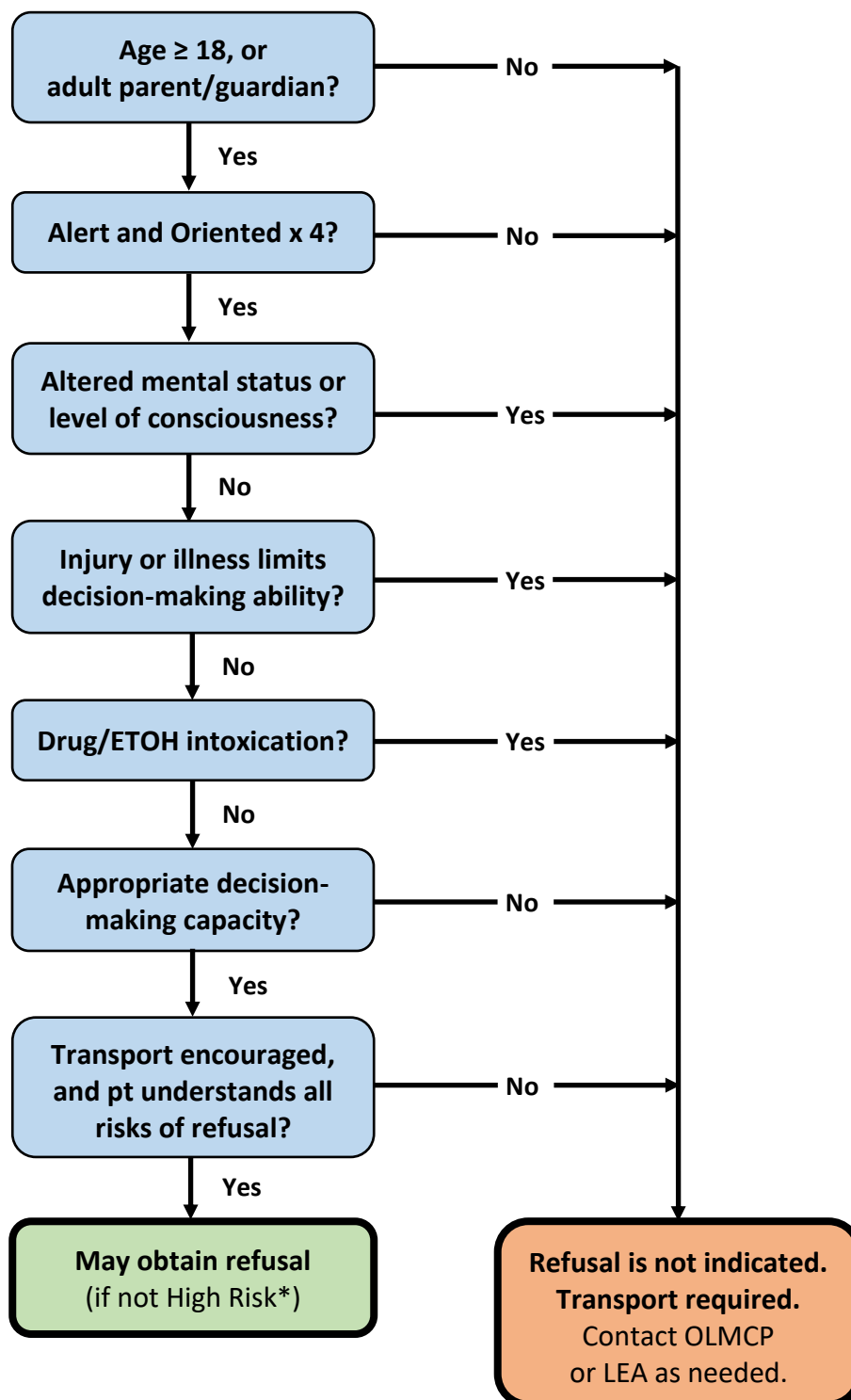
- After treatment of bronchospasm and return to an asymptomatic state, some patients will refuse transport. The following items must be present and included in the assessment and documentation:
 - The presentation is consistent with a mild exacerbation of asthma
 - No severe dyspnea at onset
 - No pain, sputum, fever, or hemoptysis
 - Not initially hypoxic (oxygen saturation < 90%)
 - Significant improvement after a single nebulizer treatment
 - **Complete resolution of symptoms**
 - Vital signs within normal limits after treatment given (BP, HR, RR, SpO2 all must be documented)
- Additional patient safety measures:
 - A family member or caregiver should stay with the patient and assist if a relapse occurs
 - Assure the patient understands transport has been offered and subsequently refused
 - Have the patient sign the written refusal form in front of two witnesses
 - Inform the patient to follow-up with their physician as soon as possible and/or call 911 if symptoms reoccur

Specific refusal of transport — insulin-induced hypoglycemia, resolved:

This protocol applies **only** to insulin dependent diabetic patients who are refusing hospital transport after the resolution of insulin-induced hypoglycemia by the administration of dextrose or oral glucose. After treatment of hypoglycemia, and return to an asymptomatic state, some patients will refuse transport to the hospital.

- The following items must be present and included in the assessment and documentation:
 - The patient is on **insulin only (does not take oral diabetic medications)**
 - The presentation is consistent with hypoglycemia
 - Rapid improvement, and **complete resolution of symptoms**, after dextrose or oral glucose
 - **Vitals signs within normal limits** after treatment (BP, HR, RR, SpO2, and blood sugar > 70)
 - There is no indication of an intentional overdose or dosing error
- Additional patient safety measures:
 - A family member or caregiver should stay with the patient and assist if a relapse occurs
 - Assure the patient understands transport has been offered and subsequently refused
 - Have the patient sign the written refusal form in front of two witnesses
 - Inform the patient to follow-up with their physician as soon as possible and/or call 911 if symptoms reoccur

Refusal of Service Flowchart



* **High Risk** patients who **require contact with OLMCP** prior to refusal of care include:

Patients age < 1 or > 65, trauma, intoxication, chest pain, abnormal vital signs, mental health concerns, or status post treatment (seizure, asthma, hypoglycemia, Narcan)

24.1.9 - PHYSICIAN ON SCENE

INFORMATION

When a physician on scene wishes to assist prehospital care, he or she must be willing to:

- Produce documentation of a valid license to practice medicine (M.D. or D.O.)
- Assume full responsibility for patient outcomes related to his or her oversight
- Agree to accompany the patient during transport (if deemed necessary)

Determine whether the physician is asking to assist care or assume command:

- **Assistance** — the physician wishes to assist the paramedic but not take over scene command
 - In this situation, the paramedic remains in command
 - The physician acts as either an extra set of hands, as a resource for procedures selected by the paramedic (e.g., endotracheal intubation), or both
- **Command** — scene command may be granted **ONLY** if:
 - The physician agrees to sign the narrative section (at the bottom right corner of the run report), accompany the patient to the hospital, and take full responsibility for patient outcomes
 - OLMCP is contacted and relinquishes responsibility of patient care to the on-scene physician

If a physician assumes on scene command:

- Orders should be followed by the on-scene paramedic unless they endanger the patient
- If orders are felt to be harmful, the paramedic should politely voice his or her concerns and immediately contact Medical Control. Follow the directives of the OLMCP.
- If the physician on scene continues to carry out interventions felt unsafe, offer no assistance and enlist aid from OLMCP and law enforcement

Critical considerations:

- The physician who offers assistance at a scene call is doing so for reasons of humanity. A professional and respectful attitude toward the physician/volunteer will be maintained at all times.
- All interactions must be well documented in the report, including physician's name and contact info
- This protocol applies to physicians who are not part of the ACFR Medical Director team

The following card can be provided to physicians offering assistance on scene:

Alachua County Fire Rescue
Office of the Medical Director

Thank you for your offer of assistance.

- These EMTs and Paramedics are operating under the authority of Florida Law and Alachua County Protocols developed by the County Medical Director. No physician or other person may assume command of patient care without the Medical Control Physician on duty relinquishing responsibility via radio or phone.
- If responsibility is given to a physician on scene, that physician is personally liable for any care provided on scene, and must accompany the patient to the hospital and sign a patient care report.

24.1.10 - UNIVERSAL PRECAUTIONS

INFORMATION

ALL BLOOD AND BODILY FLUIDS WILL BE CONSIDERED INFECTIOUS.

General practices:

- Sharps will be disposed of in appropriate sharps containers
- Sharps will not be recapped
- Hands will be cleaned, preferably with soap and water, after patient contact or contact with OPIM (other potentially infectious materials)
 - Waterless hand cleaners may be used until soap and water are available
- Contaminated equipment will be cleaned and then disinfected
- PPE should be used to cover any areas on an employee's person that could provide a route for contamination
- Appropriate PPE will be worn when treating patients where blood and/or OPIM are evident or suspected
- Appropriate respiratory protection will be used if it is documented or suspected that the patient may have infectious respiratory infections (ex: tuberculosis, measles, mumps, fever, etc.)

Universal Precautions Categories:

- Mechanical Devices:
 - Sharps containers and biomedical waste red bags
 - Sharps safety devices
- Personal Protective Equipment (PPE):
 - Gloves
 - Gowns
 - Eyewear
 - Fluid shields
 - N95 respirators
- Housekeeping:
 - Cleaning and disinfecting products
 - Waterless hand cleaner

24.1.11 - QUALITY ASSURANCE PROGRAM

INFORMATION

Purpose: To establish the review of field incident reports and on-scene care, and to identify and continually measure the quality of emergency medical care being provided to the citizens of Alachua County. It is the intent of these guidelines to meet and/or exceed the requirements of Florida Statute 401 and 64E (section 8), as well as the current Protocols developed by the Medical Director.

Scope: The guidelines prescribed are applicable to all employees of the Fire Rescue department and may not be deviated from without the expressed, written permission of the current Medical Director.

General: Information received through the review of medical field incident reports and on-scene observation of care provided will be used in focused studies and education, benchmarking, and performance outcomes which will improve the overall quality of service provided by the Alachua County Fire Rescue.

Quality Assurance categories to be reviewed each shift:

- STEMI Alert / Cardiac Arrest
- Stroke Alert
- Chest pain (30%)
- Unconscious patient, GCS < 8
- Pregnancy / OB
- Patient refusal of care (30%)
- Alternating protocols as assigned by Technical Services

Quality Assurance categories to be reviewed monthly:

- Trauma Alert / traumatic arrest
- Drowning
- Death on scene
- Airway techniques including CPAP
- Administration of selected medications (e.g., all uses of Morphine / Fentanyl / Versed)

Components of the EMS Quality Management Program:

- Review of the Standard of Care as set forth in Florida Statute and the current Protocols developed by the Medical Director in the following areas:
 - EMS Report Documentation
 - Performance Standards and Skill Evaluation
 - Patient Outcome

The above areas will be reviewed for:

- Call time / completion time
- Quality of care delivered
- Process improvement needs
- System-wide remediation requirements
- Individual remediation requirements

The following areas of the EMS Run Report document shall be reviewed as basic criteria for all reports:

- Patient identification on ALL pages
- Biographical and personal data
- Paramedic / EMT identification
- Entry date
- Identification of chief complaint
- Patient history / pertinent findings
- Physical examination results
- Diagnosis
- Documentation of ALL treatments
- Medically appropriate care
- Narrative which documents all pertinent patient care along with any unusual occurrences

Data Collection:

Electronic Reports are completed in the County Reporting Management System (RMS). Upon completion of the incident, the Paramedic/EMT is responsible for the completion of the electronic report. All screens requiring data should be completed as soon as possible so that the most accurate information is collected on each patient.

Each electronic report is reviewed by the Rescue Lieutenant assigned to QA for adherence to protocols and completion of required data. Any discrepancies will be forwarded to Technical Services for review. After review by Technical Services, any discrepancies will be returned to the individual paramedic for correction.

All report data is used to develop future training needs for the Department.

Patient Care Review Process:

In order to provide consistent and constant review of our procedures, the following steps shall be followed for each patient who receives care according to the QA review categories:

- EMS report is generated by field personnel for any EMS response by Fire and/or Rescue Unit where patient contact is made
- After the report is completed, it is reviewed by the Rescue Lieutenant assigned to QA for compliance to practice parameters. The goal is to review qualifying EMS reports, based upon the QA categories, by the completion of the next duty shift (72 hours)

The Rescue Lieutenants assigned to QA will be the Rescue Lieutenants assigned to Rescue 8 and Rescue 25. They will split the categories and review the reports of the shift prior to their assigned shift. The categories will be split as follows:

Rescue 8

- Patient refusal of care (30%)
- Administration of medications (all uses of Morphine / Fentanyl / Versed)
- Airway techniques (CPAP, Cric, I-Gel, King LT, OTI, NTI, ETCO₂ / Capnography)
- Basic medical care (10 calls per shift)
- Stroke Alert
- Chest pain (30%)
- Trauma Alert
- Alternating protocols as assigned by EMS Branch

Rescue 25

- Pregnancy / OB
- Cardiac Arrest
- Death at scene
- Sepsis Alert
- STEMI Alert
- Basic medical care (10 calls per shift)

Training

- Unconscious patient, GCS < 8
- Drowning

Technical Services will determine when rotation of categories is necessary.

All reports reflecting a high degree of quality in patient care or which may have questions regarding compliance with current protocols will be flagged for further review by the Technical Services Branch. The Rescue Lieutenant assigned to QA will advise Technical Services via email of the recognition of excellent care, as well as any non-compliance issue.

The Technical Services Branch will track all trends in service to determine future needs for training and/or changes in the protocols.

Technical Services will notify the assigned District Chief of trends, need for remedial training, and any issue being removed from the QA process for discipline.

The Technical Services Branch shall prepare a report of data on a quarterly basis. This report shall include all significant responses along with any possible changes in trends.

See EMS Quality Assurance Matrix attachment.

EMS Review Guidelines:

The following guidelines shall be used for the review of EMS reports.

Trauma Alert / Cardiac Arrest / Drowning

- Treatment parameters:
 - On scene time < 10 minutes or documentation of reason for prolonged scene time
 - Protocol adherence
 - Advanced skills utilized
 - Accurate ECG interpretation
- Patient outcome:
 - Restoration of vital signs
 - Maintenance of vital signs
 - Improvement in vital signs
- Patient transportation:
 - Ground transportation used to appropriate facility
 - Air-medical transportation (requested)

Medical Cardiac Arrest / Cardiac Alert / Stroke Alert / Unconscious Patient

- Treatment parameters:
 - On scene time < 20 minutes or documentation of reason for prolonged scene time
 - Protocol adherence
 - Advanced skills utilized
 - Accurate ECG interpretation
- Patient outcome:
 - Restoration of vital signs
 - Maintenance of vital signs
 - Improvement in vital signs
- Patient transportation:
 - Ground transportation used to appropriate facility

Pregnancy / OB

- Treatment parameters:
 - On scene time < 10 minutes or documentation of reason for prolonged scene time
 - Protocol adherence
 - Advanced skills utilized
 - Accurate ECG interpretation
- Patient Outcome:
 - Restoration of vital signs
 - Maintenance of vital signs
 - Improvement in vital signs
- Patient transportation:
 - Ground transportation used to appropriate facility

Pediatric ALS / Cardiac Arrest

- Treatment parameters:
 - On scene time < 20 minutes or documentation of reason for prolonged scene time
 - Protocol adherence
 - Advanced skills utilized
 - Accurate ECG interpretation
- Patient outcome:
 - Restoration of vital signs
 - Maintenance of vital signs
 - Improvement in vital signs
- Patient transportation:
 - Ground transportation used to appropriate facility

Pediatric Trauma

- Treatment parameters:
 - On scene time < 10 minutes or documentation of reason for prolonged scene time
 - Protocol adherence
 - Advanced skills utilized
 - Accurate ECG interpretation
- Patient outcome:
 - Restoration of vital signs
 - Maintenance of vital signs

- Improvement in vital signs
- Patient transportation:
 - Ground transportation used to appropriate facility
 - Air-medical transportation (requested)

Death on scenes

- Treatment Parameters:
 - Determination of Death parameter adherence
 - Documentation of parameter met
 - Documentation of contact with the Medical Director (IF REQUIRED)
 - Documentation of acceptable DNR form or order (if applicable)
 - Documentation of applicable scene assessment
 - Documentation of notification of appropriate agencies / law enforcement
 - Accurate ECG interpretation

Patient Refusal

- Treatment parameters:
 - Protocol adherence
 - Patient's chief complaint
 - Assessment which includes at least one (1) set of vital signs
 - Working diagnosis, if able to obtain
 - Statement of level of consciousness
 - Attempts to convince patient to seek treatment if applicable
 - Reason given for refusal documented
 - Medical Direction if required

Invasive Airway Techniques

- Oral, Nasal or Digital Intubation
 - Treatment parameters per Standards of Care
 - Documentation
 - Performed per Standards of Care
 - Bilateral breath sounds present
 - Oxygen supplementation
 - Changes in patient after assessment
- Cricothyrotomy
 - Performed within Standards of Care
 - Documentation
 - Performed per Standards of Care
 - Amount of bleeding
 - Bilateral breath sounds present
 - Oxygen supplementation
- Patient Disposition
 - Patent airway on first attempt
 - Patent airway on second attempt
 - Patent airway on greater than two (2) attempts
 - Patient without successful airway patency

Medication Administration

- Treatment Parameters
 - Per Standard of Care
 - Appropriate medication for working diagnosis
- Documentation
 - Medication delivered
 - Dosage and amount
 - Delivery route
 - Response of patient to medication
 - Any reactions or complications
- Patient Disposition
 - Expected, positive response to medication
 - Untoward reaction

Alternating Protocol

A rotation of all protocol that is not already listed in this SOG will be on a monthly rotation. The rotation will be scheduled by Technical Services. Technical Services will email the QA Rescue Lieutenants by the 1st of the month specifying the protocol to be reviewed.

Probationary Rescue Lieutenants and Newly Cleared Paramedics

All EMS reports for Probationary Rescue Lieutenants and newly cleared Paramedics will be reviewed for completeness and adherence to MCP during their first three months. The need for further review will be determined by Technical Services and the assigned District Chief at the end of the three-month period.

Treatment Categories:

- Exceptional
 - A call that exceeds expectations
- Acceptable
 - Typical call with no deviation from protocol
- Minor
 - Deviation from MCP without MC contact justification or without patient compromise
 - Transfer of patient not documented
 - No documentation of ETOH, drugs, or competency on refusals
- Major
 - Missing “alert” notifications per MCP
 - Improper rhythm recognition with concurrent treatment or non-treatment
 - Incorrect medications or dosage
 - Treatment without justification
 - Lack of documented treatment that hindered patient care
 - Waiver without MC contact or justification
 - Failure to obtain waiver without justification

Written Report Categories:

- Class 1
 - Missing signature
 - Grammar and spelling errors
 - Times missing from treatment section
- Class 2
 - ECG
 - Incorrect Protocol used
- Class 3
 - Poorly written narrative
- Class 4
 - Incomplete Report
- Good
 - Report is complete and has all required information
- Outstanding
 - All required information
 - Narrative is very clear as to this situation
 - All required signatures

Training Captains will be responsible for reviewing EMS Reports for new Rescue Lieutenants during their first three months after completing the orientation process. Those Rescue Lieutenants responsible for the QA Process at Rescue 8 and 25 will be notified when new Rescue Lieutenants have completed those three months. Rescue Lieutenants assigned to Q/A will send an e-mail to their District Chief on a weekly basis; reporting the number of medical reports reviewed during that time period. Deficiencies shall be reviewed by the District Chief to ensure compliance to the policy.

24.1.12 - BAKER / MARCHMAN ACT

INFORMATION

The Florida Mental Health Act of 1971 (**Baker Act**) allows involuntary examination of individuals presenting with:

- A mental illness (as defined in the Baker Act) and
- Who are a harm to self, harm to others, or at risk for self-neglect (as defined in the Baker Act)

This examination must be performed within 72 hours. Individuals who can initiate a Baker Act include:

- Judges
- Law enforcement officers
- Physicians
- Mental health professionals

Marchman Act:

A Florida Statute that allows for voluntary or involuntary assessment of anyone suspected of being under the influence of drugs or alcohol, and because of this, has lost the power of self-control with respect to substance use and is a danger to themselves or others. This act is filed with the court system.

The ACSO or Law Enforcement Agency (LEA) will transport all Baker Act and Marchman Act patients to a designated receiving facility unless an exception listed below is present:

- The patient is undergoing a medical emergency which requires the treatment abilities of an EMS unit
- The patient has a physical limitation which precludes the transportation by law enforcement vehicle, such as being confined to a stretcher or unable to sit

For patients under an involuntary Baker or Marchman Act requiring transport by EMS:

- If the transferring facility provides a patient advocate, the advocate will be responsible for the enforcement of the Baker / Marchman Act during transport
- If the transferring facility does NOT provide a patient advocate, determine if the patient presents the crew with an imminent threat or an appearance of violent behavior

For concerns of violence or other dangers to the EMS crew:

- Contact ACSO for assistance with securing the patient for transport and protecting the crew
- If the patient has to be restrained by LEO (handcuffs or other means) to be transported by EMS, the LEO may need to ride with EMS to provide access to the patient if the patient becomes unstable
 - EMS WILL NOT TRANSPORT PATIENTS IN THE "HOGTIE" OR "HOBBLE" POSITION
 - This can cause asphyxia and will not be tolerated
- Should the Rescue Lieutenant feel threatened or uncomfortable from the patient's imminent violent behavior, they may request that a LEO ride with EMS for security for the crew
 - LEO will contact their shift commander to determine if it is necessary for LEO to ride with or follow EMS
 - If the patient becomes violent and LEO is following, stop transport and have LEO ride with EMS
 - If LEO refuses to ride with EMS, contact the District Chief for direction
- In the rare event of an immediate life threatening condition, where waiting for an appropriate law enforcement officer would cause serious injury or death of the patient, the EMS crew will notify their District Chief and request personnel from additional units until there is sufficient man-power to mitigate any possible threat posed by the patient, should they become combative

If the patient under a Baker / Marchman Act attempts to escape / elope:

- The EMS crew is NOT to enforce the restraint order, and should the patient seek to exit the vehicle, it will be up to law enforcement to secure the patient
 - Law Enforcement will then re-evaluate the patient to see if the patient still meets Baker Act involuntary examination criteria
 - If the patient does meet criteria, he/she will be transported by EMS to the designated facility

Transporting patients under Baker / Marchman Act to a facility outside of Alachua County:

- Transferring facility shall provide a bonded law enforcement officer to maintain the Baker / Marchman Act provision
- If the facility refuses to provide this agent, the EMS crew will contact the District Chief, who will refuse the transfer if the facility is unable or unwilling to supply a security agent
- ACFR will provide return transportation for the security agent as long as the time constraints are deemed reasonable

24.1.13 - RAPID EXTRICATION

INFORMATION

Rapid extrication — moving a patient prior to initiating medical care — can be used when:

- Conditions are so volatile that it places the wellbeing of personnel and patient at greater risk if basic medical care is provided before extrication
- Patients are not in a position where care can be safely or practically rendered

Examples of situations which may require the use of rapid extrication:

- Environmental conditions:
 - Fires, floods, civil unrest, animal or insect infestation, etc.
- Challenging patient position, location, or situation:
 - High angle rescue, confined space rescues, entrapment within burning or sinking vehicles, stadium stands (during University of Florida games), etc.

Once the decision is made to move the patient to a safe location before the initiation of care:

- Risk vs. benefit must be weighed to determine if rescue is possible
- If rescue is determined to be possible, the move needs to be done rapidly and completed expediently to allow for the initiation of medical care
- Other injuries, such as C-spine injury or occluded airway may exist, and should be addressed if at all possible

Always document the circumstances that required rapid extrication.

24.1.14 - BARIATRIC PATIENT TRANSPORT

INFORMATION

Bariatric patients are a special population deserving of our care and compassion. “Bariatric” is generally defined as patients weighing in excess of 300 pounds, and practically defined as any patient whose weight exceeds the ability of the EMS crew to lift and move the patient safely without special precautions. This policy outlines the process to be used when responding to such patients.

ACFR operates two bariatric units, located at Stations 10 and 16:

- On any EMS call, determine early if bariatric equipment will be required
- Staff should be trained and qualified in the use of ACFR’s bariatric equipment and vehicles
- Bariatric equipment and vehicles should only be used by employees who have completed this training

Bariatric lifting and transport guidelines:

- No patient weighing > 300 pounds should be moved without at least 4 individuals assisting the lift
 - For every 50 to 100 additional pounds, add another provider to the lift team
- Take into account the weight and size (girth) of the patient. Even if the patient’s weight is below the stretcher capacity, their size may require the use of bariatric equipment.

Team coordination:

- All requests for non-emergent bariatric transports should be coordinated through a District Chief. Contact the appropriate District Chief to advise them of the need for bariatric transport. A special request for transport via a bariatric truck will be made.
- All requests for emergent (911) responses / transports will be handled as per CCC policy. Requests for a bariatric unit must be coordinated through CCC who will notify a DC of the special request.
- Notify the hospital early of the bariatric transport to allow ED staff time for adequate preparation



24.2 – BASIC MEDICAL CARE PROTOCOLS

24.2.1 - BASIC MEDICAL CARE

INFORMATION

Scene size up:

- Utilize personal protective equipment
- Assess the scene for hazards
- Park unit in a safe place
- Protect yourself and crew members
- Assess for the number of patients
- Assess the need for additional resources
- Assess the general condition of the patients

BLS

- Establish responsiveness
- Establish patent airway, open airway if necessary protecting cervical spine when indicated
- Supplemental oxygen if any respiratory signs or symptoms are present
- Record and monitor vital signs
- Obtain a **SAMPLE** history:
 - **S**igns / **S**ymptoms, **A**llergies, **M**edicines, **P**ertinent history, **L**ast meal, **E**vents
- Define pain response using **OPQRST**:
 - **O**nsset, **P**rovocation, **Q**uality, **R**adiation, **S**everity, **T**iming
- Control bleeding when indicated
- Record BGL if any weakness, altered mental status, or history of diabetes
- Nothing by mouth, unless patient is a known diabetic with hypoglycemia and is able to self-administer oral glucose paste or a glucose-containing beverage

ALS

- Advanced airway / ventilation management as needed
- Perform cardiac monitoring
- Evaluate 12 lead ECG if chest pain, abdominal pain above the umbilicus, or ischemic equivalent symptoms (dizziness, weakness, shortness of breath)
- Obtain vital signs
- Obtain history and perform physical exam
- Record and monitor continuous O2 saturation and capnography
- IV 0.9% Normal Saline KVO or IV lock as needed
 - If signs of dehydration (e.g. tachycardia, dry mucous membranes): administer 250 mL IV Normal Saline boluses with reassessments between boluses (hold at 1000 mL if no hypotension)
- Transport patient to nearest appropriate ED
- Minimize on-scene time when possible
- Frequently reassess patient
- Contact Medical Control for any additional orders or questions

24.2.2 - AIRWAY MANAGEMENT

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- Establish a patent airway:
 - Use jaw-thrust maneuver as needed
 - If no evidence of trauma, consider head tilt-chin lift maneuver
- Administer oxygen as needed to maintain SpO₂ > 94%
- Record and monitor vital signs
- Use suction as needed to clear airway
- Use oral (OPA) or nasal (NPA) airway adjuncts as needed
- Adult patients with a RR < 12 or > 28 BPM and/or signs of hypoxia may require assisted ventilations:
 - Bag-valve-mask ventilation with a good seal, with enough volume to make chest rise
 - Mouth-to-mouth, mouth-to-nose, mouth-to-stoma (when adjuncts are not available) - if any of these methods are employed **an incident report MUST be filled out** because of the exposure
- Pediatric patients with signs of hypoxia and/or respiratory distress (including bradycardia, abnormal breath sounds, increased work of breathing, nasal flaring, retractions, or stridor) may require assisted ventilations:
 - Pediatric bag-valve-mask (BVM, with a mask that covers both mouth and nose, but not eyes) and supplemental oxygen, with enough volume to make chest rise
 - Mouth-to-mouth, mouth-to-nose, mouth-to-stoma (when adjuncts are not available) - if any of these methods are employed **an incident report MUST be filled out** because of the exposure
- Request ALS intervention

ALS

- Airway management, as described above
- Advanced airway management as indicated, including:
 - CPAP (See [24.8.9 – Continuous Positive Airway Pressure \(CPAP\)](#))
 - I-Gel (See [24.8.6 – I-Gel Airway](#))
 - King LT (See [24.8.5 – King Tubes](#))
 - Endotracheal intubation (See [24.8.4 – Endotracheal Intubation](#))
 - Cricothyrotomy (See [24.8.3 – Cricothyrotomy, Surgical](#))

24.2.3 - OXYGEN THERAPY (ADULTS)

BLS

Oxygen should be administered to patients who:

- Display signs and symptoms of hypoxia
 - Cyanosis
 - Pallor
 - SpO₂ < 94%
 - Respiratory distress
 - Confusion / agitation
- Present with hypotension
- Suffer major trauma
- Present acutely ill
- Suspected of carbon monoxide inhalation (regardless of SpO₂ reading)
- Pregnant and may have reason for fetal hypoxia
- Any patient who the health care provider suspects may become hypoxic due to mechanism of injury or nature of illness regardless of oxygen saturation level

Methods of oxygen administration:

Nasal cannula	1 - 6 LPM	24 – 40%
Non-rebreather mask	12 - 15 LPM	90 – 95%
Bag valve mask with reservoir	10 - 25 LPM	90 – 100%
Ventilator	40 - 60 LPM	21 – 100%

24.2.4 - CONTROL OF EXTERNAL BLEEDING

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))

Wherever control of active bleeding is required or discussed in these protocols, consider the following:

- Apply direct pressure with a sterile dressing to the source of bleeding
- Elevate the injured part above the level of the heart
- Apply a pressure dressing if the methods above fail
- Apply pressure to an arterial pressure point proximal to the site of bleeding
- Apply a tourniquet:
 - For **severe** arterial bleeding refractory to the above hemorrhage control methods
 - Appropriate tourniquet placement is located 2 cm (or more) proximal to the source of hemorrhage on the extremity and not over the joint (i.e. elbow or knee)
 - Do not release or loosen a tourniquet once successfully placed
 - Always **note time of tourniquet placement** and alert receiving facility of time of placement

ALS

- Control external bleeding as described above

SPECIAL CONSIDERATIONS

- **Types of bleeding:**
 - Capillary — slight oozing of dark red blood
 - Venous — constant flow of dark red blood
 - Arterial — pulsatile squirting of bright red blood

24.2.5 - MCI AND TRIAGE SYSTEM

INFORMATION

Mass Casualty incident or “MCI” is defined as any event that overwhelms the resources of the EMS system.

MCIs will be classified into the following five levels per the Florida Field Operations Guide and recommended resources needed:

Level 1 (5 – 10 victims)

- 1 DC, 4-rescue units, 2 suppression units, 1 LEA supervisor
- Administrative notification
- CCC will notify UF Health and North Florida Regional requesting surge capability for each

Level 2 (11 – 20 victims)

- 2 DCs, 6 rescue units, 3 suppression units, LEA supervisor
- CCC will notify the 3 local hospitals and stand-alone ED’s requesting surge capability for each
- Medical Director notification
- Administrative notification

Consider:

- Mutual aid
- Fire and Rescue move-up
- 1 RTS bus
- Consider MCI trailers (ACFR & GFR)
- Medical Support Unit (MSU17) for transportation assistance

Level 3 (21 – 100 victims)

- 3 DCs, 8 rescue units, 4-6 suppression units, LEA supervisor
- CCC will notify the 3 local hospitals, stand-alone ED’s and the closest out of county hospital or trauma center requesting surge capability for each
- EOC activated, Administrative notification, Medical Director notification, Red Cross Notification

Consider:

- Mutual aid
- MSU 17, Helicopter strike team, ShandsCair Supervisor and ShandsCair ground transports, 1- LEO Supervisor, 2- RTS busses. MCI trailers (ACFR & GFR)

Level 4 (101 – 1000 victims)

The Incident Commander with EOC shall consider the following resources:

- 5 MCI Task Forces (25 units) — each TF may consist of two (2) ALS Units, two (2) Basic Life Support (BLS) Units and one (1) Fire Suppression Unit, two (2) ALS Transport Unit Strike Teams (10 units), one (1) Suppression Unit Strike Team (5 units), two (2) BLS Transport Unit Strike Teams (10 units), two (2) Mass Transit Bus Supply Trailers, Communication Trailer, and Command Staff (per local protocol).
- The 10 closest hospitals and 5 Trauma centers will be notified by Medical Control. The local Warning Point will notify the Emergency Management Agency. Metropolitan Medical Response System (MMRS) may be notified.

Level 5 (over 1000 victims)

The Incident Commander with EOC shall consider the following resources:

- 10- MCI Task Forces (50 units), four (4) ALS Transport Unit Strike Teams (20 units), two (2) Suppression Unit Strike Teams (10 units), four (4) BLS Transport Unit Strike Teams (20 units), four (4) Mass Transit Bus Command Vehicles, Supply Trailer(s), Communication Trailer Command Staff (per local protocol),
- Medical Control will notify the 20 closest hospitals and 10 Trauma centers. The local Warning Point will notify the State Warning Point, which may activate one or more Disaster Medical Assistance Teams (DMAT) and MMRS shall be notified.

The predetermined response levels 4 and 5 assigned to the above "Levels of response" will be in addition to the units already on scene. Once local resources have been reasonably depleted, including resources from neighboring jurisdictions through "move-up", "back-up", or "cover" agreements, additional resources as outlined in the Florida Fire Chiefs Association Statewide Emergency Response Plan (SERP) resource inventory ([link](#)) will be requested in accordance with the State of Florida Department of Health Ambulance Deployment Plan. COMMAND may downgrade or upgrade the assignment at any time

Incident Action Plan (IAP):

The command and control of incidents will be flexible, built from the ground up, based on the National Response Framework (NRF) and National Incident Management System (NIMS), and managed through the use of the Incident Command System (ICS).

Responsive Objectives (ICS 202):

- Life safety — to include responders, victims, civilian bystanders, and criminal suspects
- Incident stabilization
- Property conservation

Organizational Chart and Assignment List forms:

- Organizational chart (ICS 207) – ([link](#))
- Assignment Lists (ICS 204) – ([link](#))

First arriving unit / Incident Command:

- Establish Incident Command (IC), to include:
 - Name of Command (named after address)
 - Location of Command (remain visible)
 - If the first arriving unit is a Fire unit, the Company Officer should remain as the IC or Operations Section Chief / Branch Director, depending on incident size
 - If the first arriving unit is an EMS unit, this Officer should conduct a formal transfer of command and resume transport duties (for a Level I MCI), or assume Medical Communications Coordinator (MCC) for a Level II MCI or above
- First arriving unit shall conduct an all hazards management assessment. This assessment shall include at minimum a scene survey and when appropriate, an assessment for biological indicators of Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) hazards
- Establish safety and security boundaries and entry control points
 - If a CBRNE hazard is present, establish Red (Hot), Yellow (Warm, Decon), and Green (Cold) zones
- Identify staging area
- Estimate number of victims
- Request appropriate MCI Level response

- Request additional resources
- Direct remaining crew and 1st wave of arriving personnel to initiate START / Jump START triage:
 - Perform triage in accordance with START
 - Utilize color-coded ribbons to identify status and treat red patients for immediate life threats
- Have dispatch notify hospitals immediately of potential victims and request surge capability
- Assign positions to perform the functions of:
 - Triage, Treatment, Transport, and Staging
- Advise CCC of the number of victims, their categories, and ensure notification to area hospitals to ready operating room capabilities
- Identify ingress and egress routes for transport units
- Establish staging area
- Request that all responding units, regardless of task, bring and drop off medical gear to treatment area
- During large-scale or complex MCIs, designate a **Medical Branch** to reduce span of control

Triage Group Supervisor:

- Organizes the **Triage Group** to begin initial triage of victims utilizing START / Jump START
- Advise Command as soon as possible of the number of patients and category
- Coordinate with **Treatment** or **Transport** groups, and litter bearers to assure that priority victims are transported or moved to treatment area first
- Direct ongoing triage until all patients have been moved to **Treatment area** or transported
- Patients' injury / illness severity will be identified as one of the following four categories:
 - **Red** — Requires immediate transportation.
 - **Yellow** — Requires transportation but can be delayed.
 - **Green** — Ambulatory "walking wounded" with minor injuries.
 - **Black** — Deceased- not transported
- Coordinate with area hospitals through the incident command system

Treatment Group Supervisor:

- Begins Treatment area log:
 - Time each patient arrived at **Treatment** area
 - Patient number
 - Time patient is transferred to **Transport** area
- Directs personnel to treat victims where they lay or establishes a centralized treatment area
- Ensures re-triage is performed and a **secondary triage** exam is documented on the triage tag (METTAG):
 - Fill in all information, time permitting
 - Affix the tag to the victim's left hand if possible, and remove corner for documentation
 - The triage priority determined in the Treatment Phase should be the priority used for transport
- Directs treatment of life threats as needed per protocols
- Directs documentation of patient vital signs every 5 minutes
- Communicates with **Transport team** to coordinate transport of the appropriate victims
 - Ex: one red and one yellow per ambulance
- Advise **Command** as soon as possible of the number of patients and category
- Coordinate with **Treatment** team and coordinator
- Considerations for a Treatment area:
 - Capable of accommodating the number of victims and equipment
 - Consider weather safety and the presence of hazardous materials
 - Designate entry and exit points which are readily visible (entry control points)
 - On large scale incidents, divide the treatment area into three distinct areas based on priority

- Use colored tarps if MCI trailer is on scene
- Ensure that enough equipment is available to effectively treat all victims

Transport Group Supervisor:

- Begin Transport log:
 - Time patient arrived at Transport area
 - Patient number
 - Destination selected
- Coordinate the transport of victims to hospitals
- Establish continuous contact with MCC and advise overall situation (burns, trauma, smoke inhalation, HAZMAT exposure, etc.)
 - MCC will survey hospitals to determine surge capabilities / capacity
 - MCC will maintain "Hospital Capability Log" for duration of incident

Staging Group Supervisor:

- Begin Staging log
- Ensure that all personnel stay with their vehicles unless otherwise directed by IC
- If personnel are directed to assist in another function, ensure that the keys stay with each vehicle, and that all medical gear goes to treatment area
- Coordinate with each transport the location for a Loading Zone and best route to the zone
- Maintain a reserve of transport vehicles, and when depleted, request additional units through IC
- Make recommendation to command regarding rehab of personnel

Medical Communications Coordinator (MCC):

- Prime function is to:
 - Determine and update the number of victims and each hospital's readiness to accept them
 - Coordinate transportation and direct units to the appropriate hospital (as directed by Transport unit and Transport Coordinator)
- Drop off jump kits at treatment area

Litter Bearers:

- If not completed, attaches Triage tag (METTAG) to patient's left hand (if possible) and removes corner for documentation
- Packages patient appropriately, considering life over limb
- Moves patient to Treatment group supervisor
- When indicated, moves packaged patients to Transport group supervisor

Group Success Criteria:

- **Triage** group:
 - All Red patients identified and immediate life threats treated
 - All patients triaged correctly and in a timely manner
 - Triage conducted continuously
 - Patient packaged and moved appropriately for condition
- **Treatment** group:
 - Life threats treated appropriately
 - Vital sign trending monitored and documented every five minutes
 - Personal information started on METTAG
 - Patient packaged and moved appropriately for condition

- **Transport group:**
 - Maintained accurate Transport log
 - Transported patients to correct destinations
- **Staging group:**
 - Maintains up to date list of personnel and assignments
 - Maintains appropriately levels of reserves
- **MCC:**
 - Maintained up to date list of hospital surge capability
 - Tracked patient and destination accurately

Demobilization:

- Units should be rotated to rehab or released in the opposite order that the ICS was established (e.g. triage, treatment, transport, staging)
- Triage tag corners should be collected, retained, and sorted by person
- Transport unit tags should be sorted and retained by transport
- Group activity logs and triage tag corners should be turned in to the IC prior to departure
- All other EMS materials should be given to the EMS Captain

SPECIAL CONSIDERATIONS

START Triage System protocol:

- **STEP ONE:** Loudly ask anyone within the sound of your voice to move to a designated area if they are able. This will help you sort out the “walking wounded,” and these patients should be tagged green.
- **STEP TWO:** In an orderly fashion, move to each remaining patient, checking for the status of Breathing, Circulation, and Mental status. Tag them using the following rules:

Breathing:

- **No** — open and position airway. If the patient does not start breathing, triage **BLACK**
- **No** — open and position airway. If breathing begins, triage **RED**
- **Yes** — if respirations > 30, triage **RED**
- **Yes** — if respirations < 30, proceed to Circulation

Circulation: (Check radial pulse)

- Radial pulse **absent** or capillary refill > 2 seconds — control bleeding, triage **RED**
- Radial pulse **present** and capillary refill < 2 seconds — proceed to Mental Status

Mental Status: (Command the patient to “open your eyes, squeeze my hand,” etc.)

- Patient follows commands — triage **YELLOW**
- Fails to follow simple commands — triage **RED**

Special considerations:

- The first assessment finding that produces a RED tag stops further assessment
- During triage, only correct immediately life threatening problems, such as severe bleeding, airway obstruction, sucking chest wound, or tension pneumothorax



24.3 – CARDIOVASCULAR PROTOCOLS

24.3.1 - CHEST PAIN – SUSPECTED CARDIAC

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2
- Oxygen — maintain above 94%

ALS

- Airway management
- IV access
- Cardiac monitoring
- 12 lead ECG — as quickly as possible (ideally within 5 minutes)
- Determine if patient meets STEMI Alert criteria
- Alert immediately if STEMI criteria is met
- Obtain ECG before medication is given
- Treat dysrhythmias (use appropriate protocol)

Medications

- **Aspirin** 325 mg PO
 - Strongly encourage patient to take Aspirin unless true allergy exists
 - **Nitroglycerin** 0.4 mg SL (x1 if no pain relief, or Q5 minutes until pain is relieved)
 - Contraindicated if systolic BP < 130 mmHg
 - Place IV/IO and rule out inferior MI first
 - **Nitroglycerin paste** 0.5 - 2-inch, applied to anterior chest wall
 - Contraindicated if systolic BP < 130 mmHg
 - Place IV/IO and rule out inferior MI first
 - **Fentanyl** 25 - 50 mcg IV/IO/IN. May repeat to MAX 150 mcg
 - Contraindicated if systolic BP < 90 mmHg
- OR
- **Morphine** 2 - 5 mg IV/IO. May repeat to MAX 15 mg
 - Contraindicated if systolic BP < 90 mmHg

Short runs of Ventricular Tachycardia / frequent PVCs:

- If unstable, prepare for cardioversion (See [24.3.8 - Dysrhythmia – Tachycardia with a Pulse](#))
- If stable, monitor patient, 12-lead ECG, and oxygen level closely
- **Amiodarone** 150 mg IV/IO is **reserved for persistent VTach or signs of hemodynamic compromise**
 - Infusion: 150 mg in 50 mL bag Normal Saline (10 gtts) over 15 minutes (1 drop / 2 seconds)
- Isolated PVCs (premature, wide-complex beats) **do not** require Amiodarone

Severe nausea and vomiting:

- **Ondansetron** 4 mg IV/IO/PO
- **Promethazine** 12.5 mg – 25 mg IV/IO

STEMI Alert Criteria:

- ST segment elevation in two or more consecutive leads:
 - **≥ 1.5 mm in leads V1, V2, and V3**
 - **≥ 1 mm in all other leads**
 - Consecutive leads include:
 - Leads **I, AVL, V5, V6** = Lateral Wall
 - Leads **II, III, AVF** = Inferior Wall
 - Leads **V1 thru V4** = Anterior or Septal Wall
- **OR** a new onset left bundle branch block (LBBB)
 - If onset is unknown, assume new onset and call STEMI Alert

If STEMI Alert criteria are met:

- Alert immediately
- Contact CCC to inform of STEMI Alert
- Transport to closest PCI Center (NFRMC or UF Health Shands Hospital)
- Transmit 12 lead ECG to facility
- Keep copy of 12 lead ECG for records and documentation
- Monitor and reassess for any changes
- Obtain **right-sided ECG (V4R)** if elevation in leads II, III, or AVF
- See **24.8.13 – ST Elevation Myocardial Infarction (STEMI)** procedural protocol for reference

SPECIAL CONSIDERATIONS

- Obtain 12 lead ECG as soon as possible, ideally within 5 minutes, and before Nitroglycerin administration
- Patients suffering **inferior or posterior infarct or ischemia should not receive nitrates** in any form
 - Inferior or posterior MI requires IV fluid support
 - Nitroglycerin in this case can precipitate hypotension or cardiovascular collapse
- **Anginal equivalents** include: shortness of breath, diaphoresis, vomiting, or extreme fatigue, as well as pain outside the chest in a high-risk patient (coronary disease, smoker, age > 55, diabetes)
 - Please consider and obtain an ECG on these patients
- Patients who have ingested Viagra, Levitra, Cialis, Revatio, or other erectile dysfunction medicines within the last 48 hours should not receive nitrates in any form
- Do not administer Nitroglycerin without IV or IO vascular access
- Patients on blood thinners, such as Coumadin (Warfarin), Pradaxa, Xarelto, and Eliquis, or antiplatelet medicines like Plavix or low-dose Aspirin, will still benefit from Aspirin during a cardiac event
- Pregnant females with severe nausea and vomiting, give **Promethazine** 12.5 mg – 25 mg IV

24.3.2 - CHEST PAIN – NON-CARDIAC

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2
- Oxygen — maintain above 94%

ALS

- Airway management
- IV access
- Cardiac monitoring, 12 lead ECG
- No presence of ST elevation or depression
 - If ST elevation or depression, see [24.8.13 – ST Elevation Myocardial Infarction \(STEMI\)](#) protocol to rule out MI
- Treat dysrhythmias (see appropriate protocol)
- Focused physical exam of chest
- Ascertain if movement, drinking fluids, eating, deep inspiration, or other movement changes pain

Severe Nausea and vomiting:

- **Ondansetron** 4 mg IV/IO/PO
- Pregnant females, **Promethazine** 12.5 mg - 25 mg IV/IO

If shortness of breath is present:

- See [24.4.15 – Respiratory Distress](#) protocol

SPECIAL CONSIDERATIONS

- It is difficult to completely rule out emergent causes of chest pain in the field, so consider all possible causes of chest pain
 - Dangerous causes include: MI (with or without ST elevation), pulmonary embolism, pneumothorax, pericarditis, pneumonia, heart failure, esophageal tear or perforation, rib fractures, or thoracic aortic aneurysm or dissection

24.3.3 - CONGESTIVE HEART FAILURE / PULMONARY EDEMA

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂
- Oxygen — maintain above 94%

ALS

- Airway management
- IV access
- Cardiac monitoring, 12 lead ECG (rule out inferior MI)
- For **respiratory distress**, consider **CPAP** (Continuous Positive Airway Pressure):
 - Set at 10 cmH₂O
 - CPAP is contraindicated if:
 - Systolic BP < 100
 - Unconscious / obtunded
 - See [24.8.9 – Continuous Positive Airway Pressure \(CPAP\)](#) protocol
- Treat dysrhythmias (see appropriate protocol)
- If hypotension, See [24.4.10 – Hypotension / Shock](#) protocol

Medications

- **Nitroglycerin** 0.4 mg SL (Q5 minutes until symptomatic relief)
 - Contraindicated if systolic BP < 130 mmHg
 - Place IV/IO and rule out inferior MI first
- **Nitroglycerin paste** 0.5 - 2 inch ribbon, applied to anterior chest wall
 - Contraindicated if systolic BP < 130 mmHg
 - Place IV/IO and rule out inferior MI first
- **Albuterol** 2.5 mg and **Ipratropium** 0.5 mg nebulized PRN, up to 3 doses, **only if wheezing develops**
 - Albuterol increases demand on the heart and should be reserved for wheezing

SPECIAL CONSIDERATIONS

- Obtain 12 lead ECG as soon as possible, ideally within 5 minutes, and before Nitroglycerin administration
- Patients suffering **inferior or posterior infarct or ischemia should not receive nitrates** in any form
 - Inferior or posterior MI requires IV fluid support
 - Nitroglycerin in this case can precipitate hypotension or cardiovascular collapse
- Patients who have ingested Viagra, Levitra, Cialis, Revatio, or other erectile dysfunction medicines within the last 48 hours should not receive nitrates in any form

24.3.4 - CARDIAC ARREST MANAGEMENT

BLS

- Initiate basic medical care (**See [24.2.1 - Basic Medical Care](#)**)
- Initiate CPR — compressions at a rate of 100 - 120/min
 - Exchange compressors every 2 minutes
 - Minimize interruptions to CPR
- Obtain history from bystanders
- Airway management — open airway, consider C-spine precautions if trauma is evident
- BVM ventilation with O₂ — provide enough volume to make chest rise
 - BVM— ratio of 2 ventilations per 30 compressions; consider airway adjuncts (OPA or NPA)
 - ETT / I-Gel / King LT in place — one breath every 6 to 8 seconds
 - **Avoid hyperventilation** — 10 - 12 breaths/min (1 breath every 6 to 8 seconds)
- Apply pads and AED as soon as they are available, and follow instructions of AED
 - Defibrillate if instructed by AED
- Request ALS response

ALS

Cardiac arrest management:

- Perform cardiac arrest management per ACLS or PALS (*see general approach flowsheet below*)
- Identify team leader, who analyzes rhythm and assigns tasks / roles to each member of rescue team
 - Ex: airway management, compressions, code timing, IV / medication administration
- Establish IV/IO access
- Treat dysrhythmias per protocol:
 - PEA / Asystole — **See [24.3.6 - Dysrhythmia – Asystole / Pulseless Electrical Activity \(PEA\)](#)**
 - VF/Pulseless VT - **See [24.3.9 - Dysrhythmia – Ventricular Fibrillation / Pulseless Ventricular Tachycardia](#)**

Airway management:

- Place advanced airway (I-Gel, King LT, or ETT)
 - Do **not** interrupt compressions for airway placement
 - I-Gel or King LT are preferred in cardiac arrest (rapid placement, decreased interruptions)
- ETCO₂ waveform and value ≥ 20 mmHg ensures adequate CPR and proper tube placement
- **REMOVE ET TUBE IF NO CONSISTENT CAPNOGRAPHY WAVEFORM AND READING IS PRODUCED**
- **Capnography is required on every patient with an ETT / I-Gel / King LT in place**

Determination of transport:

- **All patients** should receive at least **10 minutes of on-scene CPR** by EMS, when safely possible
 - High-quality on-scene CPR is associated with increased survival and better neurologic outcomes
 - May not be possible if the scene is unsafe, large crowd, inadequate CPR surface, etc.
- **Initiate hospital transport** when:
 - **Return of spontaneous circulation (ROSC)** is achieved at any time
 - **10 minutes (5 cycles) of on-scene CPR without ROSC** has been performed
- **Continuing on-scene CPR** — For adult patients with no ROSC and no shockable rhythm (VTach / VF) at any time, the **paramedic may choose to continue on-scene CPR** rather than transport, until:
 - Transport conditions are met or
 - The patient meets termination of resuscitation criteria
 - (See **24.1.3 - Initiation of CPR / Termination of Resuscitation**)

Key determinants of survival:

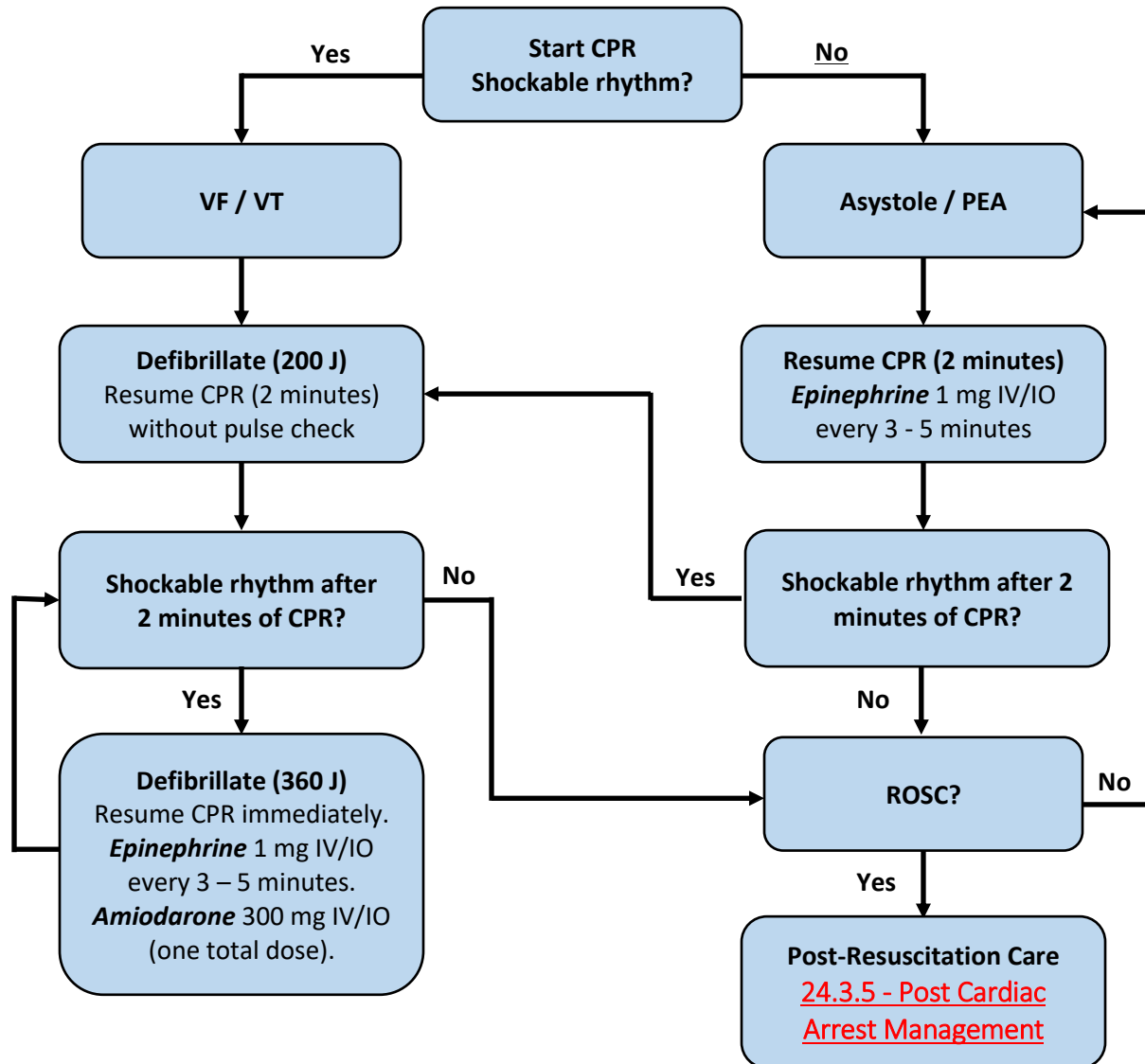
- High-quality chest compressions with minimal interruptions
- Earliest possible defibrillation of VF or VT
- Reduce time between CPR pause, defibrillation, and resuming CPR
 - When possible, continue CPR while charging defibrillator
- Avoid hyperventilation (10 - 12 breaths / min)
- Identify and treat reversible causes (H's and T's)

Return of spontaneous circulation:

- See **24.3.5 - Post Cardiac Arrest Management**

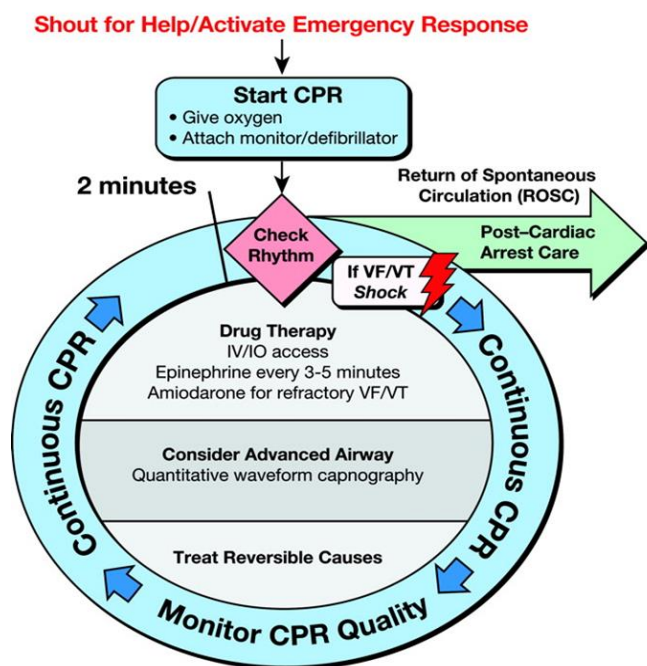
SPECIAL CONSIDERATIONS

General approach to cardiac arrest:



REFERENCE MATERIAL

Adult Cardiac Arrest



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CPR Quality

- Push hard (≥2 inches [5 cm]) and fast (≥100/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- If no advanced airway, 30:2 compression-ventilation ratio
- Quantitative waveform capnography
 - If PETCO₂ <10 mm Hg, attempt to improve CPR quality
- Intra-arterial pressure
 - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in PETCO₂ (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Shock Energy

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

Drug Therapy

- **Epinephrine IV/IO Dose:** 1 mg every 3-5 minutes
- **Vasopressin IV/IO Dose:** 40 units can replace first or second dose of epinephrine
- **Amiodarone IV/IO Dose:** First dose: 300 mg bolus. Second dose: 150 mg.

Advanced Airway

- Supraglottic advanced airway or endotracheal intubation
- Waveform capnography to confirm and monitor ET tube placement
- 8-10 breaths per minute with continuous chest compressions

Reversible Causes

- | | |
|---------------------------|-------------------------|
| – Hypovolemia | – Tension pneumothorax |
| – Hypoxia | – Tamponade, cardiac |
| – Hydrogen ion (acidosis) | – Toxins |
| – Hypo-/hyperkalemia | – Thrombosis, pulmonary |
| – Hypothermia | – Thrombosis, coronary |

Potential Causes of Asystole / PEA

Potential Causes of Asystole / PEA	Treatment
Hypovolemia (most common)	Normal Saline, 1 - 2 liters IV/IO
Hypoxia	Secure airway and ventilate
Hydrogen Ion-Acidosis	Sodium Bicarbonate , 1 mEq/kg IV/IO
Hyperkalemia (end stage renal disease)	Sodium Bicarbonate , 1 mEq/kg IV/IO
Hypothermia	Active rewarming
Tablets (drug overdose)	See overdose protocol for specific treatment
Tamponade, cardiac	Normal saline, 1 - 2 liters IV/IO
Tension pneumothorax	Needle thoracostomy
Thrombosis, coronary	Expedite transport
Thrombosis, pulmonary	Expedite transport

24.3.5 - POST CARDIAC ARREST MANAGEMENT

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- Obtain history from bystanders
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Oxygen — maintain above 94%
- Airway management — open airway, consider C-spine precautions if trauma is evident
- BVM ventilation with O2 — provide enough volume to make chest rise
 - **Avoid hyperventilation** — 10 - 12 breaths/min (1 breath every 6 to 8 seconds)
- Request ALS response

ALS

- Airway management
- IV access
- Cardiac monitoring, 12 lead ECG (evaluate for STEMI)

Hypotension after return of spontaneous circulation (ROSC):

- Defined as systolic BP < 100
 - In pediatrics, systolic BP < [70 + (2 * age)]
- Goal BP is systolic BP ≥ 120
 - In pediatrics, systolic BP ≥ [70 + (2 * age)]
- Normal Saline 20 mL/kg IV/IO until systolic BP > 120 mmHg
 - Avoid refrigerator-cooled Normal Saline, which can increase the risk of re-arrest
- **Epinephrine “push-dose”** (diluted)
 - Prepare 1:100,000 (10 mcg/mL) by mixing 1 mL of 1:10,000 **Epinephrine** in 9 mL Normal Saline
 - Administer 1 to 2 mL of this mixture every 2 minutes to titrate to systolic BP target
 - Check blood pressure between each administration

Altered mental status (GCS motor score < 6) after return of spontaneous circulation (ROSC):

- Airway management, as indicated
- Check BGL
- **Avoid hyperthermia**
 - Remove excess clothing
 - Cover only with light sheet
 - Avoid heat packs or warmed IV fluids

Cardiac arrhythmias after ROSC:

- Follow appropriate cardiovascular protocol (Bradycardia, Tachycardia with a Pulse)

24.3.6 - DYSRHYTHMIA — ASYSTOLE / PULSELESS ELECTRICAL ACTIVITY (PEA)

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- Initiate CPR — compressions at a rate of 100 - 120/min
 - Exchange compressors every 2 minutes
 - Minimize interruptions to CPR
- Obtain history from bystanders
- Airway management — open airway, consider C-spine precautions if trauma is evident
- BVM ventilation with O₂ — provide enough volume to make chest rise
 - BVM— ratio of 2 ventilations per 30 compressions; consider airway adjuncts (OPA or NPA)
 - ETT / I-Gel / King LT in place — one breath every 6 to 8 seconds
- Apply pads and AED as soon as they are available, and follow instructions of AED
- Request ALS response

ALS

Cardiac arrest management:

- Cardiac arrest management per “General approach to cardiac arrest” (see [24.3.4 - Cardiac Arrest Management](#))
- Determine team leader, who analyzes rhythm and assigns tasks / roles to each member of rescue team
 - Ex: airway management, compressions, code timing, IV / medication administration
- Initiate CPR immediately
- **All patients** should receive at least **10 minutes of on-scene CPR** by EMS, when safely possible
 - High-quality on-scene CPR is associated with increased survival and better neurologic outcomes
 - May not be possible if the scene is unsafe, large crowd, inadequate CPR surface, etc.

Airway management:

- Place advanced airway (I-Gel, King LT, or ETT)
 - Do **not** interrupt compressions for airway placement
 - I-Gel or King LT are preferred in cardiac arrest (rapid placement, decreased interruptions)
- ETCO₂ waveform and value ≥ 20 mmHg ensures adequate CPR and proper tube placement
- **REMOVE ET TUBE IF NO CONSISTENT CAPNOGRAPHY WAVEFORM AND READING IS PRODUCED**
- **Capnography is required on every patient with an ETT / I-Gel / King LT in place**

Vascular access:

- Place IV / IO
- Make no more than 2 attempts and/or 90 seconds at IV access before resorting to IO use

Medications:

- **Epinephrine** (1:10,000) 1 mg IV/IO every 3 - 5 min

Medications for specific conditions:

- **Suspected hyperkalemia** (missed dialysis, fistula) — **Sodium Bicarbonate** 1 mEq/kg IV/IO and **Calcium Chloride** 1 gram IV/IO
- **Hypovolemia** — Normal Saline 1000 mL IV/IO
- **Hypoglycemia** — **Dextrose 10%** (D10) 100 mL IV/IO

Medications for suspected drug overdoses:

- **Opioid overdose** — **Narcan** 2 mg IV/IO
- **Calcium channel blocker overdose** — **Calcium Chloride** 1 gram IV/IO
- **Beta blocker overdose** — **Glucagon** 5 mg IV/IO
- **Tricyclic antidepressant overdose** — **Sodium Bicarbonate** 1 mEq/kg IV/IO

Termination of resuscitation:

- If no response to resuscitative efforts after 20 minutes, refer to [**24.1.3 - Initiation of CPR / Termination of Resuscitation**](#) protocol

SPECIAL CONSIDERATIONS

- **5 H's:** Hypovolemia, Hypoxia, Hydrogen ion (acidosis), Hyperkalemia, Hypothermia
- **5 T's:** Tablet (drug) overdose, Tamponade, Tension pneumothorax, Thrombosis coronary, Thrombosis pulmonary (see chart in [**24.3.4 - Cardiac Arrest Management**](#))

24.3.7 - DYSRHYTHMIA - BRADYCARDIA

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management
- IV access
- 12 lead ECG
- Administer 250 mL boluses of IV Normal Saline until systolic BP > 90 mmHg
 - Contraindicated if evidence of pulmonary edema / CHF (e.g. rales / crackles)
- **Stable symptomatic bradycardia** — defined as normotensive patients with no signs of shock:
 - Provide supportive care, monitor closely, and expedite transport
 - No emergent medications are required
- **Unstable bradycardia** — defined as a **HR < 60** with — systolic BP < 90, acutely altered mental status, pallor, cyanosis, diaphoresis, shock, respiratory distress, or severe chest pain
 - In this case, do not delay treatment to obtain 12 lead ECG unless the diagnosis is in question
 - See treatment below

Unstable bradycardia medications / interventions:

- **Atropine** 0.5 mg IV Q 3 minutes PRN, MAX total dose 3 mg, while preparing for pacing
- Initiate **transcutaneous pacing** using **Demand mode**: (See [24.8.15 – External Cardiac Pacing](#))
 - Start at lowest milliamperes (MA), and increase until electrical capture with pulses achieved
 - Start rate at 70 BPM, and increase to achieve a systolic BP > 90 mmHg (maximum 100 BPM)
 - Once systolic BP > 90, consider sedation or analgesia:
 - **Fentanyl** 25 - 50 mcg IV/IO/IN Q5 min PRN, Max 150 mcg, hold if systolic BP < 90
 - **OR Versed** 1 mg IV/IO, hold if systolic BP < 90
- If hypotension persists despite Atropine and transcutaneous pacing, consider:
 - **Dopamine** infusion at 10 - 20 mcg/kg/min to achieve systolic BP > 90
- If hypotension persists despite the above, consider:
 - **Epinephrine** infusion at 2 - 10 mcg/min to achieve systolic BP > 90

SPECIAL CONSIDERATIONS

- For suspected overdose, see [24.4.12 – Overdose and Poison Ingestion](#) protocol as needed
 - Often: beta blockers, calcium channel blockers, Digoxin, opioids, tricyclic antidepressants (TCAs)

24.3.8 - DYSRHYTHMIA — TACHYCARDIA WITH A PULSE

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂
- Oxygen — maintain above 94%
- Place defibrillator pads

ALS

- Airway management
- IV access
- Cardiac monitoring
- 12 lead ECG

Management of severe tachycardia with a pulse (heart rate \geq 150 BPM):

STEP ONE — determine whether patient is **STABLE** or **UNSTABLE**:

(**Unstable** is defined as systolic BP < 90, acutely altered mental status, or signs of shock)

- If **STABLE**, move on to step two
- If **UNSTABLE**:
 - Prepare for **synchronized cardioversion** immediately:
 - 1st energy level — 100 J
 - If no response — 200 J
 - If no response — 300 J
 - If no response — 360 J
 - If **unstable** and **narrow**-complex (QRS duration < 120 msec):
 - May consider trial of **Adenosine** 6 mg rapid IV push
 - If **unstable** and **wide**-complex (QRS duration > 120 msec):
 - **Amiodarone** 150 mg IV piggyback

STEP TWO — if **STABLE**, determine whether rhythm is **WIDE** or **NARROW** complex:

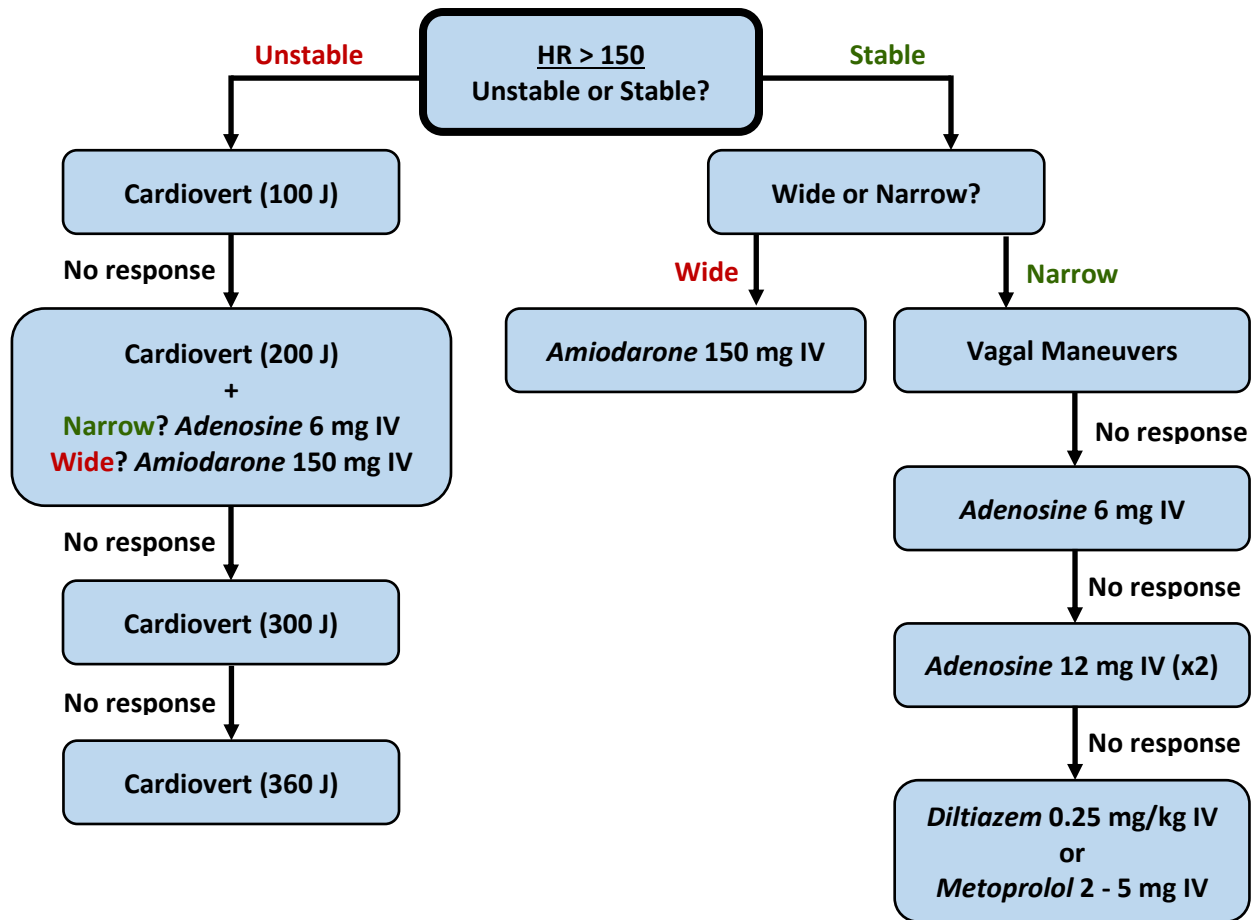
- If **NARROW** (QRS duration < 120 msec):
 - Attempt Vagal maneuvers (Valsalva; blow through an occluded straw; blow into a 10 mL syringe and attempt to move plunger, then lift patient's legs afterwards)
 - **Adenosine** 6 mg rapid IV push
 - If no response in 2 minutes, Adenosine 12 mg rapid IV push
 - If no response in 2 minutes, repeat Adenosine 12 mg rapid IV push
 - If no response, **Diltiazem** 0.25 mg/kg IV over 2 min
 - If Diltiazem is unavailable or allergy, **Metoprolol** 2 - 5 mg IVP over 1 min (if SBP > 100)
 - If no response in 5 minutes, **Metoprolol** 2 - 5 mg IVP over 1 min (if SBP > 100)
- If **WIDE** (QRS duration > 120 msec):
 - **Amiodarone** 150 mg IV piggyback
 - If evidence of polymorphic Ventricular Tachycardia (Torsades), administer **Magnesium** 2 grams IV in 10 mL of Normal Saline
- If evidence of hyperkalemia (e.g., dialysis, renal failure, fistula) in wide-complex tachycardia:
 - **Calcium Chloride** 1 gram IV/IO (contraindicated if patient is on Digoxin / Lanoxin)
 - **Sodium Bicarbonate** 1 mEq/kg IV/IO

SPECIAL CONSIDERATIONS

- Can consider sedation or analgesia prior to cardioversion:
 - **Versed** 2 - 5 mg IV/IO (if systolic BP > 100)
 - OR **Fentanyl** 25 - 50 mcg IV/IO/IN Q5 min PRN, Max 150 mcg, hold if systolic BP < 90
- Do **not** delay cardioversion if patient is unstable
- For HR < 150, consider causes of sinus tachycardia, including fever, pain, hypoxia, sepsis, dehydration, anxiety, stimulant overdose, drug or alcohol withdrawal, MI, etc.
 - Consider Normal Saline 250 mL IV/IO boluses (stop at 1000 mL if no hypotension)

REFERENCE MATERIAL

Management of severe tachycardia with a pulse (HR > 150 BPM) flowchart



24.3.9 - DYSRHYTHMIA — VENTRICULAR FIBRILLATION / PULSELESS VENTRICULAR TACHYCARDIA

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- Initiate CPR — compressions at a rate of 100 - 120/min
 - Exchange compressors every 2 minutes
 - Minimize interruptions to CPR
- Obtain history from bystanders
- Airway management — open airway, consider C-spine precautions if trauma is evident
- BVM ventilation with O₂ — provide enough volume to make chest rise
 - BVM— ratio of 2 ventilations per 30 compressions; consider airway adjuncts (OPA or NPA)
 - ETT / I-Gel / King LT in place — one breath every 6 to 8 seconds
- Apply pads and AED as soon as they are available, and follow instructions of AED
- Request ALS response

ALS

Cardiac arrest management:

- Cardiac arrest management per “General approach to cardiac arrest” (see [24.3.4 - Cardiac Arrest Management](#))
- Determine team leader, who analyzes rhythm and assigns tasks / roles to each member of rescue team
 - Ex: airway management, compressions, code timing, IV / medication administration
- Initiate CPR immediately
- **All patients** should receive at least **10 minutes of on-scene CPR** by EMS, when safely possible
 - High-quality on-scene CPR is associated with increased survival and better neurologic outcomes
 - May not be possible if the scene is unsafe, large crowd, inadequate CPR surface, etc.

Airway management:

- Place advanced airway (ETT, I-Gel, or King LT); do **not** interrupt compressions for airway placement
- ETCO₂ waveform and value ≥ 20 mmHg ensures adequate CPR and proper tube placement
- **REMOVE ET TUBE IF NO CONSISTENT CAPNOGRAPHY WAVEFORM AND READING IS PRODUCED**
- **Capnography is required on every patient with an ETT / I-Gel / King LT in place**

Vascular access:

- Place IV / IO
- Make no more than 2 attempts and/or 90 seconds at IV access before resorting to IO use

Medications:

- **Epinephrine** (1:10,000) 1 mg IV/IO every 3 - 5 min
- **Amiodarone** 300 mg IV/IO bolus
 - For persistent VF/VT, give an additional **Amiodarone** 150 mg IV/IO
- If the patient has Amiodarone allergy OR Amiodarone is unavailable:
 - **Lidocaine** 1 - 1.5 mg/kg, up to 3 mg/kg IV/IO for initial dose
 - Second dose: **Lidocaine** 0.5 - 0.75 mg/kg IV/IO (half of initial dose)

Medications for specific conditions:

- **Polymorphic VT (Torsades des pointes)** — **Magnesium Sulfate** 2 - 4 grams IV/IO push over 1 - 2 minutes
- **Suspected hyperkalemia** (missed dialysis, fistula) — **Sodium Bicarbonate** 1 mEq/kg IV/IO and **Calcium Chloride** 1 gram IV/IO
- **Hypovolemia** — Normal Saline 1000 mL IV/IO
- **Hypoglycemia** — **Dextrose 10%** (D10) 100 mL IV/IO

Medications for suspected drug overdoses:

- **Opioid overdose** — **Narcan** 2 mg IV/IO
- **Calcium channel blocker overdose** — **Calcium Chloride** 1 gram IV/IO
- **Beta blocker overdose** — **Glucagon** 5 mg IV/IO
- **Tricyclic antidepressant overdose** — **Sodium Bicarbonate** 1 mEq/kg IV/IO

Refractory ventricular fibrillation / ventricular tachycardia:

When VF/VT is noted on each consecutive rhythm assessment for 5 treatment cycles, and after 5 defibrillation shocks with no change in rhythm:

- Ensure equipment is functioning properly (no faulty or nonfunctioning pad / wire connection)
- Acquire an additional cardiac monitor to prepare for **dual external defibrillation** at 400 J total
- Attach an additional set of external defibrillation pads:
 - One set in Anterior-Posterior position, the other in Anterior-Lateral (see attached picture)
 - Pads should not touch one another
- **Charge both monitors to 200 J** (each) and provide simultaneous defibrillation with both monitors at the appropriate time, delivering a total of 400 J
- Continue with VF/VT protocol

If return of spontaneous circulation (ROSC) is obtained:

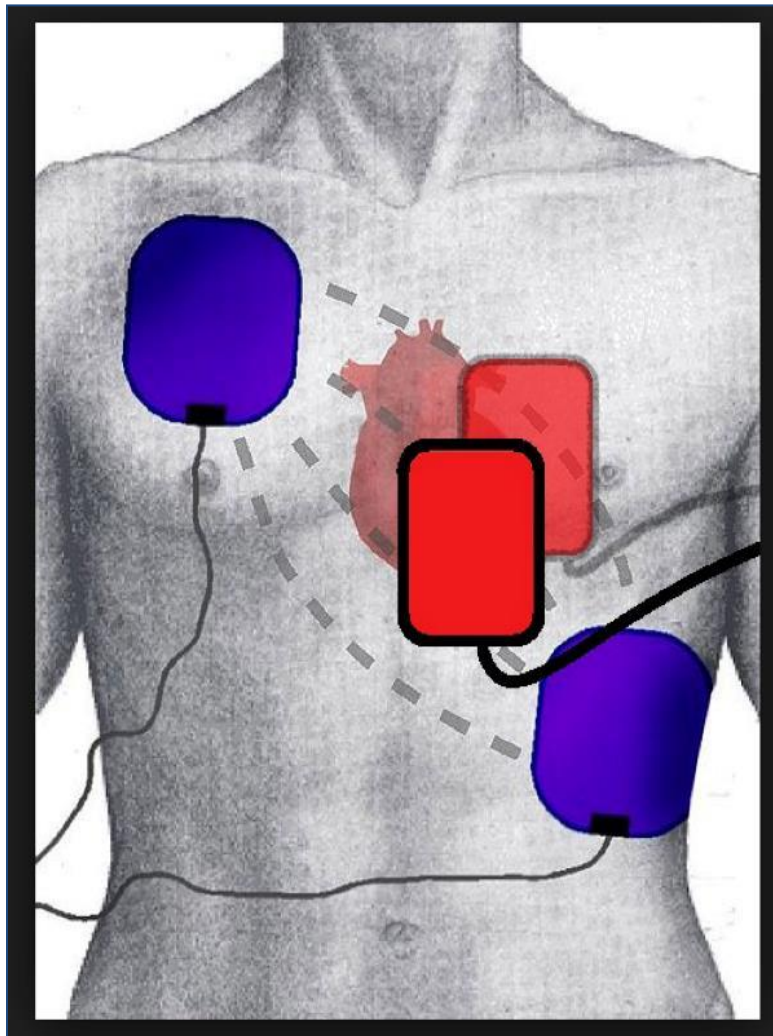
- **Amiodarone** infusion (if converted with Amiodarone) 150 mg over 15 min IV
 - 150 mg in 50 mL Normal Saline, 10 gtts set, 1 drop / 2 seconds
- **Lidocaine** infusion (if converted with lidocaine) 2 mg/min IV
 - 200 mg in 50 mL Normal Saline, 60 gtts set, 2 mg/min (or 30 gtts/min)
- See [24.3.5 - Post Cardiac Arrest Management](#)

SPECIAL CONSIDERATIONS

- Consider etiology of arrest. May resort to overdose protocol.
- See workflow of arrest below in caption
- Consider 5 H's and 5 T's:
 - - Hypovolemia
 - - Hypoxia
 - - Hydrogen Ion acidosis
 - - Hypo/Hyperthermia
 - - Hypo/hyperkalemia
 - Tension Pneumothorax
 - Tamponade, cardiac
 - Toxins, overdose
 - Thrombosis, pulmonary
 - Thrombosis, coronary

REFERENCE MATERIAL

Double Sequential Defibrillation Pad Placement



24.3.10 - CEREBROVASCULAR ACCIDENT (CVA / STROKE)

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature
- Oxygen — maintain above 95%
- BGL check

ALS

- Airway management
- IV access
- Cardiac monitoring and 12 lead ECG
- Perform stroke assessment (**Cincinnati Prehospital Stroke Scale**):
 - **Facial droop**: have patient smile or show teeth
 - **Normal** — both sides of the face move equally
 - **Abnormal** — one side of the face does not move as well
 - **Arm Drift**: patient closes eyes and holds arms outright for 10 seconds
 - **Normal** — both arms move the same OR both arms do not move at all
 - **Abnormal** — one arm does not move OR one arm drifts down, compared with the other
 - **Abnormal speech**: have the patient say the words: “you can’t teach an old dog new tricks”
 - **Normal** — patient uses correct words with no slurring
 - **Abnormal** — patient slurs words, uses the wrong words, or is unable to speak.

Stroke Alert criteria:

- Any **1 abnormal finding** on **Cincinnati Prehospital Stroke Scale**
 - 84 - 95% predictive of stroke
- No evidence of trauma
- Symptoms are new, with onset < 8 hours (includes if patient woke up with symptoms)
 - Patients with symptoms > 8 hours may have experienced a stroke, but do not meet Alert criteria
- Initial BGL is > 50
- If BGL is < 50, follow hypoglycemia protocol ([See 24.4.5 – Diabetic Emergencies](#)) and reassess
 - If symptoms persist after correction of hypoglycemia, the patient may meet Stroke Alert criteria

Facility notification and selection:

- Have CCC inform the selected facility of Stroke Alert, time of onset, gender, and age of patient
- 0 - 8 hours from onset: transport to nearest Comprehensive Stroke Center (NFRMC or UF Health Shands)
- > 8 hours from onset, transport to any Primary or Comprehensive Stroke Center as a **non-alert**

If hypotensive:

- Refer to [24.4.10 – Hypotension / Shock](#) protocol

SPECIAL CONSIDERATIONS

- **Do NOT treat elevated blood pressure** without consultation of OLMCP, as this may be a compensatory mechanism for maintaining cerebral perfusion pressure
- If patient is intubated, ventilate at CO₂ level of 35 mmHg, monitored by ETCO₂ capnography
- Obtain name and contact number of witness / family (who saw patient normal last) for the hospital
- Obtain **time of symptom onset** as well as **time last seen normal** for documentation

24.3.11 - LVAD

INFORMATION

A left ventricular assist device (LVAD) is a surgically-implanted, battery operated mechanical pump for end-stage heart failure. It assists the heart's left ventricle in delivering blood to the body. It consists of an external battery and control unit, and a tube that travels from the left ventricle to a pump then to the aorta.

BLS

- **A PALPABLE PULSE MAY NOT BE FELT** — listen to heart sounds for a continuous whirling sound
 - If **no sound is heard** and patient is unconscious and unresponsive, **start CPR**
 - if whirling **sound is heard**, and the patient is unresponsive and unconscious, transport immediately and re-evaluate heart sounds (whirling)
- Initiate basic medical care (**See 24.2.1 - Basic Medical Care**)
- History — OPQRST, SAMPLE
- Oxygen — maintain above 94%
- Vitals — before and after interventions — RR, Pulse (if palpable), SpO2, BGL
 - For blood pressure, attempt to determine the **Mean Arterial Pressure (MAP)**
 - First attempt a manual blood pressure; the first sound you hear is the MAP
 - If unsuccessful, the monitor may be able to measure a MAP
- Nothing by mouth, unless hypoglycemic (oral glucose is acceptable)
- Locate device — usually at patient's waist
 - Identify which device is in place by locating a colored sticker
 - This color can be matched to the specific device in the LVAD guide linked below
- **Listen to the patient's family** — they have been trained extensively on the device
- Call the number on the device for LVAD coordinator on call
- Grab patient's "**backup bag**" — it contains 2 extra fully charged batteries and second controller
 - **BRING THIS TO THE HOSPITAL WITH PATIENT**

ALS

- Airway management
- Cardiac monitoring and 12 lead ECG (determine if patient meets STEMI Alert criteria)
- Treat dysrhythmias (see appropriate protocol)
- IV access
- Obtain chief complaint and reference appropriate protocol
- Minimize on scene time and transport to LVAD center (ask family or patient of facility)
- The control unit will often have a specific alarm that may report the problem
- For hypotension (MAP < 65) with evidence of shock, consider Normal Saline 250 mL IV boluses
 - Frequently assess lung sounds; stop at 1000 mL, if MAP > 65, or if abnormal lung sounds

LVAD field use and troubleshooting guide:

- <http://www.mylvad.com/sites/mylvadrp/files/Field%20Guides%20Master%20Document.pdf>

24.3.12 - SYNCARDIA DEVICES

INFORMATION

A SynCardia device is a total artificial heart, surgically implanted during complete removal of the patient's heart. Unlike an LVAD, the SynCardia device does not rely on the patient's native heart.

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Oxygen — maintain above 94%
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Nothing by mouth, unless hypoglycemic (oral glucose is acceptable)
- **Listen to the patient's family** — they have been trained extensively on the device

ALS

Initiate a **SYNCARDIA ALERT** to UF Health every time the patient calls EMS.

A PALPABLE PULSE MAY NOT BE FELT — if patient is unresponsive and pulseless, **DO NOT PERFORM CPR**

- **TRANSPORT RAPIDLY**
- Airway management
- Continuous ETCO2 monitoring
- IV access
- Obtain chief complaint and reference appropriate protocol
- Minimize on scene time and transport to facility (UF Health)
 - Bring family / significant other if possible
- Locate device — usually at patient's waist or hip
- Identify error code / malfunction en route and reference Operator's Manual (see below)
- Grab patient's "**backup bag**" — it contains a backup battery-powered device driver
 - **BRING THIS TO THE HOSPITAL WITH PATIENT**

SPECIAL CONSIDERATIONS

- SynCardia patients are "Load and Go" patients
- A pulse will usually be palpable, but **may not be present** — **DO NOT PERFORM CPR ON THESE PATIENTS**
 - The device is surgically placed and could dislodge during CPR causing further damage
- Do not attach a cardiac monitor: these patients do not have any meaningful electrical activity

SynCardia Operator's Manual:

- For SynCardia operator's manual and troubleshooting guide:
 - http://www.fda.gov/ohrms/dockets/ac/04/briefing/4029b1_final.pdf



24.4 – EMERGENCY MEDICAL PROTOCOLS

24.4.1 – ABDOMINAL PAIN

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, BGL, Temperature
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- IV access
- 12 lead ECG

Severe Nausea and Vomiting:

- **Ondansetron** 4 mg SL / IV (may repeat dose after 10 min) OR
- **Promethazine** 12.5 - 25 mg IV / IO (patient must be over 16 years old)
- Normal Saline 250 mL IV/IO boluses, hold at 1000 mL if no hypotension

Suspected Nephrolithiasis Pain:

- **Toradol** 30 mg IV/IO x1
 - Contraindicated if pregnant, history of renal disease, or trauma / possible internal bleeding

SPECIAL CONSIDERATIONS

- Pregnant females: use **Promethazine** 12.5 - 25 mg IV/IO, as first-line agent for treatment of nausea
- Consider life-threatening problems that may present with abdominal pain: MI, perforated abdominal organs, GI bleeding, DKA, acute appendicitis, dissecting abdominal aortic aneurysm, ectopic pregnancy (ask about menstrual history), toxic ingestions, electrolyte imbalance
- Assess for orthostatic blood pressure changes (lying, sitting, standing)
- If patient presents in shock, refer to [24.4.10 – Hypotension / Shock](#) protocol

24.4.2 – ALLERGIC REACTIONS / ANAPHYLAXIS

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂
- Oxygen — as needed to maintain SpO₂ > 94%

ALS

- Airway management
- IV Access
- Cardiac Monitoring

Medications:

- **Allergic reaction** (itching, swelling, urticaria):
 - **Diphenhydramine** 25 - 50 mg IV/IO/IM
 - **Albuterol** 2.5 - 5 mg nebulized PRN for wheezing
- **Anaphylaxis, WITHOUT hypotension** (respiratory distress, severe wheezing, stridor):
 - **Epinephrine** (1:1,000) 0.3 mg IM
 - **Diphenhydramine** 25 - 50 mg IV/IO/IM
 - **Methylprednisolone** 125 mg IV/IO
 - **Albuterol** 2.5 - 5 mg nebulized PRN for wheezing
- **Anaphylaxis, WITH hypotension** (systolic BP < 90):
 - Anaphylaxis medications as above, plus:
 - **Epinephrine** (1:10,000) 0.5 mg IV/IO Q5 minutes to maintain systolic BP > 90
 - Normal Saline 20 mL/kg fluid bolus, maintain systolic BP > 90

MEDICAL CONTROL OPTIONS

- **Epinephrine** infusion – 2 - 10 mcg/min, titrate to maintain systolic BP > 90
- **Dopamine** infusion – 10 - 20 mcg/kg/min, titrate to maintain systolic BP > 90

SPECIAL CONSIDERATIONS

- **Epinephrine** is relatively contraindicated in patients with known coronary artery disease, angina, or previous MI, except in hypotension, respiratory distress, or life-threatening conditions
- **Promethazine** (Phenergan) 12.5 - 25 mg slow IV/IO (25 mg deep IM) is to be used **only** if patient is allergic to diphenhydramine (Benadryl) and should not be used in anyone under the age of 16
- **Danger signs:** rapid progression of symptoms, respiratory distress (stridor, wheezing, dyspnea, increased work of breathing, persistent cough, cyanosis), abdominal pain, hypotension, chest pain, dysrhythmias

24.4.3 – ALTERED MENTAL STATUS

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂, BGL, Temperature, Lactate
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management
- IV access
- 12 lead ECG
 - If cardiac problem is detected, see corresponding cardiac protocol
- Perform Stroke assessment; if positive:
 - [See 24.3.10 - Cerebrovascular Accident \(CVA / Stroke\)](#)
- Spinal immobilization if trauma suspected / occurred
- If patient presents with hypoglycemia:
 - [See 24.4.5 – Diabetic Emergencies](#)
- Suspected narcotic use / overdose (e.g., RR < 12, pinpoint pupils, history of opiate use):
 - [See 24.4.12 – Overdose and Poison Ingestion](#)
- Hypotension:
 - [See 24.4.10 – Hypotension / Shock](#) protocol

SPECIAL CONSIDERATIONS

- For pregnant females, **Promethazine** 12.5 - 25 mg IV/IO first-line agent for nausea / vomiting
- Helpful mnemonic for acute AMS — “**DON’T**” — **D**extrose (hypoglycemia), **O**xygen, **N**arcan, **T**rauma
- Assess patient for seizure history and/or mediations
- Assess patient for underlying cause of AMS. Another helpful mnemonic is “**AEIOU-TIPS**”:
 - **A**cidosis or alcohol
 - **E**pilepsy or environmental (hypothermia or fever)
 - **I**nfection
 - **O**verdose or oxygen deficiency
 - **U**remia (renal failure)
 - **T**rauma
 - **I**nsulin (hyper or hypoglycemia)
 - **P**oisons or psychiatric
 - **S**hock, stroke, or STEMI
- Be prepared for a combative patient if reversal of opiate abuse with **Narcan**, as well as acute withdrawal syndrome (seizures or delirium)

24.4.4 – CARBON MONOXIDE INTOXICATION

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂, BGL, Temperature
- Oxygen — high flow **oxygen** via NRB mask regardless of high SpO₂% readings
- Cardiac monitoring

ALS

- Airway management
- IV access
- 12 lead ECG
- Stroke assessment
- Spinal immobilization if unknown trauma occurred

Medications:

- **Oxygen** via NRB mask **regardless of SpO₂% reading** — high flow prophylactic oxygen is needed

If patient shows signs of intoxication and has been exposed to carbon monoxide:

- Consider **CPAP** at 5 - 10 cmH₂O if patient can maintain patent airway
- Signs of intoxication include headache, erythema, slow capillary refill, shortness of breath

If patient is unconscious:

- Appropriate airway management with **high flow oxygen** (CPAP contraindicated if unconscious)
- Consider altered mental status protocol and reassess patient
- Minimize patient movement
- Transport patient to the closest facility

SPECIAL CONSIDERATIONS

- Notify hospital early if you are concerned about carbon monoxide poisoning
- For smoke inhalation patients, also **consider cyanide poisoning**:
 - See **Cyanide** section in [24.4.12 – Overdose and Poison Ingestion](#) protocol
- Patients may not experience severe respiratory distress with this disorder
- **SpO₂% readings are often misleading** due to the amount of carbon monoxide in the blood
 - Constant **high flow oxygen administration** is recommended

24.4.5 – DIABETIC EMERGENCIES

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2
- BGL check — before and after interventions
 - Alert patients with BGL < 70 may self-administer oral glucose paste or a sugared beverage
- Oxygen — as needed to maintain above 94%

ALS

- Airway management
- IV Access
- Cardiac Monitoring
- Stroke Assessment
- Spinal immobilization if or suspected trauma has occurred

Medications

- For mild **hypoglycemia** (BGL 60 - 80 mg/dL and verbally responsive):
 - Administer 1 tube of **oral glucose**
 - Recheck BGL after 15 minutes
- For severe **hypoglycemia** (BGL < 60, unresponsive, or suspect hypoglycemia despite glucometer):
 - **Dextrose 10% (D10)** 100 mL IV/IO
 - Repeat in 10 minutes if BGL remains < 60 mg/dL
 - **Glucagon** 1 mg IM/IN, if IV access cannot be obtained
 - Repeat in 10 minutes once for a MAX of 2 mg if needed
- For **hyperglycemia** (BGL > 400 mg/dL):
 - Normal Saline 20 mL/kg fluid bolus, then decrease to KVO
 - Monitor closely for fluid overload state
 - Recheck BGL intermittently

SPECIAL CONSIDERATIONS

- In diabetic patients with nausea, diaphoresis, pallor or unspecified pain, consider cardiac origin
 - Obtain 12 lead ECG (and [See 24.3.1 - Chest Pain – Suspected Cardiac](#) as needed)
- Investigate the cause of hypoglycemic episode for an underlying medical emergency
- If the patient is on **oral medications** — metformin (Glucophage), glyburide (Micronase), glipizide (Glucotrol), glimepiride (Amaryl), pioglitazone (Actos), or rosiglitazone (Avandia) — **medical control must be contacted** for refusal of transport before a waiver of refusal can be obtained

24.4.6 – DYSBARISM / DIVING ACCIDENTS

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring
- Spinal immobilization if unknown trauma occurred

ALS

- Airway management
- IV access
- Perform stroke assessment (see [24.3.10 - Cerebrovascular Accident \(CVA / Stroke\)](#) protocol)
- Keep patient warm
- Monitor for possible / developing tension pneumothorax

Medications

- **Oxygen 100% by NRB regardless of SpO₂% level**

MEDICAL CONTROL OPTIONS

- ***Fentanyl*** 25 - 50 mcg IV/IO/IN Q5 min PRN for pain, Max 150 mcg, hold if systolic BP < 90, OR
- ***Morphine*** 2 - 5 mg IV/IO Q5 min PRN for pain, Max 15 mg (contraindicated if systolic BP < 90)

SPECIAL CONSIDERATIONS

- Take caution with positive pressure ventilation (BVM, intubation), which may worsen a pneumothorax
- Transport to the closest appropriate ED
- For scuba diving injuries — **Divers Alert Network emergency hotline — 919-684-9111**

24.4.7 – GASTROINTESTINAL BLEEDING

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management
- IV access (2 large bore IV's suggested)

Vomiting blood:

- Monitor airway closely

Medications

- **Ondansetron** 4 mg IV/IO/SL (may repeat dose after 10 minutes) OR
- **Promethazine** 12.5 - 25 mg IV/IO (patient must be over 16 years old)
- Normal Saline 250 mL IV/IO boluses, hold at 1000 mL if no hypotension

For hypotension:

- Administer 20 mL/kg of Normal Saline IV/IO
- Repeat at 20 minutes if continued systolic BP < 90
- [See 24.4.10 – Hypotension / Shock](#) protocol for refractory hypotension

SPECIAL CONSIDERATIONS

- For pregnant females, use **Promethazine** 12.5 - 25 mg IV/IO as first-line agent for treatment of nausea
- Transport expeditiously

24.4.8 – HYPERTHERMIA

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- Move the patient to a cooler environment
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature (oral), BGL
- Cardiac monitoring

ALS

Elevated Temperature / Heat Cramps:

- Elevated temperature, but with normal mental status and other vital signs
- May have painful cramps of abdomen or extremities
 - Oral fluids as tolerated
 - Sponge with cool water or Normal Saline

Heat Exhaustion:

- Heat exposure with **severe symptoms** — dizziness, lightheadedness, headache, irritability, normal or diminished level of consciousness, decreased BP, tachycardia, normal or slightly elevated temperature
 - Remove outer layers of clothing
 - Sponge with cool water or Normal Saline
 - Keep supine
 - IV access
 - Normal Saline 20 mL/kg IV/IO as needed

Heat Stroke:

- Heat exposure with severe **alteration in mental status** or extremely high temperature (often > 104 °F)
 - Treatment as per heat exhaustion (see above), plus
 - Cold packs to axilla / groin / neck — if significant shivering, remove packs but continue fanning
- Monitor patient closely
- Rapid Transport

SPECIAL CONSIDERATIONS

- Patients under the care of a UF Sports Medicine physician with core temp > 105 °F may be provided a cold-water bath for 15 minutes. Afterwards, they will request a rescue for continued care and transport.
- If any other emergency medical conditions exist, EMS will remove patient from bath, take over care, and transport (referring to the appropriate protocol)

24.4.9 – HYPERTENSION

INFORMATION

A hypertensive emergency is defined as a systolic BP > 220 mmHg or a diastolic BP > 110 mmHg. EMS treatment of isolated hypertension can result in rapid lowering of blood pressure, which can lead to inadequate blood flow to vital organs. Instead, focus on addressing hypertension manifestations like chest pain or heart failure.

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals every 5 minutes — and before / after interventions — BP (obtain manual), Pulse, RR, SpO2
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management
- IV access
- Obtain 12 lead ECG

For systolic BP < 220 mmHg, diastolic BP < 110 mmHg, or asymptomatic with BP ≥ 220/110:

- Provide supportive care only
- Monitor blood pressure and evaluate for symptomatic changes

Severely symptomatic with systolic BP > 220 mmHg or diastolic BP > 110 mmHg:

- Includes severe chest pain, dyspnea, pulmonary edema / CHF, altered mental status
- **Chest pain or CHF / pulmonary edema:**
 - **Nitroglycerin** 0.4 mg SL Q5 minutes until symptomatic relief
 - Contraindicated if systolic BP < 130 mmHg
 - [See 24.3.1 - Chest Pain – Suspected Cardiac](#) or [24.3.3 - Congestive Heart Failure / Pulmonary Edema](#) protocol
- **If suspected stroke / CVA / TIA:**
 - **Do NOT treat hypertension** unless directed by Medical Control
 - For altered mental status, refer to [24.3.10 - Cerebrovascular Accident \(CVA / Stroke\)](#) protocol
- **Severe symptoms with BP > 220/110:**
 - Supportive care, or may consider **Labetalol** 0.2 mg/kg slow IV/IO Q10 minutes (Max dose 10 mg)
 - Contraindicated if bradycardia, AV blocks, heart failure, COPD, asthma, or wheezing
 - If choosing to treat, **goal blood pressure is 185/90 mmHg**
 - Use Labetalol with caution – rapid decreases below this level may cause organ damage

For hypertension associated with stimulant drug overdose (e.g. cocaine, methamphetamines):

- **Versed** 1 - 2 mg IV/IO/IM/IN (may repeat once)
- For overdose, refer to [24.4.12 – Overdose and Poison Ingestion](#) protocol

SPECIAL CONSIDERATIONS

- Goal is to **decrease BP by no more than 25% of the MAP** unless dictated by Medical Control
 - MAP – “Mean Arterial Pressure” = $[(2 \times \text{diastolic BP}) + \text{systolic BP}] / 3$
- Hypertension may be a symptom, rather than the cause, of an acute disease!
 - For instance, severe hypertension may help provide extra brain perfusion in stroke
 - **Rapid decreases in blood pressure can cause organ damage, ischemic events, or worsen stroke**
- Do not use Nitroglycerin if sexual enhancement medications were used in the previous 48 hours

24.4.10 – HYPOTENSION / SHOCK

INFORMATION

Shock is a life-threatening state of inadequate blood flow to vital tissues and organs. It can occur **with or without hypotension**. Shock is generally divided into four categories:

- **Distributive** shock — inappropriate dilation of blood vessels (e.g. **septic shock** or **anaphylactic shock**)
 - Includes **neurogenic** shock — brain / spinal cord injury causes inappropriate vasodilation
- **Hypovolemic** shock — inadequate circulating intravascular fluids, as seen in **hemorrhage** or **dehydration**
- **Cardiogenic** shock — “pump failure;” resembles CHF / pulmonary edema but with hypotension
- **Obstructive** shock — physical obstruction to cardiac output (e.g. **tamponade** or **tension pneumothorax**)

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP (manual), Pulse, RR, SpO2, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring
- Signs / symptoms of shock include:
 - Hypotension
 - Altered mental status
 - Tachycardia
 - Tachypnea
 - Skin changes: pallor, mottled, or cool and clammy skin
 - Delayed capillary refill
 - Diaphoresis
 - Orthostatic blood pressure changes

ALS

- Airway management
- IV access (ideally 2 large-bore)
- 12 Lead ECG

General approach to hypotension / shock:

- Normal Saline 250 mL IV/IO boluses until systolic BP > 90 mmHg and signs of shock improve
 - In general, 20 mL/kg Normal Saline IV/IO, may repeat once
 - Hold if development of pulmonary edema / severe fluid overload state
- For refractory hypotension despite > 20 mL/kg IV fluids delivered, see “**Refractory Hypotension**” below

Refractory Hypotension — despite > 20 mL/kg IV fluids delivered — or if pulmonary edema develops:

- **Norepinephrine** (Levophed) infusion: 0.5-16 mcg/min IV/IO
 - Infusion: 4 mg in 1000 mL NS or D5W (4 mcg/mL) delivered IV/IO; titrate to systolic BP \geq 90 mmHg

OR

- **Dopamine** infusion: 10 - 20 mcg/kg/min IV/IO and titrate to effective SBP
 - Infusion: 400 mg in 250 mL D5W (1600 mcg/mL, use 60 gtts); titrate to systolic BP \geq 90 mmHg

If the above are unavailable:

- **Epinephrine** infusion: 2 - 10 mcg/min IV/IO
 - Infusion: 2 mg in 250 mL NS or D5W (8 mcg/mL, use 60 gtts); titrate to systolic BP \geq 90 mmHg

Hypovolemic shock (dehydration, hemorrhage):

- For dehydration or controlled hemorrhage:
 - Normal Saline 20 mL/kg IV/IO (may repeat once) to achieve systolic BP > 90 mmHg
 - Frequently reassess lung sounds
- For uncontrolled hemorrhage:
 - Control of external hemorrhage
 - Normal Saline 250 mL IV boluses to maintain peripheral pulses
- For refractory hypotension despite > 20 mL/kg IV fluids delivered (or if pulmonary edema develops), see “Refractory Hypotension” above

Distributive shock:

- For suspected **septic shock**, see [24.4.17 – SEPSIS](#) protocol
 - Fluid bolus Normal Saline 20 mL/kg IV/IO
 - May repeat fluid bolus Normal Saline 20 mL/kg IV once
 - If no improvement after fluid challenge, move to “Refractory Hypotension” above
- For suspected **anaphylactic shock**, see [24.4.2 – Allergic Reactions / Anaphylaxis](#) protocol
 - Normal Saline 20 mL/kg IV/IO to achieve systolic BP > 90 mmHg
 - **Epinephrine** (1:1,000) 0.3 IM
 - **Diphenhydramine** 25 - 50 mg IV/IO/IM
 - **Albuterol** 2.5 - 5 mg nebulized PRN for wheezing
 - **Methylprednisolone** (Solu-Medrol) 125 mg IV/IO
 - If hypotension persists:
 - **Epinephrine** (1:10,000) 0.5 mg IV/IO Q5 min to maintain systolic BP > 90
- For suspected **neurogenic shock**, see “general approach to hypotension / shock” above
 - Patient may be bradycardic or normal pulse with warm skin despite hypotension
 - Manage airway while maintaining C-spine immobilization
 - Consider full spinal immobilization on LSB
 - Administer oxygen regardless of saturation level
 - Keep patient warm

Cardiogenic shock (CHF):

- Manage airway by positioning patient upright if tolerated
- Normal Saline IV/IO 100 mL initial challenge
- If SBP improves, continue **cautious** fluid boluses until no further improvements or SBP 90 - 100 mmHg
- If no improvement after fluid challenge, move to “Refractory Hypotension” above

SPECIAL CONSIDERATIONS

- **“Fill the tank” before administering vasopressors!** Patients should receive copious fluid resuscitation (generally, 20 to 40 mL/kg IV Normal Saline) prior to vasopressors
 - Providing vasopressors without adequate fluid resuscitation can lead to limb or organ necrosis
- Prior to infusions, ensure that the IV is in place and **flushes and draws blood easily**. If there is any concern for infiltration, then the infusion should be administered via IO.
 - Infiltration of vasopressors outside an IV can lead to **limb-threatening necrosis**
 - Evidence of infiltration needs to be marked and the **receiving facility notified immediately**
- If significant trauma or severe illness, **do NOT** delay transport to obtain vascular access
- In general, a **normal systolic BP in pediatrics** is **70 + (age x 2)**

24.4.11 – HYPOTHERMIA

BLS

- Initiate basic medical care (**See [24.2.1 - Basic Medical Care](#)**)
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature (oral), BGL
- Assess vitals over one minute before declaring absent
- Remove patient from cold environment
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management
- IV access
- 12 lead ECG
- Warm patient in patient compartment of truck

Core Temperature > 95 °F:

- Remove wet or cold clothing, wrap patient in blankets
- Warm IV Normal Saline (if possible) 250 mL boluses up to MAX 1000 mL

Core Temperature < 95 °F:

- Remove wet or cold clothing, wrap patient in blankets
- Warm IV Normal Saline (if possible) 250 mL boluses up to MAX 1000 mL
- Treat cardiac dysrhythmias per appropriate cardiac protocol

Frostbite (local hypothermia)

- Handle injured part gently; leave uncovered
- Do not allow injured part to thaw if chance exists for the part to refreeze before arrival at ED

SPECIAL CONSIDERATIONS

- Handle patient gently; the hypothermic heart is irritable and ventricular arrhythmias may occur
- Shivering stops below 90 °F (32 °C) and below this the patient may have a precipitous decline
 - Below 88 °F (31 °C), ventricular fibrillation is a common cause of death
- No cardiac arrest should undergo termination of resuscitation until the hypothermia is resolved

24.4.11 – NAUSEA AND VOMITING

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History – OPQRST, SAMPLE
- Vitals — BP, Pulse, RR, SpO2, Temperature
- Oxygen — maintain above 94%
- Nothing by mouth

ALS

- Acquire 12 lead ECG
- IV access
- Cardiac monitoring

Medications:

- **Ondansetron** 4 mg IV/IO/SL (may repeat dose after 10min) OR
- **Promethazine** 12.5 – 25 mg IV/IO (patient must be over 16 years old)

SPECIAL CONSIDERATIONS

- For pregnant females, use **Promethazine** 12.5 – 25 mg as first-line agent for treatment of nausea
- Consider life-threatening problems that may present with nausea and vomiting: STEMI, sepsis, GI bleeding, DKA, acute appendicitis, toxic ingestion, electrolyte imbalance
- Assess for orthostatic blood pressure changes (lying, sitting, standing)
- If patient presents in shock, refer to [24.4.10 – Hypotension / Shock](#) protocol
- If showing signs of dehydration and no history of CHF:
 - Consider Normal Saline 250 mL IV/IO boluses (stop at 1000 mL if no hypotension)

24.4.12 – OVERDOSE AND POISON INGESTION

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management
- 12 lead ECG
- IV access
- Determine agent, time, amount of ingestion, and circumstances of event
- Retain and transport any pill bottles, containers, or other identifying material
- Notify CCC to contact Florida Poison Control (1-800-222-1222) and to advise of your destination hospital

General approach:

- For wide-complex QRS, **Sodium Bicarbonate** 1mEq/kg IV, Repeat once more in 5 to 10 minutes
- Refer to the appropriate protocol if the follow occurs:
 - [24.3.8 - Dysrhythmia – Tachycardia with a Pulse](#)
 - [24.3.7 - Dysrhythmia - Bradycardia](#)
 - [24.4.3 – Altered Mental Status](#)
 - [24.4.16 – Seizures](#)
 - [24.4.11 – Nausea and Vomiting](#)

TRICYCLIC ANTIDEPRESSANTS

Signs and symptoms:

- Tachycardia, bradycardia, ventricular arrhythmias (wide QRS), shock, hypotension, cardiac arrest

Examples:

- Amitriptyline, Amoxapine, Desipramine (Nopramin), Imipramine (Tofranil), Protriptyline (Vivactil), Trimipramine (Surmontil)

Treatment:

- Hyperventilation (alkalization)
- **Sodium Bicarbonate** 1 mEq/kg IV (may repeat in 10 minutes)

CHOLINERGIC POISONING

Precautions:

- May result from inhalation or topical exposure. Extreme caution to responding units. Patient must be **decontaminated** prior to transport.

Signs and symptoms:

- **SLUDGE:** Salivation, Lacrimation, Urination, Diaphoresis, GI upset, Emesis

Examples:

- Organophosphates (pesticides), carbamate, nerve agents

Treatment:

- HAZMAT alert if needed
- Supplemental O2
- Remove all contaminated clothing and flush toxic chemicals
- **Atropine** 2 mg IV/IO Q 5 min — titrate dosing to improvement in respiratory / bronchial secretions

ACETAMINOPHEN

Precautions:

- If possible, determine amount ingested. Dosing of antidote is based on amount ingested.
- Toxic level is > 140 mg/kg or > 7.5 grams in an adult

Signs and symptoms:

- Nausea, vomiting, stomach pain, low appetite. Patient may have no symptoms despite toxic overdose.

Examples:

- Tylenol

Treatment:

- Rapid transport

DIGOXIN

Signs and symptoms:

- Bradycardia, SVT, ventricular arrhythmias (wide-complex), shock, cardiac arrest

Examples:

- Digoxin, Digi-toxin, Foxglove, Oleander

Treatment:

- **Magnesium Sulfate** 2 grams slow IV/IO

CYANIDE

Signs and symptoms:

- Headache, altered mental status, confusion, seizures, coma, dyspnea, respiratory distress, chest pain, nausea / vomiting, hypertension, hypotension, shock, cardiovascular collapse, cardiac arrest

Examples:

- Known smoke inhalation / cyanide exposure

Treatment:

- Transport expeditiously
- Contact District Chief to request **CyanoKit** (see [24.8.20 – CyanoKit \(Hydroxocobalamin for Injection\)](#) protocol)

METHANOL, ETHYLENE GLYCOL, TOXIC ALCOHOLS

Signs and symptoms:

- Known ingestion / exposure

Examples:

- Antifreeze, Methanol, Ethylene glycol, Rubbing alcohol

Treatment

- Transport expeditiously

ACUTE DYSTONIC REACTION / ANTIPSYCHOTICS

Signs and symptoms:

- Known ingestion
- Extrapyrimalidal symptoms:
 - Dystonia — continuous spasms and muscle contractions
 - Dyskinesia — slow or jerky movements
 - Akathisia — motor restlessness

Examples:

- Haloperidol, Prolixin, Thorazine, Prochlorazine / Compazine, Promethazine / Phenergan

Treatment:

- **Diphenhydramine** 50 mg IV

BETA BLOCKERS

Signs and symptoms:

- Known ingestion, bradycardia, hypotension, bronchospasm, altered mental status, cardiac arrest

Examples

- Propranolol, Atenolol / Tenormin, Metoprolol / Lopressor, Nadolol / Corgard, Timolol / Blocadren, Labetalol / Trandate, Esmolol / Brevibloc

Treatment

- If SBP < 90 mmHg, altered mental status, bradycardia, 2nd or 3rd degree heart block:
 - **Atropine** 0.5 mg IV/IO Q3 min as needed, MAX 3 mg
 - No response — **Calcium Chloride** 1 gram slow IV/IO (contraindicated with Digoxin use)
 - May repeat once if no relief
 - No response — **Glucagon** 1 - 3 mg IV/IN, may repeat once if no relief
 - No response OR 2nd or 3rd degree heart block, begin transcutaneous pacing

CALCIUM CHANNEL BLOCKERS

Signs and symptoms:

- Known ingestion, bradycardia, hypotension, bronchospasm, altered mental status, cardiac arrest

Examples:

- Amlodipine / Norvasc, Nifedipine / Procardia / Adalat, Felodipine / Pendil / Rendil, Verapamil / Calan, Isradipine / Dynacirc, Diltiazem / Cardizem, Nicardipine / Cardene

Treatment:

- If SBP < 90 mmHg, altered mental status, bradycardia, or 2nd or 3rd degree heart block:
 - **Atropine** 0.5 mg IV/IO Q3 min as needed, MAX 3 mg
 - No response — **Calcium Chloride** 1 gram slow IV/IO (contraindicated with Digoxin use)
 - May repeat once if no relief
 - No response — **Glucagon** 1 - 3 mg IV/IN, may repeat once if no relief
 - No response OR 2nd or 3rd degree heart block, begin transcutaneous pacing

BENZODIAZEPINES

Signs and symptoms:

- Known ingestion, central nervous system, depression, slurred speech, respiratory depression, ataxia, impaired balance, altered mental status

Examples:

- Diazepam / Valium, Estazolam / ProSom, Flurazepam / Dalmane, Lorazepam / Ativan, Alprazolam / Xanax, Clonazepam / Klonopin

Treatment

- Airway management
- IV Normal Saline
- Prompt transport

STIMULANTS / SYMPATHOMIMETIC

Signs and symptoms:

- Known ingestion, tachycardia, SVT, ventricular arrhythmias, hypertension, shock, cardiac arrest, agitation, altered mental status

Examples:

- Amphetamines, methamphetamine, cocaine, phenylclidine (PCP)

Treatment:

- Airway management
- IV Normal Saline
- Versed 1 - 2mg slow IV/IO/IN/IM (may repeat once)

OPIATES

Signs and symptoms:

- Known ingestion, pinpoint pupils, slow respiratory drive, hypotension, altered mental status

Examples:

- Heroin, Fentanyl, Methadone, Morphine, Oxycodone, Hydrocodone, Oxycontin, Codeine

Treatment:

- Airway management
- **Narcan** 0.4 - 2 mg IV/IO/IN/IM
 - Repeat as necessary for improvement in respiratory drive

DRUG OVERDOSE CHART

Drug Class/Examples	Cardiovascular Signs of Toxicity	Treatment to Consider
<u>Stimulants, Sympathomimetic</u> Amphetamines Methamphetamine Cocaine Phencyclidine (PCP)	Tachycardia* Supraventricular & ventricular arrhythmias Hypertension Acute coronary syndromes Shock Cardiac arrest	Benzodiazepines Lidocaine Sodium Bicarb Propranolol & other nonselective β -blockers maybe harmful and controversial
<u>Calcium Channel Blockers</u> Verapamil Nifedipine Diltiazem	Bradycardia Impaired condition Shock Cardiac arrest	Mixed α -/ β -agonist Pacemaker Calcium infusions Insulin euglycemia
<u>β-Adrenergic Receptor Blockers</u> Propranolol Atenolol	Bradycardia Impaired condition Shock Cardiac arrest	Pacemakers Mixed α -/ β agonist Glucagon, insulin Insulin euglycemia
<u>Tricyclic Antidepressants</u> Amitriptyline Desipramine Nortriptyline	Tachycardia Bradycardia Ventricular arrhythmias Impaired conduction Shock, Cardiac arrest	Sodium Bicarb Mixed α -/ β agonist or α -agonist Lidocaine
<u>Cardiac Glycosides</u> Digoxin Digitoxin Foxglove Oleander	Bradycardia Supraventricular / ventricular arrhythmias Impaired conduction Shock, Cardiac arrest	Digoxin-specific fragments (Digibind) Magnesium Pacemaker
<u>Anticholinergics</u> Diphenhydramine Doxylamine	Tachycardia Supraventricular / ventricular arrhythmias Impaired conduction Shock, Cardiac arrest	Physostigmine
<u>Cholinergic</u> Carbamate Nerve agents Organophosphates	Bradycardia Ventricular arrhythmias Impaired conduction, Shock Pulmonary edema, Bronchospasm Cardiac arrest	Atropine Decontamination Pralidoxime Obidoxime

Drug Class/Examples	Cardiovascular Signs of Toxicity	Treatment to Consider
<u>Opiates</u> Heroin Fentanyl Methadone	Hypoventilation Bradycardia, Hypotension	Naloxone Nalmefene
<u>Isoniazid</u>	Lactic acidosis with / without seizures Tachycardia Bradycardia Shock, Cardiac arrest	Pyridoxide (Vitamin B6)
<u>Sodium Channel Blockers</u> Type 1A antiarrhythmics Propranolol Verapamil Tricyclic antidepressants	Impaired conduction Bradycardia Ventricular arrhythmias Seizures Shock, Cardiac arrest	Sodium Bicarb Pacemakers α -/ β Agonist Lidocaine Hypertonic saline

24.4.13 – PAIN MANAGEMENT

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST
- Vitals — before and after interventions — BP, Pulse, RR, SpO2
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- IV access

Analgesic agents may be administered for patients experiencing severe pain from any one of the following:

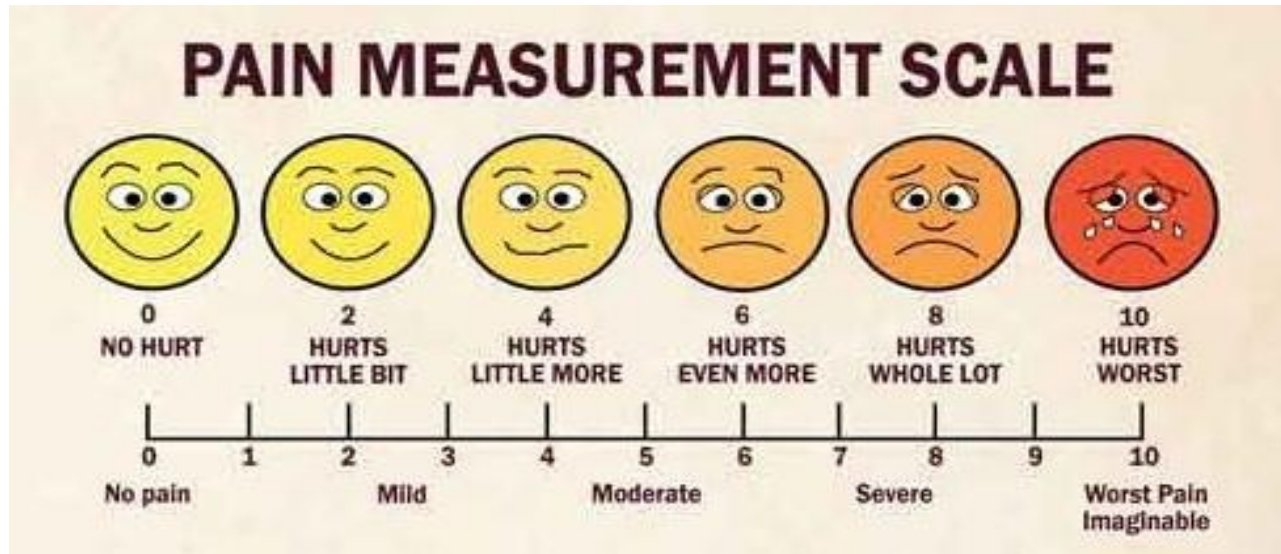
- Isolated extremity injury (suspected fractures, dislocations, and animal bites)
- Large lacerations or road rash
- Burns without airway, breathing, or circulatory compromise
- Sickle cell disease with pain that is typical for that patient's pain crisis
- Acute back pain or spasm
- Severe abdominal pain
- Flank or abdominal pain concerning for kidney stone

Medications

- **Fentanyl** 25 - 50 mcg IV/IO/IN Q5 min PRN, up to MAX 150 mcg, hold if systolic BP < 90
OR
- **Morphine** 2 - 5 mg IV/IO/IM Q 10 min PRN, MAX 15 mg, hold if systolic BP < 90
OR
- **Toradol** 30 mg IVP/IO X1 for suspected kidney stone (nephrolithiasis) pain
 - **Not used if there is history of renal disease**
 - **Not used in trauma due to possible internal bleeding**
- May treat nausea with:
 - **Ondansetron** (Zofran) 4mg IV/IO/SL
OR
 - **Promethazine** (Phenergan) 12.5 - 25 mg IV/IO (patients > age 16 or pregnant)

SPECIAL CONSIDERATIONS

- Contraindications:
 - Hypotension (systolic BP < 90), altered mental status, respiratory distress, medication allergy, pain is chronic, headache
- Considerations:
 - Chest pain should be treated per [24.3.1 - Chest Pain – Suspected Cardiac](#)



24.4.14 – PSYCHIATRIC DISTURBANCES / EXCITED DELIRIUM

BLS

- Initiate basic medical care (**See 24.2.1 - Basic Medical Care**)
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management
- IV access
- Assess patient for any medical problem or traumatic injury
- Call law enforcement for assistance if concerns of violent behavior

Medications

- **Versed** 1 - 2 mg IV/IO/IM/IN, may repeat once
- **Haldol** 2.5 - 5 mg IV/IO/IM, Max 10 mg
- Physical restraints if needed

SPECIAL CONSIDERATIONS

- A psychiatric disturbance is acute mental distress or disability NOT associated with a medical condition
- Excited Delirium may feature: agitation, anxiety, hallucination, disorientation, violent and bizarre behavior, insensitivity to pain, elevated body temp, or superhuman strength
- Always involve law enforcement if the patient may present a significant danger to him/herself, bystanders, or towards EMS
- Restrain patients in the supine or lateral recumbent position only, using no excessive force
 - **Never** allow patients to be restrained in the “hog tied” position
- Any patient who is psychotic or **could** present a danger to personnel will be transported with 2 personnel in the patient compartment
- Restrained patients must have cardiac monitor attached during transport and close monitoring of airway

24.4.15 – RESPIRATORY DISTRESS

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management
 - Observe for signs of respiratory failure: hypoxia despite 100% oxygen, poor respiratory effort, altered mental status / diminished LOC, inability to protect airway
- IV access
- 12 lead ECG
- **CPAP** if initial symptoms are severe ([24.8.9 – Continuous Positive Airway Pressure \(CPAP\)](#)):
 - Use manufacturer settings for asthma / COPD or CHF — generally 5 - 10 cmH2O
 - Brief pauses are acceptable to administer medications
- Consider whether dyspnea is a chest pain / angina equivalent:
 - If so, administer **Aspirin** 325 mg PO

Acute bronchospasm (wheezing or history of asthma or COPD):

- **Albuterol** 2.5 – 5 mg nebulized; may repeat as needed during transport if HR < 160
- If patient does not improve with Albuterol (home or EMS):
 - **Albuterol** 2.5 mg and **Ipratropium** 0.5 mg nebulized
- **Methylprednisolone** 125 mg IV/IO
- Consider CPAP at 5 cmH2O

Acute pulmonary edema (history of CHF, lower extremity edema, elevated systolic BP, wet lung sounds):

- **Nitroglycerin** 0.4 mg SL; may repeat as needed every 5 minutes
 - Contraindicated if systolic BP < 130 mmHg, evidence of inferior MI, or sexual enhancement medication (Viagra, Levitra, Cialis) use within 48 hours
- Consider CPAP at 5 - 10 cmH2O
- If patient develops wheezing in addition to CHF symptoms:
 - **Albuterol** 2.5 mg and **Ipratropium** 0.5 mg nebulized
- See [24.3.3 - Congestive Heart Failure / Pulmonary Edema](#) protocol

Foreign body obstruction suspected:

- Attempt suction and removal with Magill forceps if directly visualized
- Observe for impending respiratory failure
- If unconscious or unresponsive:
 - Give a series of 30 chest compressions, then inspect for object in airway before attempting BVM
 - If unsuccessful after one series of compressions and ventilations, attempt to directly visualize and remove object with laryngoscope and Magill forceps

Drowning:

- Spinal immobilization as indicated for evidence of trauma
- Thorough suctioning of airway
- Consider CPAP at 5 - 10 cmH₂O for patients with significant hypoxia or dyspnea
- Airway management as needed for respiratory failure
- Keep patient warm and transport expeditiously

Croup or epiglottitis (infectious upper airway obstruction):

- 100% oxygen via NRB mask
- Calm patient and keep in position of comfort
- If SpO₂ is consistently < 90% with labored breathing, contact Medical Control

MEDICAL CONTROL OPTIONS

- Refractory bronchospasm / wheezing / COPD / asthma:
 - **Magnesium sulfate** 1 - 2 grams slow IV/IO over 5 minutes
 - **Epinephrine** (1:1000) 0.3 mg IM in lateral thigh
- Croup or Epiglottitis: **Epinephrine** 0.5 mg in 2 mL Normal Saline nebulized

SPECIAL CONSIDERATIONS

- CPAP indicated only if SBP is > 100 mmHg — contact medical control if SBP is < 100 mmHg
 - Record vitals every 5 minutes with CPAP use

24.4.16 – SEIZURES

BLS

- Initiate basic medical care (**See [24.2.1 - Basic Medical Care](#)**)
- History – OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring
- Protect patient from injury
- Immobilization if trauma occurred / indicated

ALS

- Airway management
- IV access

Medications:

- For repeated seizures OR seizures lasting longer than 2 minutes:
 - **Versed** 1 - 2 mg IV/IO/IM/IN
 - May repeat dose every 2 min if seizure activity persists, Max 10 mg

MEDICAL CONTROL OPTIONS

- If prolonged transport time and/or seizure is refractory to Versed:
 - **Lidocaine** 1 mg/kg slow IV/IO

SPECIAL CONSIDERATIONS

- Consider reason for seizure activity. Example: poisoning, overdose, low BGL, or eclampsia
 - Refer to the appropriate protocol for correct treatment and management of seizures
- Prepare to manage airway in case of decreased respiratory status after Versed use

24.4.17 – SEPSIS

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management
- Continuous monitoring of non-invasive ETCO₂
- Determine if patient meets SEPSIS Alert criteria (see below)
- 12 lead ECG
- IV access
- Fluid bolus Normal Saline 20 mL/kg IV/IO
 - May repeat fluid bolus Normal Saline 20 mL/kg IV once
 - If no improvement after fluid challenge, move to Refractory Hypotension below

Sepsis Alert criteria:

- **Concern for infection** (cough, malodorous or painful urine, rash, abdominal pain, etc.)

AND

- **Two or more Systemic Inflammatory Response Syndrome (SIRS) symptoms:**
 - **Temperature** ≥ 100.4 °F (38.0 °C) or < 96.8 °F (36.0 °C)
 - **Heart rate** ≥ 90 beats per minute
 - **Respiratory rate** ≥ 20 breaths per minute
 - White blood cell count of $\geq 12,000$ or $\leq 4,000$, or $\geq 10\%$ bands (if lab results available)

AND

- **Signs of end-organ damage (any one of the following):**
 - **Hypotension** (systolic BP ≤ 90)
 - **ETCO₂** ≤ 25 mmHg or Lactate > 4 mmol/L
 - **Modified shock index (HR / Systolic BP)** > 1.3 or < 0.7
 - Neurological changes (altered mental status, coma, agitation, lethargy)
 - Respiratory changes (hypoxia, dyspnea)
 - Circulatory changes (poor capillary refill, ECG changes, pulmonary edema)
 - Renal changes (decreased urination, anuria, high creatinine)
- **Sepsis Alert** may also be issued based on paramedic discretion

Refractory hypotension — despite > 20 mL/kg IV fluids delivered — or if pulmonary edema develops:

- **Norepinephrine** (Levophed) infusion: 2 - 20 mcg/min IV/IO
 - Infusion: 4 mg in 250 mL D5W (16 mcg/mL) delivered IV/IO; titrate to systolic BP \geq 90 mmHg
- OR**
- **Dopamine** infusion: 10 - 20 mcg/kg/min IV/IO
 - Infusion: 400 mg in 250 mL D5W (1600 mcg/mL, use 60 gtts); titrate to systolic BP \geq 90 mmHg

If the above are unavailable:

- **Epinephrine** infusion: 2 - 10 mcg/min IV/IO
 - Infusion: 2 mg in 250 mL NS or D5W (8 mcg/mL, use 60 gtts); titrate to systolic BP \geq 90 mmHg

SPECIAL CONSIDERATIONS

- **“Fill the tank” before administering vasopressors!** Patients should receive copious fluid resuscitation (generally, 20 to 40 mL/kg IV Normal Saline) prior to vasopressors.
 - Providing vasopressors without adequate fluid resuscitation can lead to limb or organ necrosis.
- If significant trauma or severe illness, **do NOT** delay transport to obtain vascular access
- **Sepsis may present without fever or other signs of infection.** Signs and symptoms of poor perfusion with a suspected infectious source (urosepsis, pneumonia, bacteremia) are still concerning!
 - Fluid resuscitation and a Sepsis Alert should be initiated
- Immunosuppressed patients are at high risk for infection:
 - Immunocompromised states include: cancer, HIV, organ transplant, chronic steroids, recent surgery, indwelling foreign body (Foley catheters, IV line, External fixator), or being bed-bound
- **Systemic Inflammatory Response Syndrome (SIRS)** refers to the body's inflammatory response to a nonspecific insult, a complex cascade of events
 - **SIRS** can be caused by ischemia, inflammation, infection, trauma or a combination of insults
 - **Sepsis** is the systemic response to infection: **SIRS with a documented or presumed infection**
- Alachua County Fire Rescue and UF Health have entered into a research partnership in obtaining Lactate levels for patients that are suspected to be Septic with the Lactate scout monitors. This monitor is **not FDA approved, cannot be utilized to diagnose Sepsis**, and will only be utilized for research purposes.
 - A lactate level shall be obtained for patients who meet the criteria for sepsis alert.
 - This value should **not** be shared with the receiving hospital. It will be documented in the EMS Run Report for research purposes only.

24.4.18 – SNAKE BITE

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — BP, Pulse, RR, SpO2
- Oxygen — maintain above 94%
- Cardiac monitor
- Remove all jewelry immediately
- Irrigate bite area with Normal Saline or water
- **Outline edema, erythema, or ecchymotic area with pen and note time**
- Immobilize bite area and minimize all movement
 - Keep level with heart and place gently compressive (not restrictive / tourniquet) dressing

ALS

- Airway management (monitor closely)
- IV access (2 IV's preferred)
- Cardiac monitoring
- Assess degree of envenomation and type of snake, and advise MD at facility

Medications:

- Normal Saline IV/IO TKO
- **Fentanyl** 25 - 50 mcg IV/IO/IM PRN severe pain, Max 150 mcg, hold if SBP < 90,

If allergic reaction or anaphylaxis:

- [See 24.4.2 – Allergic Reactions / Anaphylaxis](#) protocol

If hypotension or shock:

- [See 24.4.10 – Hypotension / Shock](#) protocol

Notify Medical Control early for signs of systemic effects (syncope, altered mental status, vomiting, shock, or pain not localized to the wound).

SPECIAL CONSIDERATIONS

- **Don't apply a tourniquet** — concentrates venom to cause greater damage
- **Don't apply ice** — a factor contributing to amputation
- **Don't cut the wound** or attempt to remove venom
- **Don't attempt to capture the snake** — at most, consider a camera phone picture at a distance

Snakes can envenomate even after death or decapitation! Venomous snakes generally fall in two families:

- **Crotalids** — rattlesnake, copperhead, cottonmouth, pit viper
- **Elapids** — coral snake (“red on yellow, kill a fellow”)

24.4.19 – TASER REMOVAL

BLS

- Initiate basic medical care (**See 24.2.1 - Basic Medical Care**)
- History – OPQRST, SAMPLE
- Vitals — BP, Pulse, RR, SpO2
- Oxygen — maintain above 94%
- Cardiac monitor

ALS

- Confirm scene safety with LEA
- Probes that have penetrated a “sensitive area” such as the head, neck, spinal column, groin, or breast tissue of a female will not be removed by EMS or LEA and will require transport
- To remove probes from an area not specified above (for stable patients):
 - Place one hand on the patient in the area where the probe is embedded to stabilize the skin
 - Place second hand firmly around the probe
 - In one fluid motion, pull the probe straight out of the puncture site
 - If resistance is met, leave the probe in place and transport
 - Repeat procedure on remaining probe(s)
- Handle probes as a bio-hazard sharp, with the exception that the officer may request the probe be turned over to him/her for entry as evidence

ALL PATIENTS SHALL EITHER BE TRANSPORTED OR A WAIVER OF REFUSAL OBTAINED.

SPECIAL CONSIDERATIONS

DO NOT DELAY TRANSPORT IF ONE OR MORE OF THE FOLLOWING EXIST:

- Unconscious patient
- Evidence of progressing excited delirium
- Persistent abnormal vital signs
- History / physical exam findings consistent with amphetamine / hallucinogenic drug use
- Altered level of consciousness, aggressive or violent behavior
- Evidence of hyperthermia



24.5 – TRAUMA PROTOCOLS

24.5.1 – TRAUMA

BLS

- Initiate basic medical care (**See 24.2.1 - Basic Medical Care**)
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2
- Oxygen — maintain above 94%
- Spinal immobilization— C-collar / long spine board per spinal immobilization protocol
- Cardiac monitor

Airway management:

- Use jaw thrust to open airway if suspected spinal injury
 - Consider airway adjuncts (OPA, or NPA if no facial trauma)
 - Maintain airway with immobilization of C-spine
 - Do not use head tilt-chin lift maneuver if neck injury is suspected

Breathing:

- Assist in ventilations as necessary if rate is < 12 or > 28 with BVM with high flow oxygen

Circulation:

- Identify and control any major bleeding
 - Apply direct pressure, elevate, pressure point, pressure bandage
 - Consider tourniquet use if bleeding is still not controlled
- Perform rapid trauma assessment to identify life-threatening injuries
- Inspect head, neck, back, chest, abdomen, pelvis, upper and lower extremities, groin for “**DCAP-BTLS**”:
 - **D**eformities, **C**ontusions, **A**brasions, **P**unctures, **B**urns, **T**enderness, **L**acerations, **S**welling
- Assess neurologic status (AVPU)
 - **A**lert, **V**erbal (responds to voice), **P**ain (responds to pain), **U**nresponsive (no response)
- Check pupils (PERRL — pupils equal, round, and reactive to light)

Open chest wound:

- Cover with gloved hand, place Vaseline-soaked 4x4 gauze over wound, and tape on **three sides only**

Abdomen / pelvis:

- Assess for rigidity, rebound and/or tenderness, assess for penetrating wounds

Upper / lower extremities:

- Check PMS (**P**ulse, **M**otor, **S**ensation) before and after splinting extremities
- Femur fractures (mid-shaft) may be immobilized with traction splints
- If distal pulse deficits are noted, reduce fracture in anatomical alignment and splint in most appropriate fashion — clearly **document lack of pulse** and **make hospital staff aware**
- Facilitate air splints, ladder splints, or boards splints to immobilize the joints above and below the injury
- Place cold packs on suspected fracture sites if time and resources allow
- If critically injured, utilize long spine board as “total body splint” — time and resource efficient

ALS

- IV access (ideally 2 large bore IV's)
- 12 lead ECG

Airway management:

- Assess patency
- Use airway adjuncts if not contraindicated to maintain patency (OPA, NPA)
- Consider / perform airway management as needed (BVM, I-Gel, King LT, ETT, nasal intubation)
- Nasal intubation contraindications in the trauma patient:
 - Apnea
 - Presence of midface fractures
 - Significant neck trauma with possible disruption of the airway
 - Known bleeding disorders
- Confirm proper tube placement with continuous ETCO₂ wave form monitoring and reading

REMOVE ET TUBE IF NO CONSISTENT CAPNOGRAPHY WAVEFORM AND READING IS PRODUCED.

- If intubation is unsuccessful, and mechanical obstruction prevents ventilation via BVM or other device, perform surgical cricothyrotomy (**See 24.8.3 – Cricothyrotomy, Surgical**)

Breathing:

- Ventilate at a rate of 12 - 14 breaths/minute with high flow oxygen via BVM if ventilation is inadequate
- Hyperventilate at 20 - 22 breaths/min if evidence of herniation (decerebrate or decorticate posturing)
- Intubated patients: ventilate to an ETCO₂ target of 35 - 45mmHg using waveform capnography

Tension pneumothorax:

- A simple traumatic pneumothorax does not need an emergent needle decompression
- **Needle decompression** is performed when **severe signs and symptoms of pneumothorax** are present:
 - **Diminished or absent breath sounds, AND**
 - **Signs of tension physiology** — Anxiety or agitation, cyanosis, respiratory distress, distended neck veins, JVD, hypotension, cool or clammy skin, altered mental status, tracheal deviation
- Perform **needle decompression** of the chest (**See** Chest Decompression protocol):
 - Second intercostal space on the affected side in the midclavicular line or
 - Fourth intercostal space on affected side in midaxillary line
 - With a 14 - 16-gauge (3 cm) catheter perpendicular to the skin and over the inferior rib
 - **Leave catheter in place**

Circulatory:

- Maintain SBP of 90 - 100 mmHg
- Refer to **24.4.10 – Hypotension / Shock** protocol as needed
- If hypotensive, make no more than 2 attempts and/or 90 seconds at IV access before resorting to IO use

Re-assess:

- Continue secondary assessment
- Reassess any interventions
- Notify receiving hospital early regarding critical patients or those meeting Trauma Alert criteria
- **ALL TRAUMA PATIENTS SHOULD BE EVALUATED USING THE STATE TRAUMA SCORECARD**

Pain management:

- **Fentanyl** 25 - 50 mcg IV/IO for isolated extremity pain, Q5 min PRN, Max 150 mcg, hold if SBP < 90
OR
- **Morphine** 2 - 5 mg IV/IO for isolated extremity pain, Q5 min PRN, Max 15 mg, hold if SBP < 90

OB / pregnant trauma patients:

- A **Trauma Alert** will be called, with transport to the closest trauma center, for any **pregnant female > 20 weeks gestation** that has been **involved in an MVC at >35 MPH** and/or **rollover, ejection, steering wheel deformity** or if the patient was involved in trauma with a **significant MOI** that leads to a high index of suspicion
 - As a general rule, the uterus can be felt at the level of the belly button by 20 weeks gestation
- Assess patient for uterine contractions, vaginal bleeding, and amniotic rupture
- Transport patient with **right side elevated 15°** to decrease pressure on the inferior vena cava
 - Place pillows under the right side of the backboard to tilt the board in the immobilized patient
 - If unable, you may manually displace the uterus to the left to relieve pressure on the vena cava
- Most common cause of fetal death is maternal death — **treatment of the mother always comes first**

Traumatic cardiac arrest:

- Consider **bilateral needle decompression** of the chest (See **24.8.10 – Chest Decompression** protocol)
- See **24.3.4 - Cardiac Arrest Management** protocol

ADULT TRAUMA TRIAGE CRITERIA AND METHODOLOGY

Assess patients **sixteen (16) years of age or older** for the presence of at least one of the following four criteria to determine whether to transport as an adult trauma alert. These four criteria are to be applied in the order listed. **If even one criterion is met, the patient is identified as an adult trauma alert.**

<u>Criteria</u>		
1. Meets color-coded triage system (see below) – any one red criteria or two blue criteria 2. GCS < 12 – (must be evaluated via GCS if not identified as a trauma alert by criterion 1) 3. Meets local criteria: Pregnant females ≥ 20 weeks gestation with MVC > 35 MPH and/or rollover, ejection, steering wheel deformity, or trauma with significant MOI 4. Patient does not meet any of the trauma criteria listed above but, in the judgment of the EMT or paramedic, should be transported as a trauma alert (document)		
Component	Blue	Red
Airway ¹	• Sustained RR ≥ 30	• Active airway assistance ²
Circulation	• Sustained HR > 120	• Lack of radial pulse with sustained heart rate > 120 or • Systolic BP < 90
Best GCS Motor Response	• BMR = 5	• BMR of ≤ 4 or • Paralysis or • Suspected spinal cord injury
Cutaneous	• Tissue loss ³ or • GSW to extremities	• Amputation ⁴ or • 2° / 3° burns to > 15% TBSA or • Any penetrating injury to head, neck, or torso ⁵
Long Bone Fracture	• Single fracture due to MVA or • Fall > 10 feet	• Multiple long bone fractures
Age	• > 55	
Mechanism of Injury	• Ejection from vehicle or • Deformed steering wheel ⁶	

RED - any **one (1)** - transport as a trauma alert

BLUE - any **two (2)** - transport as a trauma alert

1. Airway evaluation is designed to reflect the intervention required for effective care. 2. Not just oxygen.
3. Degloving injuries, major flap avulsions (> 5 in.). 4. Amputations proximal to the wrist or ankle.
5. Excluding superficial wounds in which the depth of the wound can be easily determined.
6. Only applies to driver of vehicle.

PEDIATRIC TRAUMA ASSESSMENT METHODOLOGY

Assess patients **fifteen (15) years of age or younger** for the presence of one or more of the following three criteria to determine the transport destination:

1. **RED** - any **one (1) criteria** - transport as a trauma alert
2. **BLUE** - any **two (2) criteria** - transport as a trauma alert
3. Patient does not meet any of the trauma criteria listed above but, **in the judgment of the EMT or paramedic, should be transported as a trauma alert** (document)

Component	Blue	Red
Size	<ul style="list-style-type: none"> • Broselow sizes: red or purple (< 10 kg / 22 lbs) 	
Airway		<ul style="list-style-type: none"> • Assisted, intubated, or multiple times suctioning
Consciousness	<ul style="list-style-type: none"> • Amnesia or any reliable history of loss of consciousness 	<ul style="list-style-type: none"> • Altered mental status or • Paralysis or • Suspected spinal cord injury
Circulation	<ul style="list-style-type: none"> • Normal carotid or femoral pulses, with no peripheral pulses palpable or • SBP 50 - 90 mmHg 	<ul style="list-style-type: none"> • Weak or no palpable carotid or femoral pulses or • SBP < 50 mmHg
Long Bone Fracture	<ul style="list-style-type: none"> • Single closed long bone fracture site anywhere 	<ul style="list-style-type: none"> • Any open long bone fracture or • Multiple fracture sites
Cutaneous		<ul style="list-style-type: none"> • Major tissue disruption¹ or amputation² or • 2° or 3° burns to > 10% TBSA or • Any penetrating injury to head, neck, or torso³

RED - any **one (1)** - transport as a trauma alert

BLUE - any **two (2)** - transport as a trauma alert

1. Degloving injuries, major flap avulsions, or major soft tissue disruption.
2. Proximal to the wrist or ankle.
3. Excluding superficial wounds in which the depth of the wound can be easily determined.

24.5.2 – AMPUTATION / PARTIAL AMPUTATION

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management
- IV access (Ideally 2 large bore IVs)

Partial Amputation:

- Obtain PMS (pulse, motor, sensation) before and after interventions
- Place partially amputated section in a dressing moistened with Normal Saline
- Splint in line with associated extremity
- Avoid torsion or traction of severed part

Complete Amputation:

- Apply direct pressure to bleeding sites
- Elevate above the level of the heart, as able
- If bleeding continues despite direct pressure and elevation, inflate blood pressure cuff proximal to amputation site and maintain inflation above SBP — **DO NOT PLACE CUFF OVER JOINTS**
- Consider tourniquet application (2 cm above) if bleeding is unable to be controlled, prior to shock
- **NOTE TIME OF TOURNIQUET APPLICATION and NOTIFY HOSPITAL UPON ARRIVAL**
- Wrap amputated part in a dressing moistened with Normal Saline
- Secure amputated part in watertight container and place container in cool water
- Transport amputated part with patient to hospital
- Fully examine patient, determine if patient meets Trauma Alert Criteria, transport to appropriate facility

Pain management:

- **Fentanyl** 25 - 50 mcg IV/IO/IN Q5 min PRN, Max 150 mcg, hold if systolic BP < 90
OR
- **Morphine** 2 - 5 mg IV/IO Q5 min PRN, Max 15 mg, hold if systolic BP < 90

SPECIAL CONSIDERATIONS

- Placing amputated part directly on ice (or similar) may further damage the tissue and prevent its use

24.5.3 – BURNS

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring
- Remove or cool source of heat, if present (clothing, ash, tar)
- For minor burns, apply gauze moistened with sterile Normal Saline (no ice)
- For serious burns, provide a dry, sterile burn sheet
 - 2° burns, 3° burns, electrical or chemical burns

ALS

- IV access (ideally, 2 large bore IVs in severe burns)

Airway management:

- Patients with known inhalation injury or signs of potential airway burns (singled nasal hairs, soot in the pharynx, etc.) in respiratory distress should be intubated, ideally with large (e.g. 8.0 Fr) ET tube

Assess type of burn, depth and extent:

- **1st degree** (superficial):
 - Resembles a sunburn— red, blanches with pressure, painful
- **2nd degree** (partial thickness):
 - Blisters, red, moist weeping, wet or waxy skin, painful
- **3rd degree** (full thickness):
 - Waxy white, leathery gray, or charred back in color, dry and inelastic, no blanching with pressure, pain with deep pressure only

Remove burning agent if still in contact with patient:

- Remove clothing and expose burned area
- For **chemical burns** or **radiation burns**, **decontamination is paramount**:
 - **Chemical burn**: brush away loose, dry agent and irrigate burned area with copious amounts of water or Normal Saline (2 liters or more)
 - **Radiation burns**: wear bunker gear to decontaminate patient, irrigate burned area with copious amounts of water or Normal Saline (2 liters or more)

Measure and dress burns:

- Estimate and document burn size (total body surface area, TBSA%) by “Rule of Nines” (see below)
 - The patient’s palm (without fingers) is estimated at 1% TBSA
- Dress burns:
 - For 2° or 3° burns, electrical / chemical / radiation burns, apply dry sterile sheet or bandage
 - For minor 1° burns, apply gauze moistened with sterile Normal Saline (no ice)
- **Do not allow the patient to become hypothermic**
 - With skin loss, hypothermia can occur rapidly — keep patient warm, wrap in blankets

Medications

- **Fentanyl** 25 - 50 mcg IV/IO/IN Q5 min PRN, Max 150 mcg, hold if systolic BP < 90
OR
- **Morphine** 2 - 5 mg IV/IO Q5 min PRN, Max 15 mg, hold if systolic BP < 90
- Normal Saline 500 mL/hour IV/IO if 2° or 3° burn > 5% TBSA

Trauma Alert criteria for burns:

- **Adult** (age 16 and up): **2° or 3°** burns to > **15%** TBSA
- **Pediatric** (age 15 or younger): **2° or 3°** burns to > **10%** TBSA

Transport to UF Health (Burn Center) if:

- 2° burns (partial thickness) > 15% TBSA
- 3° burns (full thickness) > 5% TBSA
- Burns to the hands, face, feet, or perineum
- Burns associated with inhalation injuries
- Burns associated with trauma
- Electrical injuries

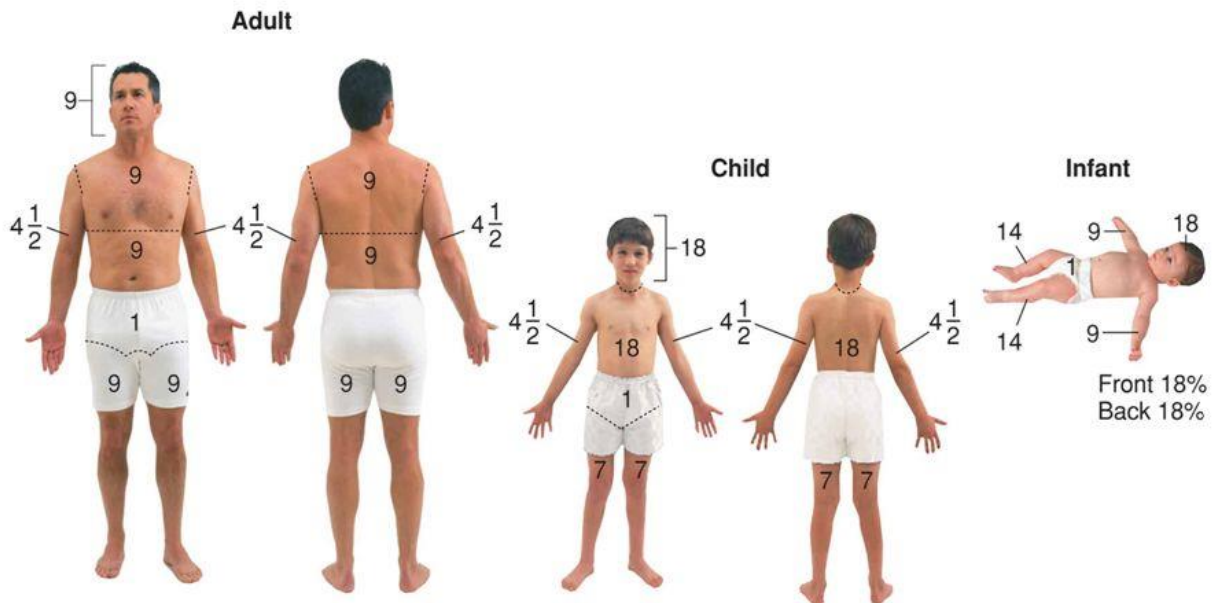
SPECIAL CONSIDERATIONS

- Do not delay transport to establish IV

Rule of Nines:

- See diagram below
 - Each whole arm is 9% (front 4.5%, back 4.5%)
 - Each whole leg is 18% (front 9%, back 9%)
- **Simplified version** — in **adults**, each of the following body areas equals **9% TBSA**:
 - Head, chest, abdomen, upper back, lower back, each arm, front of each leg, back of each leg
 - The groin equals 1% TBSA
- Small or patchy burns can be approximated using the size of the patient's palm (minus fingers):
 - **Palm size** has classically represented **1% TBSA**
 - May more accurately equal 0.4%

The Rule of Nines



Note: Each arm totals 9% (front of arm $4\frac{1}{2}\%$, back of arm $4\frac{1}{2}\%$)

24.5.4 – EYE EMERGENCIES

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2
- Oxygen — maintain above 94%
 - If diagnosed with “Central Retinal Artery Occlusion,” 100% oxygen by NRB

ALS

- Airway management
- IV access

Determine etiology:

- Blunt trauma, penetrating trauma, chemical, glaucoma (by history), etc.
- Check visual fields and visual acuity
- Trivial injuries to eyelids may hide significant injuries to the globe

Physical Trauma:

- Avoid any pressure on the affected globe
- Stabilize any penetrating objects (do not remove)
- Cover and protect the affected eye with a metal eye shield (or cup) if possible
 - Cover both eyes to prevent conjugate movement
- Avoid bright lights (dim compartment light or allow patient to close / cover eyes)
- Keep patient from bending or straining
- If facial trauma, note any ability to move eyes in a specific direction
- If blood is noted behind the pupil, ensure patient’s head remains elevated > 60 degrees

Chemical Trauma:

- Irrigate affected eye with a minimum of 2 liters Normal Saline
- Continue irrigation if the chemical was an alkali agent (or of unknown pH) or symptoms persist
- Dim cabin lights for patient comfort
- Transport emergently

Medications:

- ***Fentanyl*** 25 - 50 mcg IV/IO/IN Q5 min PRN, Max 150 mcg, hold if systolic BP < 90
OR
- ***Morphine*** 2 - 5 mg IV/IO Q5 min PRN, Max 15 mg, hold if systolic BP < 90



24.6 – OB/GYN PROTOCOLS

24.6.1 – ECTOPIC PREGNANCY, SUSPECTED

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Oxygen — maintain above 94%
- Obtain Last Menstrual Period (LMP) date

ALS

- Airway management
- IV access x2
- Cardiac monitor
- Evaluate for orthostatic hypotension

Background:

- Ectopic pregnancy is a potentially life-threatening condition, occurring in about 2% of reported pregnancies, where a pregnancy implants outside of the uterus
- Ectopic pregnancies grow until they become a surgical emergency, often causing hemorrhage

Suspect ectopic pregnancy in women of child-bearing age with:

- Reported early pregnancy, or missed or newly irregular menstrual periods
- Severe abdominal or pelvic symptoms, syncope, diaphoresis, pallor, tachycardia, or shock
 - Vaginal bleeding may or may not occur
- Pain radiating to the shoulder or abdominal bruising may suggest internal bleeding

History:

- Date (first day) of Last Menstrual Period (LMP)
- Weeks pregnant — determined by dates or ultrasound?
- Gravida (total times pregnant) / Para (births) / Aborta (pregnancies lost for any reason)
- When bleeding started

For hypotension or shock:

- See [24.4.10 – Hypotension / Shock](#) protocol

SPECIAL CONSIDERATIONS

- Monitor pad usage — two saturated pads are equivalent to one pint of blood loss (250 mL)
- **Do not allow anyone to perform a vaginal or rectal examination on the patient**
 - Vaginal bleeding may rapidly increase and hypovolemia can occur
- Transport expeditiously

24.6.2 – EMERGENCY DELIVERY

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Ask mother — Gravida (times pregnant), Para (births), Aborta (pregnancies lost)
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring
- Record APGAR at 1 and 5 mins (see below)

ALS

- Airway management
- IV access (mother)
- APGAR score at 1 and 5 minutes (see below)
- Oxygen — NC at 1 - 6 LPM (mother)

Initial assessment:

- **History** — GPA (Gravida, Para, Aborta), gestational age / estimated due date, Last Menstrual Period, prenatal care, how far apart are contractions, when did contractions start
- **Physical exam** — to determine if delivery is imminent
 - Signs include strong contractions < 2 minutes apart, crowning, and/or bulging of perineum
- If presenting part is not the head (breech delivery) immediately begin transport with supportive care

Delivery:

- Prep mother and delivery area with drapes to provide clean environment
- As head delivers, cradle and apply very gentle pressure to head to prevent rapid delivery
- Support the baby's head (face down) as it emerges from the vagina
- Aspirate mouth then nose with bulb syringe (especially if respiratory distress in the baby)
- If meconium staining is present and thick:
 - Suction with meconium aspirator until secretions are clear or appear thin and watery before delivery of the shoulders (if respiratory distress is present in the baby)
- Wipe any mucous from the baby's face with gauze
- Examine for umbilical cord wrapped around the neck (nuchal cord):
 - If present, slip cord back over head
 - If unsuccessful, deliver patient using the "somersault maneuver":
 - As head emerges, gently keep it near mother's body
 - Allow the body to deliver out past the head
 - Once loose enough, unwrap the cord from around the head and neck
 - **If present, with signs of fetal distress and unsuccessful above attempts** — last ditch maneuver:
 - Clamp the cord twice and cut in-between the clamps to remove cord from around neck
 - Deliver expediently, as blood and oxygen supply has been removed from baby
- Head will spontaneously rotate 90° to one side
- Position hands on either side of the baby's head and neck, and exert very gentle downward pressure as you deliver the anterior shoulder, then gently guide upwards to deliver the posterior shoulder

- **If anterior shoulder does not deliver (shoulder impaction), tell mother to stop pushing:**
 - Flex mother's hips sharply upward (knees-toward-chest) while another provider applies firm suprapubic pressure (to slip baby's top shoulder past pubic bone) — McRoberts maneuver
 - If unsuccessful, place hand underneath posterior shoulder and rotate clockwise
 - Attempts to deliver the posterior shoulder
 - If unsuccessful, ask mother to turn over to hands-and-knees position
 - Gravity may often resolve the shoulder impaction
 - For continued issues, contact Medical Control — do not delay transport to deliver patient
- Securely grasp the baby, keeping newborn at the same level as the mother
- After 30 seconds, clamp the cord in two locations (6 - 8 inches from baby), with clamps 2 inches apart
- Cut cord between clamps

After Delivery:

- Stimulate newborn (briskly rub with towel, or flick feet), warm and dry newborn
- Record APGAR at 1 and 5 minutes after birth (see below)
- Keep mother and newborn warm
- Evaluate vital signs for both patients
- Do not attempt delivery of the placenta
 - Approximately 15 minutes after birth, the placenta may self-deliver
 - Signs include: gush of blood from vagina, lengthening of the umbilical cord, uterine fundus rising upward in patient's abdomen, uterus becoming firmer
 - Save placenta and umbilical cord for evaluation at ED

For heavy post-delivery bleeding:

- Massage uterine fundus (through abdominal wall) until uterus firms
- Check patient's vaginal and perineal area for excessive bleeding
- In case of life-threatening bleeding, hold pressure, pack vagina with gauze, and rapid transport
- If hypotension occurs, refer **24.4.10 – Hypotension / Shock** protocol

Newborn:

- Refer to **24.6.3 – Neonatal Resuscitation** protocol if newborn has lack of spontaneous breathing or pulse rate < 100 BPM after birth, despite oxygen and stimulation
- Document and note the following:
 - Presenting part at birth (head, butt, arm, leg)
 - Date and time of birth of baby and placenta
 - Gender of newborn
 - Position of cord at delivery
 - Appearance of amniotic fluid (brown, green, clear)
 - Complications before, during, and after delivery

SPECIAL CONSIDERATIONS

- Once the baby is born, there are now two patients for the paramedic to monitor and assess
- Pediatric cardiopulmonary arrest is typically due to respiratory instability; therefore focus should be on good ventilations with high flow oxygen
- Do not use the IO drill on newborns — insert pediatric IO needle manually if necessary

REFERENCE MATERIAL

APGAR SCORING SYSTEM

	0 Points	1 Point	2 Points	Points totaled
Activity (muscle tone)	Absent	Arms and legs flexed	Active movement	<div style="border-left: 2px solid black; border-right: 2px solid black; height: 100px; position: relative;"> <div style="position: absolute; top: 0; left: 0; right: 0; height: 10px; background-color: yellow;"></div> </div>
Pulse	Absent	Below 100 bpm	Over 100 bpm	
Grimace (reflex irritability)	Flaccid	Some flexion of Extremities	Active motion (sneeze, cough, pull away)	
Appearance (skin color)	Blue, pale	Body pink, Extremities blue	Completely pink	
Respiration	Absent	Slow, irregular	Vigorous cry	
				<div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <div style="display: flex; justify-content: space-between;"> <div>Severely depressed</div> <div>0-3</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>Moderately depressed</div> <div>4-6</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div>Excellent condition</div> <div>7-10</div> </div> </div>

24.6.3 – NEONATAL RESUSCITATION

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- Obtain birth history
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂, BGL
- Provide blow-by oxygen by 100% NRB:
 - SpO₂ rises slowly after birth
 - SpO₂ goal is 60% at 1 minute, an additional 5% each minute later, or > 85% by 10 minutes
- Acquire APGAR at 1 and 5 minutes

ALS

- Airway management
- APGAR score at 1 and 5 minutes
- Cardiac monitoring (use 3-lead to determine HR)

Thick meconium staining noted:

- The baby should be suctioned prior to delivery of the body
- Baby should then be immediately intubated and meconium suctioned through the ET tube until no more meconium can be removed, prior to ventilation (if the newborn is in respiratory distress)
- Warm and dry baby
- Apply tactile stimulus to feet and back to stimulate vigorous respiratory effort
- Assess APGAR at 1 and 5 minutes

Poor tone, inadequate respiratory effort, gasping, or apnea after birth:

- Position and suction airway
- Support ventilations with 100% oxygen via BVM
- Keep warm
- Assess heart rate and respirations

If brachial pulse < 100 BPM:

- Assist ventilations with 100% oxygen via BVM or ET tube

If heart rate does not improve (< 60 BPM) despite 100% oxygen by BVM or ETT:

- Perform chest compressions at 120 / min
 - If oxygen by BVM (no ETT), ratio is 3 compressions to 1 ventilation
- Reassess after 2 minutes
- If HR remains < 60 BPM, continue CPR and ventilations
- Obtain vascular access (IV / IO / umbilical vein catheterization)
- Fluid bolus Normal Saline 20 mL/kg
- Check BGL — if < 40 mg/dL, **Dextrose 10% (D10)** 5 mL/kg IV/IO/UVC, Max 100 mL, May repeat PRN
- **Epinephrine** 0.01 mg/kg (1:10,000) into a manually placed IO
 - May repeat Epi Q5 min at 0.1 mg/kg
- Repeat fluid bolus 20 mL/kg of Normal Saline
- Consider **Narcan** 0.1 mg/kg, Max 2 mg IV/IO/IN

Heart rate improves (> 60 BPM):

- Cease compressions
- Assist in ventilations as needed
- If patient decompensates at any time, reassess heart rate and assist in ventilations

24.6.4 – PRE-ECLAMPSIA / ECLAMPSIA

INFORMATION

Pre-eclampsia is characterized by late-second or third trimester pregnancy with hypertension, proteinuria, and peripheral edema. Manifestations may include elevated BP (SBP > 160 or DBP > 120 mmHg), headache, blurred vision, confusion, or agitation. It may progress to **eclampsia**, defined by the occurrence of seizures.

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Oxygen — maintain above 94%
- Obtain Last Menstrual Period (LMP) date
- Position patient tilted right side up 10 - 15°

ALS

- Airway management
- IV access
- Cardiac monitoring

For symptomatic patients > 20 weeks gestation with SBP > 160 mmHg or DBP > 120 mmHg on two readings:

- Symptoms include: headache, confusion, agitation, vision changes, edema, or RUQ pain
- **Magnesium sulfate** 2 grams **slow** IV/IO over 5 mins
 - Magnesium may cause hypotension and decreased respiratory drive — use with caution
 - May repeat **Magnesium sulfate** 2 grams slow IV/IO over 5 minutes x1 as needed

For pregnant patients > 20 weeks with SBP > 160 mmHg or DBP > 120 mmHg who develop seizures:

- **Magnesium sulfate** as described above
- **Versed** 1 - 2 mg IV/IM/IO/IN, repeat in 2 min if seizures do not resolve after initial dose
- If no relief, consider **Labetalol** 0.2 mg/kg slow IV/IO Q10 minutes (Max dose 10 mg)
 - Blood pressure goal is **140/90** mmHg in eclampsia (seizures)
- Refer to [24.4.16 – Seizures](#) protocol and [24.4.9 – Hypertension](#) protocol as needed
- Recommend contact Medical Control

MEDICAL CONTROL OPTIONS

Call Medical Control for assistance with:

- Symptomatic hypertension < 20 weeks gestation
- Severe hypertension > 20 weeks, despite the above
- Seizures refractory to Magnesium sulfate / Versed

SPECIAL CONSIDERATIONS

- In severe pre-eclampsia, **lowering BP < 140/90 mmHg may compromise maternal-fetal blood flow**
- In eclampsia, lowering **DBP < 90 mmHg may compromise maternal-fetal blood flow**
- Apply seizure precautions and attempt to prevent maternal injury

24.6.5 – PROLAPSED UMBILICAL CORD

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Obtain and monitor fetal heart rate through umbilical cord
- Oxygen — maintain above 94%

ALS

- Airway management
- IV access
- Cardiac monitoring
- Transport expeditiously

Managing an umbilical cord presenting before baby (prolapsed cord):

- Instruct mother to pant, and **NOT to push** during contractions
- Have one provider flex mother's hips (knees-toward-chest)
- Insert sterile gloved hand into vagina and elevate the presenting fetal part off of the umbilical cord, to prevent cord compression
- Leave hand in place and avoid touching cord
- Cover exposed cord with sterile gauze moistened with Normal Saline

If crowning noted:

- Prepare to assist with vaginal delivery (see [24.6.2 – Emergency Delivery](#) protocol)

MEDICAL CONTROL OPTIONS

- **Magnesium sulfate** 2 - 4 grams slow IV/IO over 5 to 10 minutes

24.6.6 – VAGINAL BLEEDING

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring
- Obtain Last Menstrual Period (LMP) date
- Transport patient tilted right side up 10 - 15°

ALS

- Airway management
- IV access
- Important history:
 - Onset of bleeding, could patient be pregnant, count of used pads / tampons, type of absorbency
 - Obtain / save any clots or tissue expelled for physician examination in ED
- If pregnant, consider ruptured ectopic pregnancy, ruptured ovarian cyst, abortion, threatened abortion

For hypotension / shock:

- See [24.4.10 – Hypotension / Shock](#) protocol
- For severe bleeding in 2nd or 3rd trimester, place in lateral recumbent position

For active labor:

- See [24.6.2 – Emergency Delivery](#) protocol

MEDICAL CONTROL OPTIONS

- ***Fentanyl*** 25 - 50 mcg IV/IO/IN Q5 min PRN, Max 150 mcg, hold if systolic BP < 90
- **OR**
- ***Morphine*** 2 - 5 mg IV/IO Q5 min PRN, Max 15 mg, hold if systolic BP < 90

SPECIAL CONSIDERATIONS

- Monitor pad usage — two saturated pads are equivalent to one pint of blood loss (250 mL)
- **Do not allow anyone to perform a vaginal or rectal examination on the patient**
 - Vaginal bleeding may rapidly increase and hypovolemia can occur



24.7 – PEDIATRIC PROTOCOLS

24.7.1 – ABDOMINAL PAIN / NAUSEA / VOMITING - PEDIATRIC

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
 - Ask about possible toxic ingestions
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- IV access

Pain management:

- For severe pain, call Medical Control to potentially administer:
 - **Fentanyl** 1 mcg/kg IV/IO/IM PRN pain Q 20 min
 - Max individual dose 50 mcg / dose, Max total dose 150 mcg

Nausea and vomiting:

- **Ondansetron** 2 mg (8 - 15 kg) or 4 mg (> 15 kg) SL/IV/IO
 - Break 4 mg tablet in half if 2 mg tablet is required
 - Contraindicated < 6 months of age

SPECIAL CONSIDERATIONS

- Pregnant females: use **Promethazine** 12.5 - 25 mg IV/IO, as first-line agent for treatment of nausea
- Consider life-threatening problems that may present with abdominal pain or vomiting: DKA, toxic ingestions, perforated abdominal organs, acute appendicitis, GI bleeding, ectopic pregnancy (ask about menstrual history), electrolyte imbalance
- Assess for orthostatic blood pressure changes (lying, sitting, standing)
- If patient presents in shock, refer to [24.4.10 – Hypotension / Shock](#) protocol

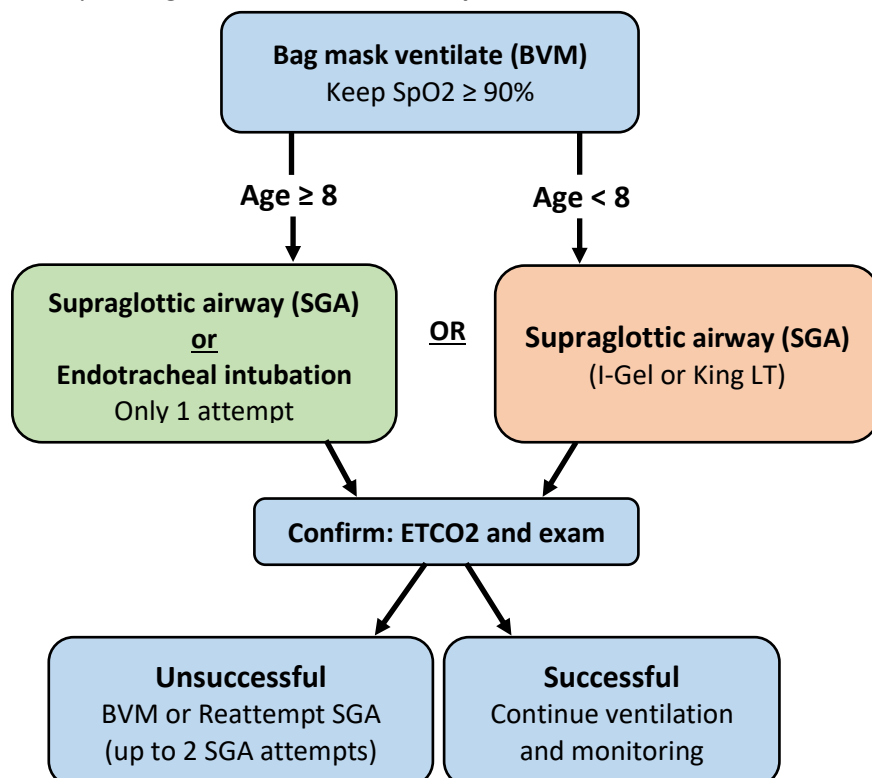
24.7.2 – AIRWAY MANAGEMENT – PEDIATRIC

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- Establish a patent airway:
 - Use jaw-thrust maneuver as needed
 - If no evidence of trauma, consider head tilt-chin lift maneuver
- Administer oxygen as needed to maintain SpO₂ > 94%
- Record and monitor vital signs
- Use suction as needed to clear airway
- Use oral (OPA) or nasal (NPA) airway adjuncts as needed
- **Pediatric patients with signs of hypoxia and/or respiratory distress may require assisted ventilations:**
 - Symptoms may include bradycardia, abnormal breath sounds, increased work of breathing, nasal flaring, retractions, stridor, or poor respiratory effort
 - Bag-valve-mask ventilation with a good seal, with enough volume to make chest rise
 - Use a mask that covers both mouth and nose, but not eyes
 - Ventilate at 12 - 20 BPM, using the higher rate for young ages
 - Mouth-to-mouth, mouth-to-nose, mouth-to-stoma (when adjuncts are not available) - if any of these methods are employed **an incident report MUST be filled out** because of the exposure
- Request ALS intervention

ALS

- Advanced airway management — **follow the sequence below:**



- At every step, **effective BVM ventilation is an acceptable airway management strategy**
- **Supraglottic Airway (SGA)** devices include I-Gel and King LT airway
- **Endotracheal intubation is not approved for age < 8 years**
 - The exception is if all other ventilation methods (BVM, I-Gel, etc.) have failed
- Endotracheal intubation may be **attempted once** per patient ≥ 8 requiring airway management
- Effective ventilation includes oxygenation (SpO₂ > 90%), chest rise and fall, adequate lung sounds, and waveform capnography

If unable to oxygenate / ventilate despite the above methods:

- For age < 12, see **24.8.2 – Cricothyrotomy, Needle** protocol
- For age ≥ 12, see **24.8.3 – Cricothyrotomy, Surgical** protocol

Foreign body airway obstruction suspected:

- If **partial obstruction** or **stridor** (high pitched upper airway sounds) **without distress**:
 - Do nothing to upset the child
 - Perform critical assessments only
 - Have parent administer blow by supplemental oxygen
 - Do not obtain vascular access unless absolutely necessary
 - Do not force a child into a specific position
 - Children will protect their airway by their body position
- If **respiratory distress**, open airway using a head tilt/chin lift (if no trauma)
 - If < 1 year old, administer up to 5 back blows and 5 chest compressions
 - If ≥ 1 year old, administer subdiaphragmatic abdominal thrusts (Heimlich) until dislodged
- If **unresponsive**, open airway and remove any apparent foreign body
 - If unsuccessful, start CPR (**See 24.3.4 - Cardiac Arrest Management**)
- If **ventilation is unsuccessful** (O₂ saturations cannot be kept > 90):
 - Reposition airway and attempt BVM ventilation
 - If unsuccessful, establish direct view of object and attempt removal with Magill forceps
 - If unsuccessful, use laryngoscope to assist view
 - If cords are clearly seen, attempt intubation (1 attempt)
 - If unsuccessful, reattempt BVM ventilation
 - If SpO₂ > 90% with BVM, continue and expedite transport
 - If unable to ventilate / oxygenate despite the above, perform Needle Cricothyrotomy
 - **See 24.8.2 – Cricothyrotomy, Needle** protocol

24.7.3 – ALLERGIC REACTIONS / ANAPHYLAXIS - PEDIATRIC

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring
- Remove patient from source of allergic reaction, if possible

ALS

- Airway management
- IV access
- Cardiac monitoring

Allergic reaction with itching, swelling and urticaria:

- **Diphenhydramine** 1 mg/kg IV/IO/IM (Max 50 mg)
- If dyspnea / wheezing, add:
 - **Albuterol** 2.5 mg nebulized (Max 2.5 mg)

Anaphylaxis (anaphylactic shock, stridor, severe respiratory distress):

- **Epinephrine** (1:1,000) 0.01 mg/kg IM (Max 0.3 mg)
 - May repeat Q5 minutes for persistent anaphylaxis
- **Diphenhydramine** 1 mg/kg IV/IO/IM (Max 50 mg)
- **Albuterol** 2.5 mg nebulized (Max 2.5 mg)
- Normal Saline 20 mL/kg to maintain systolic BP for age appropriate range (see appendices)

If hypotension / shock persists:

- **Epinephrine** (1:10,000) 0.01 mg/kg IV/IO Q 5 minutes (max 0.5 mg) to maintain age-appropriate systolic BP
 - In general, goal systolic BP is $\geq 70 + (\text{Age} \times 2)$ mmHg

SPECIAL CONSIDERATIONS

- **Promethazine (Phenergan)** is to be used if patients are allergic to **diphenhydramine (Benadryl)** and should not be used in anyone under the age of 16
- Document if patient received EpiPen prior to EMS arrival

24.7.4 – APPARENT LIFE THREATENING EVENT - PEDIATRIC

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- Establish patent airway — consider jaw thrust maneuver, or head tilt-chin lift maneuver (if no trauma)
- Assist ventilations with BVM as needed
- Oxygen — maintain above 94%
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, BGL, Temperature
- Obtain history from witnesses:
 - Any possible toxic ingestions? (medications, bottles, etc.)
 - Any possible foreign body ingestion?

ALS

- IV access as necessary (place only if vital signs are abnormal)
- Cardiac monitor
- Airway management
- Consider **Narcan** 0.01 mg/kg IV/IO, Max dose 1 mg, if respiratory depression

If seizures present:

- **Versed** 0.05 - 0.1 mg/kg IV/IO/IM/IN, Max dose 2 mg
- See [24.7.9 – Seizures - Pediatric](#) protocol

Hypoglycemia (BGL < 60):

- **Dextrose 10% (D10)** 5 mL/kg IV/IO, Max 100 mL, May repeat PRN

Cardiac Arrest:

- See [24.3.4 - Cardiac Arrest Management](#) Protocol

SPECIAL CONSIDERATIONS

- An Apparent Life-Threatening Event (**ALTE**) is any episode in which an infant or young child has an appearance that concerns observers that the child may be dying or at risk of death:
 - May include apnea, choking, color change (cyanosis or pallor), or change in muscle tone (e.g. limp)
 - Sometimes called a Brief Resolved Unexplained Event (BRUE)
- Incidence peaks at 10 - 12 weeks old, and includes premature infants and children less than 1 year old
- Possible causes of ALTE include: airway obstruction, cardiac abnormalities, hypoglycemia, sepsis, meningitis, respiratory tract infections, seizures, metabolic syndromes and trauma
- **ALTE patients are at high risk for morbidity or death, even if well-appearing at time of EMS contact**
- If the parents or caregivers refuse emergency transport, explain the child remains at high risk and needs further evaluation. If they still refuse, **CONTACT MEDICAL CONTROL**.

24.7.5 – CARDIAC ARREST - PEDIATRIC

BLS

- Initiate basic medical care (**See 24.2.1 - Basic Medical Care**)
- Initiate CPR — compressions at a rate of 100 - 120/min
 - Exchange compressors every 2 minutes
 - Minimize interruptions to CPR
- Obtain history from bystanders
- Airway management — open airway, consider C-spine precautions if trauma is evident
- BVM ventilation with O₂ — provide enough volume to make chest rise
 - BVM— ratio of 2 ventilations per 30 compressions; consider airway adjuncts (OPA or NPA)
 - ETT / I-Gel / King LT in place — one breath every 6 to 8 seconds
- Apply pads or AED as soon as they are available, and follow instructions of AED
 - Use pediatric-size pads for age < 8; may use adult pads as a last resort
 - Defibrillate if instructed by AED
- Request ALS response

ALS

Cardiac arrest management:

- Perform cardiac arrest management per PALS (Pediatric Advanced Life Support)
- **Follow “General approach to pediatric cardiac arrest” flowsheet below**
- Identify team leader, who analyzes rhythm and assigns tasks / roles to each member of rescue team
 - Ex: airway management, compressions, code timing, IV / medication administration
- Establish IV/IO access

Airway management:

- Place advanced airway (I-Gel, King LT, or ETT); do **not** interrupt compressions for airway placement
 - I-Gel or King LT are preferred in cardiac arrest (rapid placement, decreased interruptions)
- ETCO₂ waveform and value ≥ 20 mmHg ensures adequate CPR and proper tube placement
- **REMOVE ET TUBE IF NO CONSISTENT CAPNOGRAPHY WAVEFORM AND READING IS PRODUCED**
 - **Capnography is required on every patient with an ETT / I-Gel / King LT in place**

Key determinants of survival:

- High-quality chest compressions with minimal interruptions
- Earliest possible defibrillation of VF or VT
- Reduce time between CPR pause, defibrillation, and resuming CPR
 - When possible, continue CPR while charging defibrillator
- Avoid hyperventilation (8 to 10 breaths / min)
- Identify and treat reversible causes (H’s and T’s)

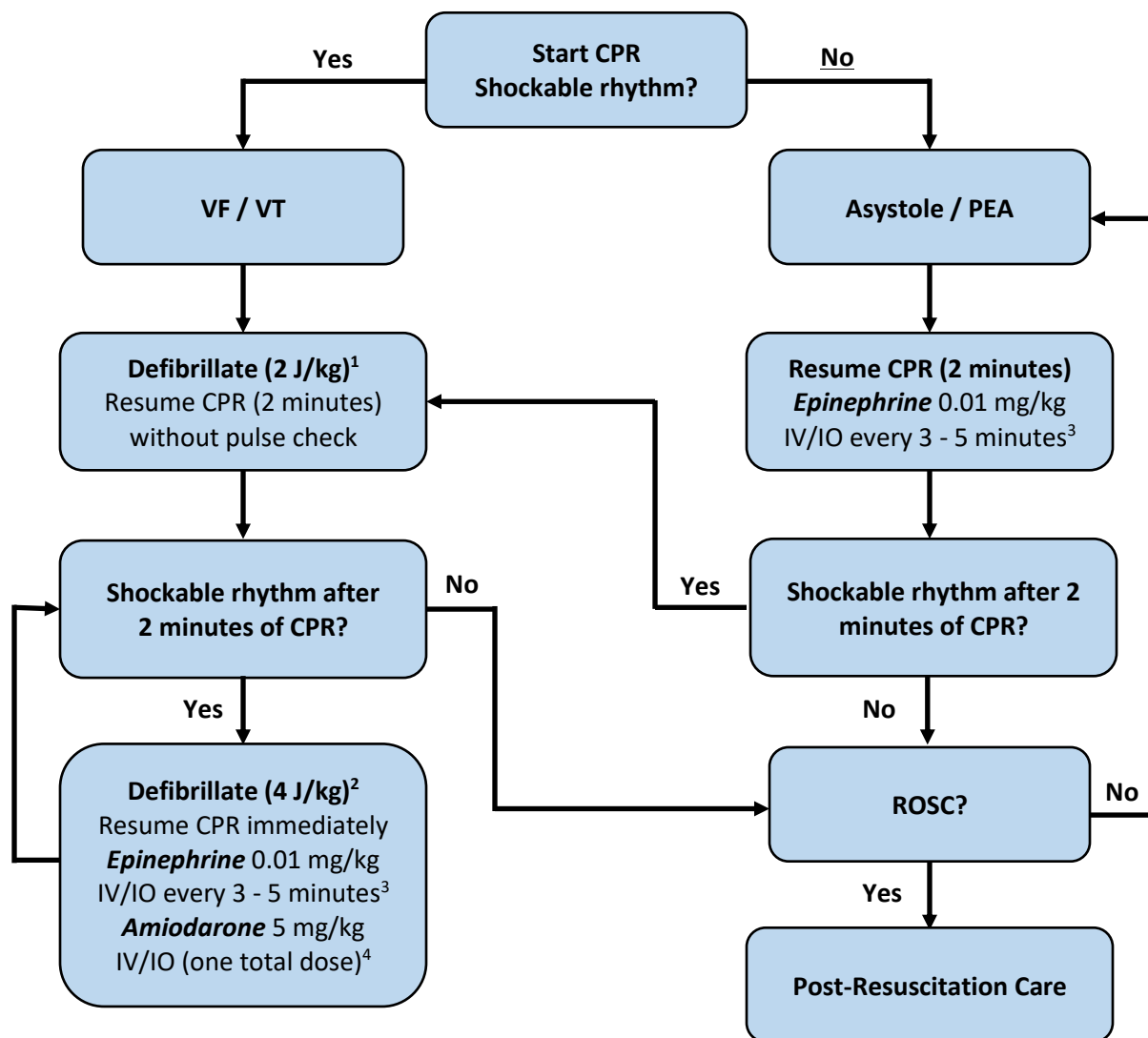
Medications and treatments for treatment of H’s and T’s:

- If hypovolemic — Normal Saline 20 mL/kg IV/IO, may repeat x 2
- If hypothermic — rewarm
- If hyperkalemia suspected:

- **Sodium bicarbonate** 1 mEq/kg IV/IO
- **Calcium chloride (10%)** 20 mg/kg IV/IO, Max dose 1 gram
- If hypoglycemic — **Dextrose 10% (D10)** 5 mL/kg IV/IO, Max 100 mL, may repeat PRN
- Assess for tension pneumothorax (absent lung sounds, tracheal deviation):
 - If suspected, see [24.8.10 – Chest Decompression](#) protocol to perform needle thoracostomy

SPECIAL CONSIDERATIONS

General approach to pediatric cardiac arrest:



Footnotes:

- 1 – Up to 200 J (adult dose)
- 2 – On subsequent defibrillations, may increase up to 10 J/kg (up to adult dose of 360 J)
- 3 – Up to 1 mg (adult dose)
- 4 – Up to 300 mg (adult dose)

REFERENCE MATERIAL

<u>Potential Causes of Asystole / PEA</u>	<u>Treatment</u>
Hypovolemia (most common)	Normal Saline, 20 mL/kg IV/IO
Hypoxia	Secure airway and ventilate
Hydrogen Ion-Acidosis	<i>Sodium Bicarbonate</i> , 1 mEq/kg IV/IO
Hyperkalemia (end stage renal disease)	<i>Sodium Bicarbonate</i> , 1 mEq/kg IV/IO
Hypothermia	Rewarming
Tablets (drug overdose)	See overdose protocol for specific treatment
Tamponade, cardiac	Normal Saline, 20 mL/kg IV/IO
Tension pneumothorax	Needle thoracostomy
Thrombosis, coronary	Expedite transport
Thrombosis, pulmonary	Expedite transport

24.7.6 – CARDIAC DYSRHYTHMIAS - PEDIATRIC

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂, BGL, Temperature
- Oxygen — maintain above 94%
- Cardiac monitor

ALS

- Airway management
- IV access
- 12 lead ECG
- If no pulse, follow [24.7.5 – Cardiac Arrest - Pediatric](#) protocol
- Assess dysrhythmias per protocols below

PEDIATRIC BRADYCARDIA

- Full Pediatric Advanced Life Support (**PALS**) assessment and treatment
- Identify and treat possible causes of bradycardia, including:
 - **Hypoxia** — open airway, assist breathing, 100% oxygen, airway management
 - **Hypothermia** — rewarm
 - **Hypovolemia** — Normal Saline 20 mL/kg IV/IO
 - **Hypoglycemia** — **Dextrose 10% (D10)** 5 mL/kg IV/IO, Max 100 mL, May repeat PRN
 - **Toxic ingestion** — contact Medical Control to treat specific toxin
 - **Acutely deteriorating head injury** — hyperventilate, with target ETCO₂ goal 30 - 35 mmHg
- For infants < 1 year old, **start chest compressions if HR < 60 BPM** despite 100% oxygenation with BVM
 - Follow algorithm described in [24.6.3 – Neonatal Resuscitation](#) protocol
- Pediatric bradycardia **will usually respond to prompt BLS measures and IV/IO fluids!**
- For age > 1 with bradycardia with signs of severe cardiopulmonary compromise:
 - Provide 100% Oxygen by NRB or BVM
 - Identify and treat correctable causes (see above)
 - Consider Normal Saline 20 mL/kg IV/IO
 - **Epinephrine** 0.01 mg/kg IV/IO (1:10,000, Max 1 mg) Q5 minutes
 - If no IV/IO, 0.1 mg/kg (1:1,000, Max 10 mg) in 5 mL Normal Saline via endotracheal tube
 - If no relief, **Atropine** 0.02 mg/kg IV/IO Q5 minutes
 - Minimum dose 0.1 mg, Max individual dose 0.5 mg, Max total dose 1 mg
 - If no relief, apply transcutaneous pacemaker:
 - For > 15 kg, apply adult pads
 - For < 15 kg, apply pediatric pads
 - Use lowest energy setting that achieves ventricular capture

PEDIATRIC TACHYCARDIA

- Full Pediatric Advanced Life Support (**PALS**) assessment and treatment
- Determine whether patient is **stable** or **unstable** with tachycardia:
 - Unstable patients demonstrate signs of shock or acute altered mental status
- If **stable**, identify and treat reversible causes, including:
 - **Hypoxia** — open airway, assist breathing, 100% oxygen, airway management
 - **Hypothermia** — rewarm
 - **Hypovolemia** — Normal Saline 20 mL/kg IV/IO
 - **Hypoglycemia** — **Dextrose 10% (D10)** 5 mL/kg IV/IO, Max 100 mL, May repeat PRN
 - **Toxic ingestion** — contact Medical Control to treat specific toxin
- If **unstable**, evaluate the cardiac rhythm:

Sinus tachycardia:

- P waves present, constant P-R interval, may have variable R-R interval
- Rate is generally < 220 BPM in infants and < 180 BPM in children
- Identify and treat reversible causes (see above)

Supraventricular tachycardia (SVT) or narrow-complex tachycardia:

- P waves absent or abnormal, regular R-R intervals
- Rate is generally > 220 BPM in infants and > 180 BPM in children
- If **stable**, consider **Adenosine** 0.1 mg/kg rapid IV/IO (Max 6 mg initial dose)
 - May repeat **Adenosine** 0.2 mg/kg rapid IV/IO (Max 12 mg second dose)
- If **unstable**, perform **synchronized** cardioversion at 1 J/kg (max dose 100 J)
 - If unsuccessful and severe symptoms persist, may repeat at 2 J/kg (max dose 200 J)

Ventricular tachycardia (VT) or wide-complex tachycardia:

- If **stable**, provide supportive care, identify and treat reversible causes
- If **unstable**, perform **synchronized** cardioversion at 1 J/kg (Max dose 100 J)
 - If unsuccessful and severe symptoms persist, may repeat at 2 J/kg (Max dose 360 J)
- If Torsades de Pointes is suspected:
 - **Magnesium sulfate** 50 mg/kg IV/IO over 10 minutes (Max dose 2 grams)

24.7.7 – OXYGEN THERAPY - PEDIATRIC

BLS

- **Oxygen should be administered to patients who:**
 - Display signs and symptoms of hypoxia (SpO₂ < 94%)
 - Suffered major trauma
 - Present as acutely ill
 - Suspected of carbon monoxide inhalation (regardless of SpO₂ reading)
 - Pregnant and may have reason for fetal hypoxia
 - Any patient who the health care provider suspects may become hypoxic due to mechanism of injury or nature of illness, regardless of oxygen saturation level

Methods of oxygen administration:

Method	Flow Rate	Oxygen Delivered
Nasal cannula	1 - 6 LPM	24 - 40%
Non rebreather mask (NRB)	12 - 15 LPM	90 - 95%
Bag valve mask with reservoir (BVM)	10 - 25 LPM	90 - 100%
Ventilator	40 - 60 LPM	21 - 100%

24.7.8 – RESPIRATORY DISTRESS - PEDIATRIC

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — before and after interventions — BP, Pulse, RR, SpO₂, Temperature, BGL
- Oxygen — maintain above 94%
- Cardiac monitoring

ALS

- Airway management (monitor closely)
- IV access (if abnormal vitals)

Croup (mild upper airway infection) or Epiglottitis (severe upper airway infection):

- **Croup:** well-appearing child, 3 months - 5 years, with frequent “barking” cough, inspiratory stridor, fever
- **Epiglottitis:** toxic-appearing child, usually < 5 years, drooling, fever, raspy voice, cyanosis, tripod position
- 100% oxygen via NRB mask or “blow by” if SpO₂ < 94%
- Parent may be allowed to hold patient
- Contact Medical Control for:
 - SpO₂ constantly < 90% with labored breathing
 - Stridor (high-pitched upper airway noises) with respiratory distress
 - May consider nebulized **Epinephrine**

Asthma, COPD, Wheezing (lower airway obstruction):

- **Albuterol:**
 - 2.5 mg (3 mL) nebulized over 10 minutes
 - May repeat as needed during transport with HR < 160
- If patient does **NOT** improve or has self-administered Albuterol prior to **EMS** arrival:
 - **Albuterol** 2.5 mg (3 mL) and **Ipratropium** 0.5 mg (2.5 mL) nebulized over 10 minutes
 - **Methylprednisolone** 2 mg/kg IV/IO (Max dose 125 mg)
- If signs of impending respiratory failure:
 - **Epinephrine** (1:1000) 0.01 mg/kg IM (Max 0.3 mg)
 - **Magnesium sulfate** 50 mg/kg IV/IO (Max 2 grams) over 5 minutes

Severe respiratory distress:

- Consider CPAP 5 cm H₂O (if > 12 years of age)
 - Record vitals every 5 minutes with CPAP use
- Advanced airway management (BVM, SGA, or ET tube placement) if no relief

SPECIAL CONSIDERATIONS

- **CPAP** — contraindicated in children < 12 years of age, unconscious, agonal respirations or arrest, facial trauma, vomiting, facial anomalies
 - CPAP indicated only if SBP is > 100 (or normotensive for age)
 - Contact Medical Control if SBP is < 100
- Contact Medical Control for consideration of administering nebulized Epinephrine
- For fever with respiratory signs / symptoms, sneezing, or coughing, personnel should wear HEPA mask

24.7.9 – SEIZURES - PEDIATRIC

BLS

- Initiate basic medical care ([See 24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
 - Obtain history of seizure (duration, activity, illnesses, trauma)
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, BGL, Temperature
- Oxygen — maintain above 94%
- Cardiac monitor
- Immobilization if trauma occurred / indicated

ALS

- Airway management
- IV access
- Cardiac monitoring

For hypoglycemia (BGL < 60):

- **Dextrose 10% (D10)** 5 mL/kg IV/IO, Max 100 mL, May repeat PRN
- See [24.4.5 – Diabetic Emergencies](#)

For repeated seizures, or seizures lasting longer than 2 minutes:

- **Versed** 0.1 mg/kg IV/IO (OR 0.2 mg/kg IM/IN), Max individual dose 2 mg
 - May repeat every 2 min (Max total dose 5 mg) if seizure activity persists
 - Call Medical Control if seizures persist despite two doses

SPECIAL CONSIDERATIONS

- Consider reason for seizure activity. Example: poisoning, overdose, low BGL, or eclampsia
 - Refer to the appropriate protocol for correct treatment and management of seizures
- Prepare to manage airway in case of decreased respiratory status after Versed use
- **THE PEDIATRIC DOSE FOR VERSED ON THE BROSELOW TAPE IS FOR RSI, NOT SEIZURES!**

24.7.10 – SNAKE BITE - PEDIATRIC

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- History — OPQRST, SAMPLE
- Vitals — BP, Pulse, RR, SpO2
- Oxygen — maintain above 94%
- Cardiac monitor

ALS

- Airway management (monitor closely)
- IV access
- Cardiac monitoring
- Immobilize area and minimize all movement
- **Outline edema, erythema, or ecchymotic area with pen and note time**
- Irrigate bite area with Normal Saline or water
- Assess degree of envenomation and type of snake, and advise MD at facility

Medications:

- Normal Saline IV/IO TKO
- For severe pain, call Medical Control to potentially administer:
 - **Fentanyl** 1 mcg/kg IV/IO/IM Q 20 min
 - Max individual dose 50 mcg / dose, Max total dose 150 mcg, Hold if SBP < 90

If allergic reaction or anaphylaxis:

- See [24.7.3 – Allergic Reactions / Anaphylaxis - Pediatric](#) protocol

If hypotension or shock:

- See [24.4.10 – Hypotension / Shock](#) protocol

SPECIAL CONSIDERATIONS

- **Don't apply a tourniquet** — concentrates venom to cause greater damage
- **Don't apply ice** — a factor contributing to amputation
- **Don't cut the wound** or attempt to remove venom
- **Don't attempt to capture the snake** — at most, consider a camera phone picture at a distance

Snakes can envenomate even after death or decapitation! Venomous snakes generally fall in two families:

- **Crotalids** — rattlesnake, copperhead, cottonmouth, pit viper
- **Elapids** — coral snake (“red on yellow, kill a fellow”)



24.8 – PROCEDURAL PROTOCOLS

24.8.1 – CRICOTHYROTOMY / DECOMPRESSION KITS

BACKGROUND

The Cricothyrotomy / Decompression kits have been developed to facilitate easy recognition and usage of items necessary to perform [24.8.2 – Cricothyrotomy, Needle](#), [24.8.3 – Cricothyrotomy, Surgical](#), and [24.8.10 – Chest Decompression](#). The kits are labeled on the outside of the box where each item is located. If the item has an expiration date, it is also listed on the outside of the kit. This will allow for easy identification without the need to open the kit except when needed for a procedure. The kits will have a breakaway seal.

USAGE

- When opened for a cricothyrotomy or decompression, the kit will need to be replaced with another kit
- Spare kits will be kept at CSW. You will need to request a replacement kit on your next order day. The opened kit must be returned to CSW for restocking and resealing.

CONTENTS

Cricothyrotomy kits contain the following equipment:

- 1 – Bougie
- 1 – 5.5 Fr. ET tube
- 2 – 14 ga, 1.25 in IV catheter
- 2 – 14 ga, 3.25 in IV catheter
- 1 – Meconium aspirator
- 1 – 3.0 x 15 mm adapter (from 3.0 Fr ET tube)
- 1 – Saline flush, 10 mL
- 1 – IV extension set
- 1 – Scalpel
- 1 – Tracheal hook

There are two (2) needle cricothyrotomy caths. In the event you have to perform a second needle cricothyrotomy before your kit is replaced, the remainder of the equipment required (meconium aspirator, IV extension set, 10 mL saline flush, and 15 mm adapter) can be obtained from the stock on the rescues.

LOCATION

Kkits are to be located in the Airway Bags.

NOTES

Kits are not to be opened to utilize the “Bougie.” We are evaluating airway procedures and will consider placement of “Bougies” as an intubation adjunct in the airway bags at a later date.

24.8.2 – CRICOTHYROTOMY, NEEDLE

INFORMATION

Surgical procedure used in medical / trauma patients requiring an emergent airway when the patient **cannot be oxygenated and ventilated** by any other secondary device (I-Gel, King LT, ET Tube, LMA, BVM, etc.)

Indicated in patients < 12 years of age.

Needle cricothyrotomy equipment:

- 14-gauge needle catheter
- Betadine or other antiseptic
- 3 mm endotracheal tube adapter
- 4x4 gauze
- 10 mL saline syringe
- IV extension set
- Meconium aspirator
- Securing device / tape
- SPO2 monitor
- ETCO2 monitor
- Cardiac monitor
- Suction
- Oxygen
- BSI
- BVM device

Procedure:

- Determine need for procedure (all other options for oxygenation / ventilation have failed)
- Prepare and gather equipment (check tube, suction on and ready, BSI, oxygen)
- Identify anatomy and landmarks and clean site
- Attach 14-gauge catheter to a 10 mL saline syringe containing 5 mL of Normal Saline
- Insert 14-gauge catheter **into the cricothyroid membrane towards the patient's feet at 30° - 45° angle**
- Aspirate while inserting needle — when air is noted (bubbles), you have entered the trachea
- Advance the catheter (as if inserting an IV) until the hub rests at the skin surface, and remove syringe
- Secure catheter in place (or hold in place by hand)
- Connect the catheter to an IV setup with a 3.0 mm ETT adapter at the end
- Attach the meconium aspirator to the 3.0 mm ETT adapter
- Attach suction tubing — to the meconium aspirator at one end, and to the oxygen source at the other
- Flow oxygen at 15L — except if newborn or small toddler, start at 8L and titrate up
- Place finger over hole in aspirator until chest rise is noted, then release to allow for expiration
- Repeat this at an appropriate respiratory rate
- Control hemorrhage and verify placement (auscultation of lung sounds, SPO2 monitor, ETCO2 monitor)
- Secure tube and monitor for possible complications

24.8.3 – CRICOTHYROTOMY, SURGICAL

INFORMATION

Surgical procedure used in patients requiring an emergent airway when the patient **cannot be oxygenated and ventilated** by any other secondary device (I-Gel, King LT, ET Tube, LMA, BVM, etc.)

Contraindicated in patients < 12 years of age.

Equipment:

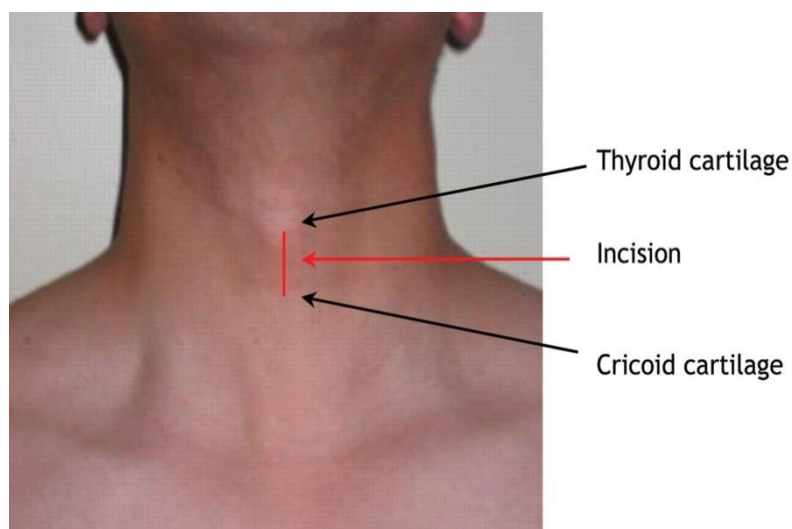
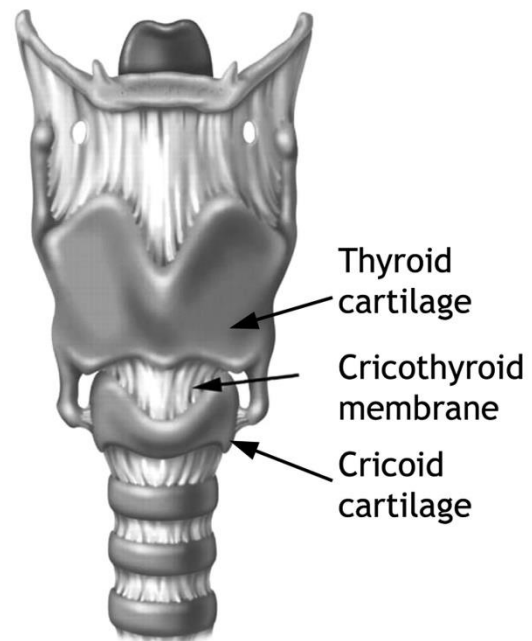
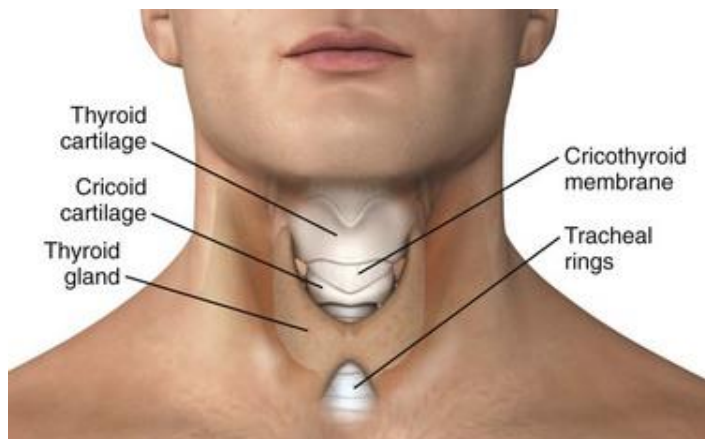
- Scalpel
- Betadine or other antiseptic
- 5.0 - 6.0 Fr endotracheal tube
- 4X4 gauze
- 10 - 12 mL syringe
- Securing device
- SPO2 monitor
- ETCO2 monitor
- Cardiac monitor
- Suction
- Oxygen
- BSI
- BVM device

Procedure:

- Determine need for procedure (all other options for oxygenation / ventilation have failed)
- Prepare and gather equipment (check tube and pilot bulb, suction on and ready, BSI, oxygen)
- Identify anatomy and landmarks and clean site
- Make a 2 - 3 cm superficial midline **vertical incision** into the dermis over the cricothyroid membrane
 - Expose thyroid cartilage and cricothyroid membrane
- Make a second **horizontal incision** through the cricothyroid membrane
- Dilate the opening
- Insert ET tube and inflate cuff
- Ventilate the patient via Ambu bag and ET tube
- Control hemorrhage and verify placement (auscultation of lung sounds, SPO2 monitor, ETCO2 monitor)
- Secure tube and monitor for possible complications
- Document depth at which tube was secured

SPECIAL CONSIDERATIONS

- Kits are located in the airway bags and are to be replaced after each use



24.8.4 – ENDOTRACHEAL INTUBATION

INFORMATION

- Select route of intubation
- Have all airway supplies and suction nearby

Orotracheal Intubation:

- Hyper-oxygenate patient with 100% O₂ using BVM prior to intubation attempt
 - If multiple oxygen sources are available, apply NC at 6 LPM throughout the procedure
- **Attempts should be limited to 10 seconds**
- Insert laryngoscope blade into oropharynx and visualize vocal cords
 - Miller blade (straight) is used to lift the epiglottis
 - Macintosh (curved) is placed in the vallecula and used to raise the larynx and epiglottis
 - Do not “rock” blade; instead, lift in one consistent up-and-forward motion
- Remove any obstructing secretions or foreign bodies with suction and/or Magill forceps
- Insert endotracheal tube past vocal cords, visually confirming placement before removing laryngoscope
- If a stylet is used, remove it after the tube has passed the cords
- Inflate the cuff
- If no cervical spine injury is suspected, gentle cricoid pressure may be used to reduce the risk of vomiting and to assist in visualization of the cords
 - **Cricoid pressure is contraindicated in the placement of the King LT airway**
- After **2 total failed attempts at endotracheal intubation** (not 2 attempts per provider), a supraglottic airway device (I-Gel, King LT) shall be immediately placed
 - No further endotracheal intubation attempts should be made
 - This is **1 failed attempt** in pediatric patients age ≥ 8
 - No endotracheal intubation should be attempted for patients age < 8
 - Exception is if all other ventilation methods (BVM, I-Gel, etc.) have failed
 - If supraglottic airway placement is unsuccessful, utilize a BVM with an OPA to oxygenate and ventilate this patient until arrival at the hospital
 - If unable to oxygenate, consider surgical cricothyrotomy
- **All intubations will be confirmed by ETCO₂**, as well as the absence of breath sounds over the epigastrium and the presence of breath sounds over bilateral lung fields
 - This must be documented in the run report
- **Electronic waveform ETCO₂ shall be measured continually on all intubations to verify tube placement**
 - Must be documented in the run report as a separate intervention (waveform capnography)
 - If waveform ETCO₂ is not available, the use of a colorimetric device is acceptable
- If endotracheal intubation or supraglottic airway device insertion is unsuccessful, the paramedic shall document and justify the failed attempts

At any time the paramedic believes the patient would instead benefit from BVM or a supraglottic device (I-Gel, King LT, LMA), he/she may elect to NOT attempt endotracheal intubation

- Common predictors of difficult intubation include: small mouth / jaw / neck, high Mallampati score, intraoral swelling / trauma / bleeding, limited neck mobility, neck swelling, and morbid obesity

Nasotracheal Intubation:

- Reserved for patients in whom orotracheal intubation is not safely possible
- Contraindicated in patients with facial fractures and/or closed head injury
- Patient must have spontaneous respirations
- Maintain cervical spine immobilization if trauma is known or suspected
- Place patient on **high flow oxygen** via NRB prior to nasal intubation
- Consider use of 4 mL of 2% Lidocaine via nebulizer mask
 - This will result in the (near) complete loss of the gag reflex and facilitate patient compliance with the passage of the ET tube
- Anesthesia can also be achieved by the placement of an NPA coated with 4% lidocaine jelly 3 - 5 minutes prior to intubation. Coat external nares and tip of endotracheal tube with 4% lidocaine jelly.
- Apply the **Beck Airway Airflow Monitor (BAAM)** device on the end of the ET tube
- Insert tube with bevel side facing the septum. The tube should be advanced along the floor of the nose. Endotrol tubes are helpful in controlling the position of the tip of the tube. **Stylets cannot be used.**
- As the tube enters the pharynx, listen for breathing sounds to get louder (whistle with the BAAM device) as you advance closer to the trachea
- The patient is likely to cough or gag — suction must be ready for use
- Listen for patient breathing and/or vocalizations (the vocal cords are widest apart upon inspiration)
- Ask patient to take a deep, slow breath — when the patient inhales, advance tube quickly through cords
- Success is noted by an absence of further vocalizations and continued air flow through the tube
- Inflate the cuff and note how many mL of air are used to inflate cuff
- Verify tube placement as you would with oral intubation
- Ventilate patient via ET tube with 100% O₂ using BVM
- Secure ET tube in place using locking device or tape
- Reassess and document tube placement after moving patient
- **All intubations will be confirmed by ETCO₂**, as well as the absence of breath sounds over the epigastrium and the presence of breath sounds over bilateral lung fields
 - This must be documented in the run report
- **Electronic waveform ETCO₂ shall be measured continually on all intubations to verify tube placement**
 - Must be documented in the run report as a separate intervention (waveform capnography)
 - If waveform ETCO₂ is not available, the use of a colorimetric device is acceptable

CONSIDERATIONS

- It is strongly suggested that the patient's head and neck be immobilized using a cervical collar and CID to prevent tube dislodgement during patient movement
- To manage the airway of a patient with known or suspected trauma who vomits during airway procedures:
 - Turn **as a unit** on side and suction oral cavity
 - Maintain spinal immobilization throughout the turning maneuver
- If the patient becomes combative, consider **Versed** 1 - 2 mg IV/IO to facilitate intubation.
 - May repeat in 2 minutes. Closely monitor for respiratory depression or arrest.

Any airway device that is not properly ventilating (e.g. absent breath sounds, cyanosis, or loss of waveform capnography) shall be removed immediately.

24.8.5 – KING TUBES

INFORMATION

Indications:

- Patient who is apneic or unconscious without an intact gag reflex, requiring airway management
- Rescue airway if unable to intubate a patient in need of airway protection
- Primary airway if intubation anticipated to be difficult and rapid airway control is necessary
- Primary airway in pulseless arrest, when attempts at intubation are likely to interrupt CPR

Contraindications:

- Intact gag reflex
- Caustic ingestion / smoke inhalation
- Known esophageal disease (varices, alcoholism, cirrhosis, etc.)

Technique:

- Initiate BLS airway sequence to include pre-oxygenating patient with O₂ via NRB or BVM
 - If multiple oxygen sources are available, apply NC at 6 LPM throughout the procedure
- Select the appropriate size King tube airway based on patient's height:

Height in feet:	3 - 4	3.5 - 4.5	4 - 5	5 - 6	> 6
Tube size:	2	2.5	3	4	5

- Gather and test equipment
 - Test balloon for leaks and note how many ML's of air is needed to fill balloon
- Lubricate posterior aspect of distal tip with water soluble lubricant (included)
- If trauma, ask partner to hold in-line spinal immobilization in neutral position
- If no trauma, sniffing position or slight cervical hyperextension is preferred
- Hold King tube in dominant hand at the connector; with other hand, open mouth and lift chin
- Advance tip under base of tongue while rotating tube back to midline
- Without exerting excessive force, advance tube until base of connector is aligned with teeth or gums
- Using supplied syringe, inflate cuff balloon with correct volume of air (marked on King tube):

Tube size:	2	2.5	3	4	5
mL of air:	25 - 35	30 - 40	45 - 60	60 - 80	70 - 90

- Attach BVM while gently bagging, slowly withdraw tube until ventilation is easy and free-flowing
- After inflation of the mask, look for signs of correct placement:
 - Slight outward movement of the tube on inflation
 - Presence of smooth oval swelling in the neck around the thyroid or cricoid area
 - No cuff visible in the oropharynx
 - Good waveform on ETCO₂ detector / monitor
 - Positive bilateral breath sounds with adequate chest rise
 - Negative sounds auscultated over the epigastric area
 - Increased oxygen saturation and skin color improvement
 - Fogging of tube with breathing
 - Change of color on the CO₂ detector

- Only to be used if waveform ETCO2 monitor is not working or available
- After placement is verified, secure tube using available tube holder
 - Note location of tube at the teeth or lips
- Monitor patient for vomiting and aspiration

SPECIAL CONSIDERATIONS

- Use with caution in patients with broken teeth, which may lacerate balloon
- Do **not** remove a properly functioning King tube in order to attempt intubation

If ventilations become compromised with King tube (including absent breath sounds, cyanosis, or loss of waveform capnography), remove King tube and provide ventilations with BVM

24.8.6 – I-GEL AIRWAY

INFORMATION

Indications:

- Patient who is apneic or unconscious without an intact gag reflex, requiring airway management
- Rescue airway if unable to intubate a patient in need of airway protection
- Primary airway if intubation anticipated to be difficult and rapid airway control is necessary
- Primary airway in pulseless arrest, when attempts at intubation are likely to interrupt CPR

Contraindications:

- Intact gag reflex
- Caustic ingestion
- Trismus, limited mouth opening, or pharyngeal mass / trauma / obstruction

Sizing:

Patient		I-Gel Size
Neonate	2 - 5 kg	1 – Pink
Infant	5 - 12 kg	1.5 – Blue
Small child	10 - 25 kg	2 – Grey
Large child	25 - 35 kg	2.5 – White
Small adult	30 - 60 kg	3 – Yellow
Medium adult	50 - 90 kg	4 – Green
Large adult	> 90 kg	5 – Orange

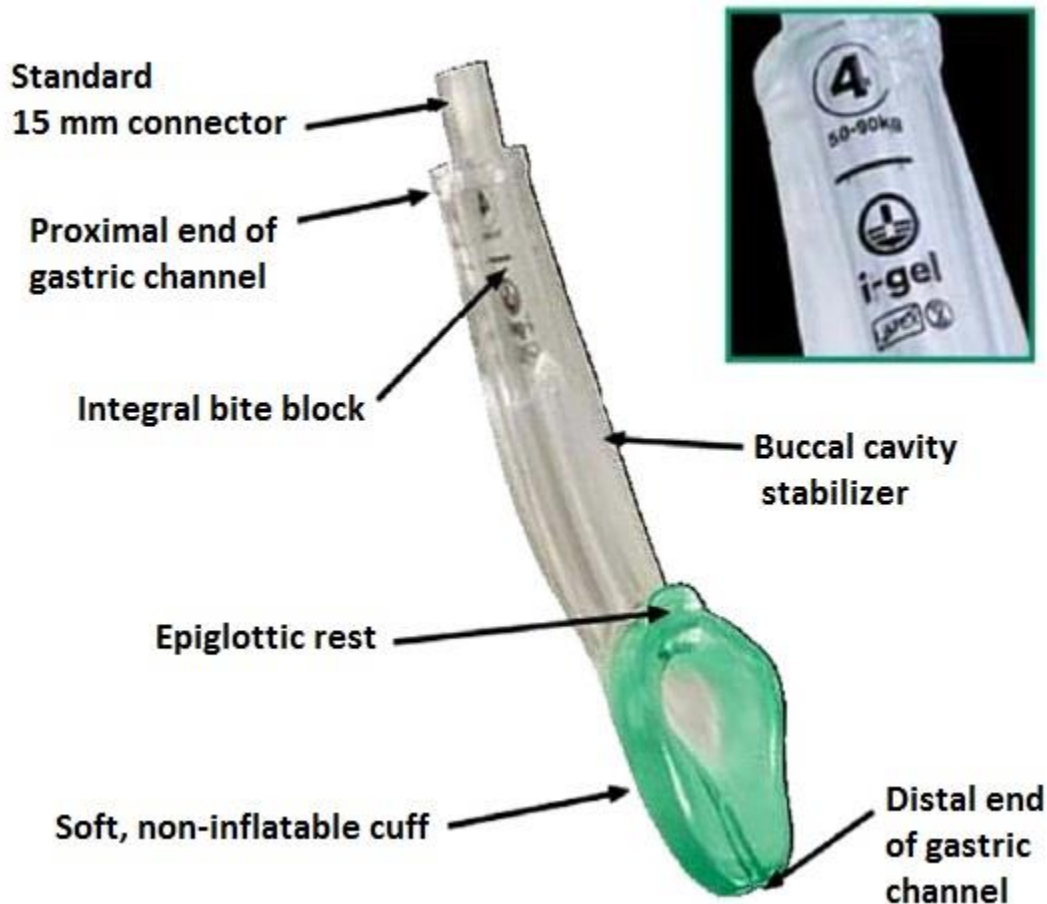
Technique:

- Initiate BLS airway sequence, including pre-oxygenation with O₂ via NRB or BVM
 - If multiple oxygen sources are available, apply NC at 6 LPM throughout the procedure
- Open packaging, remove the I-Gel from its cradle, and grasp the integral bite block (rigid handle)
 - The I-Gel **must** be separated from its cradle prior to insertion
 - The cradle is not an introducer and **must never** be inserted into the mouth
- Apply a small amount of water-based lubricant to the front, back, and sides of the cuff
 - Do not use silicone-based lubricants
 - Ensure that no significant amount of lubricant is present in the bowl of the cuff (may obstruct)
- Place patient in “sniffing position” (head extended, neck flexed) if not requiring spinal precautions
 - Gently press the chin down prior to insertion
- With the **soft cuff facing the patient’s tongue** (away from the hard palate), introduce the leading soft tip into the mouth in a direction towards the hard palate
- Glide the device downwards and backwards **along the hard palate** with a continuous but gentle push until a definitive resistance is felt
 - Sometimes **an initial resistance will be felt** from the back of the pharynx:
 - Persistent gentle pressure may be required to **push past this initial resistance**
 - Consider assisting insertion with a jaw thrust
 - **Insertion is not complete until:**
 - **A final definitive resistance is felt**, and
 - The incisors (middle teeth) are resting on the integral bite block

- Do not apply excessive force during insertion
- It should not be necessary to insert fingers into the mouth during insertion
- **No more than 3 attempts** should be performed
- **Secure the I-Gel snugly with the provided strap**
- If unavailable, secure adhesive tape to one maxilla (cheekbone), wrap around the I-Gel bite block, and secure to the contralateral maxilla (cheekbone)
- Confirm placement using waveform capnography (ETCO2). Monitor with continuous capnography.
- Remove I-Gel and resume Bag-Valve-Mask ventilation if no ETCO2 waveform is noted
- Auscultate for breathe sounds (and sounds over the epigastrium) and evaluate for chest rise and fall
- Monitor patient for vomiting and aspiration

SPECIAL CONSIDERATIONS

- Do **not** remove a properly functioning I-Gel in order to attempt intubation
- If ventilations become compromised with I-Gel (including absent breath sounds, cyanosis, or loss of waveform capnography), remove I-Gel and provide ventilations with BVM



24.8.7 – OXYGEN SATURATION MONITORING

INFORMATION

- Switch power to the “on” position of the oxyhemoglobin saturation monitor (or clip the unit on the finger using portable device)
- Place oxyhemoglobin sensor on digit or earlobe of patient (secure to finger with tape if necessary)
 - Avoid attaching sensor to hand or arm where IV has been initiated
- Allow sensor to “capture” pulse and determine oxyhemoglobin saturation (SpO2)
 - Takes approximately 15 - 20 seconds
- In order to ensure that the saturation reading is correct, the patient’s pulse rate obtained from the Pulse Oximeter **must** match the pulse measured manually
 - If these pulse rates do not match within a few beats, the SpO2 reading you have is **incorrect**
- Continue to monitor O2 saturation during transport
- Provide supplemental oxygen therapy as needed

SPECIAL CONSIDERATIONS

- If pulse oximeter is distal to the BP cuff, readings may briefly be inaccurate when the cuff is inflated

24.8.8 – END TIDAL CO₂ MONITORING

INFORMATION

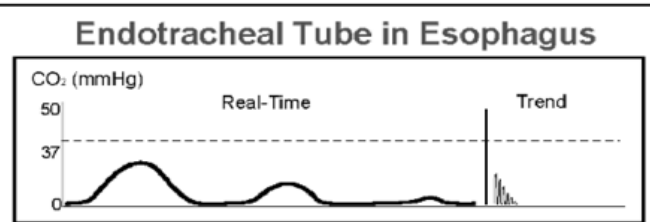
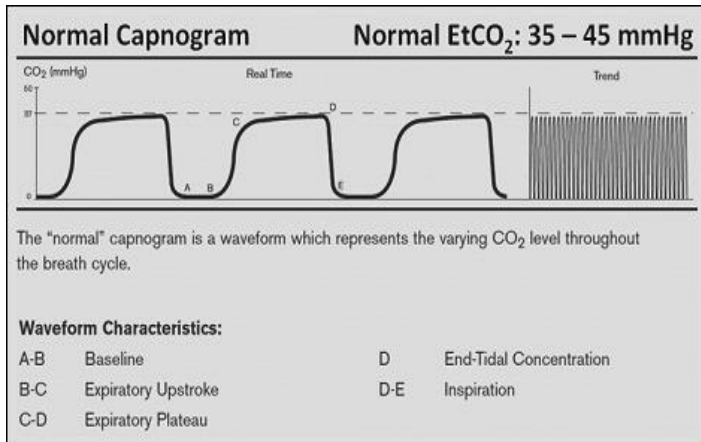
Electronic waveform capnography:

- Power on the cardiac monitor and assure the ETCO₂ cable is attached
 - The ETCO₂ device takes approximately one minute to warm up when the monitor is powered on
- Secure airway via endotracheal (ET) tube, I-Gel, or King tube intubation
 - Be sure to also follow manual confirmation techniques (i.e., visualization of tube passing vocal chords, negative sounds over the epigastrium, positive lung sounds, fogging of the ET tube)
- Place ETCO₂ device with adapter on the end of ET tube / I-Gel / King tube, between the tube and BVM
- Press the “Wave 2” soft key until the CO₂ waveform is displayed. The default color will be in yellow.
- Attach the BVM to the open end of ETCO₂ device and administer ventilations
- Note the reading of patient ETCO₂ levels on cardiac monitor (will require at least 3 ventilations)
- Look for rhythmic and consistent waveform ETCO₂ capnography on the display screen.
 - See examples below of normal and abnormal waveforms
- **If tube placement is in question at any time (no waveform or no ETCO₂ reading), remove the tube, BVM ventilate for 30 seconds, and consider repeat intubation with ET tube / I-Gel / King tube**
- If tube placement is confirmed, consider possible causes of low ETCO₂ (e.g., low cardiac output secondary to hypovolemia or cardiac failure, or cardiac arrest) and treat appropriately

Disposable CO₂ detection devices:

(For use only when electronic equipment failure or patient access cannot be made with cardiac monitor)

- Secure airway via endotracheal (ET) tube, I-Gel, or King tube
- Place CO₂ device on adapter end of ET tube, I-Gel, or King tube
- Attach the BVM to the open end of ETCO₂ device and administer ventilations
- Complete at least 6 ventilations before the disposable device will register a color change
- If with exhalation colorimetric device turns yellow, tube placement is confirmed
- **If this does not occur, or if color turns purple during transport:**
 - Reconfirm tube placement by direct visualization and auscultation:
 - **If any uncertainty, remove ET tube / I-Gel / King tube and provide BVM ventilation**
 - **If tube placement is confirmed**, consider possible causes of low end-tidal CO₂ (shock due to hypovolemia or cardiac failure, or cardiac arrest) and treat appropriately
 - A change from yellow to tan may indicate low ETCO₂ state (e.g., shock)
- Disposable devices are ineffective if they become wet
- Recheck placement of tube each time you move the patient or there is a change in his/her condition
- As soon as possible, apply electronic ETCO₂ monitoring



Possible Causes:

- Missed intubation
- A normal capnogram is the best evidence that the ET tube is correctly positioned
- With ET tube in the esophagus, little or no CO₂ is present

Sudden loss of waveform

- ET tube disconnected, dislodged, kinked or obstructed
- Loss of circulatory function



Decreasing EtCO₂

- ET tube cuff leak
- ET tube in hypopharynx
- Partial obstruction



CPR Assessment

- Attempt to maintain minimum of 10mmHg



Sudden increase in EtCO₂

- Return of spontaneous circulation (ROSC)



Bronchospasm ("Shark-fin" appearance)

- Asthma
- COPD



Hypoventilation



Hyperventilation



Decreased EtCO₂

- Apnea
- Sedation



24.8.9 – CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

INFORMATION

Indications:

- Awake patients with acute pulmonary edema (CHF, drowning) or acute bronchospastic disorders (COPD, asthma, wheezing) who have hypoxia and/or respiratory distress that do not or would not quickly improve with pharmaceutical treatment

Contraindications:

- Respiratory arrest or agonal respirations
- Unconsciousness or obtunded
- Hypotension (systolic BP < 100) or shock
- Trauma
- Persistent nausea and vomiting
- Facial anomalies
- Inability to cooperate with the procedure
- Age < 12 (children)
- Pneumothorax
- Active upper GI bleeding or history of recent gastric surgery

Equipment:

- Medical Director approved Continuous Positive Airway Pressure (CPAP) device

Procedure:

- Attach cardiac monitor, capnography, and pulse oximetry
- If indications present and SBP > 100, proceed (if SBP < 100, contact Medical Control prior to CPAP)
- Verbally instruct patient (this is critical) — patient requires “verbal sedation” to use this device:
 - “You are going to feel some pressure from the mask, but this will help you breathe easier”
- Set up CPAP device per manufacturer’s instructions
- Instruct patient to slowly inhale through the nose and exhale through the mouth (slowly over 4 seconds)
- For **CHF / pulmonary edema** — set at **10 cmH2O**
- For **COPD / bronchospasm** — set at **10 cmH2O**
- If improvement, continue treatment throughout transport to the ED
- Record and monitor vital signs, ETCO₂, and O₂ saturation as needed
- If progressive deterioration of respiratory distress and/or consciousness:
 - Offer reassurance
 - Stop treatment if necessary
 - Apply bag valve mask to patient
 - Document in patient care report adverse reactions and reasons why CPAP was discontinued

Document on every patient receiving CPAP:

- CPAP level (cmH2O)
- Vital signs every 5 minutes
- SpO₂ every 5 minutes
- Response to treatment

24.8.10 – CHEST DECOMPRESSION

INFORMATION

Indications:

- Suspected **tension pneumothorax** (at least 2 of the following):
 - Severe respiratory distress or hypoxia
 - Decreased or absent lung sounds on one side
 - Evidence of hemodynamic compromise (shock, hypotension, altered mental status)
 - Tracheal deviation away from involved side (less reliable)

OR

- **Cardiac arrest after blunt or penetrating trauma** to chest / abdomen (consider bilateral decompression)

Adult chest decompression sites:

- Second intercostal space on the **affected side** in the mid-clavicular line (strongly preferred)
- Fourth intercostal space on the affected side, mid-axillary line

Procedure:

- Prepare skin at site selected with Betadine or alcohol swabs
- Select the correct catheter size:
 - **Adults — 14 - 16-gauge catheter**, ideally > 2" long
 - **Pediatrics — 20-gauge catheter**
- Insert catheter perpendicular to the skin **OVER the inferior rib** of insertion site
- Remove any parts from the catheter / needle assembly which may occlude the lumen
- Listen for a rush of air — if noted, the diagnosis of pneumothorax and proper placement is confirmed
- **Do NOT remove the catheter** from the patient under any circumstances
- Alert the receiving hospital personnel on arrival of the presence of the catheter
- If symptoms reoccur, catheter displacement may have occurred:
 - Place another catheter adjacent to the first, following the steps above

24.8.11 – VENTILATOR

INFORMATION

Newport HT 70 Plus Transport Ventilator

- Turn on ventilator
- Attach circuit to ventilator
- Perform circuit check before continuing
- Make Sure “Blue” tile in lower right hand corner reads “**TRANS**”
- If transport will be > 1 hour, bring humidifier with patient

Protocol:

- Ventilator Transport
- Review transfer paperwork
- Meet with Respiratory Therapist and RN in charge of patient
- Auscultate patient’s breath sounds
- Assess security of ETT placement (if unsecure, secure with Thomas Tube holder)
- View and document tube size and placement at teeth
- Estimate oxygen needed and plan ahead with extra O2 tanks if necessary
- Review and document patient’s ventilator settings.
- Vital signs every 15 minutes for a stable patient with transport time > 1 hour, every 10 minutes for local transport, and every 5 minutes for an unstable patient local transport
- Document ventilator setting on ACFR ventilator settings form
- Set ventilator parameters to the same settings the patient is currently receiving

Additional equipment needed for ventilator transfer:

- SPO2 monitor with waveform capnography
- Cardiac monitor
- Full O2 bottle
- Suction
- Kelly clamp

Transfer of patient to ACFR ventilator:

- Patient should be placed on ACFR ventilator prior to being moved to transport stretcher
- Allows patient to acclimate to ACFR vent — if adjustments need to be made, make them one at a time

REMEMBER: OCCLUDE ET TUBE WITH KELLY CLAMP ON EXPIRATION WHEN READY TO SWITCH VENTILATORS IF PEEP > 10. REMOVE KELLY CLAMP AFTER BEGINNING VENTILATIONS WITH HT 70.

Consider transporting patient with in-line suction attached to reduce loss of PEEP.

Infectious patients:

- Remember to do circuit check before applying filters
- Obtain bacteriostatic filter from hospital staff and apply between ventilator and circuit
- Place N95 mask at exhalation port on circuit
- Clamp ET Tube with Kelly clamp just before exhalations starts
- Place patient on ACFR vent circuit, begin ventilations, remove Kelly clamp

Settings (adult) — parameters to use, should changes be necessary for patient comfort:

- **Tidal Volume (VT)** = 6 - 8 mL per kg of Ideal Body Weight (not actual weight, see table below)
- **Respiratory rate (RR)** = 8 - 16
- **PEEP** = 5 (may increase up to 10 to keep the alveoli inflated and prevent atelectasis)
- **Pressure Support (PS)** = 10 - 20
- **Flow** = 30 - 40
- **Inspiratory time (I-time)** = 1 - 1.5 sec. for adults
 - How rapidly breaths are delivered
 - 1.0 sec. for toddlers, 0.5 sec. for infants < 1 yr
- **P –trig (sensitivity)** = -2
 - Amount of negative inspiratory pressure needed from the patient i to initiate a breath
 - If ventilator is auto cycling, it may be necessary to increase P-trig to -4
- If patient is not tolerating the ventilator it may be necessary to change settings (one at a time)

Ventilator troubleshooting:

- **Tidal volume** is the most critical setting to get correct!
 - **6 to 8 mL of Ideal Body Weight** (not actual body weight) — “set it and forget it!”
 - An enormous number of ventilator problems occur from **tidal volumes too large**
 - Ideal Body Weight is based on **height**, not actual weight!
 - IBW formula = **50 kg + (2 kilograms for every additional inch over 5 feet)**
 - **Tidal volume (in mL) by height:**
- | Height | 6 mL / kg IBW | 8 mL / kg IBW |
|--------|---------------|---------------|
| 5'0" | 300 | 400 |
| 5'2" | 324 | 432 |
| 5'4" | 348 | 464 |
| 5'6" | 372 | 496 |
| 5'8" | 396 | 528 |
| 5'10" | 420 | 560 |
| 6'0" | 444 | 592 |
| 6'2" | 468 | 624 |
| 6'4" | 492 | 656 |
| 6'6" | 516 | 688 |
| 6'8" | 540 | 720 |
- **Respiratory rate** is used to correct abnormal ETCO₂ or low SpO₂:
 - If **low O₂** or **high ETCO₂** — **increase respiratory rate**
 - In severe bronchospasm (COPD, asthma), be cautious of high RR
 - These patients have prolonged expiratory phases
 - Air forced in without full exhalation can lead to PTX / cardiovascular collapse
 - Otherwise, patients tolerate higher RR well, as long as tidal volume (VT) is set per above
 - If **low ETCO₂** — evaluate for signs of **shock**, and if absent, **decrease respiratory rate**
 - **FiO₂%** can be turned up as needed (to 100%) to address hypoxia
 - If unreadable or any concern about SpO₂, set FiO₂ at 100%
 - **If sudden hypoxia, hypotension, or severe tachycardia on the ventilator:**
 - Consider **“stacked breaths”** — lungs full, excessive ventilation without adequate exhalation
 - Open ET tube to air and allow **full, long exhalation**
 - If no relief, **disconnect from ventilator**, ventilate ETT by BVM, and consider **“DOPE”**:
 - **Tube Dislodged** — confirm placement with laryngoscope

- Tube **O**bstructed — suction ET tube
- **P**neumothorax — consider needle thoracostomy
- Equipment failure — rapidly check equipment in anticipation of tube removal
- If persistent hypoxia or inadequate ventilation, **extubate and BVM**

Patient agitation (“asynchrony”):

- Many conscious patients transferred from hospital vents to transport vents will experience agitation
- Advise patient of the challenge of adjustment and to relax
- Be patient – there are physiological reasons for patients to become agitated, including pain, hypoxia, fever, and anxiety
- If after 10 to 15 minutes of acclimation, the patient continues to experience anxiety / agitation:
 - **Versed** 1 – 2 mg slow IV/IO, hold if systolic BP < 90
 - Repeat Q5 minutes, after ruling out hypoxia

Remember to complete the “Settings for mechanical Ventilation” form on all patients where the Newport HT70 Ventilator is used. Form will need to be scanned and attached to the Patient Care Report.

Additional resources:

Newport HT70 Ventilator Operating Manual ([link](#))

24.8.12 – 12 LEAD ECG

INFORMATION

Indications for performing a 12 lead ECG:

- Non-traumatic chest pain / thoracic back pain
- Epigastric pain with no evidence of GI cause
- Sudden onset of SOB, diaphoresis, or syncope (non-traumatic)
- CHF / acute pulmonary edema
- Any diabetic with signs / symptoms suggesting cardiac etiology
- Any overdose with potential cardiac effects (tricyclics, beta blockers, calcium channel blockers, etc.)

Electrode placement:

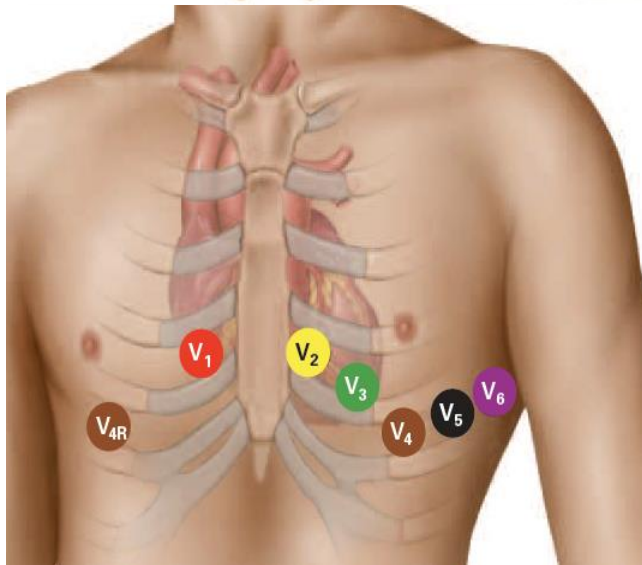
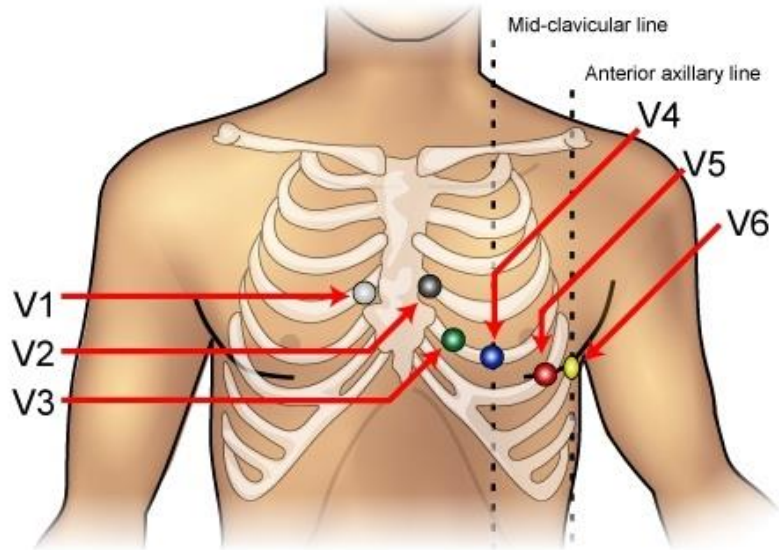
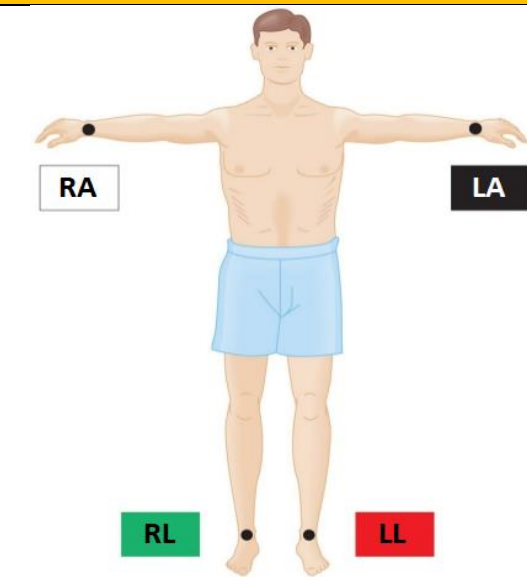
- **RA** — White lead on right arm
- **LA** — Black lead on left arm
- **RL** — Green lead on right leg
- **LL** — Red lead on left leg
- **V1** — Fourth intercostal space, at the patient's right sternal margin
- **V2** — Fourth intercostal space, at the patient's left sternal margin
- **V3** — Fifth rib, between leads V2 and V4
- **V4** — Fifth intercostal space, on the patient's mid-clavicular line
- **V5** — Patient's left anterior axillary line, at the horizontal level of V4
- **V6** — Patient's left mid-axillary line, at the same horizontal level as V4 and V5
- **V4R** — Right side fifth intercostal space, mid-clavicular line

Suspect MI if:

- 1 mm or more of ST segment elevation in 2 or more contiguous leads (≥ 1.5 mm in V1 - V3)
 - See **24.8.13 – ST Elevation Myocardial Infarction (STEMI)** protocol
- If ECG meets criteria for STEMI Alert, notify CCC and the receiving hospital
 - **Transmit 12 lead ECG for verification as soon as possible**
- Deliver radio report to receiving facility en route and advise them a 12 lead ECG has been transmitted

Note: Medications may alter the patient's ECG; therefore, it is preferred that a 12 lead ECG be obtained prior to the administration of medications and/or transport.

REFERENCE MATERIAL



- V1** 4th intercostal space, right of the sternum
- V2** 4th intercostal space, left of the sternum
- V3** between leads V2 and V4
- V4** 5th intercostal space at mid-clavicular line
- V5** level with V4 at left anterior axillary line
- V6** level with V5 at the left mid-axillary line (directly under armpit)

V4R move V4 to the opposite side of chest 5th intercostal space at midclavicular line

SITE	FACING	RECIPROCAL
SEPTAL	V1, V2	NONE
ANTERIOR	V3, V4	NONE
ANTEROSEPTAL	V1, V2, V3, V4	NONE
LATERAL	I, aVL, V5, V6	II, III, aVF
ANTEROLATERAL	I, aVL, V3, V4, V5, V6	II, III, aVF
INFERIOR	II, III, aVF	I, aVL
POSTERIOR	NONE	V1, V2, V3, V4

24.8.13 – ST ELEVATION MYOCARDIAL INFARCTION (STEMI)

INFORMATION

If a STEMI is noted by the paramedic and a STEMI alert is issued, the 12 lead ECG(s) shall be transmitted to the receiving facility as soon as possible, to allow ECG review by the Emergency Department physician.

STEMI Alert criteria:

- ACS symptoms or symptoms consistent with cardiac presentation
- 12 lead ECG printout
- ST segment elevation in two or more consecutive leads:
 - **≥ 1.5 mm in leads V1, V2, V3**
 - **≥ 1 mm in all other leads**
- OR new-onset left bundle branch block (LBBB)
 - if onset is unknown, assume new onset and call STEMI ALERT

Consecutive leads include:

- Leads **I, AVL, V5, V6** = **Lateral** wall
- Leads **II, III, AVF** = **Inferior** wall
- Leads **V1 - V4** = **Anterior** or **Septal** wall

Suspected inferior / right-sided MI:

- Suspect if elevation or depressions are present in leads II, III, AVF
- Perform **V4R** using an additional 12 lead ECG
 - Transmit additional 12 lead ECG (V4R) to receiving hospital with **“V4R” as patient name**
 - Retain copy for patient run report and additional copy for hospital upon arrival

If STEMI Alert criteria are met:

- Contact CCC to inform of STEMI Alert and hospital destination
- Transport to facility (PCI center) of patient’s choice:
 - UF Health Shands Hospital
 - North Florida Regional Medical Center
 - Veterans Administration Medical Center of Gainesville
- Transmit 12 lead ECG to facility
 - **No names shall be placed on 12 lead ECG**
- Keep copy of 12 lead for records and documentation
- Monitor and reassess for any changes
- In route to the ED, the treating paramedic shall assure the following is completed:
 - Full patient assessment
 - Treatment via appropriate Medical Care Protocol
 - 12 Lead ECG transmitted successfully
 - Radio report given to receiving facility including the following:
 - **Notification of ECG transmission**
 - Patient status / condition
 - Treatments rendered
 - Current vital signs

Bypass of emergency department directly to the Cardiac Cath Lab:

- Done only at North Florida Regional Medical Center
- Done only if the Cath Lab is staffed and ready for the patient
- Patient must be seen by the attending ED Physician to affirm patient's stability and ED bypass ability
- **Receiving hospital staff (minimum of an RN) must accompany ACFR personnel to the Cath Lab and assume patient care responsibility within the hospital**
- Should an emergency event take place during the bypass process, ACFR crews shall assist the hospital staff within their scope of practice
- ACFR crews shall notify CCC when bypassing the ED and proceeding directly to the Cardiac Cath Lab. The Rescue Lieutenant shall place their unit on a 10-minute delayed response.

REFERENCE MATERIAL**STEMI mimics — situations that resemble ECG changes seen in STEMI:**

- Conditions exist which may mask or mimic the ECG patterns seen in STEMI
- These include Left Bundle Branch Block (LBBB), Left Ventricular Hypertrophy (LVH), pericarditis, and benign early repolarization. Descriptions follow below.

Left Bundle Branch Block (LBBB):

- Can produce ST elevation in Leads V1, V2, and V3
- Can have QRS-S-T changes identical to STEMI
 - **New-onset LBBB with STEMI characteristics will be classified as a STEMI Alert**
 - **If unknown, consider LBBB new onset**
- Features: **Wide QRS** (> 0.12 sec) and a QS complex or negative terminal force in V1
 - May see deep S waves in V1, and notched ("bunny ears," "M-shaped") R wave in V6
- LBBB alters depolarization (QRS), which alters repolarization (ST-T wave), causing these QRS-S-T changes
- A bundle branch block (BBB) widens the QRS (0.12 sec or more), due to the fact that the ventricles are forced to contract sequentially, thus requiring more time
 - When a QRS of 0.12 sec or more is produced by a supraventricular rhythm, think BBB

Left Ventricular Hypertrophy (LVH):

- Can produce ST elevation in Leads V1, V2, and V3
- **The presence of LVH does not rule out STEMI**
 - Criteria to differentiate STEMI vs. LVH mimicking STEMI are not sufficiently sensitive
 - Does not generally widen QRS
- The formula to evaluate for LVH is:
 - Add the height of V5/V6's tallest R wave + the depth of V1/V2's deepest S wave
 - If > 35 mm, suspect LVH (each "little" box = 1 mm)
- Most causes of LVH are from chronic overwork or overfilling of the left ventricle

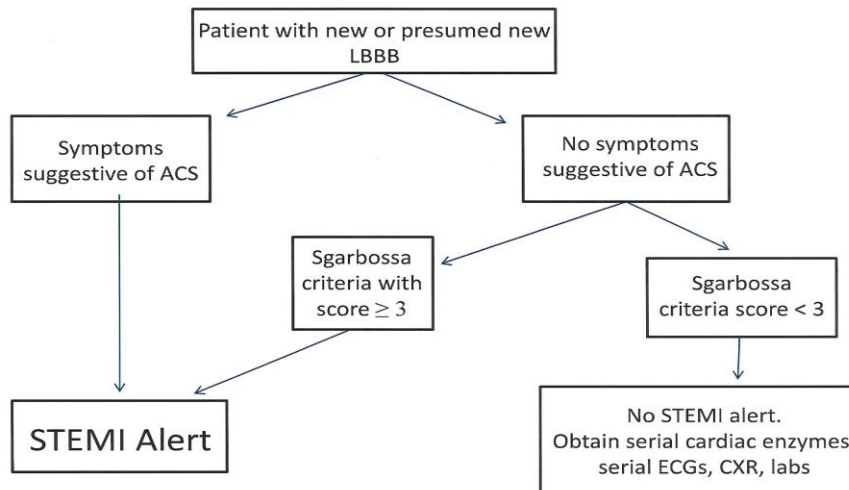
Pericarditis:

- Can produce diffuse ST elevation in many leads
 - Does not tend to follow anatomical territories (not due to coronary arteries)
 - Caused by inflammation of the epicardium secondary to inflammation of the pericardium
- **Suspicion of pericarditis does not rule out STEMI**
 - The purpose is not to rule out MI, but help ED provider suspect the possibility of pericarditis
- May produce PR depression, notching of the J-point, and a "fish hook"-shaped ST and J-Point

Benign Early Repolarization:

- Can produce ST elevation in the anterior or anterolateral leads and tall T waves
- Resembles pericarditis, with notching of the J-point and “fish hook”-shaped ST and J-Point
- ST changes are more common in the anterior and lateral chest leads
- May occur in any patient, but most common in young adult males

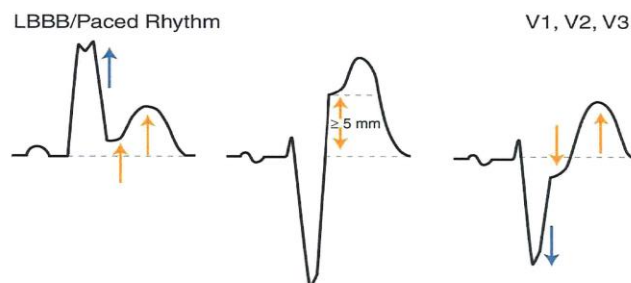
LBBB Guideline



Above recommendations meant to serve as a guideline, are not appropriate for every patient, and are not a substitute for a physician's clinical judgement.

Sgarbossa's Criteria

Criteria for diagnosis of MI	Points
ST elevation > 1mm concordant (same direction) as QRS	5
ST depression > 1mm in leads V1, V2, or V3	3
ST elevation > 5mm and discordant (opposite) with QRS	2
Total > 3 is 36-78% sensitive and 90-96% specific for acute MI	



24.8.14 – AUTOMATIC EXTERNAL DEFIBRILLATION

INFORMATION

The AED is to be used to treat patients in non-traumatic cardiac arrest who are > 8 years old.
The AED operator is in charge of patient care until ALS arrives on scene.

The sequence of events:

- Establish unresponsiveness, no pulse, and not breathing
- Provide CPR and manage ABC's (airway, breathing, circulation) until defibrillator arrives
- As soon as it is available, power on defibrillator and attach electrodes as directed
- State a brief situation report aloud (the AED will be recording sound)
- Analyze the patient's rhythm
- Do not allow anyone to touch the patient (including yourself)
- If **"shock is advised"**:
 - State "I'm clear, you're clear, we're clear" and scan the patient from head to toe to ensure no one is touching the patient
 - Press shock button on AED to deliver a shock
- Immediately perform CPR for 2 minutes, then pause to check for pulse and signs of circulation
- Re-analyze the patient's rhythm
- Deliver 1 more shock (if directed to do so by the AED) making sure that everyone is clear of the patient
- If patient is still pulseless, perform CPR for 2 minutes
- Re-analyze the patient's rhythm; if advised, the operator may deliver 1 more shock
- If the patient remains pulseless, continue CPR until ALS arrives, focusing on "hard and fast" compressions and enough ventilations to see the chest rise
- If the patient regains a pulse (spontaneous circulation) but is not breathing, correct ABC's as needed
- If patient regains a pulse (spontaneous circulation) with breathing, place patient in recovery position and monitor ABC's until transport arrives

24.8.15 – EXTERNAL CARDIAC PACING

INFORMATION

Pad and monitor placement:

- Place defibrillator pads on patient (anterior and posterior)
- Place cardiac monitor limb leads on the patient:
 - RA — White lead on right arm
 - LA — Black lead on left arm
 - RL — Green lead on right leg
 - LL — Red lead on left leg

Procedure:

- Turn central Control Knob to **PACER (Green)**
- Set the Pacer Rate at 20 - 30 BPM higher than the patient's intrinsic rate
 - Default Pacer Rate is 70 BPM. **Do not exceed 100 BPM.**
- Turn Pacer Output (mA) until there is a defined "QRS" behind each pacer spike (**electrical capture**)
 - Confirm **mechanical capture** by palpating a carotid and/or radial pulse
- Once electrical and mechanical capture is obtained, increase the current (mA) by 10% to exceed the impedance threshold
- Turn the Pacer Rate dial to adjust the patient's heart rate. Target to maintain a systolic BP > 100 mmHg.
 - **Do not exceed paced rate of 100 BPM.**
- To view the underlying rhythm, press and hold the 4:1 button (not recommended — may cause loss of mechanical capture).

As needed, **Fentanyl** 25 - 50 mcg IV/IO/IN Q5 min PRN, Max 150 mcg, hold if systolic BP < 90 OR **Versed** 1 mg IV/IO, hold if systolic BP < 90

SPECIAL CONSIDERATIONS

- The Pacer will continue to pace if a limb lead is inadvertently removed or displaced
- If monitor is turned off, the pacing function will resume if monitor is turned back on within 10 seconds
- The Zoll E Series Monitor paces in the "demand" function unless unsynchronized pacing is selected via the soft key.
- If the pacer stops due to the underlying rhythm rate exceeding that of the pacer (demand mode), be sure to check for presence of a correlating carotid and/or radial pulse

24.8.16 – INTRAVENOUS ACCESS / SALINE LOCK / MUCOSAL ATOMIZATION DEVICE

INFORMATION

Do not place an IV on same side as an AV fistula or same side after a mastectomy with lymph node resection.

IV access / Saline lock:

- Select site for IV placement
- Select appropriate size catheter for patient. Things to consider:
 - Patient age / size
 - Vein size or integrity
 - Location of IV
 - Need for fluid replacement (i.e. hypovolemia, trauma, unstable BP, cardiac arrest, etc.)
 - **Only use needle / catheter sizes that are available from ACFR supply**
- Apply tourniquet snugly to area just proximal to intended puncture site
- Prepare skin with Betadine or alcohol swabs
- Secure vein with fingers (ask patient or assistant to secure extremity)
- Insert needle and catheter assembly into vein, bevel up, and watch for free blood return
- When placement confirmed by blood return, advance catheter into the vein until you reach the hub
- Remove tourniquet

Saline lock:

- Attach Saline lock to catheter hub.
- Insure patency by briefly flushing with fluid
- Assess site for any signs of infiltration
- For IV fluid replacement:
 - Attach drip solution set to IV catheter and administer a small amount of fluid to ensure patency
 - Fluid should continue to run at a rate indicated by the patient's condition and related protocol
 - Secure catheter / Saline lock with tape or occlusive dressing

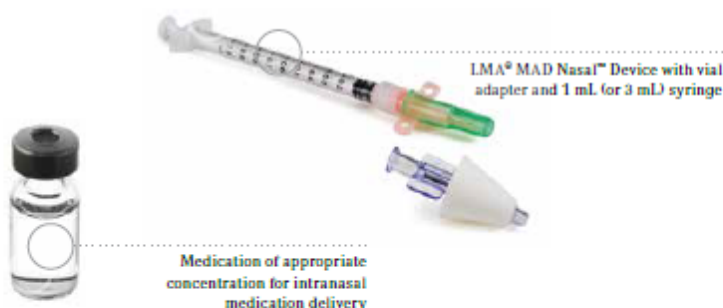
Mucosal atomization device (MAD):

- The Atomizer device shall not be utilized as a replacement of IV access
- **Purpose** — the nasal route is an attractive method of drug delivery. Due to the rich vascular plexus that is present within the nasal cavity, medications can be delivered nearly directly into the blood stream.
- **Indications** — for use on patients without IV or IO access who require rapid administration of specific medications: Narcan, Glucagon, Versed, Ativan, Fentanyl
- **Administration** —
 - No more than 1 mL of fluid should be atomized into nostril at once
 - Draw up medication with provided syringe vial adapter or needle
 - Remove the syringe vial adapter or needle
 - Attach the atomizing tip
 - Using a free hand to hold the occiput of the head stable, place the tip of the MAD snugly against the nostril, aiming slightly up and outward (toward the top of the ear)
 - Briskly compress the syringe plunger to deliver half of the medication into the nostril
 - **Max 1 mL per nostril**
 - Move to the opposite nostril and administer remaining volume into the nostril (if indicated)

Using the LMA® MAD Nasal™ Intranasal Mucosal Atomization Device

LMA® MAD Nasal™
INTRANASAL MUCOSAL
ATOMIZATION DEVICE

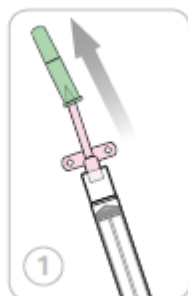
MATERIALS



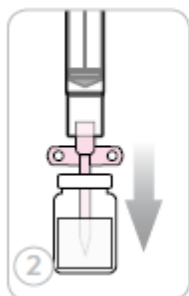
TIPS TO IMPROVE SUCCESS

- ① Minimize volume, maximize concentration
 - 1/3 mL per nostril is ideal, 1 mL is maximum
 - Use the appropriately concentrated drug
- ② Maximize total mucosal absorptive surface area
 - Atomize the drug (rather than drip it in) to cover broad surface area
 - Use BOTH nostrils to double the absorptive surface area
 - Aim slightly up and outwards to cover the turbinates and olfactory mucosa
- ③ Beware of abnormal mucosal characteristics
 - Mucous, blood and vasoconstrictors reduce absorption
 - Suction nostrils or consider alternate drug delivery method in these situations

PROCEDURE



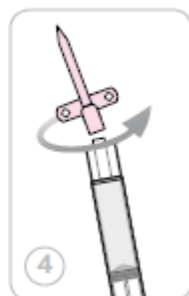
STEP 1: Remove and discard the green vial adapter cap.



STEP 2: Pierce the medication vial with the syringe vial adapter.



STEP 3: Aspirate the proper volume of medication required to treat the patient (an extra 0.1 mL of medication should be drawn up to account for the dead space in the device).



STEP 4: Remove (twist off) the syringe from the vial adapter.



STEP 5: Attach the MAD Nasal™ Device to the syringe via the luer lock connector.



STEP 6: Using the free hand to hold the occiput of the head stable, place the tip of the MAD Nasal™ Device snugly against the nostril aiming slightly up and outward (toward the top of the ear).



STEP 7: Briskly compress the syringe plunger to deliver half of the medication into the nostril.



STEP 8: Move the device over to the opposite nostril and, repeating steps 6 and 7, administer the remaining medication into the nostril if indicated.

For use with drugs approved for intranasal delivery.

TO ORDER, CALL 1.866.246.6990 OR VISIT OUR WEBSITE WWW.LMANA.COM

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Teleflex®

24.8.17 – EZ-IO INFUSION SYSTEM

INFORMATION

Indications:

- EZ-IO is to be used if **all** of the following are true:
 - Intravenous fluids or medications are needed
 - Peripheral IV access cannot be established in 2 attempts or < 90 seconds
 - The patient exhibits altered mental status, respiratory compromise, or hemodynamic instability

Contraindications:

- Fracture of the bone selected for IO infusion — consider alternate site
- Excessive tissue at insertion site, with the absence of anatomical landmarks — consider alternate site
- Prosthesis or significant orthopedic procedures within 24 hours — consider alternate site
- Infection at the site selected for insertion — consider alternate site
- Neonates, 0 - 30 days — **manual insertion without the use of the drill**

Approved site locations:

- **Proximal tibial tuberosity** (preferred site):
 - One finger (1 - 2 cm) distal from tip of the medial aspect of tibial tuberosity
- **Distal tibial tuberosity:**
 - Two fingers (2 - 4 cm) proximal to the tip of most distal aspect of tibia (medial malleolus), insertion of IO being medial aspect of distal tibial anatomy
- **Proximal humerus** (use yellow IO needle):
 - Locate the greater tubercle (flat portion of proximal humerus, 1 - 2 cm inferior to proximal tip), slightly anterior to humerus lateral midline
 - Abduct arm with elbow directed posteriorly
 - Needle set should never enter or be medial to the intertubercular groove

Equipment needed:

- EZ-IO driver
- EZ-IO AD (adult) /EZ-IO PD (pediatric) needle set:
 - **Pink** 15 mm (for 3 - 39 kg); **Blue** 25 mm (for ≥ 40 kg); **Yellow** 45 mm (excess tissue, humeral IO)
- Betadine swab / alcohol swab
- EZ-Connect
- Standard extension set
- 10 mL syringe of Normal Saline (or suitable sterile fluid)
- Pressure bag / infusion pump
- 2% Lidocaine (preservative free)
- EZ-IO yellow wristband
- 3-way stopcock

For conscious patients:

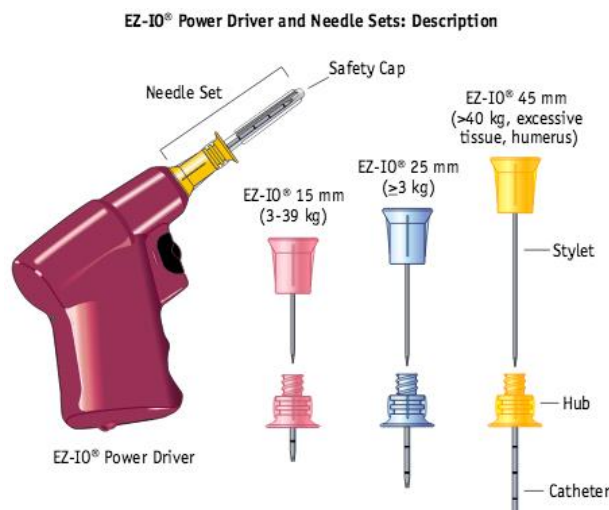
- Advise of **emergent need** for this procedure and obtain verbal consent

Procedure:

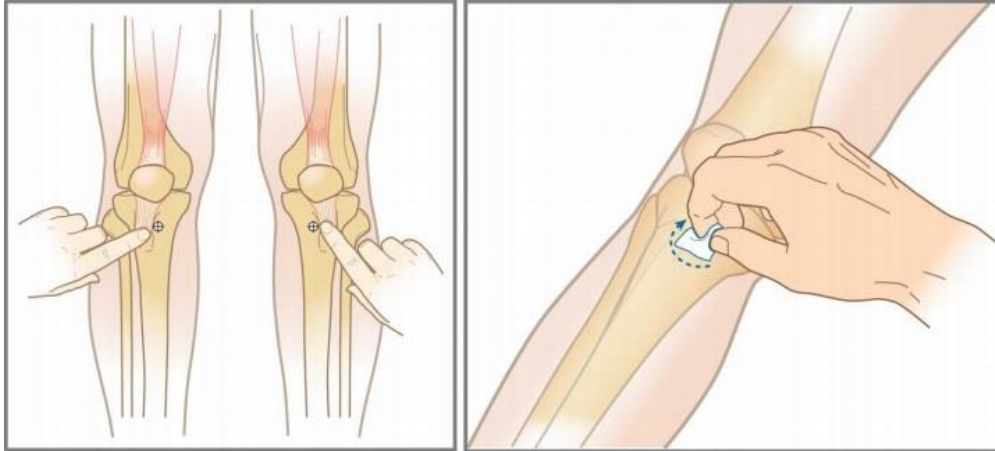
- **Preparation:**
 - Wear approved Body Substance Isolation equipment (BSI)
 - Determine EZ-IO AD or EZ-IO PD indications / rule out contraindications
 - Locate appropriate insertion site and cleanse with aseptic technique (alcohol / Betadine)
 - Prepare the EZ-IO driver and select appropriate needle set (see above)
- **Insertion:**
 - Stabilize site and insert appropriate needle set, confirming placement
 - Remove EZ-IO driver from needle set while stabilizing catheter hub
 - Remove stylet from catheter, place stylet in shuttle or approved sharps container
 - Connect primed tubing
- **Confirmation:**
 - Slowly administer appropriate dose of **Lidocaine** 2% (preservative Free) IO to conscious patients
 - 20 - 40 mg slow IO for adults, 0.5 mg/kg slow IO for pediatrics (Max 40 mg)
 - **Rapid syringe bolus** (flush) the EZ-IO catheter with 10 mL Normal Saline
 - **Fluid should flow easily** without leakage under the skin
 - Utilize pressure (pressure bag or infusion pump) for continuous infusions where applicable for hemodynamically unstable adults; repeat flush as needed for pediatrics
 - Begin infusions as necessary
 - Dress site, secure tubing, and apply wristband
 - Monitor EZ-IO site and patient condition

SPECIAL CONSIDERATIONS

- Flow rates may be slower than those achieved with IV catheters
- Ensure the administration of an appropriate rapid syringe bolus (flush) prior to infusion
 - **NO FLUSH = NO FLOW**
- Rapid syringe bolus (flush EZ-IO AD with 10 mL of Normal Saline)
- Repeat syringe bolus (flush) as needed
- **Pain:** Insertion of the EZ-IO AD and EZ-IO PD in conscious patients has been noted to cause mild to moderate discomfort (usually no more painful than a large bore IV). However, IO infusion for conscious patients has been noted to cause severe discomfort. Consider Lidocaine on conscious patients.



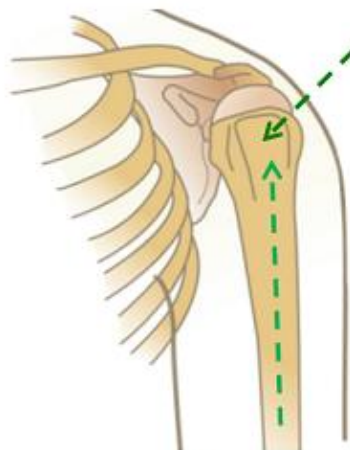
Proximal Tibial Tuberosity



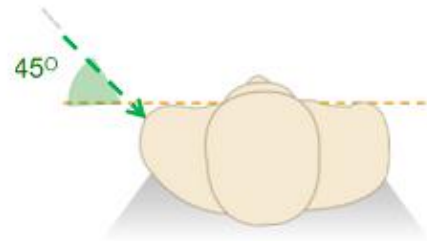
Proximal Humerus



1. Position Patient



**2. Locate insertion site:
Slide hand up to find
humerus' greater tuberosity**



**3. Insert at 45 degree
angle from anterior
plane**

24.8.18 – BLOOD DRAW

INFORMATION

If an ACFR unit is called to a scene with / by LEO to obtain blood from an individual for a blood draw:

The Law Enforcement Officer (LEO) shall provide a blood collecting kit to the paramedic. The paramedic is to follow the directions inside the kit provided by the LEO. If the seal is broke on the box or is out of date the kit shall not be used for the requested blood draw.

Read ALL instructions inside of kit provided by LEO before executing the blood draw. It is imperative to only use contents located inside of the kit provided and dispose of the used contents as instructed to do so.

Procedure:

- BSI / Universal Precautions
- Gather appropriate drawing devices located inside the kit provided by LEO
- Apply tourniquet
- Select vein as you would for IV cannulation
- Clean site with what is provided inside the kit (usually Betadine)
 - **Do not use alcohol** for cleaning site while drawing for LEA and blood alcohol levels
- Insert needle or cannula
- Attach blood tubes to vacutainer and draw blood
- Fill appropriate vials inside of kit provided by LEO
- Release tourniquet
- Withdraw needle and vacutainer
- Bandage site
- Label blood sample:
 - Patient's name
 - Date and time
 - Drawer's initials
- Complete any necessary forms located inside of kit provided by LEO

Documentation:

- Document the name of the officer requesting the blood draw and ID number
- Case number
- Reason for blood draw
- Confirmation of use of LEO provided blood draw kit
- Name of individual sample collected

24.8.19 – NASOGASTRIC TUBE PLACEMENT

INFORMATION

Age:	Newborn	1 - 6 months	6 months - 2 years	2 - 8 years	≥ 8 years	Adults
Tube Size: (French)	#8	#8 - 10	#10	#10 - 12	#14 - 16	#16 - 18

Equipment:

- Appropriate catheter size
- Water soluble lubricant / jelly
- Cup of water and straw (optional)
- Emesis bag
- Stethoscope
- Tape
- Suction
- Suction canister

Procedure:

- Explain the procedure to the patient and/or parent (if appropriate)
- Select the proper size tube
- Mark the distance the tube should be inserted:
 - **Pediatrics:** measure the tube by holding distal end of tube at patient's nose and extending tube to the tip of the earlobe and down to the xiphoid process. Mark that point on the tube.
 - **Adults:** measure the distance from the earlobe to the bridge of the nose, and then from the bridge of the nose to below the xiphoid process. Mark that point on the tube.
- To aid in the tube insertion, curl tube tightly around index finger and then release
- Lubricate distal end of tube with water-soluble lubricant
- Place the patient in a semi-upright position if condition permits
- Gently insert tube into nare. When resistance is felt, apply gentle downward pressure to advance tube.
- With the tube just above the oropharynx, instruct the patient to swallow (if able) to facilitate advancement of the tube. Offer the patient water to drink if appropriate (**only if the head is not restrained and suction is ready**).
- If cervical spine injury is not suspected, the patient may be asked to flex the neck toward the chin
- If the patient begins to cough, gag, or choke, procedure should be stopped and the patient be given an opportunity to recover. If patient begins to vomit, place in lateral decubitus position.
- Continue to pass the tube until the marked spot is reached
- Check tube placement by auscultating over stomach as air is introduced through the tube OR by aspiration of gastric contents from tube
- Tape tube in place. Tube may be left open to gravity drainage or may be hooked to suction if ordered.
- Restrain patient as needed to prevent dislocation of the tube
- **Document procedure, including tube size, which nare it was placed in, amount of stomach contents, aspirated, and the patient's tolerance of the procedure**

24.8.20 – CYANOKIT (HYDROXOCOBALAMIN FOR INJECTION)

PROTOCOL

Indication: Cyanokit is indicated for the treatment of known or suspected cyanide poisoning.

Background:

- Cyanide poisoning may result from inhalation, ingestion, or dermal exposure to various cyanide-containing compounds, **including smoke from closed-space fires**
- These agents may present with an almond odor yet, this cannot be a reliable indicator
- Cyanide is found in: hydrogen cyanide, cyanogenic plants, aliphatic nitriles, sodium nitroprusside
- Most plastics, glues, and fabrics contain cyanide agents that may be released upon burning

Identifying patients with cyanide poisoning:

- There is no widely available, rapid, confirmatory cyanide blood test
- Treatment decisions must be made on the basis of clinical history and signs and symptoms
- **If clinical suspicion of cyanide poisoning is high, Cyanokit should be administered without delay**
- Signs and symptoms include: headache, altered mental status, confusion, seizures or coma, dyspnea, mydriasis (dilated pupils), chest discomfort, tachypnea / hyperpnea (early), bradypnea / apnea (late), hypertension (early), hypotension (late), nausea, vomiting

Contraindications: NONE

Warnings and Precautions:

- **Emergency Patient Management:** In addition to Cyanokit, treatment of cyanide poisoning must include immediate attention to airway patency, adequacy of oxygenation and hydration, cardiovascular support, and management of seizure activity. Consider decontamination measures based on route of exposure.
- **Allergic Reaction:** Use caution in the management of patients with known anaphylactic reactions to hydroxocobalamin (vitamin B12) and consider alternative therapies if available. Allergic reactions may include anaphylaxis, chest discomfort, edema, urticaria, pruritus, dyspnea, and rash. Always treat any allergic reaction according to appropriate protocols.
- **Hypertension:** Many patients with cyanide poisoning will be hypotensive; however, hypertension has been observed in cyanide poisoning victims as well.
- **Erythema:** Although not dangerous, **a redness of the skin may occur** after administration of hydroxocobalamin, along with red tint to urine.

Dosage and Administration:

- **Recommended Dosing (adult):**
 - **Hydroxocobalamin** 5 grams (i.e. both 2.5 gram vials) IV/IO infusion over 15 minutes
 - May repeat depending on severity of the poisoning. T
 - **Pediatric:** There have been no safety or efficacy studies performed in pediatric patients.
 - Contact Medical Control for consultation about pediatric administration
- **Preparation of solution for infusion:** Reconstitute each 2.5 g vial of hydroxocobalamin with 100 mL of Normal Saline (not typically supplied by manufacture). The line on each vial label represents 100 mL volume of diluent. After Normal Saline is mixed with lyophilized powder, each vial should be repeatedly inverted or rocked, not shaken, for at least 30 seconds prior to infusion. This solution should be visually inspected for particulate matter and color prior to administration. If the reconstituted solution is not

dark, or if particulate matter is seen after the solution has been appropriately mixed, the solution should be discarded.

- **Incompatibility:** do **NOT** administer any drug simultaneously through same IV line as hydroxocobalamin.



Cyanokit® Antidote Administration

- Reconstitute each 2.5 gram vial with 100 mL of diluent using transfer spike
- Diluent may be Sodium Chloride 0.9%, Lactated Ringers, or 5% Dextrose
- Invert or rock vial for at least 30 seconds; *do not shake*
- Infuse 5 grams IV/IO at 15 mL / min
- Once reconstituted, Cyanokit is stable for up to 6 hours at temperatures not exceeding 40°C (104°F)

24.8.21 – SPINAL IMMOBILIZATION

INFORMATION

To protect patients from spinal cord injury, carefully evaluate for indications for C-collar or long spine board.

BLUNT TRAUMA

Cervical spine immobilization with a C-collar is required in all patients with:

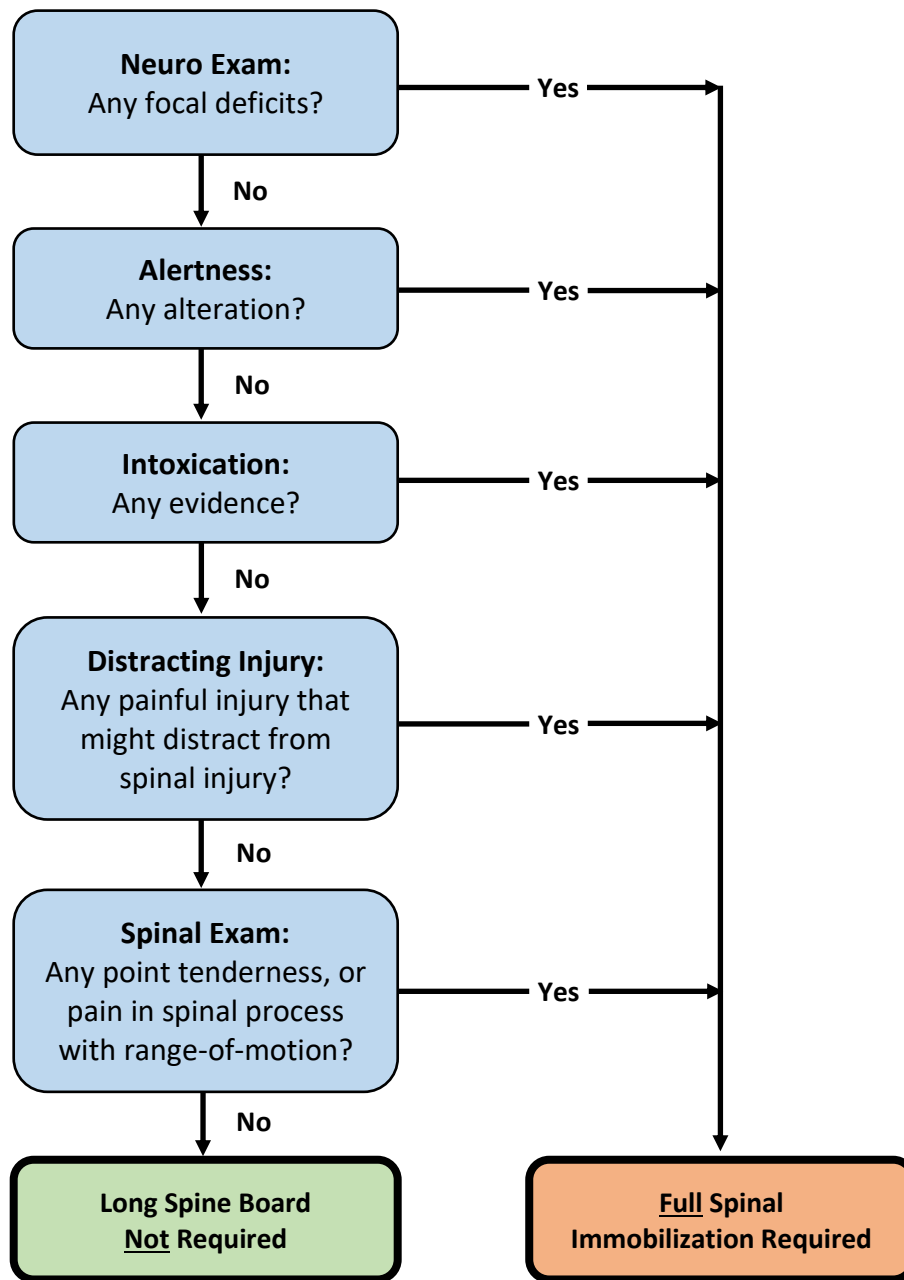
- Reported or suspected blunt trauma with:
 - Neck or cervical spine pain or tenderness
 - Altered mental status (GCS < 15)
 - Significant intoxication
 - Dementia
- Any significant traumatic mechanism:
 - Any mechanism that produces a violent impact to the head, neck, torso, or pelvis
 - Incidents with sudden acceleration or deceleration
 - Ejection
 - Shallow water drowning or diving accidents
 - High voltage electrical injuries
 - Any fall, especially in the elderly
 - Trauma Alerts from blunt trauma
- Neurological deficits or complaints, paralysis, weakness, or anatomical deformities of the spine
- **If in doubt, immobilize with a C-collar**

Not all patients require a long spine board!

Full immobilization with long-spine-board:

- **Always required in:**
 - **Trauma Alerts** from blunt trauma
 - **Significant high-energy mechanisms**, such as: ejection, falls > 3 times patient's height, axial loading injuries, and high-speed MVCs
- **Otherwise, perform a 5-step spinal assessment:**
 1. **Neurologic exam** — Any focal deficits, such as tingling, reduced strength in a joint or extremity, or numbness in an extremity?
 2. **Alertness** — Any change to alertness? Any disorientation to person, place, time or situation? Is the patient a young child? Is there a language barrier?
 3. **Intoxication** — Is there any indication the patient is intoxicated or has impaired decision-making ability?
 4. **Distracting injury** — Is there any **other** injury which is capable of producing significant pain in this patient?
 5. **Spinal exam** — Is there tenderness to palpation of **midline spine or any spinous process** when each individual spinous process is palpated?
- Any **YES** answer requires **FULL immobilization with C-collar and long spine backboard**
 - See flowchart below
- If **NO** to all of the above, the patient does not require a long spine board

A "Yes" in any section requires full spinal immobilization:



PENETRATING TRAUMA

Penetrating trauma (without blunt trauma) only requires immobilization if:

- Altered level of consciousness (GCS < 15)
- Neurologic complaints (ask about weakness, numbness, and tingling)
- Focal neurologic deficits (focal weakness or loss of sensation):
 - Test motor function in all upper and lower extremities (entire extremity)
 - Test sensation in all upper and lower extremities (start proximal and test distal)

Refusing spinal immobilization:

- Advise patient of the indication for immobilization and the risks of refusing
- If patient allows, place C-collar even if backboard is refused
- Maintain spinal alignment as best as can be achieved during transport
- Clearly document refusal of immobilization as well as the patient's capacity to make medical decisions
 - **This shall include the lack of alcohol intoxication, drug intoxication, and head trauma; as well as their ability to understand risks of refusing**

Patients who cannot tolerate supine position due to clinical condition:

- Apply all elements of spinal immobilization that the patient will tolerate
- Maintain spinal alignment as best as can be achieved during transport

SPECIAL CONSIDERATIONS

- All trauma patients should be fully evaluated and assessed to determine if patient meets Trauma Alert Criteria and transported to the appropriate facility
- In the very old and very young patients, a normal exam may not be sufficient to rule out spinal injury

When in doubt, immobilize

24.8.22 – ZOLL® AUTO PULSE MODEL 100

INFORMATION

Indication for use:

- To be used as an adjunct to manual CPR, on adult patients (> 18 years of age) only in cases of non-traumatic cardiopulmonary arrest, defined by a lack of spontaneous breathing and pulse

Description of the system:

- The AutoPulse is an automated, portable, battery-powered chest compressor, which provides chest compressions as an adjunct to performing manual CPR. Use of the AutoPulse is intended to reduce the impact of rescuer fatigue and will enable the rescuer to address additional patient needs.

AutoPulse Platform:

- The AutoPulse Platform contains the mechanical drive mechanism, control system, and electronics necessary to generate and control the force required to perform mechanical chest compressions. User controls and indicators are contained in the User Control Panel.

LifeBand Load-distributing Band (LDB):

- The LifeBand is a load-distributing band (LDB) that consists of a cover plate and two bands integrated with a compression pad with a Velcro® fastener. Attached to the AutoPulse Platform, the LifeBand is automatically adjusted to the patient and provides compressions to the patient's chest in the region of the heart. The latex-free LifeBand is a single-use component that is attached to the AutoPulse Platform before each use.

AutoPulse Power System Battery:

- The AutoPulse Battery is a removable component that supplies power for the AutoPulse operation. The Battery is a proprietary, rechargeable, Lithium Ion (Li-Ion) battery that is the exclusive power source for the AutoPulse.
- The Battery is mechanically keyed to the AutoPulse Platform and Battery Charger to facilitate correct installation. The Battery's back end contains connections for power and communications to the Battery Charger and to the AutoPulse Platform. A Battery Status Check button illuminates the Battery's status light-emitting diodes (LEDs).

Using the AutoPulse:

- Before deploying the AutoPulse, note the following warnings and precautions:
 - The AutoPulse is intended for use on adults, 18 years of age or older.
 - The AutoPulse is not intended for patients with traumatic injury (wounds resulting from sudden physical injury or violence).
 - When CPR is indicated, manual compressions should be initiated immediately, while AutoPulse is prepared for application.
 - The AutoPulse must be used only in cases that manual CPR would normally be initiated.
 - Personnel certified in manual CPR must always be present during the AutoPulse operation.
 - Use care while using sharp instruments around the LifeBand.
 - Do not block the vents of the AutoPulse Platform.

Deploying the AutoPulse System:

- In order to deploy the AutoPulse quickly and with the least interruption in cardiac compressions, a pit crew model - similar to that which is used in auto racing - is suggested for roles and positions of the staff involved in performing defibrillation and using the AutoPulse.

CPR must be initiated and interruptions kept to a minimum when deploying the AutoPulse.

1. Power up the AutoPulse. The ON/OFF button is located on the top (“head”) edge of the AutoPulse Platform.
2. The AutoPulse illuminates the green Power light-emitting diode (LED) on the User Control Panel and performs a self-test. Refer to the User Control Panel and its display panel during the operation of the AutoPulse. All operating information is available on the User Control Panel.
NOTE: Make sure that no User Advisory, Fault or System Error messages display.
3. The AutoPulse indicates that it is ready for use.
4. After assessing the patient’s condition and monitoring pads are in place, sit the patient up and remove the remainder of the upper torso clothing.
5. Slide the AutoPulse Platform into position behind the sitting patient and lay the patient down onto the Platform.
6. Position the patient so that he/she is centered laterally (from left to right) and that the armpits are aligned with the AutoPulse using the yellow line positioning guides on the platform.
7. Close the LifeBand around the patient's chest.

To properly align the two sides of the LifeBand:

- Place band with yellow alignment tab on top of patient’s chest.
- Locate mating slot of the other band placing it over the alignment tab.
- Press the bands together to engage and secure the Velcro® fastener.
- Lift up the LifeBand to its fullest, ensuring that the side bands are at a 90-degree angle to the platform, that they are not twisted and that there are no obstructions.
- Center the LifeBand on the patient's chest, placing it such that its center is over the area upon which manual compressions are conducted.
- **NOTE:** If the bands cannot be closed or any other difficulty with the device is found, continue with manual CPR.

Starting chest compressions:

1. Make sure that the yellow upper edge of the LifeBand is aligned with the patient's armpits, and is directly over the yellow line on the AutoPulse Platform. Also make sure that there are no obstructions, such as clothing or equipment, with the bands.
2. Press and release the Start/Continue button once. The AutoPulse automatically adjusts the bands to the patient's chest.
3. The AutoPulse will pause for 3 seconds to allow you to verify that the patient is properly aligned and that the LifeBand has taken up any slack in the bands. (indicated on the Display Panel Screen)
NOTE: If the patient is not properly aligned, press the Stop/Cancel button, realign the patient, and begin compressions again.
4. After the 3 second pause to verify patient alignment is complete, compressions will automatically begin. You may press the Start/Continue button to immediately initiate compressions ahead of that time.
5. **WARNING:**
 - **Do not lean on the patient after pressing the Start/Continue button.**
 - **If you must move or realign the patient, you must press the Stop/Cancel button before adjustment.**
 - **Do not place your hands or any objects on or under the LifeBand while the AutoPulse is analyzing the patient or during active operation.**

6. The pre-set mode compression operation will be Continuous Compressions. In the Continuous Compression mode, it performs compressions with no pauses. In Continuous mode, an audio cue tone for ventilation will sound 8 times per minute.
7. To access the patient or to pause the AutoPulse for any reason, press the Stop/Cancel button. The AutoPulse Platform releases the tension on the LifeBand, allowing the user to pull the bands to the maximum extended position. 10 seconds after the Stop/Cancel button has been pressed a single audio alert tone will sound. Three audio alert tones will sound 20 seconds after the pause was initiated. Audio alert tones will sound continuously after 30 seconds into the pause.
NOTE: Opening the bands during active operation will cause the AutoPulse to stop operation immediately. To restart compressions, re-fasten the Velcro® fastener, clear the Fault by pulling up on the LifeBand and pressing Start/Continue and then follow the normal operating steps.
8. To restart compressions, press the CONTINUE button.

Ending active device use:

1. After either successful resuscitation or termination of activities, press the Stop/Cancel button followed by the ON/OFF button. The Stop/Cancel button action will cease the compression cycles and relax the LifeBand. The ON/OFF button action will power down the AutoPulse.
2. Open the Velcro® fastener and lift or log roll off the patient from the AutoPulse Platform, as necessary.

Preparing the AutoPulse for its next use:

1. Remove the LifeBand from the AutoPulse Platform.
2. Discard the LifeBand as it is a single-use component. Treat the LifeBand as contaminated medical waste and dispose of it accordingly.
3. Clean the AutoPulse Platform before its next use.
4. Replace the LifeBand before returning the AutoPulse to service.
5. Remove the AutoPulse Battery.

- NOTE:** Ensure that the AutoPulse is powered down before removing and replacing the Battery.
6. Replace the Battery with a fully charged Battery before returning the AutoPulse to service.
 7. Recharge the used Battery as necessary for future use.

Periodic electrocardiogram (ECG) monitoring and/or defibrillation / ETCO2:

- When the AutoPulse is used in conjunction with defibrillators or with other therapeutic devices that must monitor an ECG signal or to continuously evaluate to determine when ROSC has occurred (ie jump in ETCO2 level ex- 10-20), interruption of the compression cycles may be required to avoid ECG motion artifact associated with mechanical chest compressions, need for defibrillation and/ or determine if ROSC has occurred.
- To temporarily interrupt the AutoPulse's active operation, press the Stop/Cancel button.
- To restart the AutoPulse press the Continue button.

Patient Alignment and Securing for Transport:

- **WARNING:** The AutoPulse is not intended for carrying or transporting a patient. The AutoPulse should be placed on the soft stretcher to carry or transport the patient, if necessary. During transport, regular checks of the patient's alignment should be performed.
- The AutoPulse does not require any patient restraints to perform compressions while the patient is lying on a flat surface. However, patient restraints should be used to maintain alignment of the patient to the AutoPulse.
- The AutoPulse is designed to accept standard restraints to maintain patient alignment. The rescuer can secure a patient of up to 300 pounds, chest circumference not to exceed 51.2 inches or chest depth not

to exceed 15 inches.

Caution: Motion can cause the patient to shift and restraints to loosen, so care should be given to the initial strapping for alignment of the patient to the AutoPulse. Regular checks of patient alignment to the AutoPulse and alignment of the LifeBand to the patient's mid-axillary line should be made if the AutoPulse is performing active compressions, or before active compressions are restarted.

When transporting the patient, lift by supporting the patient and the AutoPulse onto the stretcher utilizing the soft stretcher and place the AutoPulse and patient within the vehicle during AutoPulse operation. Secure the AutoPulse and patient to the stretcher.

Caution: Straps or restraints used for transportation purposes must not interfere with the operation of the AutoPulse. Specifically, straps across the patient's chest may restrict the compression/ decompression of the chest. In general, strapping schemes must not alter the alignment of the patient to the AutoPulse.

Remember to attach the included combination AutoPulse Shoulder Restraint/Head Immobilizer before moving.

1. Attach the Shoulder Restraint to keep the patient properly aligned on the AutoPulse Platform, therefore making for easier transport.
2. The Head Immobilizer assists in keeping the patient's head from moving, especially when combined with a cervical collar. A cloth may also be placed under the patient's head.
3. When lifted, the Soft Stretcher has a cradling effect that helps maintain alignment of the patient on the AutoPulse. Users can also allow the patient's lower legs to bend freely at the knees, facilitating moving around tight corners, elevators, and stairwells.

Always ensure the following:

1. Make sure that the patient's armpits and the upper edge of the LifeBand are aligned with the yellow line on the AutoPulse.
2. Make sure that the LifeBand is not twisted and properly mated with the Velcro®.
3. Maintain the LifeBand at 90 degrees with the AutoPulse Platform. Ensure that the LifeBand is not impeded by anything such as the patient's arms, clothing, straps, and buckles that may interfere with the movement of the LifeBand.

AutoPulse daily battery rotation and check-off:

Batteries for the AutoPulse will be rotated on a daily basis utilizing the following battery rotation procedure.

- Battery in Battery Charger becomes the spare
- Battery that is spare in case goes into AutoPulse platform
- Battery in AutoPulse bag platform goes into the Battery Charger

Once a new battery from charger is placed in AutoPulse, the AutoPulse needs to be powered on using the ON/OFF button. This allows the AutoPulse to run an analysis of the battery. The screen will advise if the battery needs to be recharged / replaced.

Cleaning the AutoPulse Platform:

1. Remove and dispose of the LifeBand.
2. Wipe all the surfaces of the AutoPulse Platform free of foreign matter and spills with a disinfectant or bactericidal wipe. Check the vents to ensure that they are free and clear of any obstructive matter.
3. Install new LifeBand and ensure that the AutoPulse is dry before storing.

24.8.23 – ZOLL® AUTO PULSE BATTERY CONDITIONING

INFORMATION

About this procedure:

- The information in this User Guide applies to the ZOLL Circulation AutoPulse® Battery Charger designed for the AutoPulse Resuscitation System Model 100. The AutoPulse Power System consists of two main components: the AutoPulse Battery Charger and the AutoPulse Battery.
- Proper use of the AutoPulse Power System requires a thorough understanding of the Power System, and appropriate training and practice using the Power System.
- Always charge a stored Battery before placing the Battery in active operation. Battery may self-discharge when not in use. Failure to charge a Battery before use may cause device power failure.

Introduction of the AutoPulse Power System:

- The AutoPulse Power System represents a state-of-the-art breakthrough in battery technology and one of the breakthroughs that make the AutoPulse Resuscitation System possible. The AutoPulse Battery communicates with the AutoPulse Battery Charger or with the AutoPulse Platform when it is plugged into each respectively.
- The Battery is intended to operate for a minimum of 30 minutes at a rate of 80 compressions per minute.
- The Battery uses a lithium ion (Li-Ion) technology because Li-Ion delivers one of the highest power outputs of any battery technology. At the same time, Li-Ion does not have the limiting memory effect inherent with nickel-cadmium (NiCd) batteries or the higher weight associated with the higher mass-to-power ratio of lead-acid batteries. The Battery automatically monitors its readiness state. Finally, the Battery is mechanically keyed to the AutoPulse Platform and Battery Charger to facilitate correct installation.
- Checking the Battery's status allows you to determine the need for a charge to ensure adequate battery capacity (run time). A green LED ensures that the Battery has the capacity for a minimum run time of 30 minutes on a typical patient. Batteries self-discharge when not in use. Recharge the Battery before use if the amber LED illuminates.

Performing a Battery Status Check:

- To determine if Battery needs to be charged, press the white Status Check button on the Battery:
 - **Green LED** – Battery charged and ready for use.
 - **Amber LED** – Battery is partially discharged and remaining runtime is unknown.
 - **Red LED** – Battery has exceeded its service life or failed a test-cycle.
- When a Battery is in the Battery Charger and the READY LED illuminates, leave the Battery in the Battery Charger to maintain peak capacity.

Battery Charger Status LEDs:

- **Yellow LED** – Battery is charging.
- **Yellow LED on Charger and Amber on Battery** – indicates that battery is in the Test-Cycle mode. Test/Cycle last approximately 12 hours. At completion of the Test-Cycle the Battery Charger will indicate READY or FAIL.
- **Green LED** – Battery is charged and ready to use.
- **Red LED** – Battery has failed or the Battery Charger is currently unable to charge the Battery. Try reinserting the battery again. If **Red LED** still illuminates, then battery has failed and needs to be replaced.

Understanding Test-Cycles:

- A test-cycle measures the Battery's charge holding capability by cycling the Battery through a charge-discharge-recharge sequence. Batteries with a high charge holding capability pass the test cycle and remain available for continued use. Batteries that no longer accept a charge will fail the test-cycle and must be replaced as they can no longer be used in the AutoPulse System.
- **Note:** The AutoPulse Battery Charger will automatically perform a Test-Cycle every 10th charge/discharge cycle or at a minimum of every 30 days. When a battery is placed in the battery charger under those conditions, the Test-Cycle Yellow LED will illuminate and the charger will automatically begin the Test-Cycle. The normal Test-Cycle requires up to 12 hours and the battery cannot be removed during the Test-Cycle. Documentation will be noted on the Battery Test-Cycle attached to the bottom of each Battery.
 - The Battery Charger will automatically perform a test-cycle:
 - Every 10th charge/discharge cycle.
 - When the Battery Charger detects that the Battery has been severely discharged (no status LEDs will illuminate when you press the Battery's Status Check button).
- **Note:** Do not remove a Battery during a test-cycle or the Battery's runtime will be unknown.
- Removing a Battery during a test-cycle may cause the Battery Charger to automatically enter a test-cycle mode the next time a Battery is inserted into the Battery Charger.
- At the end of one full test-cycle, if the Battery Charger's TEST (amber) LED remains illuminated, the Battery Charger has determined that the Battery's charge capacity remains compromised. In an attempt to restore the Battery, the Battery Charger will perform a second test-cycle (another six hours). If the Battery Charger's TEST LED remains illuminated, the Battery Charger will attempt to perform a third test-cycle (another six hours). Following the third test-cycle, the Battery will either be ready for operation (green READY LED illuminated) or the Battery will have failed the test-cycle and must be replaced (red FAIL LED illuminated).
- A Battery will fail a test-cycle following 100 charge-discharge cycles.
- **Note:** Discontinue use of any failed Battery as it will no longer hold an appropriate charge. Notify the appropriate District Chief so that a replacement Battery can be obtained.

Battery management:

- The AutoPulse System is intended to be deployed on emergency vehicles in a state of high-readiness. Therefore, regular AutoPulse System checks should be integrated into Emergency Medical Service (EMS) rig-check procedures. Regular monitoring of AutoPulse Battery status is vital to ensure adequate run time. Discharged Batteries (amber status light-emitting diode (LED) on the Battery or less than four bars seen on the AutoPulse Platform's display panel screen when the AutoPulse Platform is powered up) will result in shorter Battery run times. Discharged Batteries should be replaced with charged Batteries (green status LED or four bars seen on the AutoPulse Platform's display panel screen).
- The following essential elements of AutoPulse Battery management should be incorporated into a regular routine:
 - Leave a fully-charged Battery installed in the AutoPulse Platform at all times.
 - Leave a fully-charged spare Battery in the case that carries the AutoPulse System.
 - Maintain one fully-charged Battery in the AutoPulse Battery Charger.
- The Battery rotation performed at the beginning of each shift is:
 - Battery in Battery Charger becomes the spare.
 - Battery that is spare in case goes into the AutoPulse platform.
 - Battery in AutoPulse Platform goes into the Battery Charger.

24.8.24 – ZOLL® E SERIES™ REFERENCE GUIDE

INFORMATION

Universal Dial (Central Control Knob)

- One universal dial is used for all therapies (defib/monitoring/pacing). Turn the dial to the therapy you wish to use. Additional options will appear at the bottom of the screen. Soft keys will be used often and the options at the bottom of the screen will change based on which therapy you are utilizing.

Defib (ALS) (biphasic is 200 J for each shock):

- #1 Turn Central Control knob to **DEFIB (Red)**
- #2 Press **CHARGE**
- #3 Press **SHOCK**
- Pediatric - 2 J/kg 1st Shock → 4 J/kg 2nd and subsequent shocks (See Broselow Tape)
 - You will need to manually set the Joule settings for Pediatric patients
 - The default setting is 200 J

Cardioversion:

- Turn Central Control knob to **DEFIB (Red)**
- Press **SYNC ON/OFF** soft key
- White arrows will sync on “R-wave”
- Energy Settings are:
 - SVT: 50 to 100, 120, 150, 200 Joules
 - Atrial fibrillation / Flutter: 50 to 100, 120, 150, 200 Joules
 - Wide Complex Tachycardia: 50 to 100, 200, 300, 360 Joules
 - Pediatric: 1 J/kg 1st dose → 2 J/kg 2nd dose (See Broselow Tape)
- ****You must manually select the energy you wish to use. The energy will not automatically increase once manually changed****
- Press **CHARGE** Push and hold **SHOCK** to shock on “R-wave”
- You must press **SYNC ON/OFF** key between each cardioversion attempt. It is automatically turned off when charge is delivered in case of rhythm change to V-Fib

Pacing:

- Turn Central Control Knob to **PACER (Green)**
- Turn **Pacer Output (mA)** until “QRS” appears after each pacer spike (Electrical Capture).
- Confirm mechanical capture by checking Carotid and/or Radial pulse.
- Once you get mechanical/electrical capture, increase the current by 10% to make sure you don’t lose capture.
- Set the Pacer at 20 - 30 BPM higher than the patient’s intrinsic rate. Default pacer rate is 70 ppm. **Do not exceed 80 BPM.**
- Turn the Pacer Rate dial to change the patient’s heart rate.
- Press and hold the 4:1 button to view the underlying rhythm (Not recommended)

Blood pressure (NIBP):

- Select proper cuff size and apply to patient, making sure that the cuff is tight and properly aligned.
- Press blue **NIBP** button to take a single pressure. The cuff will inflate to 180, if a pressure is not obtained at 180, the cuff will re-inflate until a pressure is obtained. Push **NIBP** button again to abort measurement.

- Push and hold NIBP button to Auto inflate every 5 min. Press and hold again to shut off
- Auto NIBP.
- Change interval – Press “Param” Enter NIBP select Auto Interval Increase or Decrease
- To take a single pressure in between Auto Interval, Press the NIBP button again. This will take a single pressure, but not change your Auto Interval.
- To get a list of all your vitals (Trends), press “Summary” Trend It will highlight NIBP Enter Print
- You will receive trending of all blood pressures, heart rate, SPO2, and ETCO2.

12 Lead ECG

- Turn Central Control to “Monitor” and make sure Lead II not PADS is displayed.
- Prep patients skin as appropriate and attach 4 Lead cables to torso. Press and hold the recorder button to print leads I, II, III, aVR, aVL, aVF. Connect V leads to chest. Plug V lead cable into 4 lead cable block. Press and hold the RECORDER button to obtain a quick look real time 12 lead ECG.
- Press 12 Lead PT Info Gender (m/f) Age Press arrows on top of monitor & Enter Return again
- Make sure patient is still for a full 10 seconds when acquiring. Press Acquire

12 lead transmission:

- After 12 lead has been performed, monitor will be in ECG Transmission mode
- Select transmission destination (Hospital Choice or TEST)
- Press “Transmit Now” when in proximity of mobile router located in unit

ETCO2:

- Plug the ETCO2 adapter (clear piece) into the ETCO2 module and place airway adapter between ET tube and BVM.
- The CO2 module takes about 1 min. to warm-up after you turn on the monitor and should already be zeroed.
- If you have to re-zero, place the sensor into the module, Press Param (soft key). Select ETCO2. Enter. Press Zero. Make sure nothing is attached to the patient when re-zeroing.
- Press soft key labeled Wave 2 to view the wave form.

Lead button:

- Your monitor will “power up” in Lead II. You may press the “Lead” button to change leads

Recorder button:

- Press “Recorder” button once to print what you see on the screen. Press “Recorder” button again to stop printing.
- Press and hold “Recorder” button with 4 Lead cable and it will print I, II, III, aVR, aVL, aVF in Diagnostic Mode.
- Press and hold “Recorder” button with 12 Lead cable and it will print a Diagnostic 12 lead with no interpretation

Code markers:

- Press the Code Marker button, you will see a list of drugs that follow protocols, Press Enter Marker
- Once you press the Enter Marker it will automatically highlight the next drug in your protocol. To move through the list of drugs use the arrows on top of the monitor. If you deviate from the protocol use the arrows on top of the monitor to move through the list.
- If you want to mark a generic event, press the Code Marker button once

Printing a summary:

- There are three main uses in the Summary section
 - Trend: (see NIBP above)
 - Print Chart, Print Range: allows you to print a range of events. A log of events will appear on screen. Use arrow keys to scroll down to highlight the first event that you want to print. Press "Print Record". Allow the machine to print off the information you want, press "Record" to stop recorder.
 - Printing a complete summary: press "Summary" Print Call Select Call with arrows on top of the monitor Print Record

Shift check - Do in the following order:

- Rotate Batteries: 1. Unit to Charger 2. Spare to Unit 3. Charger to Spare (this should be done daily)
- Plug red end of defib cable into the black test port that is attached to the cable. Turn central dial to red (Defib). Select 30 Joules, Press Charge, Press Shock, "Test OK" will appear on screen. If you get an "Error code" contact the Duty Supervisor.

Adjusting the screen for bright light:

- Press and hold the button in the lower left that is a half shaded circle

Uploading data into tablet PCR:

- Information to be released in the future

Battery and charger maintenance:

- Batteries need to be conditioned once a month
- This should be done on the first day of every month when expired drugs are checked
- Notate battery conditioned with date and initials/id # on the tag on the side of the battery
- Charger should be tested every 3rd month (quarterly)
- Notate the charger test on the tag on the charger with date and initials / ID #



24.9 – CRITICAL CARE PROTOCOLS

24.9.1 – ARTERIAL LINE INSERTION

BACKGROUND

Arterial line insertion and monitoring is used in select critically ill patients who require very precise blood pressure monitoring or frequent arterial blood gas measurements.

Arterial lines are not risk-free. Even under perfect sterile technique, approximately 1 in 100 will produce a serious bloodstream infection, and a small number will result in permanent neurologic or vascular damage.

Arterial lines should only be placed when truly indicated.

INDICATIONS

- Monitoring of severe hemodynamic instability
- Titration of vasoactive drugs
 - IV vasopressors
 - Ongoing IV antihypertensive therapy, as in intracranial hemorrhage (ICH) or aortic dissection
- Frequent arterial blood gas sampling

PROCEDURE

Equipment

- 20 gauge Arrow Arterial Line Catheter with guidewire
- Pressure bag
- 1000 mL Normal Saline bag
- Transducer tubing
- Sterile 4x4's
- Sterile gloves
- Betadine / isopropyl alcohol / chlorhexidine / sterilizing solution
- Clear occlusive dressing (e.g., Tegaderm)
- Zola X-Series Monitor with Edwards Cable

Procedure for Radial Arterial Line insertion

- **Perform Allen Test:**
 - Elevate hand and ask patient to clench their fist for 30 seconds
 - Apply pressure to the ulnar and radial arteries as to occlude both of them
 - Ask the patient to open their fist. It should appear blanched
 - Release pressure to the ulnar artery while maintaining occlusion to radial artery
 - The color should return to normal in 5 - 15 seconds
 - If color does not return to normal, it is not safe to cannulate the radial artery
- Identify the radial artery
- Prep the area with betadine / Isopropyl alcohol / chlorhexidine

- Using sterile technique, insert Arrow Arterial Catheter into the skin just distal to the palpated artery site at a 30 to 60 degree angle
- Advance the needle Using sterile technique into the artery until pulsatile bright blood enters flash chamber
- Without advancing needle, flatten needle, then fully advance guidewire
- Advance catheter over guidewire
- Hold firm pressure on radial artery proximal to arterial line site to prevent hemorrhage
- Remove guidewire and quickly connect to pressure tubing and transducer
- Secure in place with clear occlusive dressing (e.g., Tegaderm), and tape securely
- Ensure the transducer pressure tubing and flush solution are correctly assembled and free of air bubbles
- Position the transducer at the level of the right atrium (phlebostatic axis)
- Turn the 3 way stopcock “off to patient, open to air (atmosphere)”
- Zero the arterial line on the monitor, return the stopcock to neutral setting, and verify waveform

Complications

- Bleeding
- Infection, including bacteremia
- Arterial thrombosis
- Air embolism
- Neurovascular injury

REFERENCES

Becker, D.E. (2001) Arterial catheter insertions (perform). AACN Procedure Manual for Critical Care, 4th Ed., W.B. Saunders, Philadelphia, PA, pgs. 361-365

24.9.2 – INDUCED HYPOTHERMIA STATUS POST CARDIAC ARREST (CODE COOL)

BACKGROUND

Due to the recent additions of Free Standing Emergency Departments (FSEDs) in Alachua County, the possibility arises that post-cardiac-arrest patients may have Induced Hypothermia initiated at a FSED and require transport from FSED to a tertiary care center.

According to 2015 AHA Guidelines, comatose patients with ROSC after cardiac arrest should be cooled to a targeted temperature between 32 and 36 degrees Celsius and maintained there for a minimum of 24 hours.

PROCEDURE

- Check initial core body temperature (per rectum preferred)
- Initiate IV / IO therapy
- If cleared by Medical Director, consider arterial line placement (See [24.9.1 – Arterial Line Insertion](#) protocol)
- Secure airway if not already done
- Place patient on transport ventilator and monitor ETCO₂
 - Do not hyperventilate; ETCO₂ should range from 35 - 45 mmHg
- If started by the ED continue cold (4 degrees Celsius) Normal Saline 1000 mL IV/IO
- Provide the patient with ice packs (place in groin, arm pits, behind the neck, etc.)
- Consider **Versed** 2 - 5 mg Q5 minutes IV/IO for shivering and sedation
 - May also consider **Versed** infusion 0.02 - 0.1 mg/kg/hr IV/IO
- If hypotension, See [24.4.10 – Hypotension / Shock](#) protocol
- Perform 12 Lead ECG; if STEMI present, issue STEMI Alert and transport to the nearest PCI Center
- If patient status deteriorates immediately after cooling, discontinue protocol
- Vital signs Q5 minutes, including HR / BP / SpO₂ / RR / ETCO₂ / Temperature

Complications:

- Shivering
- Cardiac arrest
- Hypotension or bradycardia
- Myocardial Infarction secondary to coronary vasoconstriction
- Hypomagnesemia / Hypokalemia / Hypophosphatemia
- Hyperglycemia

REFERENCES

- American Heart Association 2015 ACLS guidelines
- Hassan Soleimanpour, Saeid. "Main Complications of Mild Induced Hypothermia After Cardiac Arrest: A Review Article". PubMed Central (PMC). N.p., 2016. Web. 8 Nov. 2016

24.9.3 – INTRACRANIAL HEMORRHAGE

INDICATIONS

Confirmed Intracranial Hemorrhage (ICH) by CT scan:

- Epidural hematoma (EDH)
- Subdural hematoma (SDH)
- Subarachnoid hemorrhage (SAH)
- Intraparenchymal hemorrhage (IPH)

BLS

- Initiate basic medical care (See [24.2.1 - Basic Medical Care](#))
- Vitals — before and after interventions — BP, Pulse, RR, SpO2, BGL, Temperature, Lactate
- Oxygen — maintain above 94%
- Keep head of stretcher 30 - 45 degrees
- Nothing by mouth (NPO)
- Transport expeditiously

ALS

- Full ALS Assessment and Treatment
- Continuous cardiac monitoring
- Intravenous access
- Consider pain management

CCP

- Pre-Coil target systolic blood pressure is < 140 mmHg for both ruptured and un ruptured
- Post-Coil or clipping target systolic blood pressure is < 160 mmHg

To maintain acceptable blood pressure, use the following medications as needed:

Medications:

- **Labetalol** 10 mg IV/IO initial dose
 - If goal not reached after 5 minutes, 0.2 mg/kg slow IV/IO (**up to 20 mg IV/IO**)
 - May repeat **10 - 20 mg slow IV/IO doses Q5 minutes** PRN until SBP is < 160
 - Maximum total dose 200 mg
 - Repeat blood pressure before and after each dose
- **Labetalol** maintenance infusion at 0.2 – 1.2 mg/kg/hr IV/IO (Max dose 120 mg/hr)
 - Start at 0.2 mg/kg/hr and titrate every 5 - 10 minutes to BP goal

- **Nicardipine** 2.5 mg/hr IV/IO
 - May increase dose in 2.5 mg increments every 5 - 10 minutes
 - Maximum dose is 15 mg/hr
 - Once desired BP is achieved, consider incremental dose reduction to lowest rate possible which maintains desired SBP
- **Metoprolol** 5 mg IV/IO (if hypertensive and tachycardic)
 - If goal not reached after 5 minutes may repeat 5 mg IV/IO

SPECIAL CONSIDERATIONS

CCPs cleared for arterial line placement should place or request an arterial Line at transferring medical facility prior to transport

- See [24.9.1 – Arterial Line Insertion](#) protocol

24.9.4 – RAPID SEQUENCE INTUBATION

BACKGROUND

Rapid sequence intubation (RSI) involves pre-treatment with a sedative followed by a paralytic agent to facilitate proper advanced airway management.

RSI is potentially dangerous, as it removes the patient's ability to breathe spontaneously. Only use rapid sequent intubation when indicated for emergent airway management.

Only paramedics who have been cleared by the Medical Director for RSI can perform this procedure.

INDICATIONS

- Unable to protect airway
- Unable to ventilate
- Unable to oxygenate
- Anticipated clinical deterioration
 - Examples include: uncooperative trauma patient requiring life-saving procedures, expanding intraoral mass or hematoma, septic shock with progressive respiratory distress, etc.

PROCEDURE

Preparation:

- Monitor (continuous cardiac monitoring, SpO₂, ETCO₂, HR, BP) pre and post placement
- Check equipment:
 - Functional laryngoscope
 - BVM with high flow O₂
 - ET tube(s), stylet, 10 mL syringe, securing device
 - Back up device: I-Gel or King LT airway
- Advanced alternate airway bag IMMEDIATELY available
- All medications labeled and drawn up
- Suction charged and ready
- ET tube confirmation equipment
- Obtain vascular access (two lines preferred, but do not delay patient care)
- Assess for difficult airway (“**LEMON**” method)
 - Look externally (facial trauma, large incisors, large tongue)
 - Evaluate the 3-3-2 rule
 - Incisor distance > 3 finger breadths
 - Hyoid-mental distance > 3 finger breadths
 - Thyroid-to-mouth > 2 finger breadths
 - Mallampati score
 - 1: Visualize entire soft palate
 - 2: Visualized uvula
 - 3: Visualize base of uvula
 - 4: Cannot visualize soft palate

- Obstruction
- Neck mobility

Pre-treatment:

- Pre-oxygenate
- **Atropine** 0.02 mg/kg IVP/IO (Min 0.1 mg, Max 0.5 mg) for children ≤ 5 years of age
- **Lidocaine** 1.0 to 1.5 mg/kg IV/IO for suspected head injury
- Consider Sellick maneuver (gentle cricoid pressure until tube placement is confirmed)

Induction:

- Always provide the sedative before paralytic. Options include (choose one):
 - **Etomidate** 0.3 mg/kg IVP/IO x 1
 - **Versed** 0.05 mg/kg slow IVP/IO. May repeat in 5 minutes as needed x 1
 - **Ativan** 0.05 mg/kg slow IVP/IO. May repeat in 5 minutes as needed x 1

Paralysis:

- **Succinylcholine** 1 - 1.5 mg/kg IVP/IO (short acting paralytic) x 1
 - Contraindications to Succinylcholine:
 - Massive trauma or large burns > 72 hours old
 - Known hyperkalemia (e.g., end stage renal disease with missed dialysis)
 - Penetrating eye injuries (increases intraocular pressure) – relative, airway takes priority
 - Degenerative neuromuscular disease (MS, ALS)
 - Expanding neck hematoma
 - History of malignant hyperthermia

Intubation after loss of muscle tone:

- Alternative airways (**I-Gel**, **King LT**) are always acceptable
- Verify endotracheal (ET) tube placement with three methods – one **must be ETCO2!**
 - ETCO2 capnography
 - **REMOVE ET TUBE IF NO CONSISTENT ETCO2 WAVEFORM AND READING IS PRODUCED**
 - Direct visualization of the ET tube passing through the vocal cords into the trachea
 - Auscultation of bilateral breath sounds and absence of sounds over epigastrium
 - Visualization of thoracic movement with ventilation
 - Fogging in the ET tube
- Secure ET tube
- Continuous monitoring of patient is required as continued sedation will likely be needed

Post-intubation sedation:

- **While setting up an infusion:**
 - **Versed** 0.05 mg/kg slow IV/IO. May repeat in 5 minutes as needed x 2.
 - (Peds dosing: 0.05 mg/kg IV/IO. May repeat in 5 minutes as needed x 2)
 - **Ativan** 0.05 mg/kg slow IV/IO. May repeat in 5 minutes as needed x 2.
 - (Peds dosing: 0.05 mg/kg IV/IO. May repeat in 5 minutes as needed x 2)
 - **Fentanyl** 50 - 100 mcg IV/IO. May repeat in 5 minutes as needed x 2
 - (Peds dosing: 1 mcg/kg IV/IO. May repeat in 5 minutes as needed x 2)

- **Sedation infusions:**
 - **Versed** 0.02 - 0.1 mg/kg /hr IV/IO infusion, with or without
 - **Fentanyl** 1 - 2 mcg/kg/hr IV infusion
 - or
 - **Propofol** 5 - 50 mcg/kg/min IV infusion
- Select the lowest dose that allows adequate sedation and titrate down when possible
 - Reduce the dose if hypotension occurs

NOTES

Pearls

- If an extra oxygen source is available, consider passive oxygen by nasal cannula throughout intubation
- At any time ETCO2 waveform is lost, the **endotracheal tube must be removed** and patient ventilated and oxygenated with bag-valve mask
- Use laryngeal manipulation (Sellick's maneuver) during intubation to minimize aspiration
- Extra care must be given to protect the patient's neck, since any muscle tone protecting an injury will have been lost from the paralytic
- It is paramount that the airway is maintained, especially post sedation / paralysis
- If patient becomes tachycardic, hypertensive, or agitated, consider the need for further sedation
- Once paralyzed, it is entirely up to the rescuer to provide breaths for the patient

Complications

- If the patient has complications related to airway management, consider the "**DOPES**" mnemonic:
- **D**islodgement
 - Tube may be accidentally removed, or may be too deep (right mainstem intubation)
 - Remove endotracheal tube, or immediately reposition to assure ventilation / oxygenation
- **O**bstruction
 - Suction endotracheal tube for debris
 - If unsuccessful, may require removal and reintubation
- **P**neumothorax
 - See Chest Decompression Protocol
 - Pneumothorax is a contraindication to mechanical ventilation (avoid transport ventilator)
- **E**quipment failure
 - Rapidly evaluate monitor and transport ventilator
- **S**tacked breaths
 - Inhaled air without adequate time to exhale, "breath stacking"
 - Remove bag, open endotracheal tube to air, allow trapped air to exhale, repeat vital signs

When in doubt, remove the endotracheal tube and ventilate with bag-valve-mask



24.10 – APPROVED MEDICATIONS

24.10.1 – APPROVED MEDICATION LIST

Adenosine (Adenocard)

Pharmacological Effects

- A nucleoside with anti-arrhythmic activity
- It works both at the A-V node and in aberrant conduction pathways (such as found in Wolff-Parkinson-White syndrome or LGL phenomena)
- While it may be used to treat all patients with supraventricular tachy-arrhythmias, it works best in paroxysmal atrial tachycardia / SVT
- It has limited use in atrial fibrillation and atrial flutter

Indications

- Acute paroxysmal supraventricular tachycardia (SVT)

Contraindications

- The rapid degradation of the drug is a significant feature, since any adverse effects will be short-lived
- Contraindicated in patients with high heart blocks, sick sinus syndrome, functioning artificial pacemakers, A-Flutter, A-Fib and V-Tach.
- Patients with asthma may be subject to experience adenosine-induced bronchoconstriction

Cautions

- Wide complex rhythms

Adverse Reactions

- The primary adverse effects are flushing and dyspnea, each of which is of short duration
- Occasional hemodynamic disturbances may occur and very rarely brady-asystole may also occur
- These are of short duration owing to the very brief half-life of the drug

Dosage

- Stable Supraventricular Tachycardia (SVT)
 - Adult
 - Initial dose, 6 mg, rapid IV push
 - If no response within 1 - 2 minutes, second dose 12 mg, rapid IV push
 - Pediatric
 - Initial dose, 0.1 mg/kg, rapid IV push up to 6 mg
 - If no response within 1 - 2 minutes, second dose 0.2 mg/kg, up to 12 mg

Albuterol (Proventil, Ventolin)

Pharmacological Effects

- Selectively stimulates beta-2 adrenergic receptors, relaxing airway smooth muscle
- Peak bronchodilation occurs within 1 - 2 hours and continues for 3 - 4 hours after administration

Indications

- Respiratory distress with bronchospasm

Contraindications

- Contraindicated in patients with severe coronary insufficiency, history of cardiac disease, or uncontrolled, severe hypertension
- In life threatening situations, the positive effects outweigh the negative

Cautions

- Tachycardia may be disease related
- May be less effective in patients on beta-blockers

Adverse Reactions

- Tachycardia, premature ventricular contractions (PVCs), palpitations, tremor, agitation, nervousness, headache, dizziness, insomnia, hyperglycemia, hypokalemia, nausea, and vomiting

Dosage

- Respiratory distress with bronchospasm
 - Adult
 - 2.5 - 5.0 mg, repeat as needed x2, as tolerated by the patient
 - MDI can be used prior to administration
 - Pediatric
 - 2.5 - 5.0 mg, repeat as needed x2, as tolerated by the patient
 - MDI can be used prior to administration

Amiodarone (Cordarone)

Pharmacological Effects

- Antidysrhythmic, blocks sodium channels, myocardial potassium channels and calcium channels; prolongs action potential and refractory period in the myocardium

Indications

- Pulseless ventricular fibrillation / ventricular tachycardia
- Post-VF / VT cardiac arrest resuscitation
- Ventricular tachycardia
- Undetermined wide complex tachy-dysrhythmias

Contraindications

- Contraindicated in hypersensitivity
- Cardiogenic shock
- Second and third degree heart blocks, marked sinus bradycardia
- Withhold if Lidocaine has been given

Cautions

- The drug is supplied diluted in Polysorbate 80. This diluent has pharmacologic properties of its own and may rarely cause hypotension. In cardiac arrest and unstable VT, this is of little consequence
- Use caution in the treatment of A-fib, as this medication may convert A-fib to NSR and potentially release an embolus

Adverse Reactions

- Hypotension, bradycardia, Q-T prolongation, vomiting

Dosage

- Pulseless VT/VF
 - Adult
 - 300 mg IV/IO bolus
 - This bolus may be repeated once at 150 mg if VT/VF remains refractory
 - Pediatric
 - 5 mg/kg IV/IO bolus (Max single dose 300 mg IV/IO)
 - May repeat twice
- Post VF/VT cardiac arrest resuscitation OR
- VT with a pulse, unknown wide complex tachycardia
 - Adult
 - 150 mg IV/IO drip over 15 minutes
 - Mix 150 mg in 50 mL normal saline using macro drip set
 - Run at approximately 1 gtt / 2 sec
 - Pediatric
 - 5 mg/kg IV/IO drip over 20 - 60 minutes (Max dose 150 mg IV/IO)
 - May repeat to max of 15 mg/kg

Aspirin

Pharmacological Effects

- Acts as an antipyretic, anti-inflammatory agent, and inhibitor of prostaglandin production
- A secondary effect is reduction of platelet adherence, aggregation, and clot formation

Indications

- Use for patients with chest pain and a high probability of acute coronary syndrome.
- Aspirin may be omitted if the patient has taken full-dose (325 mg) Aspirin within 6 hours prior to your arrival

Contraindications

- Pediatric patients
- Patients with insufficient renal or hepatic function, bleeding disorders, or pregnancy
- Hypersensitivity to Aspirin

Cautions

- Patients with asthma or other forms of reactive airway disease
- Patients on anticoagulants such as Coumadin
- Patients with history of gastrointestinal bleeding

Adverse Reactions

- May induce a reactive airway attack or gastrointestinal bleeding in susceptible individuals

Dosage

- Chest Pain – Suspected cardiac
 - Adult
 - 324 mg chewable tablets
 - Pediatric
 - N/A

Atropine Sulfate

Pharmacological Effects

- Cardiac:
 - Increases firing rate of sinoatrial (SA) node resulting in an increased pulse rate
 - Increases conduction velocity by decreasing parasympathetic (vagal) stimulation
- Non-Cardiac:
 - Decrease of all body secretions
 - Dilation of pupils and cycloplegia
 - Increase in bladder tone, resulting in urinary retention
 - Central nervous system stimulation

Indications

- Bradycardic rhythms resulting in hypotension, chest pain, decreased mentation, or ventricular irritability (ventricular escape beats)
 - Sinus bradycardia (symptomatic)
 - Junctional or ventricular escape rhythms
 - Second or third degree heart block (narrow complex), very cautiously
 - Sinus pause or arrest
- Organophosphate poisoning

Contraindications

- Contraindicated in narrow angle glaucoma
- Avoid in coronary heart disease, tachycardia, CHF, hypertension
- Paroxysmal bradycardia if dose is given too slowly or dose is < 0.5 mg

Cautions

- Bradycardia in children is related to hypoxia until proven otherwise

Adverse Reactions

- Cardiac:
 - Tachycardia
 - Palpitations
 - Ventricular fibrillation
 - Rebound bradycardia (if administered too slowly or in too small a dose)
- Non-Cardiac:
 - Dryness of mouth (common)
 - Pain in eyes or blurred vision
 - Restlessness, irritability, or change in mental state
 - Urinary retention

Dosage

- Symptomatic Bradycardias
 - Adult
 - 0.5 - 1 mg rapid IV/IO push
 - May repeat 0.5 - 1mg every 3 - 5 minutes
 - MAX dose 0.04 mg/kg
 - Pediatric
 - 0.02 mg/kg rapid IV/IO push (minimum dose of 0.1 mg)
 - May repeat 0.02 mg/kg every 3 - 5 minutes
 - MAX individual dose 1 mg
- Organophosphate / Cholinergic Poisoning
 - Adult
 - 1 - 2 mg IV/IO push every 5 minutes
 - Pediatric
 - Contract Medical Control
- Endotracheal Tube Dosage
 - 2 - 2.5 times the IV dose

Calcium Chloride

Pharmacological Effects

- Involved in regulation of cell membrane permeability to sodium and potassium
- Important in activation of enzyme systems
- Plays a role in excitation contraction coupling (increases force of myocardial contraction and muscle contraction)

Indications

- Electrolyte used in the treatment of hyperkalemia, hypocalcemia, or calcium channel blocker toxicity by moderating nerve and muscle performance by regulating the action potential excitation threshold
- Ventricular fibrillation / Ventricular tachycardia
- Calcium Channel Blocker toxicity
- Magnesium toxicity

Contraindications

- Hypercalcemia
- Digitalis toxicity (may result in asystole)

Cautions

- Severe necrosis if IV extravasation / infiltration
- Do not use in same line as Sodium Bicarb.
 - Line must be flushed with 20 mL Normal Saline if same line must be used
- Use only in VF associated with suspected hyperkalemia, e.g. renal failure patients
- Do not use in patients with Digoxin toxicity, hypercalcemia, or renal or cardiac disease

Adverse Reactions

- Hypotension, bradycardia

Dosage

- VF/Pulseless VT
 - Adult
 - 1 gram IV/IO push of 10% solution
 - Pediatric
 - 20 mg/kg IV/IO push of 10% solution
- Calcium Channel Blocker Toxicity
 - Adult
 - 500 mg IV/IO push of 10% solution
 - Repeat dose as needed
 - Pediatric
 - Contact Medical Control
- Beta Blocker Overdose
 - Adult
 - 1 gm IV/IO slow push of 10% solution
 - May repeat dose once if needed
 - Pediatric
 - Contact medical control.

Dextrose

Pharmacological Effects

- Monosaccharide for rapidly increasing blood sugar

Indications

- Hypoglycemia

Contraindications

- Hyperglycemia

Cautions

- Avoid extravasation due to severe necrosis and sloughing at the site
- Can result in dilution of electrolyte concentrations and overhydration when fluid overload is present
- Dextrose administration may produce a vitamin B deficiency
- If suspected head trauma, CVA, or cardiac arrest, try to avoid increasing BGL > 200

Adverse Reactions

- Necrosis of tissue if vein is extravasated

Dosage

- Hypoglycemia
 - Adult
 - 100 mL of D10 solution
 - Repeat every 10 minutes if BGL < 60
 - Pediatric
 - 5 mL/kg of D10 solution, max single dose 100 mL
 - Repeat every 10 minutes if BGL < 60

Diltiazem (Cardizem)

Pharmacological Effects

- Vasodilator
- Promotes depression of A-V node conduction

Indications

- Supraventricular tachycardia (SVT)
- Atrial fibrillation / Atrial flutter

Contraindications

- Hypotension
- Bradycardia
- Sick sinus syndrome
- WPW

Cautions

- If administered with other calcium channel blockers
- If administered with beta blockers

Adverse Reactions

- Hypotension, bradycardia, dizziness

Dosage

- Supraventricular tachycardia (SVT) OR
- Atrial fibrillation / Atrial flutter
 - Adult
 - 0.25 mg/kg IV/IO over 2 - 5 minutes
 - Repeat after 15 minutes, 0.35 mg/kg IV/IO
 - May repeat again after 15 minutes, 0.35 mg/kg IV/IO
 - Pediatric
 - Contact medical control

Diphenhydramine (Benadryl)

Pharmacological Effects

- Antihistamine, sedative effect, anticholinergic

Indications

- Anaphylaxis
- Allergic reactions
- Severe dystonic reactions

Contraindications

- Neonates
- Nursing mothers
- Management of lower respiratory diseases (such as asthma)

Cautions

- Increases the effects of CNS depressants

Adverse Reactions

- Blurred vision, Hypotension, Headache, Palpitations and tachycardia, Sedation, Drowsiness, Disturbed coordination, Dystonic reaction

Dosage

- Allergic reaction
 - Adult
 - 25 - 50 mg IV/IO/IM
 - Pediatric
 - 1 - 2 mg/kg IV/IO/IM, max 50 mg
 - NOT for infants < 3 months
- Dystonic Reaction
 - Adult
 - 50 mg IV/IO/IM
 - Pediatric
 - Contact medical control

Diprivan (Propofol)

Pharmacologic Effects

- General anesthetic, sedative

Indications

- Sedation post intubation

Contraindications

- Known hypersensitivity
- Allergies to egg / egg products, soy, glycerol
- Labor and delivery
- Caution in elderly / debilitated patients

Adverse Reactions

- Propofol Infusion Syndrome
- Cardiac arrest
- Hypotension / bradycardia
- Seizure
- Pulmonary edema

Sedation Infusion Rate

- 5 - 50 mcg/kg/min
- 1,000 mg/100 mL = 10,000 mcg/mL concentration

Weight	mL/Hr		Dose (mcg/kg/min)									
			5	10	15	20	25	30	35	40	45	50
	40 kg	88 lbs	1.2	2.4	3.6	4.8	6	7.2	8.4	9.6	10.8	12
	50 kg	110 lbs	1.5	3	4.5	6	7.5	9	10.5	12	13.5	15
	60 kg	132 lbs	1.8	3.6	5.4	7.2	9	10.8	12.6	14.4	16.2	18
	70 kg	154 lbs	2.1	4.2	6.3	8.4	10.5	12.6	14.7	16.8	18.9	21
	80 kg	176 lbs	2.4	4.8	7.2	9.6	12	14.7	16.8	19.2	21.6	24
	90 kg	198 lbs	2.7	5.4	8.1	10.8	13.5	16.8	18.9	21.6	24.3	27
	100 kg	220 lbs	3	6	9	12	15	18	21	24	27	30
	110 kg	242 lbs	3.3	6.6	9.9	13.2	16.5	19.8	23.1	26.4	29.7	33
	120 kg	264 lbs	3.6	7.2	10.8	14.4	18	21.6	25.2	28.8	32.4	36

Dopamine (Intropin)

Pharmacological Effects

- Increases blood pressure
- Increases myocardial contractility (cardiac output increases)
- Slight increase in pulse rate (beta adrenergic stimulation)
- Increases potential for tachy-dysrhythmia or ventricular irritability

Indications

- Shock due to:
 - Myocardial infarction
 - Septicemia
 - Congestive heart failure
 - Hypovolemia (only as a temporary measure after initial fluids until further fluids can be administered)

Contraindications

- Uncorrected tachy-dysrhythmias, ventricular fibrillation
- Concomitant monoamine oxidase inhibitor therapy

Cautions

- Elderly
- Occlusive vascular disease
- Can increase afterload due to its vasoconstrictive effects
- Monitor BP and ECG closely, can cause heart irritability causing dysrhythmias and PVCs

Adverse Reactions

- Hypertension, Supraventricular tachycardia, Ventricular dysrhythmias (Ventricular premature contractions, Ventricular tachycardia, Ventricular fibrillation)

Dosage

- Cardiogenic Shock
 - Adult
 - 10 - 20 mcg/kg/min, titrated to maintain SBP 90 - 100 mmHg
 - Mix 400 mg into 250 mL Normal Saline, yields 1600 mcg/mL
 - Pediatric
 - 10 - 20 mcg/kg/min, titrated to maintain SBP 90 - 100 mmHg
 - Mix 400 mg into 250 mL Normal Saline, yields 1600 mcg/mL

Dosage

Weight	gtt/min with micro set		Dose (mcg/kg/min)					
			10	12	14	16	18	20
	40 kg	88 lbs	15	18	21	24	27	30
	50 kg	110 lbs	19	23	26	30	34	38
	60 kg	132 lbs	23	27	32	36	41	45
	70 kg	154 lbs	26	32	37	42	47	53
	80 kg	176 lbs	30	36	42	48	54	60
	90 kg	198 lbs	34	41	47	54	61	68
	100 kg	220 lbs	38	45	53	60	68	75
	110 kg	242 lbs	3.3	6.6	9.9	13.2	16.5	19.8
	120 kg	264 lbs	3.6	7.2	10.8	14.4	18	21.6
	130 kg	286 lbs	49	59	68	78	88	98
	140 kg	308 lbs	53	63	74	84	95	105

Epinephrine

Pharmacological Effects

- Alpha and beta adrenergic effects:
 - Increases force of myocardial contraction
 - Increases pulse rate and systolic blood pressure
 - Increases conduction velocity through the A-V node
 - Increases irritability of ventricles
 - Dilates bronchi
 - Vasoconstricts

Indications

- Cardiac arrest:
 - Asystole, PEA, VF, and pulseless VT
- Severe bradycardia, especially in neonates and pediatrics
- Anaphylaxis / Severe allergic reactions
- Hypotension
- Shock

Contraindications

- In non-life threatening conditions:
 - Coronary insufficiency
 - Dysrhythmias
 - Narrow angle glaucoma

Cautions

- Do not mix with Sodium Bicarbonate or similar alkaline solutions; inactivation of Epinephrine may result
- Hypertension
- Hyperthyroidism
- Elderly patients
- Diabetes mellitus
- Heart disease
- Tricyclic antidepressant overdose
- Peripheral vascular disease (PVD)

Adverse Reactions

- Hypertension
- Supraventricular tachycardia
- Ventricular Dysrhythmias:
 - Ventricular premature contractions (PVCs)
 - Ventricular tachycardia
 - Ventricular fibrillation

Dosage

- Cardiac arrest
 - Adult
 - 1:10,000 – 1 mg IV/IO
 - Repeat every 3 - 5 minutes
 - Pediatric
 - 1:10,000 – 0.01 mg/kg IV/IO
 - Repeat every 3 - 5 minutes
- Severe bradycardia
 - Adult
 - 1:1,000 – 2 - 10 mcg/min IV/IO infusion
 - Mix 2 mg of 1:1,000 into 250 mL Normal Saline, yields 8mcg/mL
 - Pediatric
 - Contact medical control
- Anaphylaxis
 - Moderate
 - Adult
 - 1:1,000 – 0.3 mg IM
 - Repeat dose if continued signs of shock and/or respiratory compromise
 - Pediatric
 - 1:1,000 – 0.01 mg/kg IM (Max single 0.3 mg)
 - Repeat dose if continued signs of shock and/or respiratory compromise
 - Severe
 - Adult
 - 1:10,000 – 0.5 mg IV/IO slowly
 - Repeat every 5 minutes to maintain systolic BP > 90
 - Pediatric
 - 1:10,000 – 0.01 mg/kg IV/IO slowly
 - Repeat every 5 minutes to maintain age appropriate systolic BP

Infusion Rates

- Mix 2 mg of 1:1,1000 into 250 mL of NS to yield 8 mcg/mL
- Use a 60 gtt set

gtt/min with micro set	Dose (mcg/min)								
	2	3	4	5	6	7	8	9	10
	15	23	30	38	45	53	60	68	75

Fentanyl (Sublimaze)

Pharmacological Effects

- Potent Analgesic
- Interacts with opioid mu-receptors in the brain, spinal cord, and other tissues

Indications

- Treatment of severe pain
- Sedation

Contraindications

- Known hypersensitivity
- Patients with respiratory compromise
- Patients with altered mental status
- Use with caution with elderly, hepatic impairment, and renal impairment

Adverse Reactions

- Rigid chest syndrome if administered too fast
- Altered mental status
- Vomiting
- Apnea

Dosage

- Severe pain
 - Adult
 - 25 - 50 mcg IV/IO/IN/IM
 - May repeat Q5 min for pain / sedation (hold if SBP < 100)
 - Max dose 150 mcg
 - Pediatric
 - 0.5 - 1 mcg/kg IV/IO (Max 50 single mcg IV/IO)
 - May repeat Q5 min for pain / sedation (hold if SBP < 100)
 - Max dose 150 mcg
- Sedation (intubated)
 - Adult
 - Adult: 1 - 2 mcg/kg slow IV/IO
 - May repeat Q5 min for pain / sedation (hold if SBP < 100)
 - Pediatric
 - 1-2 mcg/kg slow IV/IO
 - May rep at Q5 min for pain / sedation (hold if SBP < 100)

Sedation Infusion Rate (Intubated)

- 0.5 - 2.0 mcg/kg/hr, Max dose of 300 mcg/hr – **IV pump must be used**
 - 25 - 50 mcg bolus as needed

Mix 2.5 mg / 250 mL (10 mcg / mL)

Weight	mL/Hr		Dose (mcg/kg/hr)						
			0.5	0.75	1.0	1.25	1.5	1.75	2.0
	40 kg	88 lbs	2	3	4	5	6	7	8
	50 kg	110 lbs	2.5	3.75	5	6.25	7.5	8.75	10
	60 kg	132 lbs	3	4.5	6	7.5	9	10.5	12
	70 kg	154 lbs	3.5	5.25	7	8.75	10.5	12.25	14
	80 kg	176 lbs	4	6	8	10	12	14	16
	90 kg	198 lbs	4.5	6.75	9	11.25	13.5	15.75	18
	100 kg	220 lbs	5	7.5	10	12.5	15	17.5	20
	110 kg	242 lbs	5.5	8.25	11	13.75	16.5	19.25	22
	120 kg	264 lbs	6	9	12	15	18	21	24

Dose (mcg / hr)	Rate (mL/hr)
25	2.5
50	5
75	7.5
100	10
150	15
200	20
250	25
300	30

Glucagon

Pharmacological Effects

- A protein secreted by the alpha cells of the pancreas. When released it causes a breakdown of stored glycogen to glucose. It also inhibits the synthesis of glycogen from glucose. Both actions tend to cause an increase in circulating blood glucose. Glucagon exerts a positive inotropic action on the heart and decreases renal vascular resistance.

Indications

- Hypoglycemia when vascular access is not obtainable

Contraindications

- Hypersensitivity
- Hyperglycemia

Cautions

- Severe liver disease and very young pediatrics, because of possible insufficient stores of glycogen within the liver. In an emergency, IV/IO glucose is the agent of choice.
- Must be reconstituted before administration. It is supplied in vials containing 1 mg (1 unit) of powder and a second vial containing 1 mL of diluting solution

Adverse Reactions

- May cause nausea and vomiting, rare in emergency situations

Dosage

- Hypoglycemia
 - Adult
 - 1 mg IM/IN
 - May repeat single dose in 7 - 10 minutes
 - If no change after two doses, Dextrose must be given
 - Pediatric
 - 0.1 mg/kg IM/IN, Max 1 mg
 - If no change, give Dextrose or contact Medical Control
- Beta Blocker Overdose
 - Adult
 - 1-3 mg IV/IO/IN
 - May repeat once if no relief
 - Pediatric
 - Contact medical control

Haloperidol (Haldol)

Pharmacological Effects

- Selectively antagonizes dopamine receptors

Indications

- Antipsychotic, often used as chemical restraint for psychotic patients

Contraindications

- Known hypersensitivity
- Severe CNS depression
- Parkinson's disease

Cautions

- May increase tricyclic antidepressant or Lithium levels
- May potentiate hypotensive actions of antihypertensive agents
- Pregnancy (Category C)
- History of seizures
- Use with caution in elderly patients, and patients with severe liver or cardiac disease

Adverse Reactions

- Hypotension
- Dystonic reactions
- ECG changes, tachycardia, ventricular arrhythmias

Dosage

- Chemical Restraint
 - Adult
 - 2.5 - 5 mg IV/IO
 - OR
 - 5 - 10 mg IM
 - Max dose 10 mg
 - Pediatric
 - 0.05 - 0.15 mg/kg IM, max dose 5 mg ONLY

Ipratropium (Atrovent)

Pharmacological Effects

- Anticholinergic
- Blocks muscarinic cholinergic receptors which decreases contractility of smooth muscle in the lungs
- Inhibits bronchoconstriction and mucus secretion
- A derivative of Atropine, but does not cross blood-brain barrier, therefore preventing central side effects

Indications

- COPD
- Asthma

Contraindications

- Patients with known hypersensitivity or peanut allergy

Cautions

- Albuterol increases the effects of ipratropium
- Use with caution in pregnancy
- Not indicated for acute onset of bronchospasm
- May worsen intraocular pressure / narrow angle glaucoma

Adverse Reactions

- Only minor side effects have been reported such as dry mouth, nausea, etc.
- Occasionally tachycardia may be seen

Dosage

- Bronchospasm
 - Adult
 - 0.5 mg nebulized with albuterol, single dose
 - Pediatric
 - 0.5 mg nebulized with albuterol, single dose

Ketamine (Ketalar)

Pharmacologic Effects

- Analgesia, sedation, dissociative general anesthesia

Indications

- RSI
- Sedation
- Pain management

Contraindications

- Known hypersensitivity
- Severe HTN
- Stroke
- Head trauma

Adverse Reactions

- Respiratory depression
- Laryngospasm
- Hypertension / hypotension / bradycardia
- Increased ICP
- Arrhythmias
- Vomiting

Dosage

- RSI
 - Adult
 - 1 - 2 mg/kg IV/IO
 - Pediatric
 - 1 - 2 mg/kg IV/IO
- Sedation (intubated patient), second-line agent
 - Adult
 - 0.5 – 1 mg/kg IV/IO Q 15 minutes
 - Pediatric
 - 0.5 – 1 mg/kg IV/IO Q 15 minutes
- Analgesia
 - Adult
 - 0.1 – 0.5 mg/kg IV/IO
 - Pediatric
 - 0.1 – 0.5 mg/kg IV/IO

Ketorolac (Toradol)

Pharmacological Effects

- A NSAID used to relieve inflammatory used to relieve pain and to reduce swelling

Indications

- Relief of moderate to severe pain (short-term management)
- Useful in renal, colic and acute back strain

Contraindications

- NSAID allergy

Cautions

- Use caution in patients with active bleeding
- Use caution in patients having headaches
- Use caution if suspected bleeding
- Use caution in patents with HTN, asthma, COPD

Adverse Reactions

- Vertigo, hypertension, hypotension, bleeding disorders, nausea, vomiting, dyspnea

Dosage

- Abdominal / nephrolithiasis pain
 - Adult
 - 30 mg IV/IM
 - Pediatric
 - 1 mg/kg, max 30 mg IV/IM

Labetalol (Trandate)

Pharmacological Effects

- Beta Blockers

Indications

- Hypertension
- Tachycardia

Contraindications

- Known hypersensitivity
- Sinus bradycardia or Sick Sinus Syndrome
- WPW syndrome
- AV blocks
- Decompensated heart failure or cardiogenic shock
- Use with caution with elderly, hepatic impairment, and renal impairment

Adverse Reactions

- CHF
- Bradycardia
- AV block
- Ventricular arrhythmia

Dosage

- Critical hypertension
 - Adult
 - 0.2 mg/kg IV/IO (Max 10 mg)
 - May repeat 10 - 20 mg IV/IO Q10 minutes until blood pressure goal is reached
 - Pediatric
 - 0.2 mg/kg IV/IO (Max 10 mg)
 - May repeat dose Q10 minutes until blood pressure goal is reached

Infusion Rate

Mix 200 mg / 200 mL (1mg / mL)

Dose (mg/hr)	Rate (mL/hr)
20	20
40	40
60	60
80	80
100	100
120	120
140	140
160	160

Lidocaine Hydrochloride (Xylocaine)

Pharmacological Effects

- Suppresses ventricular dysrhythmias
- Minimal effect on AV conduction, blood pressure, or cardiac output (at usual doses)
- Local anesthetic

Indications

- Ventricular dysrhythmias
- Pain relief from tibial IO fluid infusion
- Symptomatic adult patients with heart rates > 100 bpm and wide QRS complex (> 0.12 sec)

Contraindications

- Known hypersensitivity
- Adams-Stokes syndrome
- Second degree heart block type II / Third degree heart block
- Any brady-dysrhythmia
- Patients with WPW syndrome, severe SA, AV, or intraventricular block (if an artificial pacemaker is not in place)
- Contraindicated in use with Amiodarone

Cautions

- Liver disease and CHF:
 - Cut dose by 50%
- Marked hypoxia
- Severe respiratory depression
- Hypovolemia
- Shock
- First and second degree heart block type I

Adverse Reactions

- Central nervous system (reduce/stop administration rate/amount):
 - Muscle twitching
 - Drowsiness
 - Stupor
 - Change or slurring of speech
 - Convulsions
- Respiratory:
 - Difficulty in breathing
 - Respiratory arrest
- Cardiac:
 - Hypotension
 - Heart block
 - Bradycardia (rare)

Dosage

- Cardiac Arrest (VF/VT)
 - Adult
 - 1 - 1.5 mg/kg IV/IO initial bolus
 - Repeat dose at 0.5 - 0.75 mg/kg
 - May repeat up to max 3 mg/kg
 - Pediatric
 - 1 mg/kg, Max 50 mg IV/IO
- Tachycardia
 - Adult
 - 1 - 1.5 mg/kg IV/IO initial bolus
 - Repeat dose at 0.5 - 0.75 mg/kg
 - May repeat up to max 3 mg/kg
 - After conversion, infusion 2 - 4 mg/min
 - Pediatric
 - 1 mg/kg IV/IO initial bolus
 - Repeat dose at 0.5-0.75 mg/kg
 - May repeat up to max 3 mg/kg
 - After conversion infusion, 20 - 50 mcg/kg (Max dose 4 mg/min)
- Nasal Tracheal Intubation
 - Adult/Pediatric
 - 4 mL of 2% solution nebulized
- Interosseous Insertion
 - Adult
 - 20 - 40 mg IO
 - Pediatric
 - 0.5 mg/kg IO (Max 40 mg IO)

Magnesium Sulfate

Pharmacological Effects

- An element essential for the activity of many enzymes and for normal function of the nervous and cardiovascular systems

Indications

- Significant symptoms of Pre-Eclampsia/Eclampsia (including eclamptic seizures)
- Cardiac dysrhythmias:
 - Torsades de Pointes
 - Ventricular fibrillation
 - Ventricular tachycardia
- Digoxin toxicity

Contraindications

- Myocardial damage, hepatitis, Addison disease, heart blocks, or significant renal impairment
- Second degree heart block Type II / Third degree heart block
 - NOTE: If patient taking Digitalis and has a high likelihood of Digitalis toxicity, magnesium sulfate may be useful in treating Second and Third degree heart block

Cautions

- Renal disease
- Give slowly in an awake patient
- IV calcium chloride may be given to antagonize the effects of magnesium sulfate

Adverse Reactions

- Hypermagnesemia (rare) resulting in muscle weakness, ECG changes, hypotension, and confusion may occur with magnesium administration, especially in patients with renal impairment
- Nausea and diarrhea may also occur
- Large doses may lead to respiratory depression, apnea, cardiac arrest and CNS depression

Dosage

- Cardiac Arrest (VF, VT, Torsades)
 - Adult
 - 2 grams IV/IO bolus
 - Pediatric
 - 25 - 50 mg/kg IV/IO bolus (Max 2 grams)
- Torsades de Pointes with a pulse
 - Adult
 - 0.5 - 1 grams / hr IV/IO, titrate to control rhythm
 - Pediatric
 - 25 - 50 mg/kg IV/IO over 10 - 20 minutes
- Digoxin Toxicity
 - Adult
 - 2 grams slow IV/IO
 - Pediatric
 - Call Medical Control

- Pre-eclampsia
 - 2 - 4 grams IV/IO over 10 minutes
- Eclampsia
 - 2 grams IV/IO bolus over 5 minutes
 - If patient seizes, administer another 2 gram bolus over 5 minutes

Methyl-prednisolone (Solu-Medrol)

Pharmacological Effects

- A glucocorticoid that suppresses inflammation potentiates vascular smooth muscle relaxation and may alter airway hyperactivity. It is also known to reduce post- traumatic spinal cord edema

Indications

- Bronchospasms
- Anaphylaxis

Contraindications

- Allergy

Cautions

- Drug interactions include NSAIDs and live virus vaccines.
- Hypoglycemic responses to insulin and oral hypoglycemic agents may be decreased
- Use caution in patients with GI bleeding, diabetes mellitus or severe infection

Adverse Reactions

- Anaphylaxis
- Adrenal insufficiency
- Steroid psychosis

Dosage

- Respiratory Distress/Anaphylaxis
 - Adult
 - 125 mg SIVP/IO
 - Pediatric
 - 1-2 mg/kg SIVP/IO

Metoprolol (Lopressor)

Pharmacological Effects

- Selective beta 1 blocker

Indications

- Hypertension
- Tachycardic dysrhythmias

Contraindications

- Sinus Bradycardia
- 2nd or 3rd degree AV blocks
- Heart failure
- SBP < 100 mmHg

Cautions

- Pts with bronchospastic diseases
- Recent major surgery
- WPW syndrome

Adverse Reactions

- CHF
- Bradycardia, severe

Dosage

- Tachycardia w/ pulse
 - Adult
 - 2-5 mg IVP over 1 minute
 - If no response in 3-5 minutes, repeat 2-5 mg IVP over one minute
 - Pediatric
 - Contact medical control

Midazolam (Versed)

Pharmacologic Effects

- Short acting Benzodiazepine, binds to CNS receptors, producing sedation or raising the seizure threshold

Indications

- Seizure
- Sedation
- RSI
- Severe anxiety
- Excited delirium

Contraindications

- Known hypersensitivity
- Pulmonary impairment
- Renal / hepatic impairment
- Caution in elderly / debilitated patients

Adverse Reactions

- Respiratory depression
- Apnea
- Hypotension / bradycardia

Dosage

- Seizures
 - Adult
 - 1 - 2 mg IV/IO/IM/IN
 - Repeat Q2 minutes PRN, Max 10 mg
 - Pediatric
 - 0.1 mg/kg IV/IO
 - 0.2 mg/kg IM/IN
 - Repeat Q2 minutes PR, Max 5 mg
- Chemical Restraint
 - Adult
 - 1 -2 mg IV/IO/IM/IN
 - May repeat once
 - Pediatric
 - Contact medical control
- Relief of anxiety for cardiac pacing or pre-intubation
 - Adult
 - 1 mg IV/IO/IM/IM
 - Pediatric
 - Contact medical control
- RSI
 - Adult / Pediatric
 - 0.3 mg/kg IV/IO

- Sedation (intubated)
 - Adult
 - 0.4 - 4 mg IV/IO Q 15 minutes
 - Pediatric
 - 0.1 mg/kg IV/IO Q 15 minutes, Max 10 mg

Sedation Infusion Rate

0.02 - 0.1 mg/kg/hr

Mix 50 mg / 50 mL (1mg / mL)

Dose (mg / hr)	Rate (mL / hr)
2.5	2.5
5	5
7	7.5
10	10

Morphine Sulfate

Pharmacological Effects

- Potent analgesic
- Decreases rate of AV conduction (vagotonic)
- Peripheral vasodilatation and venous pooling of blood
- Sedation and euphoria

Indications

- Severe pain, i.e., myocardial infarction, trauma
- Pulmonary edema
- Sedation

Contraindications

- Known hypersensitivity
- Hypovolemia or shock
- Monoamine oxidase inhibitors (MAO)
- Head trauma (relative)
- Depressed state of consciousness

Cautions

- Respiratory depression, i.e., associated with asthma and COPD
- Elderly patients
- Hypotension
- Acute abdominal conditions

Adverse Reactions

- Drowsiness
- Lethargy
- Nausea
- Respiratory depression
- Bradycardia or heart block
- Hypotension
- NOTE: Morphine Sulfate can be reversed with Naloxone 0.4 - 2 mg. Metabolism is slower than Naloxone. Repeated doses (titrated) of Naloxone may be indicated.

Dosage

- Pain management/pulmonary edema
 - Adult
 - 1-5 mg IV/IO/IM initially
 - May be repeated every 5 minutes as needed
 - Max dose, 15 mg
 - Pediatric
 - 0.1 mg/kg IV/IO/IM
 - May be repeated every 5 minutes as needed
 - Max dose, 15 mg

Naloxone (Narcan)

Pharmacological Effects

- Narcotic antagonist

Indications

- Respiratory depression secondary to narcotics or related drugs:
- Heroin
- Meperidine
- Codeine
- Dextromethorphan (DM, cough suppressant)
- Diphenoxylate (ingredient of Lomotil)
- Hydromorphone (Dilaudid)
- Morphine Sulfate
- Pentazocine (Talwin)
- Percocet (Oxycodone)
- Propoxyphene (Darvon, Darvocet)
- Clonidine
- Lithium
- Suspected acute opiate overdose
- Coma of unknown origin

Contraindications

- Known hypersensitivity

Cautions

- Patients known to be physically dependent on narcotics may become violent after administration of Naloxone
- Be prepared to restrain violent patients after Naloxone administration
- Naloxone may wear off prior to narcotic being metabolized. Repeat doses may be indicated
- Rare change of pulmonary edema

Adverse Reactions

- Withdrawal symptoms
- Sweating, tremor
- Nausea, vomiting
- Dilation of pupils, tearing of eyes
- Agitation or belligerence

Dosage

- Opiate Overdose
 - Adult
 - 0.4 – 2 mg IV/IO/IM or 0.8 – 2 mg IN
 - May be repeated every 2 minutes as needed, titrate to respiratory increase
 - Max dose, 10 mg
 - Pediatric
 - 0.1 mg/kg IV/IO/IM
 - May be repeated every 2 minutes as needed, titrate to respiratory increase
 - Max dose, 2 mg

Nitroglycerine (Nitrostat, Nitro-Bid Paste)

Pharmacological Effects

- Dilates veins and arteries in peripheral circulation resulting in:
- Reduced resistance to blood flow
- Decreased blood pressure
- Decreased work load on heart
- Cumulative effect in relief of angina pectoris
- Dilates coronary arteries
- Reduces coronary vasospasm
- Dilates blood vessels in smooth muscle, i.e., gastrointestinal tract, gall bladder, bile ducts, and uterus
- Improves cardiac output in patient with congestive heart failure

Indications

- Angina pectoris
- Pulmonary edema
- Severe hypertension

Contraindications

- Known hypersensitivity
- Patients suffering **inferior** (Leads II, III, avF) **or posterior infarct or ischemia should not receive nitrates** in any form
- Hypotension (blood pressure less than 90 systolic)
- Patients taking erectile dysfunction medication
 - Do Not give NTG to a patient who has taken Sildenafil (Viagra/Revatio), Vardenafil (Levitra), Tadalafil (Cialis) in the last 48 hrs
- Patients on other systemic vasodilators (i.e. patients on medication for severe pulmonary hypertension)

Cautions

- Glaucoma
- Cerebral hemorrhage
- Right coronary artery occlusion post fluid bolus for severe pulmonary hypertension
- Marked symptomatic orthostatic hypotension may occur when given with calcium channel blockers

Adverse Reactions

- Hypotension
- Usually resolves on own or with shock position; rarely need fluids
- Headache
- Skin flushing

Dosage

- Angina pectoris/Pulmonary edema/Severe hypertension
 - Adult
 - 0.4 mg SL (1 spray)
 - Repeat every 5 minutes as needed, maintain SBP > 130 mmHg
 - For continued treatment, use nitroglycerine paste
 - 1/2 – 2", applied to the anterior chest wall
 - Wipe off if Pt becomes hypotensive
 - Pediatric
 - Contact medical control

Nicardipine (Cardene)

Pharmacological Effects

- Calcium channel blocker

Indications

- Critical hypertension
- Intracranial hemorrhage
- Stable angina

Contraindications

- Known hypersensitivity
- Severe aortic stenosis
- Use with caution with elderly, hepatic impairment, and renal impairment

Adverse Reactions

- Ventricular tachycardia
- Angina exacerbation
- AV blocks

Dosage

- 5 - 15 mg/hr
 - Start at 5 mg/hr
 - Increase in 2.5 mg/hr increments to target BP, Max dose 15 mg/hr
 - D/C if hypotension or tachycardia become present

Infusion Rate

Mix 50 mg / 250 mL (0.2 mg/mL)

Dose (mg/hr)	Rate (mL/hr)
2.5	12.5
5	25
7.5	37.5
10	50
12.5	62.5
15	75

Norepinephrine (Levophed)

Pharmacological Effects

- Inotrope / pressor

Indications

- Hypotension

Contraindications

- Known hypersensitivity
- Volume depletion
- Hypoxia

Adverse Reactions

- HTN
- Bradycardia
- Extravasation / ischemic Injury

Dosage

- Hypotension / shock
 - Adult
 - 0.1 - 1.0 mcg/kg/min OR 2 - 20 mcg/min
 - Titrate by 0.02 mcg/min to resolution of shock (MAP > 65)
 - Pediatric
 - 0.5 - 2.0 mcg/kg/min, titrate by 0.02 mcg/min to resolution of shock

Infusion Rate

Mix 4 mg into 1000 mL NS yields 4 mcg / mL concentration

Dose (mcg / minute)	Rate (mL / hr)	Rate (gtt/min) using micro set
0.5	8	8
1	15	15
2	30	30
3	45	45
4	60	60
5	75	75
9	90	90
7	105	105
8	120	120
9	135	135
10	150	150
12	180	180
14	210	210
16	240	240

Ondansetron (Zofran)

Pharmacological Effects

- Anti-emetic, CNS blocking agent at serotonin 5-HT₃ receptors in the brain stem
- Onset in 3 - 10 minutes following IVP/IO/ODT. Full effect in 20 minutes, lasting 2 - 4 hours

Indications

- To aid in the control of severe nausea and/or vomiting

Contraindications

- Known hypersensitivity to Ondansetron or related agents

Cautions

- In case of pregnant female, use Phenergan as your first line agent in treatment of nausea.
- Reduce dosages (recommended 2 - 4 mg) for elderly or debilitated patients, e.g. Hepatic dysfunction or known prolonged QT syndrome

Adverse Reactions

- Rare side effects may include:
- Blurred vision
- Dizziness
- Fatigue, headache

Dosage

- Nausea/Vomiting
 - Adult
 - 4 mg IV/IO/ODT
 - May repeat once
 - Pediatric
 - 6 months – 2 years: 2 mg slow IV/IO/ODT
 - May repeat once
 - 2 years and older: 4 mg slow IV/IO/ODT
 - May repeat once

Promethazine (Phenergan)

Pharmacological Effects

- Non-selectively antagonizes central and peripheral histamine H1 receptors; possesses anticholinergic properties, resulting in antiemetic and sedative effects

Indications

- To aid in the control of severe nausea and/or vomiting

Contraindications

- Known hypersensitivity
- Patient under the age of 16

Cautions

- Must dilute in at least 10 ml NS before administration
- Use caution with patients who have glaucoma, liver impairment, seizure disorders and elderly patients
- May potentiate the effects of narcotics.

Adverse Reactions

- May lead to alteration in mental status
- Extravasation/tissue damage (IV use > IM use)
- Respiratory depression

Dosage

- Nausea/Vomiting
 - Adult
 - 12.5 – 25 mg SIVP/IM
 - Pediatric
 - Contact Medical Control

Sodium Bicarbonate

Pharmacological Effects

- Alkalinizing agent, increases serum bicarbonate, raising pH

Indications

- Metabolic acidosis (e.g., cardiac arrest, DKA, severe muscle damage)
- Tricyclic antidepressant overdose

Contraindications

- Metabolic alkalosis
- Hypokalemia
- Hypocalcemia

Cautions

- The use of Sodium Bicarbonate in Cardiac arrest is only indicated in patients with concerns of hyperkalemia or tricyclic overdose
- Use caution in patients with CHF, hypertension, edema, cirrhosis, cortico-steroid use or renal failure due to possibility of electrolyte imbalances
- Extravasation during administration can cause tissue necrosis
- Do not mix with:
 - Calcium Chloride
 - Epinephrine
 - Dopamine

Adverse Reactions

- Shortness of breath
- Sodium retention

Dosage

- Cardiac Arrest
 - Adult
 - 1 mEq/kg IVP/IO, initially
 - 0.5 mEq/kg IV/IO after 10 minutes
 - Pediatric
 - 1 mEq/kg (4.2% solution) IVP/IO, initially
 - 0.5 mEq/kg (4.2% solution) IV/IO after 10 minutes
- Tricyclic antidepressant overdose
 - Adult
 - 1 mEq/kg IV/IO
 - May repeat in 10 minutes
 - Pediatric
 - Contact medical control

24.10.2 – QUICK REFERENCE CARDS

Adenosine (Adenocard)

Route: Rapid IV/IO followed by a 10 mL Normal Saline Flush	Contraindicated in Pts with high heart blocks, sick sinus syndrome, functioning artificial pacemakers, A-Flutter, A-Fib and V-Tach. Pts with asthma may be subject to experience adenosine-induced bronchoconstriction.	
Indication	Adult	Pediatric
STABLE SVT STABLE regular/monomorphic V-Tac	<ul style="list-style-type: none"> ▪ Initial 6 mg ▪ No response, 1-2 min, 12 mg 	<ul style="list-style-type: none"> ▪ Initial 0.1 mg/kg, up to 6 mg ▪ No response, 1-2 min, 0.2 mg/kg, up to 12 mg

Albuterol (Proventil, Ventolin)

Route: Nebulizer, metered dose inhaler	Contraindicated in patients with severe coronary insufficiency, history of cardiac disease, or uncontrolled, severe hypertension In life threatening situations the positive effects outweigh the negative	
Indication	Adult	Pediatric
Respiratory distress with bronchospasm	<ul style="list-style-type: none"> ▪ 2.5-5.0 mg x2 as tolerated by the patient ▪ MDI can be used prior to administration 	<ul style="list-style-type: none"> ▪ 2.5 mg x2 as tolerated by the patient.

Amiodarone

Route: IV SLOW push or IV drip	Contraindicated in hypersensitivity, cardiogenic shock, marked sinus bradycardia, 2 nd /3 rd heart block Withhold if Lidocaine has been given	
Indication	Adult	Pediatric
Pulseless VT or VF	<ul style="list-style-type: none"> ▪ 300 mg IV/IO ▪ 150 mg IV/IO in 10-15 min if refractory 	<ul style="list-style-type: none"> ▪ 5 mg/kg IV/IO ▪ May repeat x2
Stable VT	<ul style="list-style-type: none"> ▪ 150 mg, IVD over 15 min ▪ Mix: 150 mg -> 50 mL, MACRO, 1 gtt/ 2 sec 	<ul style="list-style-type: none"> ▪ 5 mg/kg IV/IO drip over 20-60 min ▪ May repeat to max of 15 mg/kg

Aspirin

Route: PO	Contraindicated in Pts with insufficient renal or hepatic function, febrile pediatrics with influenza, bleeding disorders, pregnancy or asthma. Caution: Pts who are already taking anticoagulants	
Indication	Adult	Pediatric
Chest pain (suspected cardiac)	▪ 324 mg, chewable baby Aspirin	▪ N/A

Atropine Sulfate

Route: IV, IO, ET	Contraindicated in narrow angle glaucoma Avoid in coronary heart disease, tachycardia, CHF, hypertension Bradycardia in children is due to hypoxia until proven otherwise	
Indication	Adult	Pediatric
Bradycardia	▪ 0.5-1 mg IVP q3-5 min, max 0.04 mg/kg	▪ 0.02 mg/kg (min 0.1mg) IVP q3-5 min, max 1 mg
Cholinergic Poisoning	▪ 1-2 mg IVP q5 min	▪ Contact medical control
ET Tube dose	▪ 2-2.5 times the IV dose	▪ Minimum of 0.1 mg/kg

Calcium Chloride

Route: SLOW IV/IO	Do not use in same line as Sodium Bicarb. Line must be flushed with 20 mL Normal Saline if same line must be used Use only in VF associated with suspected hyperkalemia, i.e. renal failure Pts Do not use in Pts with digitalis toxicity, hypercalcemia, or renal or cardiac disease Avoid extravasation due to severe necrosis at the site	
Indication	Adult	Pediatric
Pulseless VT or VF	▪ 1 gm IVP/IOP of a 10% solution	▪ 20 mg/kg, IVP/IOP
Calcium Channel Blocker OD	▪ 500 mg IV/IO of 10% solution ▪ Repeat dose as needed	▪ Contact medical control
Beta Blocker Overdose	▪ 1 gm slow IV/IO of 10% solution ▪ May repeat once	▪ Contact medical control

Dextrose

Route: IV, IO	Avoid extravasation due to severe necrosis and sloughing at the site Contraindicated in hyperglycemia If suspected head trauma, CVA, or cardiac arrest, try to avoid increasing BGL > 200	
Indication	Adult	Pediatric
Hypoglycemia	<ul style="list-style-type: none"> Initially 100 mL of D10 solution Repeat q10 min if BGL < 60 	<ul style="list-style-type: none"> 5 mL/kg, max single dose 100 mL Repeat q10 min if BGL < 60

Diltiazem

Route: SLOW IVP, SLOW IO	Contraindicated in hypotension, bradycardia, sick sinus syndrome and WPW Caution if administered with beta blockers or calcium channel blockers	
Indication	Adult	Pediatric
SVT, A-Fib, A-Flutter	<ul style="list-style-type: none"> 0.25 mg/kg IV over 2-5 min If no response in 15 min, 0.35 mg/kg IV May repeat 0.35 mg/kg once if no response in 15 min 	<ul style="list-style-type: none"> Contact medical control

Diphenhydramine (Benadryl)

Route: IV, IO, IM	Contraindicated in neonates, nursing mothers, lower respiratory diseases. Caution: increases the effects of CNS depressants	
Indication	Adult	Pediatric
Allergic Reaction	<ul style="list-style-type: none"> 25-50 mg IVP/IO/IM 	<ul style="list-style-type: none"> 1-2 mg/kg IVP/IO/IM, max 50 mg NOT for infants < 3 months
Dystonic Reaction	<ul style="list-style-type: none"> 50 mg IVP/IO/IM 	<ul style="list-style-type: none"> Contact medical control

Dopamine (Intropin)

Route: Regulated IV infusion	Contraindicated in Pts with uncorrected tacy-dysrhythmias, VF, MAOI therapy Monitor BP and ECG closely, can cause heart irritability causing dysrhythmias and PVCs	
Indication	Adult	Pediatric
Cardiogenic Shock	<ul style="list-style-type: none"> 10-20 mcg/kg/min, titrate to SBP 90-100 mmHg Mix: 400 mg -> 250 mL NS, 1600 mcg/mL 	<ul style="list-style-type: none"> 10-20 mcg/kg/min, titrate to SBP 90-100 mmHg Mix: 400 mg -> 250 mL Normal Saline, 1600 mcg/mL

Epinephrine

Route: IV, IO, IM, ET	Contraindications in non-life-threatening conditions: coronary insufficiency, dysrhythmias, narrow angle glaucoma.	
Indication	Adult	Pediatric
Anaphylaxis (Moderate)	<ul style="list-style-type: none"> 1:1,000 – <ul style="list-style-type: none"> 0.3 mg IM Repeat dose if continued signs of shock/respiratory compromise 	<ul style="list-style-type: none"> 1:1,000 – <ul style="list-style-type: none"> 0.01 mg/kg IM, max 0.3 mg Repeat dose if continued signs of shock/respiratory compromise
Anaphylaxis (Severe) w/ hypotension	<ul style="list-style-type: none"> 1:10,000 – <ul style="list-style-type: none"> 0.5 mg IV/IO slowly Repeat q5 min to maintain SBP>90 	<ul style="list-style-type: none"> 1:10,000 – <ul style="list-style-type: none"> 0.01 mg/kg IV/IO slowly, max single dose 0.5 mg Repeat q5 min, goal systolic BP is $\geq 70 + (\text{Age} * 2)$ mmHg
Cardiac Arrest	<ul style="list-style-type: none"> 1:10,000 – <ul style="list-style-type: none"> 1 mg IVP/IO q3-5 min 	<ul style="list-style-type: none"> 1:10,000 – <ul style="list-style-type: none"> 0.01 mg/kg IV/IO q3-5 min
Bradycardia (Severe)	<ul style="list-style-type: none"> 1:1,000 – <ul style="list-style-type: none"> 2-10 mcg/min IV/IO infusion Mix: 2mg -> 250 mL NS; 8 mcg/ml 	<ul style="list-style-type: none"> 1, 10,000 – <ul style="list-style-type: none"> 0.01 mg/kg, max single dose 0.5 mg
ET Tube Dose	2-2.5 times the IV dose	10 times the IV dose

Fentanyl (Sublimaze)

Route: IV, IO, IN, IM	Contraindicated in Pts with respiratory compromise, AMS. Use caution with elderly, hepatic and renal impaired Pts.	
Indication	Adult	Pediatric
Pain Management	<ul style="list-style-type: none"> ▪ 25-50 mcg ▪ May repeat q5, maintain SBP >100, Max 150 mcg 	<ul style="list-style-type: none"> ▪ 0.5-1 mcg/kg (max single dose 50 mcg) ▪ May repeat q5, maintain SBP >100

Glucagon

Route: IM (preferably in anteriolateral thigh)	May cause nausea, vomiting, tachycardia, and hypertension Contraindicated in the hyperglycemic Pt	
Indication	Adult	Pediatric
Hypoglycemia	<ul style="list-style-type: none"> ▪ 1 mg IM ▪ May repeat in 7-10 min x1 dose ▪ If no change in BGL after 2 doses, Dextrose must be given 	<ul style="list-style-type: none"> ▪ 0.5-1 mg IM (max single dose 1mg) ▪ If no change, give Dextrose or contact MCP
Beta Blocker Overdose	<ul style="list-style-type: none"> ▪ 1-3 mg IV/IO/IN ▪ May repeat once if needed 	<ul style="list-style-type: none"> ▪ Contact medical control

Haloperidol (Haldol)

Route: SIVP, SIOP, IM	Contraindicated in Pts with CNS depression, pregnant, severe liver or cardiac disease, or head injury May increase tricyclic antidepressant levels and hypotensive actions of antihypertensive agents	
Indication	Adult	Pediatric
Chemical Restraint	<ul style="list-style-type: none"> ▪ 2.5-5 mg IVP/IO ▪ 5-10 mg IM 	<ul style="list-style-type: none"> ▪ 0.05-0.15 mg IM up to max of 5 mg ▪ IM ONLY

Ipratropium (Atrovent)

Route: Nebulizer	Albuterol increases the effects of ipratropium Contraindicated in Pts with peanut allergy Use with caution in pregnancy Not indicated for acute onset of bronchospasm	
Indication	Adult	Pediatric
Respiratory Distress with bronchospasm	<ul style="list-style-type: none"> 0.5 mg mixed with 2.5 mg of albuterol One dose only 	0.5 mg mixed with 2.5 mg of albuterol

Ketorolac (Toradol)

Route: IV/IM	Contraindicated with NSAID allergy.	
Indication	Adult	Pediatric
Pain Management	30 mg IV/IM, single dose	1 mg/kg up to 30 mg

Labetalol (Trandate)

Route: SIVP, SIOP	Contraindicated in sinus bradycardia or sick sinus syndrome, WPW, AV blocks, decompensated heart failure or cardiogenic shock. Use with caution in elderly, hepatic and renal impaired Pts	
Indication	Adult	Pediatric
Hypertension	<ul style="list-style-type: none"> 0.2 mg/kg IVP/IO (Max 10 mg) Repeat Q10 min to achieve BP 185/90 	<ul style="list-style-type: none"> 0.5 mg/kg IV/IO (Max 10 mg) Repeat Q10 min to achieve BP 185/90

Lidocaine (Xylocaine)

Route: IV, IO, ET, Nebulizer, IV infusion	Contraindicated with Adams-Stokes syndrome, 2 nd degree type II / 3 rd degree heart blocks, any brady-dysrhythmia, WPW, severe SA, AV or intraventricular block. Do not give if Amiodarone has been given.	
Indication	Adult	Pediatric
Cardiac Arrest (VF/VT)	<ul style="list-style-type: none"> ▪ 1-1.5 mg/kg IVP/IO initially ▪ 0.5-0.75 mg/kg IVP/IO subsequently, max 3 mg/kg 	<ul style="list-style-type: none"> ▪ 1 mg/kg IVP/IO ▪ Max dose of 50 mg
Tachycardia	<ul style="list-style-type: none"> ▪ 1-1.5 mg/kg IVP/IO initially ▪ 0.5-0.75 mg/kg IVP/IO subsequently, max 3 mg/kg ▪ After conversion infusion, 2-4 mg/min, 1 gm -> 250 mL, 4mg/mL 	<ul style="list-style-type: none"> ▪ 1 mg/kg IVP/IO initially ▪ 0.5 mg/kg IVP/IO subsequently, 3 mg/kg ▪ After conversion infusion, 20-50 mcg/kg/min, 200 mg -> 250 mL
Nasal Tracheal Intubation	▪ 4 mL of 2% lidocaine nebulized	▪ 4 mL of 2% lidocaine nebulized
IO Insertion	▪ 20-40 mg IO	▪ 0.5 mg/kg (max 40 mg) IO

Magnesium Sulfate

Route: IV, IO	Contraindicated in Pts with myocardial damage, hepatitis, Addison disease, or significant renal impairment. Second degree heart block Type II / Third degree heart block NOTE: If patient taking Digitalis and has a high likelihood of Digitalis toxicity, magnesium sulfate may be useful in treating Second and Third degree heart block IV calcium chloride may be given to antagonize the effects of magnesium sulfate	
Indication	Adult	Pediatric
Cardiac Arrest – V-Fib, V-Tach, Torsades	▪ 2 gm IVP/IO bolus	▪ 25-50 mg/kg (max 2 gm) IV/IO
Torsades de Pointes with a pulse	▪ 1 gm/hr, titrate to control rhythm ▪ Mix: 2 gm -> 250 mL NS, 8 mg/mL	▪ 25-50 mg/kg over 10-20 min, ▪ Mix: 2 gm -> 250 mL NS, 8 mg/mL
Digoxin Toxicity	▪ 2 gm SIVP	▪ Contact medical control
Pre-eclampsia	▪ 2-4 gm IV/IO over 10-15 min	
Eclampsia	▪ 1 gm IVP/IO bolus over 5 minutes ▪ If Pt seizes during infusion, another 2 gm bolus over 5 min,	

Methyl-prednisolone (Solu-Medrol)

Route: IV, IO, IV infusion	Drug interactions include NSAIDs and live virus vaccines Hypoglycemic responses to insulin and oral hypoglycemic agents may be decreased Use caution in Pts with GI bleeding, diabetes mellitus or severe infection	
Indication	Adult	Pediatric
Anaphylaxis/Respiratory Distress	▪ 125 mg SIVP/IO	▪ 1-2 mg/kg SIV/IO

Metoprolol (Lopressor)

Route: IV, IO	Contraindicated in sinus bradycardia, 2 nd or 3 rd degree heart blocks, heart failure, SBP < 100	
Indication	Adult	Pediatric
Tachycardia w/ pulse	▪ 2-5 mg IVP over 1 minute ▪ If no response in 3-5 min, repeat 2-5 mg over 1 min	▪ Contact medical control

Midazolam (Versed)

Route: Slow IV, Slow IO, IM or IN	Contraindicated in pulmonary/renal/hepatic impairment. May cause respiratory depression, apnea, hypotension or bradycardia.	
Indication	Adult	Pediatric
Seizures	<ul style="list-style-type: none"> 1-2 mg over 2 min. If desired effect not achieved after 2 min may repeat to max of 10 mg. 	<ul style="list-style-type: none"> 0.05-0.1 mg/kg over 2 min. If desired effect not achieved after 2 min may repeat to a total dose of 5 mg. Broselow does not reflect seizure dose!
Sedation/Chemical restraint	<ul style="list-style-type: none"> 1-2 mg IV/IO/IM/IN May repeat once 	<ul style="list-style-type: none"> Contact medical control
Anxiety for pacing	<ul style="list-style-type: none"> 1 mg IV/IO/IM/IN 	<ul style="list-style-type: none"> Contact medical control

Morphine Sulfate

Route: IV, IO, IM	Contraindicated in Pts with hypovolemia or shock, head injuries, increased ICP, N/V or respiratory depression. MAO inhibitors may potentiate adverse effects	
Indication	Adult	Pediatric
Pain Management/Pulmonary Edema	<ul style="list-style-type: none"> 1-5 mg May repeat q5 min PRN, max dose 15 mg 	<ul style="list-style-type: none"> 0.1 mg/kg May repeat q5 PRN, max 15 mg

Naloxone (Narcan)

Route: Slow IVP, IO, IM, IN, ET	Use with caution in Pts with cardiac disease due to the possibility of flash pulmonary edema. Use with caution in Pts with possible narcotic addiction due to possibility of withdrawal Administration of naloxone may not reverse hypotension.	
Indication	Adult	Pediatric
Narcotic Overdose	<ul style="list-style-type: none"> 0.4-2 mg IVP/IO/IM q2 min, titrate to respiratory increase 0.8-2 mg IN Max dose, 10 mg ET tube is 2-2.5 times 	<ul style="list-style-type: none"> 0.1 mg/kg IVP/IO/IM q 2 min, titrate to respiratory increase, max dose 2 mg

Nitroglycerine

Route: Sublingual, transdermal	Contraindicated in shock, severe bradycardia, severe tachycardia, sexual performance drugs within 48 hrs, head trauma, and cerebral hemorrhage. DO NOT USE in Pts presenting with inferior MI (II, III, aVF) Marked symptomatic orthostatic hypotension may occur when given with calcium channel blockers.	
Indication	Adult	Pediatric
Angina, pulmonary edema, Hypertension	<ul style="list-style-type: none"> 0.4 mg SL q5 as long as SBP > 130 mmHg 0.5"-2" applied to the anterior chest wall 	<ul style="list-style-type: none"> Contact medical control

Norepinephrine (Levophed)

Route: IV/IO	Contraindicated in hypovolemia and hypoxia.	
Indication	Adult	Pediatric
Hypotension/Shock	<ul style="list-style-type: none"> 0.5 – 16 mcg/min Mix 4 mg into 1000 mL of NS, yields 4 mcg/mL? 	<ul style="list-style-type: none"> 0.05-1 mcg/kg/min Mix 4 mg into 1000 mL NS, yields 4 mcg/mL

Ondansetron (Zofran)

Route: IV/IO/DOT	In case of pregnant female, use Phenergan as your first line agent in treatment of nausea. Reduce dosages (recommended 2 - 4 mg) for elderly or debilitated patients, e.g. Hepatic dysfunction or known prolonged QT syndrome	
Indication	Adult	Pediatric
Nausea/Vomiting	<ul style="list-style-type: none"> 4 mg IV/IO/DOT May repeat once 	<ul style="list-style-type: none"> 6 mos – 2 yrs <ul style="list-style-type: none"> 2 mg slow IV/IO/ODT 2 yrs and older <ul style="list-style-type: none"> 4 mg slow IV/IO/ODT May repeat once

Promethazine (Phenergan)

Route: IV, IM	Contraindicated in Pt's under 16 Must dilute in at least 10 mL Normal Saline before administration	
Indication	Adult	Pediatric
Nausea/Vomiting	<ul style="list-style-type: none"> 12.5-25 mg SLOW IVP, IM 	<ul style="list-style-type: none"> N/A

Sodium Bicarbonate

Route: SIVP, SIOP, IV infusion	<p>Contraindicated in hypokalemia and hypocalcemia.</p> <p>The use of Sodium Bicarbonate in Cardiac arrest is only indicated in patients with concerns of hyperkalemia or tricyclic overdose</p> <p>Extravasation during administration can cause tissue necrosis.</p>	
Indication	Adult	Pediatric
Cardiac Arrest	<ul style="list-style-type: none"> ▪ 1 mEq/kg IVP/IO ▪ Repeat 0.5 mEq/kg after 10 min 	<ul style="list-style-type: none"> ▪ 1 mEq/kg IVP/IO of 4.2% ▪ Repeat 0.5 mEq/kg after 10 min of 4.2%
Tricyclic Overdose	<ul style="list-style-type: none"> ▪ 1 mEq/kg IVP/IO ▪ May repeat in 10 minutes if needed 	<ul style="list-style-type: none"> ▪ Contact medical control

24.10.3 – DRIP CALCULATIONS

Dopamine (10 - 20 mcg/kg/min)

$$\frac{\frac{10 \text{ mcg}}{\text{kg}} \times \text{weight (kg)} \times 60 \text{ gtt/mL}}{\frac{\text{min}}{\frac{1600 \text{ mcg}}{1 \text{ mL}} \times 1 \text{ min}}} = \text{_____ gtt/min}$$

$$\frac{\frac{20 \text{ mcg}}{\text{kg}} \times \text{weight (kg)} \times 60 \text{ gtts/mL}}{\frac{\text{min}}{\frac{1600 \text{ mcg}}{1 \text{ mL}} \times 1 \text{ min}}} = \text{_____ gtts/min}$$

Magnesium for Torsades or eclampsia

$$\frac{1 \text{ g}}{1 \text{ hr}} \times \frac{60 \text{ gtts}}{1 \text{ mL}} \times \frac{10 \text{ mL}}{5 \text{ g}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 2 \text{ gtts/min}$$

Bicarbonate for TCA

$$\frac{150 \text{ mL}}{1 \text{ hr}} \times \frac{60 \text{ gtts}}{1 \text{ mL}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 150 \text{ gtts/min}$$

Epinephrine (2 – 20 mcg/min)

$$\frac{\frac{2 \text{ mcg}}{\text{min}} \times \frac{60 \text{ gtts}}{1 \text{ mL}}}{\frac{2000 \text{ mcg}}{250 \text{ mL}}} = 15 \text{ gtts/min}$$

$$\frac{\frac{20 \text{ mcg}}{\text{min}} \times \frac{60 \text{ gtts}}{1 \text{ mL}}}{\frac{2000 \text{ mcg}}{250 \text{ mL}}} = 150 \text{ gtts/min}$$



24.11 – APPENDICES

24.11.1 – GLASGOW COMA SCORE

GLASGOW COMA SCORE - ADULT

Eyes	Spontaneous	4
	Opens to verbal commands	3
	Opens to pain	2
	No eye opening	1
Verbal	Oriented	5
	Confused conversation	4
	Inappropriate (words discernible)	3
	Incomprehensible words	2
	No vocal response	1
Motor	Obeys commands	6
	Purposeful movement to pain	5
	Withdraws from pain	4
	Flexion to pain (Decorticate posture)	3
	Extension to pain (Decerebrate posture)	2
	No motor response	1

GLASGOW COMA SCORE - PEDIATRIC

Eyes	Spontaneous	4
	Opens to verbal commands	3
	Opens to pain	2
	No eye opening	1
Verbal	Smiles, oriented to sounds, follows objects, interacts	5
	Cries but is consolable, inappropriate interactions	4
	Inconsistently consolable, moaning	3
	Inconsolable, agitated	2
	No vocal response	1
Motor	Obeys commands	6
	Purposeful movement to pain	5
	Withdraws from pain	4
	Flexion to pain (Decorticate posture)	3
	Extension to pain (Decerebrate posture)	2
	No motor response	1

24.11.2 – NORMAL PEDIATRIC VITAL SIGNS

Age	Weight (kg)	Pulse	Respirations	BP	BGL (grams/dL)
Newborn	3	140	40	80/50	40 - 60
6 Month	6	140	30	90/60	40 - 60
1 year	10	120	25	90/60	40 - 60
5 years	20	100	20	100/60	60 - 80
15 years	50	80	14	120/80	

24.11.3 – ALTERNATE ROUTES OF DRUG ADMINISTRATION

INFORMATION

The preferred route of drug administration shall be intravenous when not otherwise specified in operational protocols. However, providers must be aware of alternate routes of medication administration and make this information available to Medical Control when difficulties arise in giving required fluids and/or medications.

Intraosseous:

- Any medication given IV may be given via the intraosseous route

Endotracheal:

- The following medications may be given via the endotracheal route (“**NAVEL**”):
 - **N**aloxone
 - **A**tropine
 - **V**asopressin
 - **E**pinephrine
 - **L**idocaine
- Dilute with 10 - 15 mL of Normal Saline prior to administration
- Administration must be followed by hyper-insufflation of the lungs to promote optimal drug absorption
- Administer **2 to 2.5 times the recommended IV dosage when using the ET route**
 - Preferably, this is done by administering through IV tubing past the end of the ETT

Sublingual:

- Nitroglycerin
- Glucose paste
- Zofran (ODT, oral dissolving tablet)

Intramuscular:

- Atropine, Diphenhydramine, Fentanyl, Glucagon, Haldol, Morphine, Lidocaine, Naloxone, Versed

Intranasal:

- When administering medications via the atomizer, minimum of 0.3 mL and maximum of 1 mL per nare
- Narcan, Versed, Glucagon, Fentanyl

Transcutaneous:

- Nitroglycerin paste

24.11.4 – APPROVED ABBREVIATIONS FOR DOCUMENTATION

Abd — Abdomen	CVA — Cerebral vascular accident	I&D — Incision and drainage
APAP — Acetaminophen	CVP — Central venous pressure	IM — Intramuscular
ABC — Airway, Breathing, circulation	CPR — Cardiopulmonary resuscitation	Inf — Inferior
ACLS — Advanced Cardiac Life Support	DM — Diabetes	IV — Intravenous
Adm — Admission	DC/dc — discontinue	IVF — Intravenous fluids
ALS — Advanced Life Support	D & C — Dilation and curettage	IVP — Intravenous push
A&O — Alert and Oriented	Detox — detoxification	J — Joules
AMA — Against Medical Advice	DOA — Dead on arrival at hospital	JVD — Jugular-venous distention
ASA — Aspirin	DOE — Dyspnea on exertion	K+ — Potassium
ATLS — Advanced Trauma Life Support	DOS — Dead on scene	KO — Knocked out
@ — At	DT — Delirium Tremens	KVO — Keep vein open
BBB — Bundle Branch Block	Dx — diagnosis	L — Liter
BLS — Basic Life Support	ED — Emergency Department	Lac — Laceration
BGL — Blood glucose level	ECG/EKG — Electrocardiogram	Lat — Lateral
BP — Blood pressure	EENT/ENT — eye, ear, nose throat	LB — Large bore
BM — Bowel movement	EOM — Extraocular movement	Lb — Pound
BS — Breath sounds	ETT — Endotracheal tube	LBBB — Left bundle branch block
BVM — Bag-valve mask	ETA — Estimated time of arrival	Lg — Large
C — Centigrade	ETOH — Alcohol	Liq — Liquid
Ca — Cancer	F — Fahrenheit	LLL — Left lower lobe
Ca++ — Calcium	FHR — Fetal Heart Rate	LMP — Last menstrual period
CP — Chest pain	FB — Foreign body	LLQ — Left lower quadrant
C/O — Complains of	FD — Fire Department	LOC — Loss of consciousness
CHF — Congestive Heart Failure	FI — Fluid	L-spine — Lumbar spine
CAB — Coronary artery bypass	Fx — Fracture	Lt — Left
CAD — Coronary artery disease	GB — Gallbladder	LUL — Left Upper Lobe
CABG — Coronary Artery Bypass Graft	GC — Gonococcus or gonorrhea	MAE — Moves all extremities
Cath — Catheter, catheterization	GCS — Glasgow Coma Scale	mcg — Microgram
CBC — Complete blood count	GI — Gastrointestinal	MCL — Midclavicular line
cc — Cubic centimeter	Gm — Gram	MCP — Medical Control Physician
CC — Chief Complaint	Gr — Grain	Meds — Medications
CCU — Coronary care unit	GSW — Gunshot wound	mEq — Milliequivalent
CHF — Congestive heart failure	Gtt(s) — Drops	Mg — Magnesium
CHI — Closed head injury	GU — Genitourinary	Mg/mgm — Milligram
Circ — Circulation	GYN — Gynecology	MI — Myocardial infarction
Cm — Centimeter	Hr — Hour	Misc. — Miscellaneous
CMS — Circulation, movement, sensation	HA — Headache	mL — Milliliter
CNS — Central nervous system	HB — Heart block	mm — Millimeter
CO ₂ — Carbon dioxide	Hct — Hematocrit	MS — Multiple sclerosis
COPD — Chronic obstructive lung disease pulmonary disease	HEENT — Head, ears, eyes, nose and throat	MVA — Motor vehicle accident
C-spine — Cervical spine	Hg — Mercury	MVC — Motor vehicle collision
C-section — Caesarean section	Hgb/Hb — Hemoglobin	N/A — Not applicable
CSF — Cerebrospinal fluid	H&P — History and physical exam	NaHCO ₃ — Sodium Bicarb
CSM — Carotid sinus massage	HR — Heart rate	NC — Nasal cannula
	Ht — Height	Neuro — Neurology
	Hx — History	ITG — Nitroglycerine
	ICU — Intensive Care Unit	NAD — No acute distress
	IO — Intraosseus	NKDA — No known drug allergies
		NSR — Normal sinus rhythm
		NPO — Nothing by mouth

NRB — Non-rebreathing face mask
 NS — Normal Saline
 NSR — Normal sinus rhythm
 NV — Nausea and Vomiting
 NVD — Nausea, vomiting, diarrhea
 NH — Nursing home
 O2 — Oxygen
 OB — Obstetrics
 Occ — Occasional
 OD — Overdose
 Ophth — Ophthalmology
 OR — Operating room
 Os — Left eye
 Od — Right eye
 Oz — Ounce
 PAC — Premature atrial contraction
 Para — Number of pregnancies
 PAT — Paroxysmal atrial tachycardia
 Path — Pathology
 PD — Police department
 PE — Physical exam
 Peds — Pediatrics
 Per — By or through
 PERRL — Pupils equal, round and react to light
 PERLA — Pupils equal, and react to light and accommodation
 PID — Pelvic inflammatory disease
 PMS — Pulse, motor, sensation
 PND — Paroxysmal nocturnal dyspnea
 PO — By mouth

Pos — Positive
 Post — Posterior
 PRN — As Needed
 PSVT — Paroxysmal supraventricular tachycardia
 Psych — Psychiatric
 Pt — Patient
 PTA — Prior to arrival
 PVC — Premature ventricular contractions
 RBBB — Right bundle branch block
 RBC — Red blood cell
 Resp — Respirations
 RHD — Rheumatic heart disease
 RLQ — Right lower quadrant
 RO — Rule out
 ROM — Range of motion
 ROS — Review of systems
 RSR — Regular sinus rhythm
 RUQ — Right upper quadrant
 Rx — Prescribed Medications
 SL — Sublingual
 SOB — Shortness of breath
 Sol — Solution
 Sm — Small
 Stat — At once
 SC — Subcutaneous
 STD — Sexually transmitted Disease
 Sup — Superior
 Sx — Sign/symptom
 SVT — Supraventricular tachycardia

TB — Tuberculosis
 Tbsp — Tablespoon
 Temp — Temperature
 TIA — Transient ischemic attack
 Tid — Three times a day
 TKO — To keep open
 TM — Tympanic membrane
 Tol — Tolerated
 TRA — To run at
 Tsp — Teaspoon
 Tx — Treatment
 UOA — Upon our Arrival
 UA — Urinalysis
 Unk — Unknown
 URI — Upper-respiratory infection
 Uro — Urology
 UTI — Urinary tract infection
 Vag — Vaginal
 VD — Venereal disease
 VF — Ventricular fibrillation
 Via — By way of
 Vol — Volume
 VS — Vital signs
 VT — Ventricular tachycardia
 WBC — White blood cells
 WNL — Within normal limits
 WPW — Wolfe Parkinson White syndrome
 Wt — Weight
 WO — Wide open
 YO — Year old
 Yr — Years