Patient Care Protocols

JOHNSON COUNTY EMS SYSTEM

OFFICE OF THE MEDICAL DIRECTOR

2025

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PRINCIPLES OF CARE

Principles of Quality, Patient-Centric Care in the Johnson County EMS System

On all EMS patient encounters the following principles shall apply:

- **Do No Harm**
  - Use clinical judgement and reasoning prior to every intervention to ensure potential benefit of intervention is greater than the potential risk.

- **Recognize and Treat Emergencies**
  - Rapidly identify and reverse emergency condition(s) that EMS is capable of identifying and reversing.
  - If unable to reverse the emergency in the field environment, then focus on early notification and safe delivery of the patient to a destination where the emergency issue can be addressed, while mitigating the emergency to the extent possible.

EMS Providers should address the following areas when providing patient care:

- **Airway/Ventilation/Oxygenation**
  - Did the EMS Provider appropriately assess airway/ventilation/oxygenation status?
  - Did the EMS Provider recognize a threat (or potential threat) to the airway/ventilation/oxygenation status of the patient?
  - Did the EMS Provider appropriately address or reverse the threat (or potential threat) to the airway/ventilation/oxygenation of the patient?
  - Was every attempt made to deliver an appropriately oxygenated/ventilated patient with a reasonable airway to the destination if possible?
  - Were the above assessments and interventions documented with a rationale

- **Perfusion**
  - Did the EMS Provider appropriately assess perfusion and circulatory status of the patient?
  - Did the EMS Provider recognize a threat (or potential threat) to adequate perfusion of the patient?
  - Did the EMS Provider appropriately address or reverse (when able) the threat (or potential threat) to the perfusion of the patient?
  - Was every attempt made to deliver an appropriately perfused patient to the appropriate destination within EMS capability?
  - Were the above assessments and interventions documented with a rationale?

- **Suffering**
    - Did the EMS Provider appropriately assess for suffering?
    - Did the EMS Provider recognize suffering (or potential suffering)?
    - Did the EMS Provider attempt to address/alleviate suffering when able?
    - Were the above assessments and interventions documented with a rationale?

- **Patient Autonomy**
    - Did the EMS Provider appropriately respect patient autonomy?
    - Did the EMS Provider assess for decision-making capacity?
    - Did the EMS Provider use shared decision-making when dealing with treatments and interventions when able?
    - Were the above assessments and interventions documented with a rationale?

- **Destination determination**
    - Did the destination meet the needs of the patient presentation given the circumstances?
    - Was the time to destination appropriate for the patient presentation and circumstances?
    - Did the destination decision respect patient autonomy?
    - Was the destination determination rationale documented?

- **Patient/Provider Safety**
    - Did the EMS Provider behave in a manner consistent with a Culture of Safety regarding both patient and peers?

AUTHORIZATION OF PROTOCOLS

Description:

- The protocols that follow delineate treatment guidelines for the majority of patient presentations seen by the agencies in Johnson County who provide EMS response.

Responsibilities:

- **Medical Directors:** As outlined in Kansas Annotated Statutes (KSA 65-6112 and 65-6126) medical directors are responsible for providing medical oversight which includes the following:
    - Review, approve and implement medical protocols and to approve and monitor the activities, competency and education of emergency medical service providers.
    - Medical protocols are defined as written guidelines that authorize emergency medical service providers to perform certain medical procedures prior to contacting a physician, physician assistant authorized by a physician, advanced practice registered nurse authorized by a physician or professional nurse authorized by a physician.
    - Medical Protocols include the following:
        - Standing orders for all ALS and BLS providers in Johnson County.
        - Therapeutics, equipment and supplies used to deliver care.
        - Transport destination criteria.
        - Clinical practice parameters for all out-of-hospital care.
    - The Office of the Medical Director may seek out assistance and ask for opinions of other healthcare professionals inside and outside of the Johnson County EMS System when necessary to help inform the decisions of the Medical Directors.

- **Agency Administrators and Chiefs:** will assure through education and quality assurance measures that EMS providers are prepared to function with competence to employ these protocols. They will also provide feedback on trends within their organization and the EMS system to appropriate committees to ensure the protocols remain an effective document.

- **EMS Clinicians:** These protocols reflect the standards and practices to which clinicians within the Johnson County EMS system are expected to adhere. The content herein is based on current guidelines, protocols, and best practices as established by the EMS medical director and relevant legal statutes. All clinicians are required to comply with these protocols to ensure the highest level of patient care and to minimize legal liability. Clinicians may only deviate from these protocols when provided a written or verbal medical order from a physician, a physician assistant when authorized by a physician, and an advanced practice registered nurse when authorized by a physician via direct voice contact in-person, via telephone, radio, and/or video communications. Clinicians will be tested on these protocols through the EMS system credentialing process. These protocols are subject to change, and it is the responsibility of each clinician to stay informed about updates and modifications

- **Services Authorized to Use Protocols:** Consolidated Fire District No. 2, Johnson County Emergency Communications Center, Johnson County Fire District No. 1, Johnson County MED-ACT, Leawood Fire Department, Lenexa Fire Department, Northwest Consolidated Fire District, Olathe Fire Department, Overland Park Fire Department, Shawnee Fire Department.

Procedures:

- Application of these protocols to less than EMT-level certified personnel should be done on a service-by-service basis according to the regulations of the Kansas Board of EMS and the Office of the Medical Director.
- When an acute shortage occurs for a medication that exists in the formulary, the EMS System Medical Director (or designee) may temporarily substitute that medication with an appropriate replacement until a resolution can be found.
- Standing orders are specific treatment protocols that can be implemented when indicated and appropriate, prior to contact with Direct Medical Oversight.
- In the following situations all protocols may be utilized as standing orders:
  - Mass Casualty Incidents in which resources are overwhelmed
  - Disasters, natural or otherwise, that disable communications

❖ Please download the Johnson County Protocol App for the most up-to-date protocols. It is the responsibility of the individual provider to maintain the most current Johnson County EMS protocols. This book may contain errors and may not be the most up-to-date version. The latest most accurate version is maintained on the Johnson County Protocol App and may be downloaded.

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LOCAL SCOPE OF PRACTICE

Each EMS Provider is responsible for knowing their authorized patient care activities and for ensuring they do not exceed their local scope of practice as designated by credentialing designation below.

CO/A = Chief Officer / Administrative

EMT = Emergency Medical Technician / Registered Nurse

AEMT = Advanced Emergency Medical Technician

PM = Paramedic

AIRWAY/VENTILATION/OXYGENATION	CO/A	EMT/RN	AEMT	PM
Chin lift/Jaw-Thrust	Yes	Yes	Yes	Yes
Nasal Airway Insertion	Yes	Yes	Yes	Yes
Oral Airway Insertion	Yes	Yes	Yes	Yes
Suction Upper Airway	Yes	Yes	Yes	Yes
Suction Tracheal/Stoma	No	No	Yes	Yes
Gastric decompression with I-Gel	No	Yes	Yes	Yes
Nasal Cannula	Yes	Yes	Yes	Yes
Non-Rebreather Face Mask	Yes	Yes	Yes	Yes
FBAO-Basic Infant/Child/Adult	Yes	Yes	Yes	Yes
FBAO-Advanced (Laryngoscopy/Magill's)	No	No	No	Yes
BVM (Adult/Child/Infant)	Yes	Yes	Yes	Yes
ETCO2- colorimetric device	No	Yes	Yes	Yes
ETCO2-waveform/capnometry/interpret	No	No	Yes	Yes
Pulse oximetry	Yes	Yes	Yes	Yes
CPAP Application	No	Yes	Yes	Yes
Supraglottic Airway Insertion	No	Yes	Yes	Yes
Endotracheal Intubation	No	No	No	Yes
Cricothyrotomy (Adult)	No	No	No	Yes
Needle Decompression-chest	No	No	No	Yes
Cardiovascular/Circulation	**CO/A**	**EMT/RN**	**AEMT**	**PM**
CPR (Adult/Child/Infant)	Yes	Yes	Yes	Yes
Compressions (Mechanical Device)	No	Yes	Yes	Yes
Automated Defibrillation (AED)	Yes	Yes	Yes	Yes
Manual Defibrillation	No	No	Yes	Yes
Cardiac Monitor-Limb lead acquisition	No	Yes	Yes	Yes
Cardiac Monitor-12-lead acquisition	No	Yes	Yes	Yes
Cardiac Monitor-rhythm interpretation	No	No	Yes	Yes
Cardiac Monitor-12-lead interpretation	No	No	No	Yes
Synchronized Cardioversion	No	No	No	Yes
Transcutaneous Pacing	No	No	No	Yes

Trauma/SMR/Splinting/Patient Restraint	CO/A	EMT/RN	AEMT	PM
Hemorrhage Control-TQ application	Yes	Yes	Yes	Yes
Hemorrhage Control-Direct pressure	Yes	Yes	Yes	Yes
Hemorrhage Control-Wound Packing	Yes	Yes	Yes	Yes
C-collar application	Yes	Yes	Yes	Yes
Long Spine Board/Scoop Stretcher	Yes	Yes	Yes	Yes
Extremity Splinting	Yes	Yes	Yes	Yes
Traction Splints	No	Yes	Yes	Yes
Manual Patient Restraint/Hold	Yes	Yes	Yes	Yes
Mechanical Patient Restraints application	No	Yes	Yes	Yes
Vascular Access/IV Therapy	**CO/A**	**EMT/RN**	**AEMT**	**PM**
IV Initiation-peripheral	No	No	Yes	Yes
IO Initiation (approved sites)	No	No	Yes	Yes
Pre-Existing Central line Access	No	No	No	Yes
Implanted Port-a-Cath Access	No	No	No	No
Fluid Administration (Crystalloid)	No	No	Yes	Yes
Fluid Administration (Blood Products)	No	No	No	Yes
IV line troubleshooting	No	No	Yes	Yes
IV Pump Operation (approved meds only)	No	No	No	Yes
Medication Administration- Routes (Approved Medications Only)	**CO/A**	**EMT/RN**	**AEMT**	**PM**
Auto-Injector	Yes	Yes	Yes	Yes
Medicated Inhaler-Patient Assisted	Yes	Yes	Yes	Yes
Oral (PO)	No	Yes	Yes	Yes
Sublingual	No	Yes	Yes	Yes
Nebulized/aerosolized	No	Yes	Yes	Yes
Intramuscular (IM)	No	No	Yes	Yes
IV/IO Push	No	No	Yes	Yes
IV/IO medication drips	No	No	No	Yes
Intranasal (IN)	No	Yes	Yes	Yes
Intranasal (IN)-unit-dosed/pre-measured	Yes	Yes	Yes	Yes
Topical/Transdermal	No	No	No	Yes
Miscellaneous	**CO/A**	**EMT/RN**	**AEMT**	**PM**
Assisted Childbirth/Delivery	Yes	Yes	Yes	Yes
Blood glucose monitoring	Yes	Yes	Yes	Yes
Irrigation/Decontamination	Yes	Yes	Yes	Yes
Medication Cross-Check	Yes	Yes	Yes	Yes
Phlebotomy	No	No	Yes	yes
Cincinnati Stroke Screening	Yes	Yes	Yes	Yes
Large Vessel Occlusion Screen	No	No	No	Yes
Destination/Routing Determination (TCD)	No	No	No	Yes

Medication Administration per Credential Level

Medication	CO/A	EMT/RN	AEMT	PM
Albuterol (Metered Dose Inhaler)	Y	Y	Y	Y
DuoDote (Auto-Injector)	Y	Y	Y	Y
Epinephrine (Auto-Injector)	Y	Y	Y	Y
Ipratropium (Metered Dose Inhaler)	Y	Y	Y	Y
Isopropyl Prep Pad (Inhaled)	Y	Y	Y	Y
Naloxone (IN Preload)	Y	Y	Y	Y
Naloxone IM Auto-Injector	Y	Y	Y	Y
Albuterol (Neb)	N	Y	Y	Y
Aspirin (PO)	N	Y	Y	Y
Instaglucose (PO)	N	Y	Y	Y
Ipratropium (Neb)	N	Y	Y	Y
Nitroglycerin (SL)	N	Y	Y	Y
Amiodarone	N	N	Y	Y
Dextrose 10%	N	N	Y	Y
Diphenhydramine	N	N	Y	Y
Epinephrine	N	N	Y	Y
Fentanyl	N	N	Y	Y
Glucagon	N	N	Y	Y
Lactated Ringers	N	N	Y	Y
Lidocaine	N	N	Y	Y
Midazolam	N	N	Y	Y
Naloxone	N	N	Y	Y
Normal Saline	N	N	Y	Y
Ondansetron	N	N	Y	Y
Adenosine	N	N	N	Y
Atropine	N	N	N	Y
Calcium Chloride	N	N	N	Y
Epinephrine (Push-Dose)	N	N	N	Y
Haloperidol	N	N	N	Y
Hydroxocobalamin	N	N	N	Y
Ketamine	N	N	N	Y
Lorazepam	N	N	N	Y
Norepinephrine	N	N	N	Y
Oxymatozalone	N	N	N	Y
Racemic Epinephrine	N	N	N	Y
Sodium Bicarb	N	N	N	Y
Tetracaine	N	N	N	Y

INTRODUCTION TO PATIENT CARE GUIDELINES

UNIVERSAL CARE GUIDELINES are included to reduce the need for extensive reiteration of basic assessment/management and other considerations in every protocol.

TREATMENT AND INTERVENTIONS are not to be considered necessarily sequentially but should be considered in light of the environment and patient presentation and are unique to each individual patient.

Use of guidelines requires constant clinical judgement and decision-making that are unique to each patient care event.

While some specific guidelines have been included for pediatric patients, considerations of patient age and size (pediatric, geriatric, and bariatric) have been interwoven in the guidelines throughout the document where relevant.

Unless specifically stated guidelines apply to both adult and pediatric patients.

The **APPENDICES** contain material to which many guidelines refer to increase consistency in internal standardization and to reduce duplication.

Generic medication names are utilized throughout the guidelines. A complete list of these, may be found in **MEDICATION FORMULARY**.

Target Audience:

Licensed KS EMS Providers credentialed by the Medical Director to provide out-of-hospital care in the JOCO EMS System.

UNIVERSAL CARE

UNIVERSAL CARE GUIDELINES

Patient Care Goals:

- Provide appropriate initial assessment and management of any EMS patient.

Safety/Logistics:

- **Scene Size-Up**: As you approach the scene, evaluate hazards to yourself, responding personnel, patient and bystanders. Establish and follow Incident Management Systems.
- For Multi-Casualty Incidents (see **Appendix F)**
- **Personal Protective Equipment (PPE):** Prior to patient assessment, employ precautions to prevent contact with potentially infectious aerosols/droplets/body fluids or hazardous materials as indicated.

Initial Patient Impression:

- Transmit **INITIAL** patient impression over the radio when the patient has one of the following conditions/circumstances:
  - Critical
  - Trauma Plan Activation
  - Code Blue
  - Type Black
- It is acceptable and encouraged to upgrade or downgrade incoming units based on initial patient impression.
- Cancelling an ambulance generally should not be done based on initial patient impression.

Patient Assessment:

- **Primary Survey**: (**A**irway, **B**reathing, **C**irculation is cited below; although there are specific circumstances where **C**irculation, **A**irway, **B**reathing may be indicated such as cardiac arrest or major arterial bleeding).
  - **Airway** (Maintain spinal motion restriction if indicated. (see **Spinal Care** protocol)
    - Assess for patency and open the airway as indicated
    - If patient unable to maintain airway patency—open airway (see **Airway/Ventilation Management** protocol)
  - **Breathing**
    - Evaluate presence or absence of adequate breathing
    - If patient not breathing adequately or apneic (see **Airway/Ventilation Management** protocol)
  - **Circulation**
    - Control any major external bleeding (see **Trauma** protocol)
    - Assess pulse and evaluate for adequate perfusion
    - If no pulse begin compressions (see **Cardiac Arrest/Resuscitation** protocol)
    - If inadequate perfusion (see **Shock** protocol)

- **Disability**
  - Evaluate patient responsiveness: **AVPU** (**A**lert, **V**erbal, **P**ain, **U**nresponsive)
  - If patient's mental status is altered check blood glucose (see **Hypoglycemia** protocol)

➢ **Secondary Survey:**

- The performance of the secondary survey should not delay transport to definitive care for critical patients (particularly trauma).
- The Secondary Survey may be **one or both** of the following:
  - A focused physical exam that is tailored to the individual patient that focuses on a specific injury or medical complaint.
  - A rapid examination of the entire body from head-to-toe.
- **Airway**
  - patency, snoring, obstruction, secretions
  - Use adjuncts to maintain patency and relieve obstruction as indicated (see **Airway/Ventilation Management** protocol)
- **Breathing/Chest**
  - Rate, depth, work of breathing, retractions, auscultation, positioning, chest wall stability/symmetry, pulse oximetry, ETCO2.
  - Apply oxygen and ventilate patient as indicated to achieve target of 94-98% oxygen saturation based upon clinical presentation and assessment. (See **Airway/Ventilation Management** protocol)
  - Treat tension pneumothorax as indicated (See **Trauma** protocol)
- **Circulation**
  - Blood Pressure, EKG monitoring, ETCO2, skin color/temperature, capillary refill
  - Obtain vascular access as indicated (see **Vascular Access** protocol)
  - Control hemorrhage as indicated (see **Trauma** protocol)
  - Assess for shock and treat as indicated (see **Shock** protocol)
- **Disability**
  - Mental status, (GCS when appropriate), pupils, motor/sensory examination, speech, assessment of decision-making capacity, if acute stroke suspected (see **Suspected Stroke/TIA** protocol).
- **Expose**
  - As appropriate according to complaint
  - Be considerate of modesty
  - Keep patient warm
- **HEENT**
  - Scalp, face, eyes, ears, naso/oropharynx, trachea, cervical spine, JVD
- **Abdomen/Back**
  - Flank/abdomen visual inspection, palpation of abdomen/flank, thoracic/lumbar spine.
- **Extremities**
  - Deformity, pulses, edema, range of motion, strength

- **Vitals Signs and On-going assessment**:
  - An initial full set of vital signs is required: pulse, blood pressure, respiratory rate, and mental status assessment (*Ideally, vitals should be obtained within 5 minutes of patient contact unless circumstances exist that prevent ability to obtain and document reasons for delay*). (see **Table 1. Normal Vital Signs**).
  - **Stable patients** should have at least two sets of vital signs when situation allows.
  - **Critical patients** should have vital signs monitored more frequently.
  - One set of vitals should be taken shortly before arriving or on arrival to receiving facility.
  - Establish baseline during initial assessment and then trend any change in status (ex. GCS, mental status, pain scores, etc.)

Table 1. Normal Vital Signs

Age	Pulse-Awake (beats/ minute)	Pulse-Sleeping (beats/ minute)	Respiratory Rate (breaths/ minute)	Systolic BP (mmHg)
Preterm less than 1 kg	120–160		30–60	39–59
Preterm 1–3 kg	120–160		30–60	60–76
Newborn	100–205	85–160	30–60	67–84
Up to 1 year	100–190	90–160	30–60	72–104
1–2 years	100–190	90–160	24–40	86–106
2–3 years	98–140	60–120	24–40	86–106
3–4 years	80–140	60–100	24–40	89–112
4–5 years	80–140	60–100	22–34	89–112
5–6 years	75–140	58–90	22–34	89–112
6–10 years	75–140	58–90	18–30	97–115
10–12 years	75–118	58–90	18–30	102–120
12–13 years	60–100	58–90	15–20	110–131
13–15 years	60–100	50–90	15–20	110–131
15 years or older	60–100	50–90	15–20	110–131

Source: Extrapolated from the 2020 American Heart Association Pediatric Advanced Life Support's tables from the Nursing Care of the Critically Ill Child, and from Web Box 1: Existing reference ranges for respiratory rate and heart rate in the appendix of the article by Fleming, et al, published in Lancet

Note: While many factors affect blood pressure (e.g., pain, activity, hydration), it is imperative to rapidly recognize hypotension, especially in children. For children of the ages 1–10, hypotension is present if the systolic blood pressure is less than 70 mmHg + (child's age in years x 2) mmHg.

- **Obtain a Focused History**: (SAMPLE)
  - **S**ymptoms
    - Onset of symptoms
    - Provocation-exacerbating or alleviating factors
    - Quality
    - Radiation
    - Severity-pain scale (tolerability of pain may be useful assessment tool)
    - Time of onset and circumstances around onset
  - **A**llergies-medication, environmental, and foods
  - **M**edications-prescription, over-the-counter, bring containers/list to facility if possible
  - **P**ast Medical History-including advanced directives, and medical records
  - **L**ast Oral Intake
  - **E**vents leading up to 911 call

Airway/Ventilation Management Principles:

- Airway interventions and ventilation therapies should be implemented **starting with the least invasive and progressing to the most invasive**; only advance to the next technique if the current technique is not working. The overriding goal is for the patient to arrive at the hospital adequately ventilated and oxygenated. Achieving this goal may not require the use of an advanced airway.
- Refer to specific protocols (**Airway/Ventilation Management** and **Respiratory Distress** protocols).

Circulatory Assessment/Management Principles:

- Patients with cardiac/respiratory complaints as well as those patients with altered mental status and/or critical illness/injury should have continuous EKG and pulse oximetry monitoring.
- Obtain a 12-lead EKG on any patient with:
  - Suspicion for cardiac cause of patient complaint (regardless of age) unless doing so might cause a significant delay in emergent intervention (ex. cardioversion, pacing, airway issues etc.)
  - CVA/TIA
  - Altered Mental Status
  - Overdose/Ingestion
  - Critical Illness
  - Trauma patients if suspicion for cardiac injury or if concern trauma was result of medical issue.

Key Considerations:

- **Adult**:
  - Regarding trauma/burn routing an adult is defined as ≥15 years old.
  - Regarding medication dosing, defibrillation energy levels, medical protocols an adult is any patient whose height exceeds the length-based tape.
- **Pediatrics**:
  - Regarding trauma/burn routing a pediatric patient is <15 years old.
  - Regarding medication dosing, defibrillation energy levels, medical protocols a pediatric patient is any patient whose height DOES NOT exceed the length-based tape.
- **Geriatrics**:
  - The geriatric population is generally defined as those patients who are ≥ 65 years old.
  - Consider reducing analgesic and sedation medication dosages in this population when appropriate.
  - Consider Direct Medical Oversight for guidance.
- **High-Risk Populations**:
  - Regardless of age, patients with chronic kidney disease (ex. dialysis), hepatic disease (ex. cirrhosis, end-stage liver disease), or chronic and/or multiple co-morbidities consider reduced medication dosages.
  - Consider Direct Medical Oversight for guidance.
- **Secondary Survey** may not be completed if patient has critical primary survey problems
- **Critical Patients**: patient management should occur simultaneously with assessment as indicated.

Patient Safety Considerations:

- Be aware of potential need to adjust management based on patient age and comorbidities, including medication dosages.
- The maximum weight-based dose of medication administered to a pediatric patient should not exceed the maximum adult dose except where specifically stated in a patient care protocol/formulary.
- Direct Medical Oversight should be consulted when mandated or as provider judgement dictates.

VASCULAR ACCESS

Patient Care Goals:

- Successfully achieve vascular access when indicated

Key Considerations:

- The decision to obtain and the method to achieve vascular access requires provider judgement and is patient and scenario specific.
- The number of attempts at a method of vascular access before attempting another method also requires provider judgement.
- The benefits for obtaining vascular access should outweigh the risks (ex. patient discomfort, delay in transport etc.)
- Vascular access can be achieved using any of the following:
    - **Peripheral IV** (including External Jugular)
    - **IO** (unstable OR cardiac arrest patients only)
        - Acceptable sites for IO:
            - Humeral head
            - Proximal tibia
            - Distal tibia (medial malleolus)
    - **Pre-existing vascular access points** in patients who are unstable OR in cardiac arrest when they have **externally visible access ports**. (Ex. tunneled catheters in chest, hickman, groshong, broviac, PICC etc.)
        - When accessing pre-existing lines (peripheral or central) **5ml of blood must be withdrawn** from any port to be used **PRIOR** to using the line to avoid an inadvertent bolus of heparin.
    - **Dialysis AV grafts/fistula** should only be accessed as a last resort and only after failed IV/IO attempts in unstable OR cardiac arrest patients.
        - When accessing dialysis AV graft/fistula:
            - Be prepared for hemorrhage as they are under high pressure.
            - May require use of pressure bag to flow IV fluids.

OBTAINING BLOOD SAMPLES

Patient Care Goals:

- Assist hospital partners with pre-identified patient populations where obtaining blood samples in the field reduces time to definitive care within the health care system.
- Assist Law Enforcement with lawful requests for blood samples when appropriate.

Key Considerations:

- Blood samples for laboratory analysis may be obtained for patients with time critical diagnoses (TCDs) as determined by the needs of the receiving hospitals in accordance with EMS System Medical Director approved procedures.
- Blood samples may be drawn at the request of Law Enforcement if the following conditions are met:
    - Patient care and patient condition will not be compromised.
    - The risk to provider and patient is minimal.
    - Obtaining blood sample does not inappropriately delay transport or patient care.
    - Law Enforcement presents appropriate documentation (ex. order from judge)

MEDICATION ADMINISTRATION AND VERIFICATION

Patient Care Goals:

- Ensure that every patient administered a medication by an EMS provider is given the correct, unexpired, medication, via the correct route, at the right dose for the right reason.

Principles of Medication Administration and Verification:

- The Medication Cross-Check should be used PRIOR to the administration of ANY medication to ensure the correct patient, medication, dose, and route. (see Field Reference Guide (**FRG)** for Medication Cross-Check)
- No medication should be administered to a patient who has a known hypersensitivity.
- Medications being prepared for administration should not be directly mixed in the same syringe with any other medication.
- Any medication given via the IV route may also be given via the IO route.
- Medication administered via IM route should be given in the lateral thigh. When lateral thigh is not accessible and/or feasible, deltoid administration is acceptable as alternative.
- A maximum volume of 1 mL (ideally no more than 0.5ml) may be given in each nostril for IN administration.
- For pediatric patients measured with the length-based tape, medications should be administered utilizing the corresponding color-coded cards in the **FRG**. For pediatric patients whose height exceeds the length-based tape system, use adult medication dosing. For those patients not measuring to the shortest length, the minimum dose should be used.
- NEVER administer the contents of a syringe that is not labeled OR without visualizing the vial from which it was immediately drawn
- Only draw up in a syringe the actual amount of medication intended to be given at that time when able.

PATIENT AND PROVIDER SAFETY DURING TRANSPORT

Patient Care Goals:

- Safely deliver the patient and EMS Providers to the appropriate destination in the most efficient manner while minimizing unnecessary risks to the patient, EMS providers and the public.

Principles of Safe Transportation:

- **Lights and Sirens:**
  - Routine use of emergency lights and sirens is not warranted and unnecessarily jeopardizes the patient, EMS providers and public safety.
  - When emergency lights and sirens are utilized during patient transport every attempt should be made to limit speeds to a level that is safe for the emergency vehicle being driven and the road conditions on which is it being operated.
- **Patient and EMS Provider Restraints:**
  - Every patient should be appropriately restrained during transport.
  - Pediatric patients (including newly born) should be secured to the cot using the appropriate pediatric restraint device (see **FRG** for sizing).
  - EMS Providers should be appropriately restrained at all times during transport.
- **Chest Compressions During Transport**:
  - If chest compressions are likely to be needed during transport, apply a mechanical compression device prior to departure.

DIRECT MEDICAL OVERSIGHT

Direct Medical Oversight:

- The following individuals are able to provide Direct Medical Oversight:
  - Johnson County EMS System Medical Director
  - Johnson County EMS System Deputy Medical Director
  - Physician designated by EMS System Medical Director
  - EMS Fellows working with Johnson County EMS System as part of their ACGME approved fellowship rotation
  - ED Physician or designee at a Base Hospital/Facility (see **Appendix H**)

When to use Direct Medical Oversight:

- Direct Medical Oversight should be contacted:
  - To approve EMS provider requests required in the protocol for interventions beyond standing orders.
  - Before deviation from protocol.
  - When the EMS provider feels that physician involvement may persuade a refusing patient to accept EMS interventions or seek higher-level medical care.
  - When ALS interventions have been performed and the patient refuses transport except where addressed by specific protocol.
  - To discontinue resuscitation in an exceptional resuscitation situation or any other arrest situation not addressed in the **Cardiac Arrest & Resuscitation** protocol **or** **Termination of Resuscitation** protocol**.**
  - Anytime provider has any questions/concerns that arise with any patient.
- To maintain continuity of care, once communication with Direct Medical Oversight has been established all decisions outside of standing orders or which require further discussion with Direct Medical Oversight should be made through discussion with the same physician or designee when situation allows.

Non-Base Hospitals:

- When the transport destination is a non-base hospital, Direct Medical Oversight (as defined in Protocol) must approve any EMS provider or physician request for intervention other than standing orders.
- EMS providers should ensure that the non-base hospital has been notified of changes in orders, patient status, or destination, either by direct communication or by requesting this communication through Direct Medical Oversight.

BIOMEDICAL COMMUNICATIONS/DOCUMENTATION

Patient Care Goals:

- Ensure relevant patient information is communicated to health care partners at receiving facilities in a timely fashion to minimize delays to definitive care.
- Ensure accurate patient information and medical interventions are appropriately documented in the electronic health record (EHR) and shared with relevant hospital partners.
- Accurately document patient care events and medical interventions in order to contribute to quality initiatives, benchmarking, clinical registries, and research.

Biomedical communications:

- Transporting units should communicate with the receiving facility on every patient transport even if only to provide information and confirm care plan.
- Biomedical communication should be made as early as practical during the course of the call, especially to discuss continuation of care plan beyond standing orders.
- An initial notification should occur as early as practical following arrival on scene to provide basic information to the facility.
- A more detailed report is given when patient transport has begun or as soon as more details are available to aid the staff in preparation for the needs of the patient.
- When air transport is utilized, the ground crew is encouraged to provide a report to the receiving facility as soon as the patient is loaded in the helicopter.

Radio Report:

- **A verbal radio report should include the following elements:**
  - Identify unit
  - Identify the need for Direct Medical Oversight – request to speak to a physician directly if appropriate
  - Estimated time of arrival (ETA)
  - Mental status
  - Patient's age and sex
  - Patient's chief complaint
  - Brief pertinent history of the present illness/Mechanism of Injury
  - Pertinent physical exam findings/Injuries
  - Vital signs
  - Emergency care given and the patient's response to care given
- **Transporting units will advise receiving facility of changes in patient's status**.

Electronic Health Record Documentation:

It is the responsibility of the transporting unit to gather all necessary information from the scene and ancillary personnel. First responder and other information from participating EMS units should be included in the documentation of the incident.

ABUSE, NEGLECT, HUMAN TRAFFICKING

Patient Care Goals:

- Recognize and report any suspicion for abuse, neglect, and/or human trafficking

Abuse, Neglect, Human Trafficking:

- EMS providers are mandated to report suspected abuse of the adult or pediatric patient to the appropriate authorities, not just to the receiving physician/hospital staff.
- Utilize the Abuse Hotline at (800) 922-5330 to report such suspicions. This is a 24-hour service that accepts reports of adult/pediatric abuse and neglect.
- The hotline that handles abuse/neglect reports at nursing care facilities is (800) 842-0078 and is available only on weekdays from 0800-1200 and 1300-1600.
- Utilize the National Human Trafficking Resource Center hotline to report suspected human trafficking (888) 373-7888 and notify the appropriate Law Enforcement agency.

*Refer to appropriate departmental policy and procedure for further documentation requirements as determined by your specific agency.

GENERAL MEDICAL PROTOCOLS

ABDOMINAL PAIN (Non-Traumatic)

Patient Care Goals:

- Identify life-threatening causes of abdominal pain.
- Improve patient comfort.

Patient Presentation:

- Abdominal pain NOT due to or related to pregnancy or trauma
- For Abdominal pain due to or related to pregnancy (see **Obstetrics/Gynecology** protocol)

Treatment and Interventions:

- Establish vascular access as indicated. (see **Vascular Access** protocol)
- Administer *Crystalloid* as indicated (see **Crystalloid** formulary and **FRG**)
- Provide analgesia as indicated (see **Pain Management** protocol)
- Administer *Ondansetron* as indicated (see **Nausea/Vomiting** protocol and **FRG**)
- Treat shock as indicated (see **Shock** protocol)

Key Considerations:

- Allow the patient to assume a comfortable position, unless contraindicated. Flexion of the knees and hips may help reduce pain.
- Abdominal/back pain in women of childbearing age should be treated as pregnancy related until proven otherwise.
- The diagnosis of abdominal aneurysm/aortic dissection should be considered with abdominal pain, with or without back and / or lower extremity pain or diminished pulses, especially in patients over 50 and/or patients with shock/poor perfusion.
- Notify receiving facility early with suspected abdominal aneurysm.
- Consider patients > 50, diabetics and/or women especially with upper abdominal complaints to have high risk or concern for ACS.
- Obtain 12-lead EKG in any patient EMS provider believes is high risk or concern for ACS.
- Abdominal pain in older adults, patients with bleeding disorders, patients on anticoagulation medications, children less than 2 years old and patients that are immunocompromised may be a symptom of severe illness.

ADRENAL INSUFFICIENCY/ADRENAL CRISIS

Patient Care Goals:

- Recognize adrenal crisis
- Promptly administer "stress dose" corticosteroid if available
- Recognize and treat hypoglycemia and shock
- Increase patient comfort by treating vomiting and pain when appropriate

Treatment and Interventions:

- Establish vascular access as indicated (see **Vascular Access** protocol)
- Administer *Crystalloid* as indicated (see **Crystalloid** formulary and **FRG**)
- Obtain blood glucose and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Administer *Ondansetron* as indicated (see **Nausea/Vomiting** protocol and **FRG**)
- Treat shock as indicated (see **Shock** protocol)
- Administer patient's prescribed "stress dose" corticosteroid IV/IO/IM for patients with adrenal insufficiency who have one of the following presentations/conditions:
    - Shock (any cause)
    - Fever and ill-appearance
    - Multi-system trauma
    - Drowning
    - Environmental hyperthermia/hypothermia
    - Multiple long-bone fractures
    - Vomiting/diarrhea accompanied by dehydration
    - Respiratory distress
    - 2nd or 3rd degree burns with >5% BSA
    - Hypoglycemia

Key Considerations:

- Adrenal insufficiency results when the body does not produce the essential life-sustaining hormones cortisol and aldosterone, which are vital to maintaining blood pressure, cardiac contractility, water, and salt balance.
- Acute adrenal insufficiency can result in refractory shock or death in patients on a maintenance dose of steroid medication (ex. prednisone, hydrocortisone (Solu-Cortef), dexamethasone (Decadron) etc.) who experience illness or trauma and are not given a "stress dose".
- There is no ideal way to determine if a patient is experiencing an adrenal crisis in the EMS environment, however if they have known Adrenal Insufficiency and are prescribed "stress dose" steroids and are acutely ill/injured administration of patient "stress dose" becomes a high priority.

AGITATED OR VIOLENT PATIENT/BEHAVIORAL EMERGENCY

Patient Care Goals:

- Provide emergency medical care to the agitated, violent, or uncooperative patient
- Maximizing and maintaining safety for the patient, EMS providers, and others

Patient Presentation:

- Patients who are exhibiting agitated, violent, or uncooperative behavior or who are a danger to self or others

Treatment and Interventions:

- Obtain blood glucose and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Consider physical restraints as necessary when other de-escalation methods have failed (see **Patient Restraint** protocol).
- Consider the following pharmacological interventions for persistent agitated, violent, or uncooperative behavior:
  - *Midazolam* (see **midazolam** formulary and **FRG**)
- Initiate EKG monitoring for any patient receiving pharmacologic management of agitation when possible.
- Obtain temperature when necessary and treat as indicated (see **Hyperthermia** protocol)
- Consider calling a Johnson County Mental Health Co-Responder or the Johnson County Mental Health 24/7 crisis line at 913-268-0156 for consultation.
- Consider transport to RSI. if patient meets checklist criteria (see **RSI checklist**)

Key Considerations:

- Do NOT attempt to enter or control a scene where physical violence or weapons are suspected to be present.
- Agitated or violent patients/Behavioral emergencies include many of the following**:** paranoia, disorientation, hyper-aggression, violent, hallucinations, tachycardia, hypertension, diaphoresis, hyperthermia, increased strength, psychosis.
- Establish patient rapport if possible
- Attempt verbal reassurance and calm patient prior to use of pharmacologic and/or physical restraint devices if possible
- Engage family members/loved ones to encourage patient cooperation if their presence does not exacerbate the patient's agitation.
- Continued verbal reassurance and calming of patient following use of chemical/physical restraint devices

Patient/Provider Safety Considerations:

- The management of violent patients requires a constant reevaluation of the risk/benefit balance for the patient and bystanders in order to provide the safest care for all involved. These are complex and high-risk encounters. There is no one size fits all solution for addressing these patients.
- Patients exhibiting agitated or violent behavior may be due to a medical condition (ex. head injury, hypoxia, hypercapnia, hypoglycemia etc.)
- EMS providers should provide continuous monitoring of:
    - Airway patency
    - Respiratory status with pulse oximetry and/or capnography
    - Circulatory status with frequent blood pressure measurements
    - Mental status and trends in level of patient cooperation
    - Extremity perfusion with capillary refill in patients in physical restraint device

ALTERED MENTAL STATUS

Aliases:

- Confusion, altered level of consciousness, AMS

Patient Care Goals:

- Identify reversible causes and treat when indicated
- Protect patient from harm

Patient Presentation:

- Any patient who has impaired decision-making capacity NOT due to trauma

Treatment and Interventions:

- Manage airway as indicated (See **Airway/Ventilation Management** protocol)
- Treat respiratory distress as indicated (see **Respiratory Distress** protocols)
- Place pulse oximeter and treat hypoxia as indicated
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Treat seizure as indicated (see **Seizure** protocol)
- Treat shock as indicated (see **Shock** protocol)
- Initiate EKG monitoring and obtain 12-lead (see **Dysrhythmias** protocol)
- Monitor ETCO2 for hypercapnia as indicated
- Consider obtaining temperature if concern for sepsis
- Consider naloxone administration (see **Opioid Overdose** protocol and **FRG**)
- Assess and treat poisoning/overdose as indicated (see **Universal Poisoning** protocol)
- If requires physical/chemical restraint (see **Agitated/Violent patient** protocol)
- Initiate active cooling or warming as indicated (see **Hyperthermia**/**Hypothermia** protocols)
- Assess for suspected CVA/TIA (see **Stroke** protocol)

Key Considerations:

- Focus in AMS should be on reversible causes
- Use bystanders and scene/environment to look for clues as to cause of AMS
- Medications and/or illicit substances are key history pieces
- Medical alert tags and advanced directives should be sought out
- Look for occult signs of head trauma/injury

Patient/Provider Safety Considerations:

- With depressed mental status, initial focus is on airway patency, oxygenation, ventilation, and perfusion
- The violent patient may need physical and/or chemical restraint to insure proper assessment and treatment
- Hypoglycemic and hypoxic patients can be irritable and violent

ANAPHYLAXIS AND ALLERGIC REACTION

Patient Care Goals:

- Provide timely therapy for potentially life-threatening reactions to known or suspected allergens to prevent cardiorespiratory collapse and shock
- Provide symptomatic relief for symptoms due to known or suspected allergens

Patient Presentation:

- Anaphylaxis – More severe and is characterized by an acute onset involving:
  - **Two or more** of the following organ systems involved occurring rapidly after exposure to a likely allergen:
    - Skin and/or mucosal involvement (urticaria, itchy, swollen tongue/lips)
    - Respiratory compromise (dyspnea, wheeze, stridor, hypoxia)
    - Persistent gastrointestinal symptoms (vomiting, abdominal pain, diarrhea)
    - Hypotension or associated symptoms (syncope, hypotonia, incontinence)
      - Adults: Systolic BP<90mmHg
      - Pediatric: Hypotension for age (see **Table 1. Abnormal Vital Signs**)

Table 1. Abnormal Vital Signs

Age	Heart Rate	Respiratory Rate	Systolic BP	Temp (°C)
0 d – 1 mo	>205	>60	<60	<36 or >38
≥ 1 mo – 3 mo	>205	>60	<70	<36 or >38
≥ 3 mo – 1 yr	>190	>60	<70	<36 or >38.5
≥ 1 yr – 2 yr	>190	>40	<70 + (age in yr x 2)	<36 or >38.5
≥ 2 yr – 4 yr	>140	>40	<70 + (age in yr x 2)	<36 or >38.5
≥ 4 yr – 6 yr	>140	>34	<70 + (age in yr x 2)	<36 or >38.5
≥ 6 yr – 10 yr	>140	>30	<70 + (age in yr x 2)	<36 or >38.5
≥ 10 yr – 13 yr	>100	>30	<90	<36 or >38.5
> 13 yr	>100	>16	<90	<36 or >38.5

- Allergic Reaction (Non-anaphylactic)
  - Signs involving only **one** organ system (e.g. localized angioedema that does not compromise the airway, hives alone, etc.)

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat respiratory distress/hypoxia as indicated (see **Respiratory Distress** protocols)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- If signs/symptoms of anaphylaxis administer:
  - *Epinephrine/Epinephrine Auto-Injector* (see **epinephrine** formulary and **FRG**)
  - *Albuterol/ipratropium as indicated (*see **albuterol/ipratropium** formulary and **FRG**)
  - *Diphenhydramine (see **diphenhydramine** formulary and **FRG**)*
  - *Crystalloid* as indicated *(see **crystalloid** formulary and **FRG**)*
  - If stridor and/or severe lip/tongue angioedema is present consider administering:
    - *Racemic epinephrine* (ONLY AFTER IM EPINEPHRINE) (see **racemic epinephrine** formulary and **FRG**)
  - Position hypotensive anaphylaxis patient supine
  - Initiate EKG monitoring if epinephrine/racemic epinephrine given
- If signs/symptoms of allergic reaction without signs of anaphylaxis consider:
  - *Diphenhydramine* (see **diphenhydramine** formulary and **FRG)**
- For bites/envenomations (see **Bites and Envenomations** protocol)

Key Considerations:

- Anaphylaxis is a serious and potentially life-threatening medical emergency.
- When anaphylaxis is suspected, EMS personnel should always consider epinephrine as first-line treatment. Cardiovascular collapse may occur abruptly, without the prior development of skin or respiratory symptoms.
- Contrary to common belief that all cases of anaphylaxis present with cutaneous manifestations, such as urticaria or mucocutaneous swelling, a significant portion of anaphylactic episodes may not involve these signs and symptoms on initial presentation.
- Moreover, most fatal reactions to food-induced anaphylaxis in children were not associated with cutaneous manifestations.
- Skin involvement may be ABSENT in up to 40% of cases of anaphylaxis.
- Gastrointestinal symptoms occur most commonly in food-induced anaphylaxis, but can occur with other causes
- Oral pruritus/itching is often the first symptom observed in patients experiencing food-induced anaphylaxis
- Abdominal cramping is also common in food-induced anaphylaxis, but nausea, vomiting, and diarrhea are frequently observed as well (and can be particularly severe and life-threatening)
- Patients with asthma are at high risk for a severe allergic reactions.
- A localized allergic reaction (e.g. urticaria (hives) or angioedema that does not compromise the airway) may be treated with antihistamine therapy only.

Patient/Provider Safety Considerations:

- Failure to administer IM epinephrine when indicated is common and may lead to increased morbidity and mortality.
- There are no absolute contraindications to administration of IM epinephrine for anaphylaxis.
- Never administer ONLY racemic epinephrine for angioedema/stridor associated with anaphylaxis. IM epinephrine is still indicated and should be prioritized PRIOR to racemic epinephrine administration.
- Inadvertent administration of IV/IO epinephrine can result in catastrophic patient outcome
- Ensure FRG and medication cross-check utilized to avoid giving adult doses of epinephrine to pediatric patients.
- Remove any constricting bands, jewelry, rings, clothing from swollen hands/feet etc.

EPISTAXIS

Aliases:

- Nose bleed

Patient Care Goals:

- Minimize on-going blood loss
- Minimize risk of aspiration or swallowing large quantities of blood
- Ensure adequate airway patency and oxygenation/ventilation

Patient Presentation:

- Any patient with NON-traumatic epistaxis

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat shock as indicated (see **Shock** protocol)
- Treat nausea/vomiting as indicated (see **Nausea/vomiting** protocol)
- For minor epistaxis provide manual compression/nose clip for 20 minutes
- Epistaxis that is uncontrolled by manual compression/nose clip:
    - Instruct patient to blow nose to expel any clots (contraindicated if facial trauma/head injury)
    - Immediately administer *oxymetazoline* (see **oxymetazoline** formulary and **FRG**)
    - Re-apply manual compression/nose clip for 20 minutes

Key Considerations:

- Patient should have head tilted forward
- Ice pack to the back of the neck **offers no benefit** in epistaxis and should not be performed.
- Have suction available for patient so as to avoid swallowing large quantities of blood
- Oxymetazoline is safe for elderly and hypertensive patients when applied topically.

HYPERGLYCEMIA

Aliases:

- Diabetic ketoacidosis (DKA), hyperosmolar hyperglycemic state, hyperosmolar non-ketotic coma, diabetes

Patient Care Goals:

- Recognize hyperglycemia and begin fluid resuscitation when indicated
- Recognize and treat life-threatening complications of DKA

Patient Presentation:

- Patient may present with any of the following:
  - Altered mental status
  - Stroke symptoms (e.g. hemiparesis, dysarthria)
  - Seizure
  - Symptoms of hyperglycemia (e.g. polyuria, polydipsia, weakness, dizziness, abdominal pain, tachypnea)
  - History of diabetes and other medical symptoms

Treatment and Intervention:

- Establish vascular access as indicated (see **Vascular Access** protocol)
- Initiate EKG monitoring and obtain 12-lead EKG
- If findings of hyperkalemia are present on 12-lead:
  - Consider administration of *calcium chloride* (see **calcium chloride** formulary and **FRG**)
  - Consider administration of *sodium bicarbonate* (see **sodium bicarbonate** formulary and **FRG**)
  - Consider administration of *albuterol* (see **albuterol** formulary and **FRG**)
  - Consider *crystalloid* fluid bolus (see **crystalloid** formulary and **FRG**)
- If glucose >250mg/dL with symptoms of dehydration, vomiting, abdominal pain or altered level of consciousness:
  - Administer *crystalloid* fluid bolus (see **crystalloid** formulary and **FRG**)
- Treat nausea/vomiting as indicated (see **Nausea/Vomiting** protocol)
- Treat shock as indicated (see **Shock** protocol)

Key Considerations:

- New onset diabetic ketoacidosis in pediatric patients commonly presents with nausea, vomiting, abdominal pain, and/or urinary frequency.
- Consider causes for hyperglycemia such as:
  - **Insulin** – this refers to any medication changes for insulin or oral medications including poor compliance or malfunctioning insulin pump
  - **Ischemia** – this refers to hyperglycemia sometimes being an indication of physiologic stress in a patient and can be a clue to myocardial ischemia in particular

- **Infection/Sepsis** – underlying infection can cause derangements in glucose control
- **Stress/Trauma**: any traumatic/stressful event can cause hyperglycemia and may be truly unrelated and should not be aggressively managed.

Patient/Provider Safety Considerations:

- Overly aggressive administration of fluid in hyperglycemic patients may cause cerebral edema or dangerous hyponatremia, however this is of little concern in the EMS environment.
- Asymptomatic hyperglycemia poses no risk to the patient while inappropriately aggressive interventions to manage blood sugar can harm patients

HYPOGLYCEMIA

Aliases:

- Diabetic coma, insulin shock

Patient Care Goals:

- Recognize and appropriately reverse symptomatic hypoglycemia

Patient Presentation:

- Patient may present with any of the following:
  - Blood glucose (<60mg/dL for non-diabetics OR <80mg/dL in diabetic)
  - Altered mental status
  - Stroke symptoms (e.g. hemiparesis, dysarthria)
  - Seizure
  - History of diabetes and other medical symptoms

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat seizure as indicated (see **Seizure** protocol)
- Treat shock as indicated (see **Shock** protocol)
- Initiate EKG monitoring
- If symptomatic and blood glucose is <60mg/dL for non-diabetics OR <80mg/dL in diabetic administer one of the following:
  - Conscious patient with a patent airway:
    - *Instaglucose* (see **instaglucose** formulary for other sugar-containing alternatives and **FRG**)
  - Unconscious patient, or patients who are unable to protect their own airway:
    - *Dextrose 10%* (see **dextrose** formulary and **FRG**)
    - *Glucagon* (see **glucagon** formulary and **FRG**)
- Evaluate for presence of an automated external insulin delivery device (insulin pump)
- For patients with an insulin pump who are hypoglycemic with associated altered mental status (GCS <15):
  - Stop the pump, disconnect, or remove at insertion site if patient cannot ingest oral glucose or ALS is not available
  - Leave the pump connected and running if able to ingest oral glucose or receive ALS interventions in timely manner
- Reassess Blood glucose after interventions at appropriate time intervals as needed (note glucagon may take 20-45 minutes to see full effect)
- If maximal field dosage of dextrose solution does not achieve euglycemia and normalization of mental status:
  - Initiate transport to appropriate facility for further treatment of refractory hypoglycemia
  - Continue treatment of hypoglycemia using approved therapies
  - Evaluate for alternative causes of altered mental status

- **Disposition:**
  - If hypoglycemia with continued symptoms, transport to appropriate receiving facility
  - Hypoglycemic patients who have had a seizure should be transported to the hospital regardless of their mental status and response to therapy
  - If symptoms of hypoglycemia resolve after treatment, release without transport should only be considered if **all** of the following are true: (see **Hypoglycemia refusal checklist**)
    - Patient has diagnosis of Type I or Type II Diabetes
    - No apparent disease process other than isolated hypoglycemia
    - Patient has no further complaint (ex. chest pain, vomiting, shortness of breath etc.)
    - Repeat blood sugar is >80 mg/dL (adult) and >60mg/dL (pediatric)
    - Patient takes insulin OR metformin to control diabetes
    - Normal mental status and normal neurological exam
    - Did NOT have a seizure from hypoglycemia
    - Patient can promptly obtain and will eat a meal containing carbohydrates
    - A reliable adult will be staying with the patient.
  - Patient should be instructed to contact their primary healthcare practitioner ASAP to discuss medication regimen.
  - Patient should be instructed to recheck their blood glucose frequently in the following hours.

Key Considerations:

- Consider contribution of oral diabetic medications to hypoglycemia
- When necessary to remove/discontinue insulin pump use family/patient assistance when available.
- Consider potential for intentional overdose of hypoglycemic agents (insulin overdoses are exceptionally lethal and require transport)
- Avoid overshoot hyperglycemia when correcting hypoglycemia. Administer dextrose10% in small doses until either mental status improves or a maximum field dose is achieved

Patient/Provider Safety Considerations:

- Sulfonylureas (e.g. glyburide, glipizide) have long half-lives ranging from 12-60 hours. Patients with corrected hypoglycemia who are taking these agents are at particular risk for recurrent symptoms and frequently require hospital admission.

NAUSEA/VOMITING

Aliases:

- Gastroenteritis, emesis

Patient Care Goals:

- Decrease discomfort secondary to nausea and vomiting

Patient Presentation:

- Any patient with active nausea and/or vomiting

Treatment and Interventions:

- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Consider following treatments:
  - *Ondansetron* (see **ondansetron** formulary and **FRG**)
  - Inhaled vapor from *isopropyl alcohol pad* (see **isopropyl alcohol** formulary and **FRG**)
  - *Crystalloid* as indicated (see **crystalloid** formulary and **FRG**)
  - Provide analgesia as indicated (see **Pain Management** protocol)

Key Considerations:

- Nausea and vomiting are symptoms of illness – in addition to treating the patient's nausea and vomiting a thorough history and physical are key to identifying what may be a disease in need of urgent/emergent treatment (e.g. bowel obstruction, myocardial infarction, pregnancy)
- While ondansetron has not been adequately studied in pregnancy to determine safety, it remains a treatment option for hyperemesis gravidarum in pregnant patients.
- Do NOT routinely give ondansetron to patients prophylactically when giving opioids in attempt to "prevent" nausea and vomiting.

Patient/Provider Safety Considerations:

- For very young pediatric patients, Ondansetron can be sedating and is often unnecessary in the prehospital environment.

PAIN MANAGEMENT

Aliases:

- Analgesia, pain control

Patient Care Goals:

- Reduce discomfort and anxiety of the patient experiencing pain (medical or traumatic) through non-pharmacologic and pharmacologic interventions.

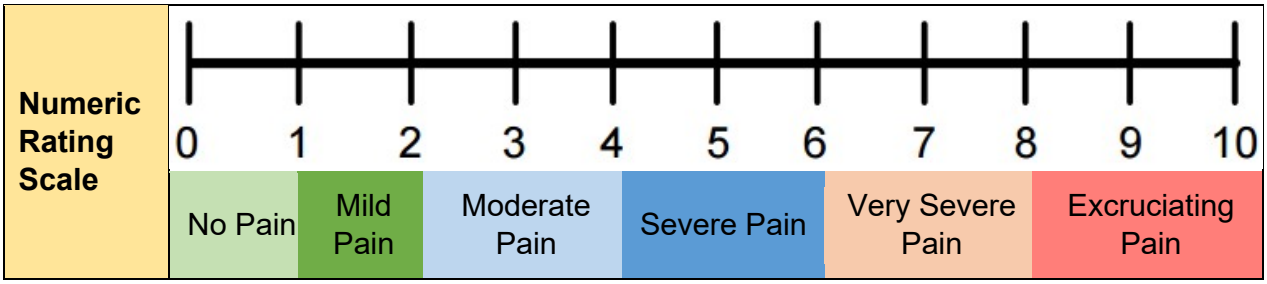
Patient Presentation:

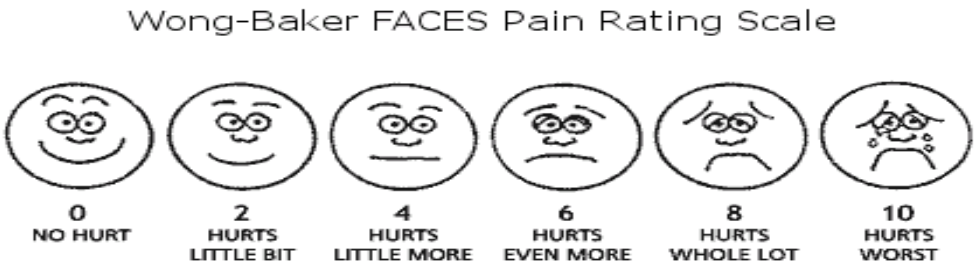
- Patients who are experiencing pain (except pregnant patients in active labor)

Treatment and Interventions:

- Determine patient's pain score assessment using standard pain scale.
  - Pediatric: Wong Baker Faces Pain Rating Scale
  - Adult: Numeric Rating Scale
  - Ask patient about tolerability of pain and if they would like pain medication
- If available, and appropriate consider use of non-pharmaceutical pain management techniques:
  - Allow patient to be in position of comfort
  - Ice packs
  - Immobilization/splinting
  - Verbal reassurance and emotional support from EMS provider and/or family/friend
- If non-pharmaceutical pain management techniques fail to control pain adequately consider the following:
  - Administration of *fentanyl* (see **fentanyl** formulary and **FRG**)
  - *Ketamine* infusion considered for following: (see **ketamine** formulary and **FRG**)
    - Appropriate dose of fentanyl has failed to control pain adequately
    - Contraindication to fentanyl administration
    - Patient with signs/symptoms of shock
    - Alternative for patient who refuses opioids
  - *Tetracaine* for eye trauma/pain (see **tetracaine** formulary and **FRG**)
- Treat nausea/vomiting as indicated, but not prophylactically (see **Nausea/Vomiting** protocol)
- Reassess response to pain interventions and document

Universal Pain Assessment Tools





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Key Considerations:

- Approaches to pain relief must be designed to be safe and effective in the dynamic prehospital environment. The degree of pain and the hemodynamic status of the patient will determine the urgency and extent of analgesic interventions.

Patient/Provider Safety Considerations:

- Administer opioids with caution to patients with GCS less than 15, hypotension, identified medication allergy, hypoxia (oxygen saturation less than 90%) after maximal supplemental oxygen therapy, or signs of hypoventilation
- Use of splinting techniques and application of ice should be done to reduce the total amount of medication used to keep the patient comfortable
- Fentanyl IV has immediate onset, but **peak effect not observed until 10 minutes**. **Use caution and avoid repeat dosing too quickly to avoid stacking doses and causing over-sedation/respiratory depression.**
- Pulse oximetry should be monitored continuously when opioids are administered.
- Naloxone should be readily available to reverse respiratory depression.
- Consider lower dosing for those who are elderly, have chronic co-morbidities, multi-system trauma and/or hemodynamic instability.
- Ketamine should be avoided if active psychosis, active CHF exacerbation, ACS or stroke.
- Ketamine is preferable option for patients who have hemodynamic compromise

PATIENT RESTRAINT

Patient Care Goals:

- Safely restrain violent/agitated patient when necessary
- Ensure EMS provider and patient safety
- Ensure appropriate medical monitoring is in place when restraints are utilized

Patient Presentation:

- This protocol applies to any patient who requires physical restraints due to uncontrollable violence/agitation that poses a safety risk to bystanders, Law Enforcement, EMS providers and/or patient. (for chemical sedation see **Agitated/Violent/Behavioral** protocol, **midazolam** formulary and **FRG**)

Treatment and Interventions:

- Attempt verbal de-escalation and reduce environment stimuli when appropriate PRIOR to using physical restraints.
- Request Law Enforcement assistance
- Ensure sufficient personnel on-scene to safely restrain patient.
- Restrain patient in lateral or supine position initially (never on abdomen or face-down)
- Secure patient with one arm above the head and one arm at/below the waist and both lower extremities individually secured.
- Placement on stretcher in upright position when possible to reduce aspiration risk.
- EKG monitoring as soon as possible especially when pharmacologic management has been administered.
- Continuous monitoring and reassessment.

Key Considerations:

- The following techniques are expressly prohibited:
  - Secure or transport in a prone position with or without hands and feet behind the back
  - “Hobbling” or “Hog-tying”
  - "Sandwiching” patients between backboards
  - Techniques that constrict the neck or compromise the airway
  - Any technique/strapping that restricts patient’s chest or ability to breathe adequately.
  - Improvised physical restraint devices (with exception of the below described use of supplemental straps/sheets).
- Do NOT attempt to enter or control a scene where physical violence or weapons are present.

- Uncontrolled or poorly controlled patient agitation and physical violence can place the patient at risk for sudden cardiopulmonary arrest due to the following etiologies:
    - **Delirium with agitated behavior:** A postmortem diagnosis of exclusion for sudden death thought to result from metabolic acidosis stemming from physical agitation or physical control measures and potentially exacerbated by stimulant drugs (e.g., cocaine) or alcohol withdrawal.
    - **Positional asphyxia**: Sudden death from restriction of chest wall movement and/or obstruction of the airway secondary to restricted head or neck positioning resulting in hypercarbia and/or hypoxia
- For patients with key-locking devices, applied by another agency (ex. Law Enforcement), consider the following options:
    - Remove device and replace it with a device that does not require a key.
    - Administer pharmacologic management medication then remove and replace device with another non-key-locking device after patient has become more cooperative
    - Transport patient accompanied in patient compartment by Law Enforcement who has applied the device and has key.
    - Transport patient to hospital in Law Enforcement vehicle if medical condition of patient is deemed stable, Direct Medical Oversight so authorizes, no chemical restraint was used, and Law Enforcement and EMS providers agree.
- Supplemental straps or sheets may be necessary to prevent flexion/extension of torso, hips, legs by being placed around the lower lumbar region, below the buttocks, and over the thighs, knees, and legs
- Secure extremities directly to stretcher frame.

<u>Patient/Provider Safety Considerations</u>:

- The management of violent patients requires a constant reevaluation of the risk/benefit balance for the patient and bystanders in order to provide the safest care for all involved. These are complex and high-risk encounters. There is no one size fits all solution for addressing these patients.
- Stretchers with adequate foam padding, particularly around the head, facilitate patient's ability to self-position the head and neck to maintain airway patency.
- Stretcher straps should be applied as the standard procedure for all patients during transport.
- Continuous monitoring of:
    - Airway patency
    - Respiratory status with pulse oximetry and/or capnography
    - Circulatory status with frequent blood pressure measurements
    - Mental status and trends in level of patient cooperation
    - Extremity perfusion with capillary refill in patients in physical restraint device

SEIZURES

Aliases:

- Status epilepticus, febrile seizure, convulsions, eclampsia

Patient Care Goals:

- Maintaining airway, ventilation and oxygenation during and after seizure
- Prompt cessation of seizures in the prehospital setting when possible
- Minimizing adverse events in the treatment of seizures in the prehospital setting

Patient Presentation:

- Any patient actively seizing

Treatment and Interventions:

- Manage Airway as indicated (see **Airway/Ventilation Management** protocol)
- Manage respiratory distress as indicated (see **Respiratory Distress** protocols)
- Place pulse oximeter and/or waveform capnography to monitor oxygenation/ventilation
- For patient who is actively seizing:
    - If NO vascular access is present administer *midazolam* (IM) (see **midazolam** formulary and **FRG**)
    - If IV/IO present administer *midazolam* (IV/IO) (see **midazolam** formulary and **FRG**)
    - Repeat dose of *midazolam* every 5 minutes as indicated and repeat doses can be administered IM/IV/IO/IN (see **midazolam** formulary and **FRG)**
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia** protocol)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Initiate EKG monitoring
- Consider obtaining temperature if concern for febrile seizure/sepsis
- For febrile seizures, consider the following interventions after stopping the seizure, since the following interventions provide symptomatic relief for fevers but do not stop the seizure:
    - Removing excessive layers of clothing

Key Considerations:

- IM route is preferred route for initial dose (unless IV/IO already established)
- IM dosing is preferred route for initial dose however IN/IM/IV/IO are all acceptable for repeat dosing.
- IV placement is not always necessary for treatment of seizures but could be obtained if needed for other reasons.
- Consider acquiring a 12-lead EKG following cessation of seizure in patients without a history of seizure to determine possible cardiac cause such as arrhythmia
- The presence of fever with seizure in children less than 6 months old and greater than 6 yo is not consistent with a simple febrile seizure, and should prompt evaluation for meningitis, encephalitis or other cause (ex. non-accidental trauma)

- Many airway/breathing issues in seizing patients can be managed without placement of an advanced airway. Reserve these measures for patients that fail less invasive maneuvers such as: positioning, oxygen application, nasal/oral airways and/or BVM (see **Airway/Ventilation Management** protocol)
- For new onset seizures or seizures that are refractory to treatment, consider other potential causes including, but not limited to, trauma, stroke, electrolyte abnormality, toxic ingestion, pregnancy with eclampsia, hyperthermia

Patient/Provider Safety Considerations:

- More than two doses of benzodiazepines are associated with high risk of airway compromise
- Use caution, weigh risks/benefits of deferring treatment until hospital, and/or consider consultation with direct medical oversight if patient has received two doses of benzodiazepines by bystanders and/or EMS providers.
- Hypoglycemic patients who are treated in the field for seizure should be transported to hospital, regardless of whether or not they return to baseline mental status after treatment

SHOCK

Patient Care Goals:

- Initiate early fluid resuscitation and/or vasopressors to maintain/restore adequate perfusion to vital organs
- Differentiate between possible underlying causes of shock in order to promptly initiate additional therapy

Patient Presentation:

- Signs of poor perfusion (due to a medical cause) such as one or more of the following:
  - Adults: Systolic BP<90mmHg
  - Pediatric: Hypotension for age (see **Table 1. Abnormal Vital Signs**)
  - Altered mental status
  - Delayed/flash capillary refill
  - Hypoxia
  - Decreased urine output
  - Tachycardia
  - Weak, decreased or bounding pulses
  - Cool/mottled or flushed skin
  - Respiratory rate greater than 20 in adults or elevated in children (see vital signs in **FRG)**
- Shock due to suspected Trauma (see **Trauma** protocol)
- Shock due to Anaphylaxis (see **Anaphylaxis** protocol)

Table 1. Abnormal Vital Signs

Age	Heart Rate	Respiratory Rate	Systolic BP	Temp (°C)
0 d – 1 mo	>205	>60	<60	<36 or >38
≥ 1 mo – 3 mo	>205	>60	<70	<36 or >38
≥ 3 mo – 1 yr	>190	>60	<70	<36 or >38.5
≥ 1 yr – 2 yr	>190	>40	<70 + (age in yr x 2)	<36 or >38.5
≥ 2 yr – 4 yr	>140	>40	<70 + (age in yr x 2)	<36 or >38.5
≥ 4 yr – 6 yr	>140	>34	<70 + (age in yr x 2)	<36 or >38.5
≥ 6 yr – 10 yr	>140	>30	<70 + (age in yr x 2)	<36 or >38.5
≥ 10 yr – 13 yr	>100	>30	<90	<36 or >38.5
> 13 yr	>100	>16	<90	<36 or >38.5

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Manage respiratory distress as indicated (see **Respiratory Distress** protocols)
- Place pulse oximeter and/or waveform capnography to monitor oxygenation/ventilation (ETCO2 <25 mmHg may be sign of poor perfusion)
- Initiate EKG monitoring and obtain 12-lead and treat as indicated (see **Dysrhythmias** protocol)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Consider temperature if concern for sepsis
- Administer *crystalloid* as indicated (see ***crystalloid*** formulary and **FRG**)
- Consider the following treatments for shock unresponsive to IV fluids
    - **Cardiogenic, hypovolemic, obstructive, and distributive shock**:
        - Address reversible causes when able
        - Vasopressor titrated to a MAP > 65mmHg or SBP >100mmHg (see **epinephrine**/**norepinephrine** and **FRG**)
        - Pediatrics – consider *epinephrine* (see **epinephrine** formulary and **FRG**)
- Provide advanced notification to hospital
- Expedite transport to appropriate facility

Key Considerations:

- Possible etiologies of shock:
    - Cardiogenic (CHF, ACS, dysrhythmias)
    - Distributive (neurogenic, septic, anaphylactic)
    - Hypovolemic (e.g. poor PO, excessive fluid loss from GI bleed, hyperglycemia, diuresis, vomiting/diarrhea, hemorrhage etc.)
    - Obstructive (e.g. pulmonary embolism, cardiac tamponade, tension pneumothorax).
    - Distributive shock (sepsis)
        - Temperature less than 96.8°F(36°C) or greater than 100.4°F(38°C)
        - Tachycardia
        - Tachypnea
        - Concern for infection
- Norepinephrine is the first-line drug of choice for neurogenic shock
- For anaphylactic shock, (see **Anaphylaxis** protocol)
- Early, aggressive IV fluid administration is essential in the treatment of suspected shock NOT due to trauma.

- Patients predisposed to shock:
    - Immunocompromised (patients undergoing chemotherapy or with a primary or acquired immunodeficiency)
    - Adrenal insufficiency (Addison's disease, congenital adrenal hyperplasia, chronic or recent steroid use)
    - History of a solid organ or bone marrow transplant
    - Infants
    - Elderly
- In most adults, tachycardia is the first sign of compensated shock and may persist for hours. Tachycardia can be a late sign of shock in children and a tachycardic child may be close to cardiovascular collapse
- Hypotension indicates uncompensated shock, which may progress to cardiopulmonary failure within minutes

Patient/Provider Safety Considerations:

- Recognition of cardiogenic shock - if patient condition deteriorates after fluid administration, crackles/worsening respiratory distress/hypoxia, or hepatomegaly develop, then consider withholding further fluid administration and begin vasopressor if indicated.
- Acceptable to withhold IV fluids and begin with vasopressor if cardiogenic shock patient appears to be volume overloaded (edema, crackles, hepatomegaly, JVD etc.)

CARDIOVASCULAR

CHEST PAIN/ACS/STEMI

Patient Care Goals:

- Identify STEMI or Acute AMI quickly
- Early notification of hospital
- Monitor vital signs and cardiac rhythm and be prepared to provide CPR and defibrillation if needed
- Administer appropriate medications
- Minimize scene time (ideal <15 minutes)
- Transport to closest appropriate facility capable of emergent revascularization

Patient Presentation:

- Chest pain or discomfort in other areas of the body (e.g. arm, jaw, and epigastrium) of suspected cardiac origin, shortness of breath, sweating, nausea, vomiting, and dizziness. Atypical or unusual symptoms are more common in women, the elderly and diabetic patients. May also present with CHF, syncope and/or shock

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Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Manage respiratory distress as indicated (see **Respiratory Distress** protocols)
- Initiate EKG monitoring and treat dysrhythmias as indicated (see **Dysrhythmia** protocols)
- Obtain 12-lead EKG
- Administer *aspirin* unless EMS provider can confirm patient already took at least 324mg of *aspirin* within previous 6 hours.(see **aspirin** Formulary and **FRG**)
- Establish vascular access (see **Vascular Access** protocol)
- Obtain bilateral blood pressures.
- Provide analgesia as indicated. (see **fentanyl** formulary **and FRG**)
- Consider administration of *nitroglycerin* (see **nitroglycerin** formulary and **FRG**)
    - **Nitroglycerin is contraindicated** if sildenafil (Viagra®, Revatio®), vardenafil (Levitra®, Staxyn®), tadalafil (Cialis®, Adcirca®) or other erectile dysfunction or pulmonary hypertension agent has been used within 48 hours. Also avoid use in patients receiving intravenous epoprostenol (Flolan®) or treporstenil (Remodulin®) for treatment of pulmonary hypertension.
    - Use caution if Inferior Wall STEMI/ACUTE MI and/or Right Ventricular Infarct concern.
- Treat shock as indicated (See **Shock** protocol)

Pediatric Management:

- Pediatric patients with chest pain should receive 12-lead EKG, but do NOT administer aspirin or nitroglycerin routinely.
- ☎Direct Medical Oversight should be contacted for decision-making regarding treatment of pediatric chest pain.

Key Considerations:

- **Use the Adult STEMI/ACUTE MI Checklist**(see Checklist)
- The 12-lead EKG is the primary diagnostic tool that identifies a STEMI/ACUTE MI and it is imperative that EMS providers routinely acquire a 12-lead EKG within 10 minutes of patient contact for all patients exhibiting signs and symptoms of ACS unless doing so might cause significant delay in emergent intervention (ex. cardioversion, pacing, airway or perfusion issues etc.).
- When the monitor EKG interpretive program reads "STEMI" or "ACUTE MI" or the EMS provider identifies a STEMI, contact the appropriate receiving facility to declare a "STEMI Alert" as soon as possible. Begin the radio communication with the following three things:
  - **"STEMI Alert"** notification
  - Estimated time of arrival
  - Age and gender of the patient
- Obtain and interpret 12-lead PRIOR to any nitroglycerin administration (if given at all)
- Care should always be taken when giving nitroglycerin when the patient's blood pressure is marginal. If used in this setting, the clinician should weigh the risk and benefit of nitrate administration over the administration of an opiate analgesic and be ready to respond to hypotension with fluid bolus or pressor
- Obtain serial 12-lead EKGs (minimum of two)
- Gather pertinent history to include:
  - **Complete medication list** (it is important for treating physician to be informed if patient is taking beta-blockers, calcium channel blockers, clonidine, digoxin, anticoagulants, and medications treating erectile dysfunction/pulmonary hypertension).
- Acute Coronary Syndrome may present with atypical pain, vague or only generalized complaints. Keep a high-index of suspicion especially in females, elderly and diabetics.
- **Do NOT routinely apply supplemental oxygen unless patient's oxygen saturation is <94% or patient has severe respiratory distress, or there is concern for potential loss of airway where pre-oxygenation for more invasive airway management may be considered**.

DYSRHYTHMIAS (BRADYCARDIA)

Patient Care Goals:

- Identify life-threatening bradycardias
- Maintain adequate oxygenation, ventilation and perfusion
- Treat underlying causes

Patient Presentation:

- Heart rate less than 60 beats per minute with either symptoms (altered mental status, chest pain, CHF, seizure, syncope, diaphoresis etc.) or evidence of hemodynamic instability
- The major EKG rhythms classified as bradycardia include:
  - Sinus bradycardia
  - Second-degree AV block: Type I (Wenckebach/Mobitz I)
  - Second-degree AV block: Type II (Mobitz II)
  - Third-degree AV block/Complete heart block
  - Junctional rhythms
  - Ventricular escape rhythms

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Manage respiratory distress as indicated (see **Respiratory Distress** protocols)
- Initiate EKG monitoring
- Obtain 12-lead EKG (12-lead may be delayed for life-threatening interventions)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Obtain blood glucose and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Search for and correct reversible causes as indicated.
- Consider the following additional therapies if bradycardia and symptoms of hemodynamic instability are present:
  - *Atropine* (see **atropine** formulary and **FRG**)
  - *Transcutaneous Pacing* – If pacing is performed, consider sedation and/or pain control (see **midazolam**/**fentanyl** formulary and FRG)
  - *Epinephrine* for hypotension titrated to a MAP >65mmHg or SBP >100mmHg (see **Epinephrine** formulary and **FRG**)

Pediatric Management:

- Initiate chest compressions for heart less than 60 and signs of poor perfusion (altered mental status, hypoxia, hypotension, weak pulse, delayed capillary refill, cyanosis etc.) despite oxygenation/ventilation.
- Manage airway and assist ventilations as necessary with minimally interrupted chest compressions using a compression to ventilation ratio 15:2 (30:2 if single provider is present)
- Administer oxygen as appropriate with a target of achieving 94-98% saturation (see **Respiratory Distress** protocol)
- Initiate monitoring and obtain 12-lead EKG

- Establish vascular access as indicated (see **Vascular Access** protocol)
- Check blood glucose and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Consider the following additional therapies if bradycardia and signs/symptoms of hemodynamic instability are present:
    - *Epinephrine* (see **epinephrine** formulary and **FRG**)
    - *Atropine* (if increased vagal tone or cholinergic drug toxicity) (see **Atropine** formulary and FRG)
    - *Transcutaneous pacing* –If pacing is performed, consider sedation and/or pain control. (see **midazolam**/**fentanyl** formulary and **FRG)**

Key Considerations:

- If concern about decompensation consider early placement of electrical therapy pad for possible pacing
- Always treat the patient and NOT the monitor. The heart rhythm should be interpreted in context of the signs/symptoms of the patient and interventions should ONLY be undertaken when patient is symptomatic and/or has signs of poor perfusion.
- Hyperkalemia should be considered high on the differential diagnosis with very wide, bizarre appearance of QRS complex with/without bradycardia (history of dialysis/end-stage renal disease should heighten suspicion as well).
- Hypoxia is common cause of bradycardia in pediatric patients (but can also be cause in adults).
- Patients who have undergone cardiac transplant will NOT respond to atropine.
- Consider medication overdoses (ex. beta-blockers, calcium channel blockers, sodium channel blockers/TCAs, digoxin and clonidine) and refer to **Toxins and Environmental** protocol)
- Decision to perform TCP requires clinical judgement by EMS provider on risk/benefit.
- It is acceptable to provide TCP first if delay in vascular access if poor perfusion (this requires clinical judgement)
- It is also acceptable to trial dose of atropine if vascular access available prior to TCP (this requires clinical judgement).
- Consider TCP earlier and prepare for TCP in patients with high-degree AV blocks (ex. 2nd degree Mobitz II or 3rd Degree/Complete heart blocks).
- Utilization of sedation/pain control during TCP is a complex decision requiring clinical judgement and Direct Medical Oversight should be sought when indicated.
- For pediatric patients: Bradycardia with adequate pulses, perfusion, and respiratory effort requires no emergency intervention.
- Epinephrine is the drug of choice for symptomatic PEDIATRIC bradycardia

DYSRHYTHMIAS (TACHYCARDIA)

Patient Care Goals:

- Maintain adequate oxygenation, ventilation, and perfusion
- Attempt to restore sinus rhythm when unstable.
- Consider non-cardiac etiologies causing compensatory tachycardia

Patient Presentation:

- Patients will present with elevated heart rate for age and may or may not also present with associated symptoms such as palpitations, dyspnea, chest pain, syncope/near-syncope, hemodynamic compromise, altered mental status, or other signs of poor perfusion.

- The major EKG rhythms classified as tachycardias:
  - Supraventricular tachycardia (SVT)
  - Multifocal atrial tachycardia (MAT)
  - Ventricular tachycardia (VT)
  - Torsades de pointes (polymorphic VT)
  - Atrial fibrillation (A-fib)/A-flutter)

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Manage respiratory distress as indicated (see **Respiratory Distress** protocols)
- Initiate EKG monitoring
- Obtain 12-lead EKG (12-lead may be delayed for life-threatening interventions)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Obtain blood glucose and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Consider and treat reversible causes of tachycardia as indicated
- Consider the following therapies if tachycardia and signs/symptoms of hemodynamic instability are present:
  - **Regular Narrow Complex Tachycardia –** (SVT)
    - Stable Regular Narrow Complex Tachycardia (SVT)
      - Perform vagal maneuvers (modified Valsalva for adults and pediatric patients old enough to follow instructions)
      - Consider *Adenosine* (see adenosine formulary and FRG) if vagal maneuvers unsuccessful
    - Unstable Regular Narrow Complex Tachycardia (SVT)
      - Consider vagal maneuvers (modified Valsalva for adults and pediatric patients old enough to follow instructions) AND/OR
      - *Adenosine* (see adenosine formulary and FRG) AND/OR
      - Synchronized cardioversion
        - If performed, consider sedation or pain control (see **midazolam**/**fentanyl** formulary and FRG, see FRG for energy settings.)

- **Irregular Narrow Complex Tachycardia** (A-fib/flutter, MAT)
  - Monitor for signs of hemodynamic instability
  - Synchronized cardioversion (only if unstable) –If performed, consider sedation and/or pain control. (see **midazolam**/**fentanyl** formulary and **FRG**, see **FRG** for energy settings)
- **Regular Wide-complex Tachycardia** - (e.g. sustained ventricular tachycardia)
  - Monitor for signs of hemodynamic instability
  - *Lidocaine (*see **lidocaine** formulary and **FRG**)
  - Synchronized cardioversion (only if unstable) –If performed, consider sedation and/or pain control. (see **midazolam**/**fentanyl** formulary and **FRG**, see **FRG** for energy settings)
- **Irregular Wide Complex Tachycardia**
  - Monitor for signs of instability
  - Synchronized cardioversion (only if unstable) –If performed, consider sedation and/or pain control. (see **midazolam**/**fentanyl** formulary and **FRG**, see **FRG** for energy settings)
- **Torsades de Pointes**
  - Defibrillation (see **FRG** for energy settings)

Key Considerations:

- If concern about decompensation consider early placement of electrical therapy pads.
- Atrial fibrillation/flutter rarely requires cardioversion in the field.
- A wide-complex irregular rhythm should be considered pre-excited atrial fibrillation; extreme care must be taken in these patients
  - Characteristic EKG findings include a short PR interval and, in some cases, a delta wave.
  - Avoid AV nodal blocking agents such as adenosine in patients with pre-excitation atrial fibrillation (e.g. Wolff Parkinson-White Syndrome, Lown-Ganong-Levine Syndrome) because these drugs may cause a paradoxical increase in the ventricular response.
  - Blocking the AV node in some of these patients may lead to impulses that are transmitted exclusively down the accessory pathway, which can result in ventricular fibrillation
- Supraventricular Tachycardia
  - Ice to face of infants for 15-20 seconds (or as long as can tolerate is effective vagal maneuver that can be considered)
  - Studies in infants and children have demonstrated the effectiveness of adenosine for the treatment of hemodynamically stable or unstable SVT
  - Adenosine should be considered the preferred medication for stable SVT if vagal maneuvers are unsuccessful or are unable to be performed

Patient/Provider Safety Considerations:

- Only use one antidysrhythmic at a time
- With irregular wide complex tachycardia (atrial fibrillation with aberrancy such as Wolff Parkinson-White and Lown-Ganong Levine), avoid use of AV nodal blocking agents (e.g. adenosine)

SUSPECTED STROKE/TRANSIENT ISCHEMIC ATTACK

Aliases:

- Cerebrovascular accident (CVA), TIA

Patient Care Goals:

- Detect neurological deficits through appropriate screening
- Establish time last known well as accurately as possible
- Transport to the appropriate stroke facility
- Minimize scene time (ideal <15 minutes)
- Rule out hypoglycemia as possible mimic

Patient Presentation:

- Adult or pediatric patient with any of the following:
  - Neurologic deficit such as facial droop, localized weakness, gait disturbance, slurred speech, unilateral sensory deficits, altered mentation, sudden onset of dizziness/vertigo
  - Hemiparesis, hemiplegia
  - Dysconjugate gaze, forced or crossed gaze
  - Severe headache, neck pain/stiffness, sudden onset of visual disturbances
- This protocol does **NOT** apply to patients who are found to be hypoglycemic OR who have head trauma

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Manage respiratory distress as indicated (see **Respiratory Distress** protocols)
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Perform Prehospital Cincinnati Stroke Scale (see **CVA checklist**) ADULT and PEDIATRIC
  - If Cincinnati Stroke Scale is POSITIVE:
    - Assess for LVO (Large Vessel Occlusion) by performing FAST-ED LVO Screen (see checklist) ADULTS ONLY
      - If FAST-ED LVO screens POSITIVE use Stroke Routing Checklist to determine appropriate receiving facility (See CVA checklist)
- Initiate EKG monitoring and obtain 12-lead EKG
- Establish vascular access as indicated (see **Vascular access** protocol)
- Treat seizures as indicated (see **Seizure** protocol)
- Treat nausea/vomiting as indicated (see **Nausea/Vomiting** protocol)
- Treat shock as indicated (see **Shock** protocol)
- Elevate patient head of bed when appropriate and as patient condition permits
- Notify hospital and advise “Code Stroke” as soon as possible

Key Considerations:

- Pediatrics:
  - Treatment principles remain the same
  - LVO Stroke Scales are not validated for pediatric patients, therefore pediatric patients do NOT need LVO screen performed.
  - All pediatric stroke patients should be transported to CMH-Main
- Last known well time must be as specific as possible. If the patient was last seen normal prior to bedtime or a nap, this is the time to be documented (NOT the time the patient woke up with symptoms present)
- Stroke mimics may include the following:
  - Hypoglycemia
  - Seizure (post-ictal)
  - Sepsis
  - Complex Migraine
  - Intoxication
- Obtain key history to include:
  - Time last known well
  - Recent head injury
  - Recent surgery
  - Any anti-coagulation or anti-platelet medications
  - Pregnancy status
  - Family contact number

Patient /Provider Safety Considerations:

- Prevent aspiration – elevate head of stretcher 15-30 degrees if systolic BP greater than 100 mm Hg and have suction prepared and available.
- Do **NOT** routinely administer supplemental oxygen unless pulse oximetry less than <94% or if impending respiratory failure/invasive airway management suspected.
- DO NOT LOWER BLOOD PRESSURE

SYNCOPE AND PRESYNCOPE

Patient Care Goals:

- Stabilize and resuscitate as necessary
- Initiate monitoring and diagnostic procedures to evaluate possible causes of syncope
- Identify high-risk patients

Treatment and Interventions:

- Establish vascular access as indicated (see **Vascular Access** protocol)
- Administer *crystalloid* as indicated (see **crystalloid** formulary and **FRG**)
- Initiate EKG monitoring and treat dysrhythmias as indicated (see **Dysrhythmia** protocol)
- Obtain 12-lead EKG
- Obtain blood glucose and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Treat shock as indicated (see **Shock** protocol)

Key Considerations:

- Treatment and management should be directed at abnormalities discovered in the physical exam and may include management of cardiac dysrhythmias, ACS, hemorrhage, and shock etc.
- Syncope is both loss of consciousness and loss of postural tone. It typically resolves quickly after becoming supine. Presyncope are the symptoms associated with sensation/signs of “almost passing out” or “nearly fainting” and the symptoms can be more prolonged.
- The symptoms preceding the event are important in determining etiology.
- Syncope often is due to a benign process but can be an indication of serious underlying disease in both the adult and pediatric patient.
- **Often patients with syncope are found normal on EMS evaluation, but this should not reassure the EMS provider of a benign cause and still warrants thorough evaluation**.
- In general patients experiencing syncope require cardiac monitoring and emergency department evaluation. **Transport should be encouraged and recommended**.
- High-risk patients include the following: Age ≥ 60, Syncope with exertion, History of CHF, Syncope with chest pain, Abnormal EKG, Syncope with dyspnea, patients with significant co-morbidities.
- Always consider dysrhythmias, GI bleed, ectopic pregnancy, and seizure as possible causes or mimics of syncope.
- Patients who experience syncope associated with headache, neck pain, chest pain, abdominal pain, back pain, dyspnea, or dyspnea on exertion are ominous.

- Syncope during exercise or accompanied by palpitations is ominous.
- Orthostatic vital signs are neither sensitive nor specific in evaluation of syncope and should not guide decision-making in general.
- Syncope in seated/supine position is concerning and atypical.
- Syncope without any prodrome/warning may indicate arrhythmia as cause.
- Geriatric patients suffering falls from standing may sustain significant injury and should be diligently screened for trauma (see **Trauma** protocol)

VENTRICULAR ASSIST DEVICES

Aliases:

- Ventricular assist device (VAD), left ventricular assist device (LVAD), right ventricular assist device (RVAD), biventricular assist device (BiVAD)

Patient Care Goals:

- Rapid identification of, and interventions for VAD-related malfunctions or complications resulting in cardiovascular compromise.

Patient Presentation:

- Adult patients that have had an implantable ventricular assist device (VAD), including a left ventricular assist device (LVAD), right ventricular assist device (RVAD), or biventricular-assist device (BiVAD), and have symptoms of cardiovascular compromise
- Patients with VADs that are in cardiac arrest

Treatment and Interventions: (see **EMS VAD Troubleshooting Guide**)

- Assess for signs of hypoperfusion including pallor, diaphoresis, and altered mental status.
- Assess the VAD:
  - Assess for alarms
  - Auscultate for pump sound “hum/whirring”
  - Utilize available resources to troubleshoot potential VAD malfunctions and to determine appropriate corrective actions to restore normal VAD function (see VAD EMS Troubleshooting guide)
  - Contact the patient’s VAD-trained companion, if available.
  - Contact the patient’s VAD coordinator, using the phone number on the device.
  - Check all the connections to system controller.
  - Change VAD batteries if indicated.
- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Manage respiratory distress as indicated (see **Respiratory Distress** protocols)
- Initiate EKG monitoring and obtain 12-lead EKG (12-lead may be delayed for life-threatening interventions)
- Treat dysrhythmias as indicated (see **Dysrhythmia** protocol)
- Establish vascular access as indicated (see **Vascular Access** Protocol)
- Administer *crystalloid* as indicated (see **crystalloid** formulary and **FRG**)
- Treat shock as indicated (see **Shock** protocol)
- Obtain blood glucose and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Search for and correct reversible causes as indicated

Key considerations:

- If patient is experiencing VAD-related complications or cardiovascular problems, expedite transport to the medical facility where VAD was placed if patient's clinical condition and time allows
- If patient has a functioning VAD and is experiencing a non-cardiovascular-related problem, transport to a facility that is appropriate for the patient's main presenting problem without manipulating the device
- If patient is in cardiac arrest:
    - CPR should not be performed if there is evidence the pump is still functioning, the decision whether to perform CPR should be made based upon best clinical judgment in consultation with the patient's VAD-trained companion and the VAD coordinator (or Direct Medical Oversight if VAD coordinator unavailable)
    - CPR may be initiated if:
        - You have confirmed the pump has stopped and troubleshooting efforts to restart it have failed, and
        - The patient is unresponsive and has no detectable signs of life.
- You do not need to disconnect the controller or batteries in order to:
    - Defibrillate/synchronized cardioversion
    - Acquire a 12-lead EKG
- Automatic non-invasive cuff blood pressures may be difficult to obtain due to the narrow pulse pressure created by the continuous flow pump
- Flow through many VAD devices is not pulsatile and patients may not have a palpable pulse or accurate pulse oximetry
- Although automatic non-invasive blood pressure cuffs are often ineffective in measuring systolic and diastolic pressure, if they do obtain a measurement, the MAP is usually accurate.
- Ventricular fibrillation, ventricular tachycardia, or asystole/PEA may be the patient's "normal" underlying rhythm. Evaluate clinical condition and provide care in consultation with VAD coordinator and/or Direct Medical Oversight.
- The patient's travel bag should accompany them at all times with back-up controller and spare batteries
- If feasible, bring the patient's power module, cable, and display module to the hospital
- The most common cause for VAD alarms is low battery and power failure.

RESPIRATORY DISTRESS

AIRWAY/VENTILATION MANAGEMENT

Patient Care Goals:

- Provide effective oxygenation and ventilation
- Recognize and alleviate respiratory distress
- Provide necessary interventions quickly and safely to patients with the need for respiratory support
- Identify a potentially difficulty airway in a timely fashion

Patient Presentation:

- Children and adults with signs of respiratory distress/respiratory failure
- Patients with evidence of hypoxemia or hypoventilation
- This does NOT apply to Neonate/Newborn patients (see **Neonatal Resuscitation** protocol)

Treatment and Interventions:

- Model treatment progression for airway management generally includes **a least to most invasive** approach:
- Acceptable non-invasive airway management/ventilation techniques may include:
  - Optimal body positioning
  - Manual maneuvers (e.g. head-tilt/chin lift, jaw thrust) and suctioning as indicated
  - Application of oxygen
  - Oral/Nasal airway insertion
  - CPAP
  - 2-Person BVM
- Examples of invasive airway interventions may include:
  - Supraglottic airway (SGA) insertion
  - Oral endotracheal intubation
  - Direct laryngoscopy with Magill's forceps for airway obstruction
  - Surgical cricothyrotomy (ADULTS only)
- Continuous monitoring of pulse oximetry, ETCO2 and EKG is required for any patient in respiratory distress and/or who has advanced airway placed.
- Ventilation rates provided to apneic patient (in general):
  - Adult: 10-12 breaths/min (guided by ETCO2 readings)
  - Child: 20 breaths/min (guided by ETCO2 readings)
  - Infant: 30 breaths/minute (guided by ETCO2 readings)
  - Neonate/Newborn: (see **Neonatal Resuscitation** protocol)
- ETCO2 values should stay between 35-45 mmHg (ideally 40 mmHg)
  - For signs/symptoms of herniation (head injury with unilateral blown pupil and/or posturing) consider modest hyperventilation (ETCO2 30-35 mmHg)
- Consider sedation/analgesia with *midazolam* and/or *fentanyl* for agitation and compliance with invasive airway management (CPAP tolerance, supraglottic, ET tube maintenance) (see **midazolam**/**fentanyl** formulary and **FRG**)

- **Required confirmation techniques for advanced airways (SGA, ET tube, Surgical Cricothyrotomy)**
    - Continuous ETCO2 waveform capnography (Colorimetric device acceptable for initial SGA confirmation in BLS agency prior to ALS arrival)
    - Bilateral breath sounds present with chest rise
    - Absent gastric sounds
    - There is NO role for “misting or condensation in the tube” as a method of confirmation as misplaced airways often have “condensation” despite being in the wrong position.
    - When position of advanced airway is in doubt, immediately begin troubleshooting, and ensure ETCO2 waveform capnography confirms placement.
    - **If you are unable to confirm airway with ETCO2 waveform capnography after brief troubleshooting you MUST PULL the advanced airway and continue troubleshooting to include: re-attempting airway, inserting different airway device, repositioning patient, correcting equipment malfunctions etc.**
- **Foreign Body Airway Obstruction (FBAO)**:
    - If patient is conscious and able to cough encourage continued coughing.
    - If patient is conscious and unable to cough effectively and is unable to clear obstruction move to BLS procedures (abdominal thrusts for adults/children, back-blows and chest thrusts for infants) until cleared or becomes unconscious.
    - If unconscious/cardiac arrest and concern for FBAO paramedics should move to Direct Laryngoscopy with Magill’s forceps.
    - If unable to visualize or retrieve foreign body using Direct Laryngoscopy and Magill’s forceps in an Adult patient the paramedic should move to consider surgical cricothyrotomy.
    - If foreign body is confirmed below the vocal cords can consider placing an endotracheal tube in an attempt to bypass foreign body and/or push the foreign body down further into the right or left mainstem bronchus. Rapid extrication and transport to the closest hospital is indicated
    - If unable to visualize or retrieve foreign body using Direct Laryngoscopy and Magill’s forceps in a Pediatric patient the paramedic should attempt to place an endotracheal tube in an attempt to bypass foreign body and/or push the foreign body down further into the right or left mainstem bronchus. If this fails, continue BLS airway maneuvers to include BVM and rapid extrication and transport to the closest hospital is indicated.

Key Considerations:

- Two-person, two-thumbs-up (thenar eminence) BVM ventilation is more effective than one-person technique and should be used when additional providers are available
- Oropharyngeal airways (OPA) and nasopharyngeal airways (NPA) - Consider the addition of an OPA and/or NPA to make BVM ventilation more effective, especially in patients with altered mental status

- Consider the use of a SGA if BVM is not effective in maintaining oxygenation and/or ventilation. This is especially important in children since endotracheal intubation is an infrequently performed skill in this age group and has not been shown to improve outcomes
- During CPR ideally ventilation should occur during the upstroke of a compression between two chest compressions
- Pre-oxygenation, apneic oxygenation (high-flow oxygen by nasal cannula at 10-15 lpm) may prolong the period before hypoxia occurs during an intubation attempt and may be considered
- Appropriate attention should be paid to adequate pre-oxygenation to avoid peri-intubation hypoxia and subsequent cardiac arrest
- Prompt suctioning of soiled airways before SGA/intubation attempt may improve first pass success
- Do not routinely apply oxygen unless indicated.
- Patients who appear to be "hyperventilating" should have investigation into cause and presume serious underlying pathology is present. Consider DKA, sepsis, PE, pneumothorax, shock or other causes and coach to slow down breathing. Do NOT have them rebreathe into bag.
- Quantitative waveform capnography is indicated for:
    - Assessment and monitoring of ventilatory status in patients with significant respiratory distress, with or without airway adjuncts.
    - To assist in decision-making for patients with respiratory difficulty of unclear cause (e.g., bronchospasm vs. pulmonary edema) and to help direct therapy
    - To evaluate acid-base status in critically ill patients
    - Is not indicated for every patient with shortness of breath. Rather, it is a monitoring and decision-making tool for patients with significant respiratory distress where interpretation of the capnography waveform and ETCO2 values assist in determining the appropriate course of treatment for the patient as well as the patient's response

Patient/Provider Safety Considerations:

- Protect cervical spine when indicated
- Signs of a difficult airway may include any of the following:
    - Inability for lower incisors to bite upper lip, short jaw or limited jaw thrust, small thyromental space, upper airway obstruction, large tongue, obesity, large tonsils, large neck, craniofacial abnormalities/trauma, excessive facial hair, history of obstructive sleep apnea, infants/newborns, blood/vomitus in airway and performing intervention on the ground)
- Correct reversible causes such as opioid overdose/hypoglycemia to avoid more invasive airway maneuvers when indicated.
- Direct laryngoscopy with Magill's forceps should be considered early if history of choking immediately prior to event or foreign body airway obstruction is a concern and patient is unresponsive.
- Early endotracheal intubation can be considered in cases of airway burns and/or anaphylaxis if EMS provider judgement deems necessary (it is NOT a mandate and less invasive methods including SGA are still acceptable)

- Consideration for cricothyrotomy (ADULTS only) should only occur in patients unable to be oxygenated/ventilated by less invasive methods AND if the risk of death outweighs the risk of procedural complication.
- Avoid excessive pressure or volume when ventilating using BVM. Only ventilate to observe minimal chest rise.
- **Only squeeze BVM with one hand to avoid over-ventilation**
- Avoid endotracheal intubation and attempts at intubation unless other less invasive methods have failed since intubation is associated with aspiration, oral trauma, esophageal intubation, right mainstem intubation, and worse outcomes in the EMS environment, especially in children.
- Continuous monitoring of airway with ETCO2 is required for any advanced airway.
- Secure advanced airway using commercial device or tape.
- Ventilation rates should be guided by ETCO2 and may vary depending on underlying pathology.
- EMS providers are more likely to be unsuccessful when intubating children in cardiac arrest and complications such as malposition of the ET tube or aspiration can be nearly three times as common in children as compared to adults
- Contraindications to CPAP: (all require clinical judgement)
    - Altered level of consciousness
    - Unable to protect/maintain airway
    - Concern for aspiration (e.g. Secretions, vomiting)
    - Pneumothorax
    - Facial/head trauma
    - Shock
    - Recent GI and/or oral/tracheal/neck/facial surgery
- BVM: Appropriately-sized masks should completely cover the nose and mouth and maintain an effective seal around the cheeks and chin
- Midazolam and/or fentanyl are NOT intended to be used to sedate a patient in order to facilitate the placement of a supraglottic or endotracheal tube. The JOCO EMS System does NOT perform sedation-facilitated intubation as midazolam and/or fentanyl are not ideal induction agents and the safety of this practice is in question.
- Versed and/or fentanyl may be used to assist with patient comfort and compliance with an already placed advanced airway and with compliance with CPAP.
- Patients with personal home-use ventilators (ex. Trilogy) who are chronically on mechanical ventilation and are resting comfortably with their home ventilator may be transported using their home ventilator. This does not apply to the following situations:
    - Cardiac arrest
    - Severe respiratory distress
    - EMS clinician uncomfortable with device and unable to troubleshoot appropriately

BRONCHOSPASM (ASTHMA AND OBSTRUCTIVE LUNG DISEASE)

Aliases:

- Asthma, respiratory distress, wheezing, respiratory failure, bronchospasm, chronic obstructive lung disease, COPD

Patient Care Goals:

- Alleviate respiratory distress due to bronchospasm
- Maintain adequate oxygenation/ventilation
- Promptly identify and intervene for patients who require escalation of therapy
- Deliver appropriate therapy by differentiating other causes of respiratory distress

Patient Presentation:

- Respiratory distress with wheezing or decreased air entry in patients, presumed to be due to bronchospasm from reactive airway disease, asthma, or chronic obstructive lung disease, pneumonia, acute bronchitis etc.
- Symptoms/signs may include:
  - Wheezing – may have inspiratory and/or expiratory wheezing unless they are unable to move adequate air to generate wheezes
  - May have signs of respiratory infection (e.g. fever, nasal congestion, cough, sore throat)
  - May have acute onset after inhaling irritant
- This does not apply to respiratory distress caused by other etiologies such as:
  - Bronchiolitis (wheezing/crackles less than 2 y/o)
  - Croup
  - Epiglottitis
  - Foreign body aspiration
  - Submersion/drowning
  - Congestive heart failure
  - Trauma

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation management** protocol)
- Administer oxygen as appropriate
- Escalate from a nasal cannula to a non-rebreather mask as needed, in order to maintain adequate oxygenation
- Suction the nose and/or mouth (via bulb, rigid suction catheter, suction catheter) if excessive secretions are present as indicated
- Monitoring:
  - Pulse oximetry and end-tidal CO2 (ETCO2) should be routinely used for any patient with respiratory distress
  - Initiate EKG monitoring as indicated
  - Obtain 12-lead as indicated

- Inhaled Medications to be administered for patients in respiratory distress with signs of bronchospasm:
  - *Albuterol* (see **albuterol** formulary and **FRG**) and should be repeated with unlimited frequency for ongoing distress
  - *Ipratropium (*see **ipratropium** formulary and **FRG**) should be administered with *albuterol* when available
- Administer *Epinephrine* IM (see **epinephrine** formulary and **FRG**) should be administered for impending respiratory failure as adjunctive therapy when there are no clinical signs of improvement with inhaled medications or for any patient with clinical concerns for deterioration due to bronchospasm.
- When no clinical signs of improvement of oxygenation and/or respiratory distress with non-invasive airway adjuncts proceed to:
  - Non-invasive positive pressure ventilation via continuous positive airway pressure (CPAP)
  - Bag-valve-mask ventilation should be utilized in children with respiratory failure
  - Supraglottic devices and intubation – should be utilized only if bag-valve-mask ventilation fails - the airway should be managed in the least invasive way possible
- Consider *midazolam* to facilitate compliance with advanced airway management (see **midazolam** formulary and **FRG**)
- Needle decompression can be considered in any patient with severe respiratory distress when concern for tension pneumothorax is high.
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Treat shock as indicated (see **Shock** protocol)

Key Considerations:

- Normoxia is the goal in general. Oxygen should never be applied indiscriminately without good reason.
- COPD patients not in respiratory distress should be given oxygen to maintain adequate oxygen saturation above 90%
- In the asthmatic patient, pharmacologic intervention should take priority over CPAP
- When CPAP/BVM/Supraglottic/Intubation is needed inhaled medications should be given as well.
- In the setting of severe bronchoconstriction, wheezing might not be heard. Patients with known asthma who complain of chest pain or shortness of breath should be empirically treated, even if wheezing is absent.

Patient/Provider Safety Considerations:

- Giving positive pressure in the setting of bronchoconstriction, either via a BVM, supraglottic airway or intubation, increases the risk of air trapping which can lead to pneumothorax and cardiovascular collapse. These interventions should be reserved for situations of respiratory failure.
- When providing positive pressure ventilation in setting of severe bronchoconstriction ensure adequate time for exhalation between breaths to minimize risk of barotrauma and breath stacking.

- CPAP should only be applied if patient's mental status can tolerate it and patient has enough respiratory drive to benefit.
    - Contraindications to CPAP: (all require clinical judgement)
        - Altered level of consciousness
        - Unable to protect/maintain airway
        - Concern for aspiration (e.g. Secretions, vomiting)
        - Pneumothorax
        - Facial/head trauma
        - Shock
        - Recent GI and/or oral/tracheal/neck/facial surgery
- Nebulizer droplets can carry infectious particles, so additional PPE should be considered, including placement of a surgical mask over the nebulizer to limit droplet spread and/or mask on EMS providers in close contact with patient.

PULMONARY EDEMA

Aliases:

- Congestive heart failure, respiratory distress, respiratory failure, acute respiratory distress syndrome

Patient Care Goals:

- Decrease respiratory distress and work of breathing
- Maintaining adequate oxygenation, ventilation and perfusion
- Identify patient who may benefit from CPAP and/or nitrates

Patient Presentation:

- Respiratory distress with presence of crackles/rales (cardiac wheezing may be heard in some patients in appropriate clinical context)
- Clinical impression consistent with congestive heart failure/pulmonary edema
- This does not apply to patients with the following:
  - Clinical impression of infection (e.g. fever, pneumonia concerns)
  - Respiratory distress consistent with asthma/COPD exacerbation

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation management** protocol)
- Administer oxygen as appropriate
- Initiate EKG monitoring and perform 12-lead EKG
- Pulse oximetry and end-tidal CO2 (ETCO2) should be routinely used for any patient with respiratory distress
- Establish IV access as indicated (see **Vascular Access** protocol)
- Consider the following therapies as indicated:
  - *Nitroglycerin* (see **nitroglycerin** formulary and **FRG**)
  - CPAP if mental status and respiratory drive are adequate
  - *Albuterol/ipratropium* if wheezing (see **albuterol**/**ipratropium** formulary and **FRG**)
  - Consider advanced airway for severe distress or if not improving with less invasive support (see **Airway/Ventilation Management** and **FRG)**
  - Consider *midazolam* to facilitate compliance with CPAP (see **midazolam** formulary and **FRG**)

Key considerations:

- Contraindications to CPAP: (all require clinical judgement)
  - Altered level of consciousness
  - Unable to protect/maintain airway
  - Concern for aspiration (e.g. Secretions, vomiting)
  - Pneumothorax
  - Facial/head trauma
  - Shock
  - Recent GI and/or oral/tracheal/neck/facial surgery

- Benefits of CPAP:
    - Increased oxygenation and perfusion by reducing work of breathing
    - Maintaining inflation and recruitment of atelectasis alveoli
    - Improving pulmonary compliance
    - Decreasing work of breathing, HR and SBP
    - Improves delivery of inhaled medications
    - Reduces preload, and afterload therefore improving cardiac output
- Complications of CPAP:
    - Anxiety
    - Risk of hypotension and pneumothorax due to increased intrathoracic pressure and subsequent decrease in venous return
    - Potential barotrauma resulting in pneumothorax and/or pneumomediastinum
- Nitrates provide both subjective and objective improvement, and might decrease intubation rates.
- Nitrates can reduce both preload and afterload and potentially increase cardiac output. Because many CHF patients present with very elevated arterial and venous pressure, frequent doses of nitrates may be required to control blood pressure and afterload.
- Some patients are very sensitive to even normal doses and may experience marked hypotension. It is therefore critical to monitor blood pressure and EKG during nitrate therapy.
- Most hypotension with nitrates is short-lived as half-life of nitrates is very short and resolves with placing patient supine +/- IV fluid challenge.
- Consider other cause of CHF/pulmonary edema to include:
    - ACS
    - Dysrhythmias (tachy and brady)
    - Medications
    - Renal failure
    - Toxic gas inhalation
    - Major injury/myocardial contusion
    - Pericardial tamponade
    - Sepsis

Patient/Provider Safety Considerations:

- The use of nitrates should be avoided in any patient who has used a phosphodiesterase inhibitor within the past 48 hours. Examples are: sildenafil (Viagra®, Revatio®), vardenafil (Levitra®, Staxyn®), tadalafil (Cialis®, Adcirca®) which are used for erectile dysfunction and pulmonary hypertension. Also avoid use in patients receiving intravenous epoprostenol (Flolan®) or treporstenil (Remodulin®) which is used for pulmonary hypertension.
- Administer nitrates with caution, if at all, to patients with an inferior STEMI/ACUTE MI or suspected STEMI/ACUTE MI with right ventricular involvement because these patients require adequate RV preload.

PEDIATRIC SPECIFIC GUIDELINES

PEDIATRIC RESPIRATORY DISTRESS (BRONCHIOLITIS)

Patient Care Goals:

- Alleviate respiratory distress
- Maintain adequate oxygenation/ventilation
- Promptly identify respiratory distress, failure, and/or arrest, and intervene for patients who require escalation of therapy
- Deliver appropriate therapy by differentiating other causes of pediatric respiratory distress

Patient Presentation:

- Child less than 2 y/o typically with diffuse rhonchi/crackles/wheezing or an otherwise undifferentiated illness characterized by rhinorrhea, cough, fever, tachypnea, and/or increase in work of breathing
- This does not apply to the following conditions:
  - Anaphylaxis
  - Croup
  - Epiglottitis
  - Foreign body aspiration
  - Submersion/drowning
  - Asthma

Treatment and Interventions:

- Manage Airway as indicated (see **Airway/Ventilation Management** protocol)
- Give supplemental oxygen as needed to keep oxygen saturations >90%– escalate from blow-by, to nasal cannula to a non-breather mask as needed, in order to maintain normal oxygenation
- Suction the nose and/or mouth (via bulb, rigid suction catheter, or suction catheter) if excessive secretions are present
- Pulse oximetry and end-tidal CO2 (ETCO2) should be routinely used for any patient with respiratory distress
- Consider EKG monitoring if there are no signs of clinical improvement after treating respiratory distress
- Inhaled medications are generally unnecessary and should **not** be routinely administered, however if patient is in severe respiratory distress despite suctioning and oxygen application a one-time trial of either of the following can be considered:
  - *nebulized epinephrine* (see **racemic epinephrine** formulary and **FRG**)
  - *albuterol* (see **albuterol** formulary and **FRG**)
- IVs should only be placed in children with respiratory distress for clinical concerns of poor perfusion and/or need to administer IV medications
- Bag-valve-mask ventilation should be utilized in children with respiratory failure
- Supraglottic devices and intubation should only be utilized if less invasive airway and ventilation maneuvers fail

Key Considerations:

- Suctioning can be a very effective intervention to alleviate distress, since infants are obligate nose breathers
- Though albuterol has previously been a consideration, the most recent evidence does not demonstrate a benefit in using it for bronchiolitis
- Ipratropium and other anticholinergic agents should not be given to children with bronchiolitis in the prehospital setting

PEDIATRIC RESPIRATORY DISTRESS (CROUP)

Patient Care Goals:

- Alleviate respiratory distress
- Maintain adequate oxygenation/ventilation
- Promptly identify respiratory distress, respiratory failure, and respiratory arrest, and intervene for patients who require escalation of therapy
- Deliver appropriate therapy by differentiating other causes of pediatric respiratory distress

Patient Presentation:

- Child with suspected croup (history of stridor or history of barky cough)
- This does not apply to the following conditions:
  - Anaphylaxis
  - Asthma
  - Bronchiolitis (wheezing $less\ than$ 2 yo)
  - Foreign body aspiration
  - Submersion/drowning
  - Epiglottitis

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Give supplemental oxygen as needed to keep oxygen saturations >90%– escalate from blow-by, to nasal cannula to a non-breather mask as needed, in order to maintain normal oxygenation-avoid agitating patient
- Suction the nose and/or mouth (via bulb, rigid suction catheter, or suction catheter) if excessive secretions are present-avoid agitating patient
- Pulse oximetry and end-tidal CO2 (ETCO2) should be routinely used for any patient with respiratory distress-avoid agitating patient when possible
- Consider EKG monitoring if there are no signs of clinical improvement after treating respiratory distress
- If clinical impression for croup is high and patient has respiratory distress with signs of STRIDOR AT REST administer:
  - Nebulized *racemic epinephrine* (see **racemic epinephrine** formulary and **FRG**) and do NOT repeat
- IVs should only be placed in children with respiratory distress for clinical concerns of poor perfusion and/or when administering IV medications
- Bag-valve-mask ventilation should be utilized in children with respiratory failure
- Supraglottic devices and intubation should only be utilized if less invasive airway and ventilation maneuvers fail.

Key Considerations:

- Frequently, pediatric croup patients will have stridor associated with crying and/or agitation but will resolve when resting. These patients should **NOT** receive racemic epinephrine.
- Racemic epinephrine should be given **ONLY for patients who have stridor at rest**. Clinical judgement is required taking into consideration work of breathing, general appearance, mental status if child remains agitated with stridor.
- Upper airway obstruction can have inspiratory, expiratory, or biphasic stridor
- Foreign bodies can mimic croup, it is important to ask about a possible choking event.
- Impending respiratory failure is indicated by:
    - Change in mental status such as fatigue and listlessness
    - Pallor
    - Dusky appearance
    - Decreased retractions
    - Decreased breath sounds with decreasing stridor

Patient/Provider Safety Considerations:

- Patients who receive nebulized racemic epinephrine should be transported to definitive care
- Patients who receive nebulized racemic epinephrine frequently have peri-oral pale/duskiness that can be normal side effect of epinephrine induced vasoconstriction. This is typically just around mouth/nose/chin region.

PEDIATRIC SPECIFIC GUIDELINES (BRUE-BRIEF RESOLVED UNEXPLAINED EVENT) & ACUTE EVENTS IN INFANTS

Aliases:

- Apparent Life-Threatening Event, ALTE

Patient Care Goals:

- Recognize patient characteristics and symptoms consistent with a BRUE
- Promptly identify and intervene for patients who require escalation of care
- Choose proper destination for patient transport

Patient Presentation:

- Suspected BRUE:
  - An event in an infant less than 1 y/o reported by a bystander as sudden, brief (less than 1 min), completely resolved upon EMS arrival that includes one or more of the following:
    - Absent, decreased, or irregular breathing
    - Color change (central cyanosis or pallor)
    - Marked change in muscle tone (hyper- or hypotonia)
    - Altered level of responsiveness (irritability or change from baseline)
- This does NOT apply to any of the following conditions/circumstances:
  - Abnormal vitals signs for age (including fever)
  - Vomiting
  - Noisy or labored breathing
  - History or exam concerning for child abuse or neglect
  - Color change that involved only redness (e.g. in the face) or isolated perioral or hand/feet cyanosis

Treatment and Interventions:

- Manage airway and indicated (see **Airway/Ventilation Management** protocol)
- Give supplemental oxygen for signs of respiratory distress or hypoxia-Escalate from blow-by, a nasal cannula to a non-rebreather mask as needed
- Pulse oximetry monitoring
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Initiate EKG monitoring
- Routine IVs should not be placed on BRUE patients unless signs of poor perfusion and/or when administering IV medications.
- Treat any underlying condition as indicated per protocol
- Transport to appropriate facility

Key Considerations:

- BRUE is a group of symptoms, not a disease process
- All patients should be transported to an ED
- The determination of a BRUE is made ONLY after hospital evaluation, not in the field
- A few of these infants will die even after hospital evaluation and treatment
- Contact Direct Medical Oversight if parent/guardian is refusing medical care and/or transport.
- Possible identifiable causes to be considered:
    - Reflux (spitting up)
    - Swallowing dysfunction
    - Nasal congestion
    - Breath-holding spell
    - Change in tone associated with choking, gagging, coughing, crying, feeding
    - Seizure (eye deviation, nystagmus, tonic-clonic activity, clonus)

Patient/Provider Safety Considerations:

- Regardless of patient appearance, all patients with a history of signs or symptoms of BRUE should be transported for further evaluation
- Destination considerations:
    - Consider transport to a facility with pediatric critical care capability for patients with **high risk criteria** present:
        - Less than 2 months of age
        - History of prematurity (less than or equal to 32 weeks gestation or corrected gestational age less than or equal to 45 weeks)
        - More than 1 BRUE, now or in the past
        - Event duration greater than 1 minute
        - CPR or resuscitation by caregivers or EMS
        - Current or recent respiratory infection

NEWBORN/NEONATAL RESUSCITATION

Patient Care Goals:

- Rapidly identify newly born requiring resuscitative efforts
- Provide appropriate interventions to minimize distress in the newly born

Patient Presentation:

- Newly born infants
- If any doubt about gestational age and/or viability, initiate resuscitation

Treatment and Interventions: (see **Appendix H)**

- If immediate resuscitation is required and the newborn is still attached to the mother, clamp the cord at least 6 inches from neonate umbilicus in two places and cut between the clamps.
- If no resuscitation is required, see **(Childbirth / Childbirth Complications / Maternal Cardiac Arrest** protocol)
- Warm, dry, and stimulate
- Wrap infant in dry towel or thermal blanket to keep infant as warm as possible during resuscitation; keep head covered if possible
- If strong cry, regular respiratory effort, good tone, and term gestation, infant should be placed skin-to-skin with mother and covered with dry linen.
- If weak cry, signs of respiratory distress, poor tone, or preterm gestation then position airway (sniffing position) and clear airway as needed. If signs of respiratory distress with airway obstruction, suction mouth then nose; routine suctioning NOT recommended
- If heart rate greater than 100 beats per minute (can use EKG monitor for HR)
    - Monitor for central cyanosis - provide blow-by oxygen as needed
    - Monitor for signs of respiratory distress. If apneic or in significant respiratory distress:
        - Initiate BVM ventilation with **room air** at 40-60 breaths per minute
        - Consider SGA ONLY if BVM is ineffective.
        - Consider endotracheal intubation only if SGA is ineffective and limit to one attempt.
- If heart rate less than 100 beats per minute
    - Initiate BVM ventilation with **room air** at 40-60 breaths per minute.
    - Rates and volumes of ventilation required can be variable, only use the minimum necessary rate and volume to achieve chest rise and a change in heart rate (squeeze BVM with one finger/thumb only)
        - If no improvement after 90 seconds, change to high flow oxygen until heart rate normalizes.
        - Consider SGA ONLY if BVM is ineffective.
        - Consider endotracheal intubation only if SGA is ineffective and limit to one attempt.

- If heart rate less than 60 beats per minute
  - Ensure effective ventilations with **high flow** oxygen and adequate chest rise
  - If no improvement after 30 seconds, initiate chest compressions - two-thumb-encircling hands technique is preferred
    - Coordinate chest compressions with positive pressure ventilation (3:1 ratio, 90 compressions and 30 breaths per minute)
    - Consider SGA only if BVM is ineffective
    - Consider endotracheal intubation only if SGA is ineffective and limit to one attempt
    - Administer *epinephrine* IV/IO (see **epinephrine** formulary and **FRG**)
    - Consider obtaining a blood glucose for ongoing resuscitation, maternal history of diabetes, ill appearing or unable to feed (see **Hypoglycemia**/**Hyperglycemia** protocol)
    - Consider *naloxone* (see **naloxone** formulary and **FRG**) if concerns about maternal heroin/opiate abuse.
    - Administer *crystalloid* bolus IV/IO for signs of shock (see **crystalloid** formulary and **FRG**)

Table 1. Assessments that are used to initiate BMV and chest compressions

		INTERVENTION INDICATED		
		Blow-by Oxygen	**Bag-Mask-Ventilation (BVM)**	**BVM and Chest compressions**
ASSESSMENT	**Heart Rate (BPM)**	> 100	60–100	< 60
	Respiratory Distress/Apnea	No	Yes	
	Central Cyanosis Present	Yes	Yes/No	

- Pulse oximetry should only be considered if prolonged resuscitative efforts or if supplemental oxygen is administered - goal: oxygen saturation at 10 minutes is 85-95%

Table 2. Projected Pulse Oximetry in Infants Over Time

Time Since Birth	Projected Increase in Pulse Oximeter Over Time
1 minute	60–65%
2 minutes	65–70%
3 minutes	70–75%
4 minutes	75–80%
5 minutes	80–85%
10 minutes	85–90%

Key Considerations:

- Approximately 10% of newly born infants require some assistance to begin breathing
- Deliveries complicated by maternal bleeding (placenta previa, or placental abruption) place the infant at risk for hypovolemia secondary to blood loss
- Low birth weight infants are at high risk for hypothermia due to heat loss.
- Primary indicator of effective ventilation is improvement in heart rate.
- If any doubt about accuracy of gestational age, initiate resuscitation.
- If pulse oximetry is used as an adjunct, the preferred placement place of the probe is the right arm, preferably wrist or medial surface of the palm. Normalization of blood oxygen levels (SaO_2 85-95%) will not be achieved until approximately 10 minutes following birth
- Both hypoxia and excess oxygen administration can result in harm to the infant. If prolonged oxygen use is required, titrate to maintain an oxygen saturation of 85-95%
- While not ideal, a larger facemask than indicated for patient size may be used to provide bag-valve-mask ventilation if an appropriately sized mask is not available - avoid pressure over the eyes as this may result in bradycardia (due to increase vagal stimulation)
- **Increase in heart rate is the most reliable indicator of effective resuscitative efforts**
- A multiple gestation delivery may require additional resources and/or providers
- Consider asking for additional resources for imminent delivery.
- Only necessary to suction neonate when thick meconium AND respiratory distress observed.
- Immediately provide Positive pressure ventilation with BVM if respirations absent/depressed, decreased tone or HR <100 regardless of presence of meconium.
- It is difficult to determine gestational age in the field – if there is any doubt as to viability, resuscitation efforts should be initiated
- Acrocyanosis, a blue discoloration of the distal extremities, is a common finding in the newly born infant transitioning to extrauterine life and requires no treatment – this must be differentiated from central cyanosis which demands intervention.

Patient/Provider Safety Considerations:

- Hypothermia is common in newborns and worsens outcomes of nearly all post-natal complications
  - Ensure heat retention by drying the infant thoroughly, covering the head, and wrapping the baby in dry cloth
  - When it does not encumber necessary assessment or required interventions, “kangaroo care” (i.e. placing the infant skin-to-skin directly against mother’s chest and wrapping them together) is an effective warming technique
  - Newborn infants are prone to hypothermia which may lead to hypoglycemia, hypoxia and lethargy. Aggressive warming techniques should be initiated including drying, swaddling, and warm blankets covering body and head.
  - Check blood glucose and follow **Hypoglycemia**/**Hyperglycemia** protocol as appropriate.
- **Mother should be secured during transport on cot.**
- **During transport, neonate should be appropriately secured in restraint device**.

TOXINS AND ENVIRONMENTAL

TOXINS/ENVIRONMENTAL POISONING/OVERDOSE UNIVERSAL CARE GUIDELINES

Patient Care Goals:

- Early activation of appropriate Hazmat specialty resources when indicated
- Remove patient from hazardous material environment.
- Decontaminate to remove continued sources of absorption, ingestion, inhalation, or injection
- Identify intoxicating agent by toxidrome or appropriate environmental testing
- Assess risk for organ impairments (heart, brain, kidney, etc.)
- Identify antidote or mitigating agent
- Treat signs and symptoms in effort to stabilize patient

Patient Presentation:

- Presentation may vary depending on concentration and duration of exposure. Method of exposure may include any combination of the following potential routes:
  - Absorption
  - Ingestion
  - Inhalation
  - Injection

Treatment and Interventions:

- Make sure the scene is safe.
- Consider body substance isolation (BSI) or appropriate PPE
- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Administer oxygen as appropriate with a target of achieving 94-98% saturation and, if there is hypoventilation noted, support breathing (see **Respiratory Distress** protocols)
- Administer antidote if available
- Expose patient for assessment, and then re-cover to assure retention of body heat
- Establish vascular access as indicated (see **Vascular access** protocol)
- Treat shock as indicated (see **Shock** protocol)
- Initiate EKG monitoring and treat as indicated (see **Dysrhythmia** protocol)
- Consider 12-lead EKG as indicated
- Obtain blood glucose and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Consider Contacting Poison control at 1-800-222-1222 (KS Poison Control)

Key Considerations:

- When indicated, identify specific medication/toxins taken (including immediate release vs sustained release), time of ingestion, dose, and quantity, route of exposure. When appropriate, bring all medications (prescribed and not prescribed) in the environment
- Check for needle marks, paraphernalia, bites, bottles, or evidence of agent involved in exposure, self-inflicted injury, or trauma

Patient/Provider Safety Considerations:

- Scene/environmental safety for patient and provider.
    - Early notification of Hazmat specialty resources when indicated
    - Consider environmental carbon monoxide monitor use
    - Monitor patient airway, breathing, pulse oximetry, $ETCO_2$ for adequate ventilation as they may change over time
    - Monitor EKG with special attention to rate, rhythm, QRS and QTc duration
    - Maintain or normalize patient temperature

ACETYLCHOLINESTERASE INHIBITOR (CARBAMATES, NERVE AGENTS, ORGANOPHOSPHATES) EXPOSURE

Aliases:

- Acetylcholinesterase inhibitor, carbamate, insecticide, nerve agent, organophosphate, pesticide

Patient Care Goals

- Rapid recognition of the signs and symptoms of confirmed or suspected acetylcholinesterase inhibitor (AChEI) agents such as carbamates, nerve agents, or organophosphates exposure.
- Expeditious and repeated administration of atropine, which is the primary antidote

Patient Presentation

- ***DUMBELS*** is a mnemonic used to describe the signs and symptoms of acetylcholinesterase inhibitor agent poisoning:
  - **D**iarrhea
  - **U**rination
  - **M**iosis/**M**uscle weakness
  - **B**ronchospasm/**B**ronchorrhea/**B**radycardia
  - **E**mesis
  - **L**acrimation
  - **S**alivation/**S**weating
- Estimated level of exposure based upon signs and symptoms:
  - Mild
    - Miosis alone (while this is a primary sign in vapor exposure, it may not be present is all exposures)
    - Miosis and severe rhinorrhea
  - Mild to moderate (in addition to symptoms of mild exposure)
    - Localized swelling
    - Muscle fasciculations
    - Nausea and vomiting
    - Weakness
    - Shortness of breath
  - Severe (in addition to symptoms of mild to moderate exposure)
    - Unconsciousness
    - Convulsions
    - Apnea or severe respiratory distress requiring assisted ventilation
    - Flaccid paralysis

Treatment and Interventions:

- Don the appropriate PPE
- Remove the patient's clothing and wash the skin with soap and water
- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat respiratory distress/hypoxia as indicated (see **Respiratory Distress** protocols)
- Administer *atropine* immediately for confirmed or suspected acetylcholinesterase inhibitor agent exposure (see **atropine** formulary and **FRG**)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Treat seizures as indicated (see **Seizure** protocol)
- Initiate EKG monitoring as soon as practical and treat as indicated (see **Dysrhythmia** protocol)

Key Considerations:

- Exposure to acetylcholinesterase inhibitor agents can occur through the skin, inhalation, or ingestion and may be intentional or accidental.
- Contaminated clothing can provide a source of continued exposure to the toxin.
- Atropine in extremely large, and potentially multiple, doses is the antidote for an acetylcholinesterase inhibitor agent poisoning.
- Clinical improvement should be based upon the drying of secretions and easing of respiratory effort rather than heart rate or pupillary response.
- Pralidoxime chloride (2-PAM) is a secondary treatment and, when available, may be administered concurrently with atropine.
- The stock of atropine and pralidoxime chloride available to EMS providers is usually not sufficient to fully treat the victim of an acetylcholinesterase inhibitor agent exposure; however, EMS providers should initiate the administration of atropine and, if available, pralidoxime chloride and activate HazMat resources to obtain more atropine as necessary.
- When treating seizures the intramuscular (IM) absorption may be more clinically efficacious than the intranasal (IN) route in the presence of significant rhinorrhea.
- The heart rate may be normal, bradycardic, or tachycardic.
- Pupil findings are variable and may present with miosis or mydriasis

Patient/Provider Safety Considerations:

- Continuous and ongoing patient reassessment is critical
- Initiation of and ongoing treatment should not be based upon heart rate or pupillary response, but rather on drying of secretions and respiratory improvement.

BETA BLOCKER POISONING/OVERDOSE

Aliases:

- Anti-hypertensive medication

Patient Care Goals:

- Assure adequate ventilation, oxygenation and correction of hypoperfusion

Patient Presentation:

- Patients who overdose on beta-blockers may present with any of the following:
  - Bradycardia
  - Hypotension
  - Altered mental status
  - Weakness
  - Shortness of breath
  - Possible seizures
  - hypoglycemia

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat respiratory distress as indicated (see **Respiratory Distress** protocols)
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Initiate EKG monitoring and perform 12-lead EKG
- Treat shock as indicated (see **Shock** protocol)
- Administer *crystalloid* as indicated (see **crystalloid** formulary and **FRG**)
- Consider *atropine sulfate* for symptomatic bradycardia (see **atropine** formulary and **FRG**)
- Consider *vasopressor* for hypotension titrated to a MAP >65mmHg or SBP >100mmHg (see **norepinephrine**/**epinephrine** formulary and **FRG**)
- ☎Consider *calcium chloride* in consultation with Direct Medical Oversight (see **calcium chloride** formulary and **FRG**)
- Consider *transcutaneous pacing* if refractory to initial pharmacologic interventions
- Treat seizure as indicated (see **Seizure** protocol)
- ☎If widened QRS can consider administration of *sodium bicarbonate* in consultation with Direct Medical Oversight (see **sodium bicarbonate** formulary and **FRG**)

Key Considerations:

- A single pill can kill a toddler. It is very important that EMS does a careful assessment of medications the toddler may have access to and bring all suspect medications to the ED.
- Atropine may have little or no effect (likely to be more helpful in mild overdoses) - the hypotension and bradycardia may be mutually exclusive and the blood pressure may not respond to correction of bradycardia

- Propranolol crosses the blood brain barrier and can cause altered mental status, seizure, and widened QRS similar to TCA toxicity
- Identify specific medication taken (noting immediate release vs. sustained release formulations), time of ingestion, and quantity
- Transcutaneous pacing may not always capture nor correct hypotension when capture is successful
- Calcium chloride should only be considered for severe overdoses and in consultation with Direct Medical Oversight
- Frequent reassessment is essential as patient deterioration can be rapid and catastrophic

BITES AND ENVENOMATIONS

Patient Care Goals:

- Assure adequate ventilation, oxygenation and correction of hypoperfusion
- Get patient to a hospital that has access to antivenin (when applicable) in timely fashion
- Improve patient comfort

Patient Presentation:

- Bites, stings, and envenomations can come from a variety of marine and terrestrial animals and insects causing local or systemic effects

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat respiratory distress as indicated (see **Respiratory Distress** protocols)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Administer *crystalloid* as indicated (see **crystalloid** formulary and **FRG**)
- Treat shock as indicated (see **Shock** protocol)
- Treat anaphylaxis as indicated (see **Anaphylaxis** protocol)
- Treat seizures as indicated (see **Seizure** protocol)
- Provide analgesia as indicated (see **Pain Management** protocol)
- Initiate EKG monitoring as indicated
- Immobilize affected extremity as indicated
- Keep bite at level of heart (if possible)
- Remove any constricting clothing/jewelry
- Consider Contacting Poison control at 1-800-222-1222 (KS Poison Control)
- Consider contacting hospital directly to confirm availability of antivenin (when applicable)

Key considerations:

- There are a spectrum of toxins and envenomations and limited EMS interventions that will have any mitigating effect on the patient in the field
- The critical intervention is to get the patient to a hospital that has access to the antivenin if applicable.

Patient/Provider Safety Considerations:

- EMS providers should not try to capture the offending marine or terrestrial animal or insect.
- If the offending organism has been killed, beware that many dead insect, marine, or fanged animals can continue to bite or sting with venom and should be safely placed in a hard sided and closed container for future identification when possible.

- Patient may still have an imbedded stinger, tooth, nematocyst, or barb which may continue to deliver toxin if left imbedded. Consider safe removal when possible without squeezing the toxin delivery apparatus.
- **Do NOT**:
    - Apply tourniquets, tight constricting bandages, or constricting bands above or below the site of the envenomation/bite/sting.
    - Perform incision and/or suction wound to remove toxin
    - Apply cold packs or immerse the affected extremity in ice/cold water

CALCIUM CHANNEL BLOCKER POISONING/OVERDOSE

Aliases:

- Anti-hypertensive medication

Patient Care Goals:

- Assure adequate ventilation, oxygenation and correction of hypoperfusion

Patient Presentation:

- Patients who overdose on calcium channel blockers may present with any of the following:
  - Bradycardia
  - Hypotension
  - Altered mental status
  - Nausea/vomiting
  - Decreased AV Nodal conduction
  - Cardiogenic shock
  - Hyperglycemia
  - Weakness
  - Respiratory distress
  - Flushing

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat respiratory distress as indicated (see **Respiratory Distress** protocols)
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Initiate EKG monitoring and perform 12-lead EKG
- Treat shock as indicated (see **Shock** protocol)
- Administer *crystalloid* as indicated (see **crystalloid** formulary and **FRG**)
- Consider *atropine sulfate* for symptomatic bradycardia (see **atropine** formulary and **FRG**)
- Consider vasopressor for hypotension titrated to a MAP >65mmHg or SBP >100mmHg (see **norepinephrine**/**epinephrine** formulary and **FRG**)
- ☎Consider *calcium chloride* in consultation with Direct Medical Oversight (see **calcium chloride** formulary and **FRG**)
- Consider *transcutaneous pacing* if refractory to initial pharmacologic interventions
- Treat seizure as indicated (see **Seizure** protocol)
- ☎If widened QRS can consider administration of *sodium bicarbonate* in consultation with Direct Medical Oversight (see **sodium bicarbonate** formulary and **FRG**)

Key Considerations:

- A single pill can kill a toddler. It is very important that EMS does a careful assessment of medications the toddler may have access to and bring all suspect medications to the ED.
- While most calcium channel blockers cause bradycardia, dihydropyridine class calcium channel blockers (e.g. nifedipine, amlodipine) can cause a reflex tachycardia (torsade de pointes) early in the ingestion. The patient can become bradycardic as the intoxication worsens
- Calcium channel blockers can cause many types of rhythms that can range from sinus bradycardia to complete heart block
- Hyperglycemia is the result of the blocking of L-type calcium channels in the pancreas. This can help differentiate these ingestions from beta blockers. There may also be a relationship between the severity of the ingestion and the extent of the hyperglycemia
- Atropine may have little or no effect (likely to be more helpful in mild overdoses)
- Hypotension and bradycardia may be mutually exclusive and the blood pressure may not respond to correction of bradycardia.
- Transcutaneous pacing may not always capture nor correct hypotension when capture is successful.
- Serial frequent assessments are essential as these patients often have rapid deterioration with profound hypotension.

CARBON MONOXIDE POISONING/SMOKE INHALATION

Patient Care Goals:

- Remove patient from toxic environment.
- Assure adequate ventilation, oxygenation and correction of hypoperfusion.

Patient Presentation

- Patients exposed to carbon monoxide may present with a spectrum of sign/symptoms which could include any of the following:
  - Nausea
  - Fatigue
  - Headache
  - Vertigo/dizziness
  - Altered mental status
  - Tachypnea
  - Tachycardia
  - Seizures
  - Cardiac arrest

Treatment and Interventions

- Apply high-flow 100% oxygen and manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat respiratory distress as indicated (see **Respiratory Distress** protocols)
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Initiate EKG monitoring and perform 12-lead EKG
- Treat shock as indicated (see **Shock** protocol)
- Treat seizure as indicated (see **Seizure** protocol)
- Consider transporting patients with concern for severe carbon monoxide poisoning directly to a facility with hyperbaric oxygen capabilities (KUMC is only 24/7 hyperbaric center) if feasible and patient does not meet criteria for other specialty care (e.g. trauma or burns)

Key Considerations:

- Pulse oximetry is inaccurate due to the carbon monoxide binding with hemoglobin
- As maternal carboxyhemoglobin levels do not accurately reflect fetal carboxyhemoglobin levels, pregnant patients are more likely to be treated with hyperbaric oxygen
- Do not look for cherry red skin coloration as an indication of carbon monoxide poisoning, as this is an unusual finding

- Carbon monoxide is a colorless, odorless gas which has a high affinity for binding to red cell hemoglobin, thus preventing the binding of oxygen to the hemoglobin, leading to hypoxia. A significant reduction in oxygen delivery to tissues and organs occurs with carbon monoxide poisoning. Carbon monoxide is also a cellular toxin which can result in delayed or persistent neurologic sequelae in significant exposures. With any form of combustion (fire/smoke [e.g. propane, kerosene, or charcoal stoves or heaters], combustion engines [e.g. generators, lawn mowers, motor vehicles, home heating systems]), carbon monoxide will be generated.
- Cyanide toxicity may need to be considered in the hemodynamically unstable patient removed from a fire. (see **Cyanide Exposure** protocol)

Patient/Provider Safety Considerations:

- Remove patient and response personnel from potentially hazardous environment as soon as possible using appropriate PPE and resources to ensure no further harm to personnel
- Provide instruction to the patient, the patient's family, and other appropriate bystanders to not enter the environment (e.g. building, car) where the carbon monoxide exposure occurred until the source of the poisoning has been eliminated
- **CO oximeter devices may yield inaccurate low/normal results for patients with CO poisoning**. All patients with probable or suspected CO poisoning should be placed on high-flow oxygen AND transported to the nearest appropriate hospital based on their presenting signs and symptoms

CONDUCTED ELECTRICAL WEAPON INJURY (Taser™)

Aliases: Tased

Patient Care Goals:

- Manage the condition that triggered the application of the conducted electrical weapon with special attention to patients meeting criterion for hyperactive delirium with severe agitation
- Make sure patient is appropriately secured or restrained with assistance of Law Enforcement to protect the patient and staff
- Perform comprehensive trauma and medical assessment as patients who have received conducted electrical weapon may have already been involved in physical confrontation
- If discharged from a distance, two single barbed darts (13mm length) should be located

Patient Presentation:

- Patient received either the direct contact discharge or the distance two-barbed dart discharge of the conducted electrical weapon

Treatment and Interventions:

- Ensure patient is appropriately secured/restrained with assistance of Law Enforcement as necessary to ensure provider safety (see **Patient Restraint** protocol)
- Evaluate patient for evidence of hyperactive delirium with severe agitation (see **Agitated/Violent Patient** protocol)
- Initiate EKG monitoring and consider 12-lead as indicated
- Treat medical and traumatic injuries per appropriate protocol as indicated
- Remove barbed darts except in sensitive areas (ex. head, ears, eyes, neck, hands, feet, genitalia, imbedded in bone, nipple, or umbilicus etc.)

Key Considerations:

- Patient may be under the influence of toxic substances and or may have underlying medical or psychiatric disorder.
- Conducted electrical weapon can be discharged in three fashions:
  - Direct contact without the use of the darts
  - One or two darts with additional contact by direct contact of weapon
  - From a distance up to 35 feet with two darts
- The device delivers 19 pulses per second with an average current per pulse of 2.1 milliamps which in combination with toxins/drugs, patient's underlying diseases, excessive physical exertion, and trauma may precipitate arrhythmias, therefore initiate EKG monitoring and consider 12-lead EKG assessment

- Drive Stun™ is a direct weapon two-point contact which is designed to generate pain and not incapacitate the subject
- Ascertain if more than one TASER® cartridge was used (by one or more officers, in effort to identify total number of possible darts and contacts)

Patient/Provider Safety Considerations:

- Before removal of the barbed dart, make sure the cartridge has been removed from the conducted electrical weapon
- The patient may have underlying pathology before being tased (refer to appropriate guidelines for managing the underlying medical/traumatic pathology)
- Perform a comprehensive assessment with special attention looking for signs and symptoms that may indicate hyperactive delirium with severe agitation
- EMS providers who respond for a conducted electrical weapon should not perform a “medical clearance” for Law Enforcement and should always offer transport

CYANIDE EXPOSURE

Aliases:

- Cyanide, hydrogen cyanide

Patient Care Goals:

- Remove patient from toxic environment
- Assure adequate ventilation, oxygenation and correction of hypoperfusion
- Rapid administration of hydroxocobalamin

Patient Presentation:

- Cyanide should be suspected in occupational or other smoke exposures (e.g. firefighting), industrial accidents, natural catastrophes, suicide and murder attempts, chemical warfare and terrorism (whenever there are multiple casualties of an unclear etiology).
    - Signs/symptoms of cyanide exposure (inhalation, ingestion, or absorption) may include any of the following:
        - anxiety, vertigo, weakness, headache, tachypnea, nausea, dyspnea, vomiting, and tachycardia, hypotension, altered mental status, seizures, respiratory depression/arrest, cardiac dysrhythmias

Treatment and Interventions:

- Remove patient from toxic environment and decon as appropriate.
- Apply 100% oxygen via non-rebreather mask or bag valve mask and manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat respiratory distress as indicated (see **Respiratory Distress** protocols)
- Establish vascular access (see **Vascular Access** protocol)
- Treat shock as indicated (see **Shock** protocol)
- Initiate EKG monitoring and obtain 12-lead EKG
- Obtain blood glucose and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Administer *hydroxocobalamin* for symptomatic smoke inhalation and/or cardiac arrest due to suspected exposure to cyanide. (see **hydroxocobalamin** formulary and **FRG**)
- Treat seizures as indicated (see **Seizure** protocol)
- Treat cardiac arrest as indicated (see **Cardiac arrest/resuscitation** protocol)

Key Considerations:

- Cyanide is a colorless gas or white crystal with a “bitter almond” smell (genetically only 40% of population can smell it).
- Cyanide binds to the ferric ion in cells, blocking the enzyme cytochrome oxidase, thus preventing the use of oxygen by the cell’s mitochondria, leading to cellular hypoxia.

- Pulse oximetry accurately reflects serum levels of oxygen but does not accurately reflect tissue oxygen levels therefore should not be relied upon in possible cyanide and/or carbon monoxide toxicity
- After hydroxocobalamin has been administered, pulse oximetry levels are no longer accurate
- The rapidity of onset is related to the severity of exposure (inhalation or ingestion) and may be dramatic with immediate effects that include early hypertension with subsequent hypotension, sudden cardiovascular collapse or seizure/coma, and rapid death.
- After hydroxocobalamin has been administered skin, urine and tears will all turn red. This flushing should NOT be interpreted as an allergic reaction.
- Treatment decisions must be made on the basis of clinical history and signs and symptoms of cyanide intoxication. For the patient with an appropriate history and manifesting one or more significant cyanide exposure signs or symptoms, treat with hydroxocobalamin

Patient/Provider Safety Considerations:

- In the event of multiple casualties, be sure to wear appropriate PPE during rescue evacuation from the toxic environment
- If the patient ingests cyanide, it will react with the acids in the stomach generating hydrogen cyanide gas. Be sure to maximize air circulation in closed spaces (ambulance) as the patient's gastric contents may contain hydrogen cyanide gases when released with vomiting or belching.

DROWNING

Aliases:

- Near-drowning, non-fatal drowning, fatal drowning, submersion, immersion

Patient Care Goals:

- Rapid assessment and management of life-threatening injuries
- Rescue from the water-based environment
- Transport all patients suffering from drowning for hospital evaluation unless termination of resuscitation guidelines apply

Patient Presentation:

- Patients suffering from drowning or drowning events independent of presence or absence of symptoms.

Treatment and Interventions:

- Ensure scene safety for patient and rescuers. Remove patient from water as soon as possible
- Primary survey should include aggressive airway management and restoration of adequate oxygenation and ventilation - unlike the CAB strategy used in standard cardiac arrest, patients suffering cardiac arrest from drowning require an ABC approach with prompt airway management and supplemental breathing (see **Airway/Ventilation Management** and **Respiratory Distress** protocols)
- If concern for cervical spine injury manage c-spine as indicated (see **Spinal Care** protocol)
- Initiate EKG monitoring as soon as feasible
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Treat cardiac arrest per cardiac arrest protocol (see **Cardiac Arrest** checklists)
- Treat hypothermia as indicated (see **Hypothermia/Cold exposure** protocol)

Key Considerations:

- The World Health Organization definition of drowning is “the process of experiencing respiratory impairment from submersion/immersion in liquid”
- Submersion refers to situations in which the patient’s airway is underwater. Immersion refers to situations in which the patient’s body is in water but the patient’s airway remains out of the water
- History should include circumstances leading to the submersion, details of mechanism of injury, time under water, and water temperature (if available)
- Routine c-spine precautions in all victims of drowning is likely unnecessary unless the mechanism or injury, history, or physical exam suggests a cervical spine injury
- Mechanisms of injury highly suggestive of cervical spine injury include diving, water skiing, surfing or watercraft accidents
- Initiation of in-water ventilations may increase survival
- In-water chest compressions are futile

- Active efforts to expel water from the airway (by abdominal thrusts or other means) should be avoided as they delay resuscitative efforts and increase the potential for vomiting and aspiration
- Uncertainty exists regarding survival in cold water drowning, however, recent literature suggests the following:
    - If water temperature is less than 43°F (6°C) and the patient is submerged with evidence of cardiac arrest:
        - Survival is possible for submersion time less than 90 minutes and resuscitative efforts should be initiated
        - Survival is not likely for submersion time greater than 90 minutes and providers may consider not initiating resuscitation or termination of resuscitation on scene
    - If water temperature is greater than 43°F (6°C) and the patient is submerged with evidence of cardiac arrest:
        - Survival is possible for submersion time less than 30 minutes and resuscitative efforts should be initiated
        - Survival is not likely for submersion time greater than 30 minutes and providers may consider not initiating resuscitation or termination of resuscitation on scene
- Patients may develop subacute respiratory difficulty after drowning and therefore all victims of drowning should be transported for observation

ELECTRICAL INJURIES

Aliases:

- Electrical burns, electrocution

Patient Care Goals:

- Prevent additional harm to patient
- Identify and treat life-threatening issues such as dysrhythmias and cardiac arrest
- Identify characteristics of electrical source to communicate to receiving facility (voltage, amperage, alternating current [AC] versus direct current [DC])
- Understand that deep tissue injury can be far greater than external appearance
- Have high index of suspicion for associated trauma due to patient being thrown/long fall

Patient Presentation:

- Exposure to electrical current (AC or DC).

Treatment and Interventions:

- Ensure scene safety. The electrical source **must be disabled** prior to assessment
- Assess primary survey with specific focus on dysrhythmias or cardiac arrest
- Initiate EKG monitoring and obtain a 12-lead EKG
- Assess for potential associated trauma and note if the patient was thrown from contact point - if patient has altered mental status, assume trauma was involved and treat accordingly (see **Trauma** protocol)
- Establish Vascular Access as indicated (see **Vascular Access** Protocol)
- Treat shock as indicated (see **Shock** protocol)
- Apply clean, dry dressings to wounds
- Remove constricting clothing and jewelry
- Provide analgesia as indicated (see **Pain Management** protocol)
- Transport preferentially to Burn Center for electrical injuries.
- Transport to a Trauma Center is acceptable if significant associated trauma

Key Considerations:

- Electrical current causes injury through three main mechanisms:
  - **Direct tissue damage**, altering cell membrane resting potential, and eliciting tetany in skeletal and/or cardiac muscles
  - **Conversion of electrical energy into thermal energy**, causing massive tissue destruction and coagulative necrosis
  - **Mechanical injury with direct trauma** resulting from falls or violent muscle contraction.

- Anticipate atrial and/or ventricular dysrhythmias as well as cardiac arrest
- The mortality related to electrical injuries is impacted by several factors:
    - Route current takes through the body – current traversing the heart has higher mortality
    - Type of current – AC vs. DC
        - AC is more likely to cause cardiac dysrhythmias
        - DC is more likely to cause deep tissue burns
        - However, either type of current can cause any injury
        - DC typically causes one muscle contraction while AC can cause repeated contractions
        - Both types of current can cause involuntary muscle contractions that do not allow the victim to let go of the electrical source
        - AC is more likely to cause ventricular fibrillation
        - DC is more likely to cause asystole
        - The amount of current impacts mortality more than the voltage

Current level (Milliamperes)	Probable Effect on Human Body of 120 V, 60 Hz AC for 1 second
1 mA	Perception level. Slight tingling sensation. Still dangerous if wet conditions.
5mA	Slight shock felt; not painful but disturbing. Average individual can let go. However, strong involuntary reactions to shocks in this range may lead to injuries.
6mA - 16mA	Painful shock, begin to lose muscular control. Commonly referred to as the freezing current or "let-go" range.
17mA - 99mA	Extreme pain, respiratory arrest, severe muscular contractions. Individual cannot let go. Death is possible.
100mA - 2000mA	Ventricular fibrillation (uneven, uncoordinated pumping of the heart). Muscular contraction and nerve damage begins to occur. Death is likely.
> 2,000mA	Cardiac arrest, internal organ damage, and severe burns. Death is probable.

- **Even patients who appear dead (particularly dilated pupils) may have good outcomes with prompt recognition and resuscitation.**
- Fixed/dilated pupils may be a sign of neurologic insult, rather than a sign of death/impending death – Should not be used as a solitary, independent sign of death for the purpose of discontinuing resuscitation in this patient population
- Determine characteristics of source if possible – AC or DC, voltage, amperage, and also time of injury Identify all sites of burn injury
- If the patient became part of the circuit, there will be an additional site near the contact with ground
- Electrical burns are often full thickness and involve significant deep tissue damage.

Patient/Provider Safety Considerations:

- Verify no additional threat to patient
- Ensure electrical power shut off
- Failure to attempt resuscitation of an electrocuted patient (patients may have good outcomes with prompt resuscitation and restoration of ventilations)

HYPERTHERMIA/HEAT EXPOSURE

Aliases:

- Hyperthermia, heat cramps, heat exhaustion, heat syncope, heat edema, heat stroke

Patient Care Goals:

- Cooling and rehydration
- Reduce the risk for decompensation
- Reduce the risk for agitation and uncooperative behavior by early recognition and treatment
- For Heat Stroke "COOL FIRST, TRANSPORT SECOND"

Patient Presentation:

- Patients may present with any of the following:
  - Heat cramps
  - Heat exhaustion
  - Heat stroke
  - Heat syncope
  - Heat edema

- This does **NOT** include the following:
  - Fever from infectious or inflammatory conditions
  - Malignant hyperthermia
  - Serotonin syndrome
  - Neuroleptic malignant syndrome

Treatment and Interventions:

- Move victim to a cool area and shield from the sun or any external heat source when practical
- Remove as much clothing as is practical and loosen any restrictive garments (being mindful of modesty and environmental conditions)
- If altered mental status, obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Measure **core** temp (rectally) if concerned about heat illness especially if altered mental status/heat stroke concerns.
- If core temperature is greater than 104°F (40°C) and altered mental status is present, begin aggressive active cooling by:
  - Cold Water/Ice bath immersion (if available) with continuous core rectal temp monitoring until <102.2°F (39°C) (preferred option)
- If core temperature is >104.0°F (40.0C) and Cold Water/Ice bath immersion is **not** available, then one of the following is acceptable:
  - Tarp-assisted cooling with oscillation (TACO method)
  - Continual deluge/dousing with cold water from hose or other cold-water source
  - Rotating ice water-soaked towels or sheets

- If core temperature monitoring and Cold Water/Ice bath immersion, TACO method, cold water-dousing, or rotating iced towels are unavailable then initiate transport while cooling with one of the below methods:
    - Continually misting exposed skin with cool water while fanning patient/Max AC accompanied by ice packs around neck/axillae/groin (this is the least preferable cooling option)
- Cooling efforts should continue until the patient's core temperature is less than 102.2°F (40.0°C) or, if continuous core temperature monitoring is not available, until the patient demonstrates improvement in mental status.
- When continuous core temperature monitoring is unavailable, it is acceptable to use periodic rectal temperature monitoring every 5 minutes
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Treat shock as indicated (see **Shock** protocol)
- Initiate EKG monitoring when feasible
- Treat seizures as indicated (see **Seizure** protocol)
- Consider *midazolam* for shivering during cooling (see **midazolam formulary** and **FRG**)

Key Considerations:

- *Heat Cramps*: are minor muscle cramps usually in the legs and abdominal wall. Patient temperature is normal.
- *Heat Exhaustion*: Gradual onset. As it progresses tachycardia, hypotension, elevated temperature, and very painful cramps may occur. Symptoms of headache, nausea and vomiting may occur. Mental status is normal. Heat exhaustion can progress to heat stroke.
- *Heat Stroke*: occurs when the cooling mechanism of the body (sweating) ceases due to temperature overload and/or electrolyte imbalances. Patient temperature is usually ≥104°F (40C). When no thermometer is available, it is distinguished from heat exhaustion by altered level of consciousness.
- *Heat Syncope*: is a transient loss of consciousness with spontaneous return to normal mentation attributable to heat exposure. Mental status is normal.
- *Heat Edema*: is dependent extremity swelling caused by interstitial fluid pooling.
- All patients suffering from life-threatening heat illness should be transported to the hospital.
- Patients at risk for heat emergencies include neonates, infants, geriatric patients, and patients with mental illness
- Contributory risk factors may come from:
    - Prescription and over-the-counter herbal supplements
    - Cold medications
    - Heart medications
    - Diuretics
    - Psychiatric medications
    - Drug abuse
    - Accidental or intentional drug overdose
- Heat exposure can occur either due to increased environmental temperatures or prolonged exercise or a combination of both
- Environments with temperature ≥90°F and humidity ≥60% present the most risk

- Heat stroke is associated with cardiac arrhythmias independent of drug ingestion/overdose.
- Heat stroke has also been associated with cerebral edema
- **Rapid cooling takes priority over other interventions for heat stroke (e.g. cardiac monitoring, IV access)**
- Do not forget to look for other causes of altered mental status such as low blood glucose level, or, in the proper circumstances (e.g. endurance exercise events), consider exercise associated hyponatremia (EAH), especially in the patient with altered mental status, normal blood glucose, and normal temperature.
- Hyperthermia not from environmental factors has a differential that includes the following:
    - Fever and delirium
    - Hyperthyroid storm
    - Delirium tremens (DTs)
    - CNS lesion or tumor
    - Adverse drug event: neuroleptic malignant syndrome, malignant hyperthermia
- **Pediatric Considerations**: Children left in cars who show signs of altered mental status and elevated body temperature should be presumed to have hyperthermia.
- **In general, when capable, COOL BEFORE TRANSPORT**

HYPOTHERMIA/COLD EXPOSURE

Aliases:

- Hypothermia, frost bite, cold-induced injuries

Patient Care Goals:

- Maintain hemodynamic stability
- Prevent further heat loss
- Rewarm the patient in a safe manner
- Appropriate management of hypothermia induced cardiac arrest
- Prevent loss of limbs

Patient Presentation:

- Patients suffering systemic or localized cold injuries.
- Patients with mild hypothermia will have normal mental status, shivering, and may have normal vital signs.
- Patient with moderate to severe hypothermia will have mental status changes, eventual loss of shivering, and progressive bradycardia, hypotension, and decreased respiratory status

Exclusion Criteria:

- Patients without cold exposure OR Patients with cold exposure but no signs/symptoms attributable to hypothermia or frostbite.

Treatment and Interventions:

- **Hypothermia**:
  - Maintain patient and rescuer safety - the patient has fallen victim to cold injury and rescuers have likely had to enter the same environment. Maintain rescuer safety by preventing cold injury to rescuers.
  - Remove patient from environment and prevent further heat loss by removing wet clothes and drying skin, insulate from the ground, shelter the patient from wind and wet conditions, and insulate the patient with dry blanket/wrap.
  - Move to warm environment as soon as feasible.
  - Manage Airway as indicated (see **Airway/Ventilation Management** protocol)
  - If altered mental status obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
  - Measure core temperature (rectal) **once in warm environment**
  - Initiate EKG monitoring and perform 12-lead as indicated.
  - Establish Vascular Access as indicated (see **Vascular Access** protocol)
  - Treat shock as indicated (see **Shock** protocol)
  - Consider field-rewarming methods such as placement of large heat packs or heat blankets (chemical or electric if feasible) to the anterior chest or wrapped around the patient's thorax if large enough

- **Frostbite**:
  - If the patient has evidence of frostbite, and ambulation/travel is necessary for evacuation or safety, avoid rewarming of extremities until definitive treatment is possible. Additive injury occurs when the area of frostbite is rewarmed then inadvertently refrozen. Only initiate rewarming if refreezing is absolutely preventable.
  - Rewarm frostbitten parts by contact with non-affected body surfaces. Do not rub or cause physical trauma.
  - After rewarming, cover injured parts with loose, clean dressing. Blisters should not be de-roofed or opened/drained.
  - Provide analgesia as indicated (see **Pain Management** protocol)

Key Considerations:

- Definitions:
  - Mild hypothermia: core temperature (95-89.8°F/35-31.1°C)
  - Moderate hypothermia: core temperature (89.7-82.5°F/32-28°C)
  - Severe hypothermia: core temperature (82.4-75.2°F/28-24°C)
  - Profound hypothermia: core temperature (<75.2°F/25°C)
  - Rectal temperatures are not reliable or suitable for taking temperatures in the field and should only be done in a warm environment (such as a heated ambulance)
  - Care must be taken not to hyperventilate the patient as hypocarbia may reduce the threshold for ventricular fibrillation in the cold patient
  - It is important that the patient's clinical presentation and the signs or symptoms the patient is experiencing are prioritized over a core temperature reading taken in isolation (treat the patient and not the thermometer).
  - The rescuer may need to evaluate the hypothermic patient for longer than the normothermic patient (up to 60 seconds)
  - Patients with frostbite will develop numbness involving the affected body part along with a "clumsy" feeling along with areas of blanched skin - later findings include a "woody" sensation, decreased or loss of sensation, bruising or blister formation, or a white and waxy appearance to affected tissue.

Considerations in HYPOTHERMIC CARDIAC ARREST:

- The following are contraindications for initiation of resuscitation in the hypothermic patient:
  - Obvious mortal injuries
  - The patient exhibits signs of being frozen (such as ice formation in the airway)
  - Chest wall rigidity such that compressions are impossible
  - Danger to rescuers
- Fixed and dilated pupils, apparent rigor mortis, and dependent lividity may not be contraindication for resuscitation in the severely hypothermic patient
- The mainstay of therapy in severe hypothermia and cardiac arrest should be effective chest compressions and attempts at rewarming.

- Chest compressions should be provided at the same rate as in normothermic patients.
- If the patient has a shockable rhythm (VF/VT), defibrillation should be attempted.
- Continue defibrillation attempts every 2 minutes per usual cardiac arrest care concurrently with rewarming strategies
- The likelihood of successful defibrillation increases with increase in temperature
- If defibrillation is unsuccessful and the patient's core temperature is greater than 86°F (30°C), follow guidelines for normothermic patients.
- If available monitors reveal asystole, CPR alone is the mainstay of therapy.
- If monitoring reveals an organized rhythm (other than VF or VT) and no pulses are detected, do not start CPR, but continue to monitor
    - While this may represent pulseless electrical activity (PEA), this may also represent situations in which the patient's pulses are not detectable but remain effective due to decreased metabolic needs.
    - In the case of PEA, the rhythm will deteriorate rapidly to asystole, in which case, CPR should be re-initiated.
- Manage the airway per standard care in cardiac arrest victims (see **Airway/Ventilation Management** protocol)
    - Withhold medications until the patient's core temperature is greater than 86°F(30°C)
    - Above 86°F(30°C), standard medications in cardiac arrest can be given as needed.
- Upon ROSC, treat per normothermic patient (see **Post-ROSC** checklist)
- Patients with severe hypothermia and arrest may benefit from resuscitation even after prolonged downtime.
- Patients should not be considered deceased until rewarming has been attempted
- If a hypothermic patient clearly suffered cardiac arrest and subsequently became hypothermic afterward with prolonged down time between arrest and rescue, there is no rationale for initiating resuscitation and warming the patient

Patient/Provider Safety Considerations:

- Given the additive effects of additional cold stress, the patient should be removed from the cold environment as soon as operationally feasible
- Devices that self-generate heat (e.g. heat packs) that are being utilized during the rewarming process should be wrapped in a barrier to avoid direct contact with the skin and to prevent burns. Available evidence suggests that heat packs with peak temperatures above 113°F (45°C) are most likely to cause burns. In patients who are unresponsive, or unable to recognize a developing injury, please check the area in which the heating pad is placed regularly to ensure no tissue damage occurs.
- Handle the patient gently
- Attempt to keep the patient in the horizontal position, especially limiting motion of the extremities to avoid increasing return of cold blood to the heart
- Once in a warm environment, clothing should be cut off (rather than removed by manipulating the extremities)

LIGHTNING STRIKE/LIGHTNING STRIKE INJURY

Patient Care Goals:

- Identify patient(s) as lightning strike victim(s)
- Move to safe area
- Initiate immediate resuscitation of cardiac arrest victim(s), within limits of mass casualty care, also known as “reverse triage”
- Cardiac monitoring during transport
- Treat associated traumatic injuries
- Transport to appropriate facility

Patient Presentation:

- Patients of all ages who have been the victim of lightning strike injury

Treatment and Interventions:

- Ensure scene safety and move patient to safety as soon as possible.
- If in cardiac arrest, (see **Cardiac Arrest/Resuscitation** protocol)
- Assess for potential associated trauma and note if the patient was thrown from contact point - if patient has altered mental status, assume trauma was involved and treat accordingly (see **Trauma** protocol)
- Establish Vascular Access as indicated – Avoid initiation through burned skin (see **Vascular Access** protocol)
- Initiate EKG monitoring and obtain 12-lead
- Treat shock as indicated (see **Shock** protocol)
- Apply clean, dry dressings to wounds
- Remove constricting clothing and jewelry
- Provide analgesia as indicated (see **Pain Management** protocol)
- Transport preferentially to Burn Center for electrical injuries.
- Transport to a Trauma Center is acceptable if significant associated trauma

Key Considerations:

- Lightning strike is a result of very high voltage, very short duration DC current exposure
- Patient may be in full cardiopulmonary arrest or have only respiratory arrest, as injury is a result of DC current
- May have stroke-like findings as a result of neurologic insult
- May have secondary traumatic injury as a result of over pressurization, blast or missile injury
- Fixed/dilated pupils may be a sign of neurologic insult, rather than a sign of death/impending death – Should not be used as a solitary, independent sign of death for the purpose of discontinuing resuscitation in this patient population
- Lightning strike cardiopulmonary arrest patients have a high rate of successful resuscitation, if initiated early, in contrast to general cardiac arrest statistics

- If multiple victims, cardiac arrest patients whose injury was witnessed or thought to be recent should be treated first and aggressively (reverse from traditional triage practices)
- Patients may be successfully resuscitated if provided proper cardiac and respiratory support, highlighting the value of “reverse triage”
- Patients suffering cardiac arrest from lightning strike initially suffer a combined cardiac and respiratory arrest

Patient/Provider Safety Considerations:

- Recognize that repeat strike is a risk. Patient and rescuer safety is paramount
- Victims do not carry or discharge a current, so the patient is safe to touch and treat

OPIOID OVERDOSE

Aliases:

- Carfentanil, Dilaudid®, fentanyl, heroin, hydrocodone, hydromorphone, methadone, morphine, opiate, opioid, oxycodone, Oxycontin®, Percocet®, Percodan®, U-47700, Vicodin®, codeine, tramadol

Patient Care Goals:

- Rapid recognition and intervention of a clinically significant opioid poisoning or overdose
- Prevention of respiratory and/or cardiac arrest
- Prevention of future opioid poisoning or overdose leading to respiratory and/or cardiac arrest

Patient Presentation:

- Patients exhibiting miosis (pinpoint pupils), decreased mental status, and respiratory depression of all age groups with known or suspected opioid use or abuse.

Treatments and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat respiratory distress as indicated (see **Respiratory Distress** protocols)
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Initiate EKG monitoring and consider 12-lead EKG
- If the patient has respiratory depression/apnea from a confirmed or suspected opioid overdose:
    - Consider *naloxone* administration (see **naloxone** formulary and **FRG**)
- See (**Appendix K**) for Naloxone Leave Behind Program

Key Considerations:

- EMS providers should be prepared to initiate airway management before, during, and after naloxone administration and to provide appropriate airway support until the patient has adequate respiratory effort
- Airway management/oxygenation/ventilation should occur PRIOR to naloxone administration
- Naloxone has no benefit in the treatment of cardiac arrest.
- Naloxone can be administered via the IV, IM, IN, IO routes.
- The essential feature of opioid overdose requiring EMS intervention is respiratory depression or apnea
- Some opioids have additional toxic effects (e.g. methadone can produce QT prolongation, and tramadol can produce seizures)
- Patients with opioid overdose from fentanyl or fentanyl analogs may rapidly exhibit chest wall rigidity and require positive end expiratory pressure (PEEP), in

addition to multiple and/or larger doses of naloxone, to achieve adequate ventilation

- If possible, identify specific medication taken (including immediate release versus sustained release) time of ingestion, and quantity
- Naloxone administration via the intravenous route provides more predictable bioavailability and flexibility in dosing and titration
- If naloxone was administered to the patient prior to the arrival of EMS, obtain the dose and route through which it was administered and, if possible, bring the devices containing the dispensed naloxone with the patient along with all other medications on scene
- Legally prescribed opioids are also manufactured as an adhesive patch for transdermal absorption, and if found, should be removed from the skin
- The risk of respiratory arrest with subsequent cardiac arrest from an opioid overdose as well as hypoxia, hypercarbia, and aspiration may be increased when other substances such as alcohol, benzodiazepines, or other medications have also been taken by the patient
- Re-expansion pulmonary edema after naloxone administration for opioid OD has been reported.
- **Pediatric Considerations**: The signs and symptoms of an opioid overdose may also be seen in newborns who have been delivered from a mother with recent or chronic opioid use. Newborns who have been administered naloxone for respiratory depression due to presumed intrauterine opioid exposure may be narcotic dependent and should be monitored closely for seizures.

Patient/Provider Safety Considerations:

- The clinical opioid reversal effect of naloxone is limited and may end within an hour whereas opioids often have a duration of 4 hours or longer
- Monitor the patient for recurrent respiratory depression and decreased mental status and opioid withdrawal syndrome.
- Patients with altered mental status secondary to an opioid overdose may become agitated or violent following naloxone administration due to opioid withdrawal therefore the goal is to use the lowest dose as possible to avoid precipitating withdrawal
- Be prepared for this potential scenario and take the appropriate measures in advance to ensure and maintain scene safety
- The IN route has the benefit of no risk of needle stick to the provider, but with much longer time to effect.
- Be aware that unsecured hypodermic needles may be on scene if the intravenous route may have been used by the patient, and that there is a higher risk of needle sticks during the management of this patient population which may also have an increased incidence of blood-borne pathogens.
- High-potency opioids may require higher and/or more frequently administered doses of naloxone to reverse respiratory depression and/or to maintain adequate respirations. (Direct Medical Oversight should be sought)
- Regardless of the doses of naloxone administered, airway management with provision of adequate oxygenation and ventilation is the primary goal in patients with confirmed or suspected opioid overdose

RIOT CONTROL AGENTS

Aliases:

- CN (Mace®), CS, OC (pepper spray), tear gas, harassing agents, incapacitating agents, chemical crowd control agents, lacrimators

Patient Care Goals:

- Address side effects of exposed individuals
- Irrigation of affected areas of the body
- Minimize effect to provider

Patient Presentation:

- Exposure to identifiable agents that are not intended to cause significant injury or fatality
- This does **NOT** apply to exposures to the following:
  - Chlorine, phosgene, ammonia, or other agents intended to cause significant injury or fatality
  - Exposure to an unknown agent/toxin/substance

Treatment and Interventions:

- Move affected individuals from contaminated environment into fresh air if possible
- Remove contaminated clothing as able while being mindful of modesty and environmental conditions
- Have patient remove contact lenses if appropriate
- Irrigation with water or saline may facilitate resolution of symptoms and is recommended for decontamination of dermal and ocular exposure
- Treat Respiratory Distress as indicated (see **Respiratory Distress** protocols)
- For persistent pain of the eye or skin (see **Topical Chemical Burn** protocol)

Key Considerations:

- CN, CS, and OC are the most commonly encountered riot control agents
- CN, CS and OC have a high safety ratio. All three have a high median lethal concentration (LCt50) and a low median effective concentration (ECt50).
- Toxicity is related to time of exposure and concentration of agent used (exposure in non-ventilated space).
- Symptoms that may be experienced after exposure:
  - Eyes: tearing, pain, conjunctivitis, blurred vision
  - Nose/mouth/throat: rhinorrhea, burning/pain, trouble swallowing, drooling
  - Lungs: chest tightness, coughing, choking sensation, wheezing, dyspnea
  - Skin: burning, redness, dermatitis
  - GI: nausea and vomiting are rare and may be post-tussive
- Symptoms begin within seconds of exposure, are self-limited and are best treated by removing patient from ongoing exposure. Symptoms frequently decrease over time (15-45 minutes) after exposure ends.

Patient/Provider Safety Considerations:

- Patients with pre-existing pulmonary conditions (e.g. asthma, COPD) may be prone to more severe respiratory effects
- Traumatic injury may result when exposed individuals are in proximity to the device used to disperse the riot control agent (e.g. hose/stream under pressure, riot control agent projectile, grenade)

STIMULANT POISONING/OVERDOSE

Aliases:

- Cocaine, methamphetamine, amphetamines, PCP, phencyclidine, bath salts, stimulants, uppers, K2, Synthetic THC, synthetic cathinones, ecstasy, spice

Patient Care Goals:

- Identify intoxicating agent when possible
- Recognize when resuscitation is needed and initiate when appropriate
- Recognize when benzodiazepines may be beneficial for severe tachycardia and hypertension, agitation, hallucinations, chest pain, seizures and arrhythmias

Patient Presentation:

- Any patient suspected of being intoxicated on or exposed to stimulants/hallucinogenics who present with any of the following:
  - Tachycardia/tachydysrhythmias, hypertension, diaphoresis, delusions/paranoia, seizures, hyperthermia, mydriasis (dilated pupils), agitation

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat respiratory distress as indicated (see **Respiratory Distress** protocols)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Obtain temperature and treat as indicated (see **Hyperthermia** protocol)
- Administer *crystalloid* as indicated (see **crystalloid** formulary and **FRG**)
- Initiate EKG monitoring and obtain 12-lead when feasible
- ☎ If wide complex QRS consider administration of *sodium bicarbonate* in consultation with Direct Medical Oversight (see **sodium bicarbonate** formulary and **FRG**)
- Treat chest pain as ACS and follow STEMI/ACUTE MI protocol if EKG is consistent with STEMI/ACUTE MI (see **Chest Pain/ACS/STEMI** protocol)
- Restrain as indicated (see **Patient restraint** and **Agitated/violent/behavioral patient** protocol)
- Administer midazolam as indicated per **Agitated/violent/behavioral patient** protocol
- Treat seizures as indicated (see **Seizure** protocol)

Key Considerations:

- Be prepared for the potential of cardiovascular collapse as well as respiratory arrest.
- Recognition and treatment of hyperthermia (including sedatives to decrease heat production from muscular activity) is essential as many deaths are attributable to hyperthermia.
- If Law Enforcement has placed the patient in handcuffs (see **Patient restraint** protocol)
- If patient has signs and symptoms of ACS, strive to give nitroglycerin (see **nitroglycerin** formulary and **Chest Pain/ACS/STEMI** protocol)
    - Vasospasm is often the problem with ACS and stimulant abuse.
- Maintaining vascular access, cardiac monitor, and SPO2/ETCO2 monitors are key to being able to catch and intervene decompensations in a timely manner.
- Cocaine has sodium channel blocking effects and can cause significant cardiac conduction abnormalities with a widened QRS (>100ms). Treatment is with sodium bicarbonate similar to a tricyclic antidepressant. Check a 12-lead EKG to assess for these complications and consult Direct Medical Oversight for guidance.

Patient/Provider Safety Considerations:

- Apply the least amount of physical management devices that are necessary to protect the patient and the providers (see **Agitated/violent/behavior** protocol)
- Assessment for potential weapons or additional drugs is very important since these items can pose a threat not just to the patient but also to the EMS crew

TCA POISONING/OVERDOSE

Patient Care Goals:

- Recognize EKG findings consistent with TCA Overdose/Poisoning and administer Sodium Bicarbonate as indicated.

Patient Presentation:

- Patients may present with any number of the following signs and symptoms:
  - Palpitations
  - Chest pain
  - Hypotension
  - Seizures
  - Altered mental status
  - Respiratory depression
  - Dry mouth
  - Dry skin
  - Blurred vision
  - Urinary retention
  - Wide-complex QRS
  - Tachycardia
  - Mydriasis
  - Fever

Treatment and Interventions:

- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Treat Respiratory Distress as indicated (see **Respiratory Distress** protocols)
- Initiate EKG monitoring and perform 12-lead EKG
- Establish Vascular Access as indicated (see **Vascular Access** protocol)
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- ☎ If wide-complex QRS consider *sodium bicarbonate* in consultation with Direct Medical Oversight (see **sodium bicarbonate** formulary and **FRG**)
- Treat shock as indicated (see **Shock** protocol)
- Treat seizures as indicated (see **Seizure** protocol)

Key Considerations:

- TCA's have sodium channel blocking effects that are responsible for two major adverse effects:
  - Seizures and wide-complex tachydysrhythmias
- The following EKG findings may be seen with TCA poisoning:
  - Wide Complex QRS > 100 ms (intraventricular conduction delay that is non-specific)
  - Right axis deviation
  - R/S ratio >0.7 in AVR
  - Terminal portion of R wave >3mm in AVR
- Multiple boluses of sodium bicarbonate may be necessary in TCA OD to ensure QRS is narrowing.
- Involve Direct Medical Oversight for redosing in TCA Overdose
- TCA's also can present with anticholinergic symptoms/syndrome

TOPICAL CHEMICAL BURNS

Patient Care Goals:

- Rapid recognition of a topical chemical burn
- Initiation of emergent and appropriate intervention and patient transport

Patient Presentation:

- Patients who have sustained exposure to a chemical that can cause a topical chemical burn may develop immediate or in some cases a delayed clinical presentation.
- Agents that are known to cause chemical burns include alkali, acids, mustard agent, and lewisite

Treatment and Interventions:

- Don the appropriate PPE
- Remove the patient's clothing, if necessary
- Manage airway as indicated and plan for associated complications due to oropharyngeal burns (see **Airway/Ventilation Management** protocol)
- Treat respiratory distress as indicated (see **Respiratory Distress** protocols)
- If dry chemical contamination, carefully brush off solid chemical prior to copious/high volume flushing the site as the irrigating solution may activate a chemical reaction
- If wet chemical contamination, flush the patient's skin (and eyes, if involved) with copious amounts of water or crystalloid
- For eye exposure, administer continuous flushing of irrigation fluid to eye
    - Consider *tetracaine* administration prior to irrigation of eyes (see **tetracaine** formulary and **Pain Management** protocol)
- Take measures to minimize hypothermia
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Administer *crystalloid* as indicated (see **crystalloid** formulary and **Burn** protocol)
- Provide analgesia as indicated (see **Pain Management** protocol)

Key Considerations:

- Information regarding the chemical should be gathered while on scene including materials safety data sheet if available
- Communicate all data regarding the chemical to the receiving facility

Patient/Provider Safety Considerations:

- Activate appropriate Hazmat resources as necessary
- Don appropriate PPE
- Take measures to prevent the patient from further contamination through decontamination
- Take measures to protect the EMS provider and others from contamination
- Do not attempt to neutralize an acid with an alkali or an alkali with an acid as an exothermic reaction will occur and cause serious thermal injury to the patient
- Expeditious transport to a designated burn center should be considered for burns that involve a significant percentage of total body surface area or burns that involve the eyes, face, hands, feet or genitals (see **Burn** protocol)

OBSTETRICS AND GYNECOLOGY

OBSTETRIC AND GYNECOLOGICAL CONDITIONS

Patient Care Goals:

- Recognize serious conditions associated with hemorrhage during pregnancy even when hemorrhage or pregnancy is not apparent (e.g. ectopic pregnancy, abruptio placenta, placenta previa)
- Recognize shock and treat accordingly

Patient Presentation:

- Female patient with vaginal bleeding in any trimester
- Female patient with pelvic pain/abdominal pain or possible ectopic pregnancy
- Maternal age at pregnancy may range from 10 to 60 years of age
- Childbirth and active labor (see **Childbirth** protocol)

Treatment and Interventions:

- If signs of shock:
  - Position patient supine and keep patient warm
  - Establish Vascular access (see **Vascular access** protocol)
  - Administer *crystalloid* as indicated (see **Shock** protocol and **crystalloid** formulary)
  - Initiate EKG monitoring
  - Treat nausea/vomiting as indicated (see **Nausea/Vomiting** protocol)
  - Transport to closest appropriate receiving facility

Key Considerations:

- **Abruptio placenta**: generally occurs in third trimester of pregnancy; placenta prematurely separates from the uterus causing intrauterine bleeding
  - Lower abdominal pain, contractions and uterine rigidity (often not present until abruption is advanced)
  - Vaginal bleeding-this may not be present in cases of concealed abruption
  - May present with shock, with minimal or no vaginal bleeding
  - High index of suspicion for abruption with history of trauma, maternal hypertension, maternal drug use (especially cocaine)
- **Placenta previa**: placenta covers part or all of the cervical opening
  - Generally, late second or third trimester
  - Painless vaginal bleeding, unless in active labor
  - For management during active labor (see **Childbirth** protocol)

- **Ectopic pregnancy:** pregnancy that occurs outside of the uterus
    - First trimester
    - Abdominal/pelvic pain with or without vaginal bleeding.
    - Considered in any female patient between 10 and 60 with unexplained shock and abdominal pain.
    - Shock is possible even with minimal to no vaginal bleeding
    - Syncope can be a presenting symptom of hemorrhage from ectopic pregnancy
- **Spontaneous abortion (miscarriage):** typically refers to miscarriage in early pregnancy
    - Generally, first trimester (can be later as well)
    - Intermittent pelvic pain (uterine contractions) with vaginal bleeding

Patient/Provider Safety Considerations:

- Patients in third trimester of pregnancy should be transported on left side or with uterus manually displaced to left if hypotensive, otherwise position of comfort is appropriate.
- Do not place hand/fingers into vagina of bleeding patient except in cases of prolapsed cord or breech birth that is not progressing.

CHILDBIRTH/CHILDBIRTH COMPLICATIONS/MATERNAL CARDIAC ARREST

Patient Care Goals:

- Recognize imminent birth
- Assist with delivery of newborn
- Recognize complicated delivery situations
- Apply appropriate techniques when delivery complication exists

Patient Presentation:

- Pregnant patient with imminent delivery and/or crowning

Treatment and Interventions:

- If patient in labor but no signs of impending delivery, promptly transport to appropriate receiving facility
- Delivery should be controlled so as to allow a slow controlled delivery of infant – This will help to prevent injury to mother
- Support the infant's head as needed
- Check for umbilical cord around the baby's neck and if present:
  - Slip it over the head
  - If unable to free the cord from the neck, double clamp the cord and cut between the clamps (do this only if cord is tight and preventing delivery)
  - It is not necessary to double clamp and cut a nuchal cord if cord is not tight around neck and delivery is progressing otherwise normally
- Do **not** routinely suction the infant's airway (even with a bulb syringe) during delivery
- Grasping the head/face with hand over the ears (hands should NOT be on infant's neck), gently guide head down to allow delivery of the anterior shoulder (do NOT pull forceful traction on head/neck)
- Once you see anterior axilla/armpit, you can gently guide the head up to allow delivery of the posterior shoulder
- Slowly deliver the remainder of the infant
- If no resuscitation is required, immediately warm/dry/stimulate the newborn and delay cord clamping/cutting for at least 60 seconds. In vigorous infants >34 weeks it is acceptable to honor mother's request for longer delay to clamp/cut cord (up to 5 minutes).
- clamp cord about 6 inches from the abdomen with 2 clamps; cut the cord between the clamps
  - While cord is attached, take care to ensure the infant is not significantly higher positioned than the mother to prevent blood from flowing backwards from baby to placenta (baby to mother's chest is safe and appropriate).

- After delivery of infant, suctioning (including suctioning with a bulb syringe) should be reserved for infants who have obvious obstruction to the airway or require positive pressure ventilation (see **Neonatal Resuscitation** protocol for further care of the infant)
- Dry and warm infant, wrap in towel and place on maternal chest (skin-to-skin) unless resuscitation needed
- The placenta will deliver spontaneously, often within 5-15 minutes of the infant
    - Do not force the placenta to deliver; do not pull on umbilical cord
    - Contain all tissue in plastic bag and transport
- Record APGAR scores at 1 and 5 minutes
- Allowing the infant to nurse will promote uterine contraction and help control bleeding.
- Consider uterine fundal massage after placental delivery for hemorrhage control.
- Transport infant secured in appropriate restraint device.
- Keep infant warm during transport (heater in ambulance, blankets, warming devices, cap)
- Most deliveries proceed without complications – If complications of delivery occur, the following are recommended:
    - **Shoulder dystocia** – if delivery fails to progress after head delivers, quickly attempt the following
        - Hyperflex mother's hips to severe supine knee-chest position
        - Apply firm suprapubic pressure toward infant face at 45-degree angle to attempt to dislodge anterior shoulder
        - Apply this firm pressure PRIOR to mother's next push attempt (pressure should be applied immediately before her next contraction/push)
        - Attempt these maneuvers 2-3 times (e.g. 2-3 contractions/pushing)
        - Apply high-flow oxygen to mother
        - Transport as soon as possible if these maneuvers fail while continuing these maneuvers
        - Contact closest appropriate receiving facility for Direct Medical Oversight and to mobilize OB resources
    - **Prolapsed umbilical cord**
        - Placed gloved hand into vagina and gently lift head/body off of cord
        - Assess for pulsations in cord
        - Wrap the prolapsed cord in moist gauze
        - Apply high-flow oxygen to mother
        - Transport as soon as possible
        - Maintain until relieved by hospital staff.
        - Consider placing mother in prone knee-chest position during transport
        - Contact closest appropriate receiving facility for Direct Medical Oversight and to mobilize OB resources

- **Breech birth**
  - Place mother supine, allow the legs, buttocks and trunk to deliver spontaneously, then support the body while the head is delivered
  - You may need to rotate the infant's trunk from an anterior chest position to a posterior chest position as breech infants cannot be delivered chest anterior
  - You may need to sweep the legs out of the vagina if buttocks present first
  - NEVER pull on the body, just support infant body while mother pushes
  - Once legs are delivered support the body to avoid hyperextension of the head
  - Keep the infant elevated off the umbilical cord
  - If head fails to deliver, place gloved hand into vagina with fingers between infant's face and uterine/vaginal wall to create an open airway and maintain the airway until delivery or until arrival at the hospital.
  - Apply high-flow oxygen to mother
  - Transport as soon as possible if infant fails to promptly deliver head
  - Contact closest appropriate receiving facility for Direct Medical Oversight and to mobilize OB resources
  - The presentation of an arm or leg through the vagina is an indication for immediate transport to hospital
  - Assess for presence of prolapsed cord and treat as above
- **Excessive bleeding**:
  - May occur during active labor with placenta previa
  - Obtain history from patient
  - Placenta previa may prevent delivery of infant vaginally
  - Treat shock as indicated (see **Shock** protocol)
  - Transport patient promptly as may need emergent C-section
- **Post-Partum hemorrhage**
  - Observe and assess for significant blood loss (3-4 soaked pads) and signs/symptoms of shock.
  - Firm uterine fundal massage after placental delivery
  - Examine perineum for large tears that may be source of bleeding and apply direct pressure (consider hemostatic dressing/packing)
  - Treat shock as indicated (see **Shock** protocol).
  - Transport patient promptly

- **Maternal cardiac arrest**
  - Apply manual pressure to displace uterus from right to left
  - Treat per the cardiac arrest protocol for resuscitation care (defibrillation and medications should be given for same indications and doses as if non-pregnant patient)
  - Transport as soon as possible if infant is estimated to be over 20 weeks gestation (uterus palpable at or above umbilicus)
  - Perimortem Cesarean section at receiving facility is most successful if done within 5 minutes of maternal cardiac arrest
  - Contact closest appropriate receiving facility for Direct Medical Oversight and to mobilize OB resources
  - Early attempt to contact MD1 or MD2 via medical director recorded line for field response to any potential maternal cardiac arrest for possible peri-mortem C-section, but transport should not be delayed

Key Considerations:

- Signs of imminent delivery:
  - Contractions (typically repetitive, short intervals and painful)
  - Crowning
  - Urge to push
  - Urge to move bowels
  - Membrane rupture
- Some bleeding is normal with any childbirth
- Large quantities of blood or free bleeding are abnormal

APGAR Score

Sign	0	1	2
Appearance:	Blue, Pale	Body pink, Extremities blue	Completely pink
Pulse:	Absent	Slow (less than l00)	≥ 100
Grimace:	No response	Grimace	Cough or Sneeze
Activity:	Limp	Some flexion	Active motion of extremities
Respirations:	Absent	Slow, Irregular	Good, Crying

Patient/Provider Safety Considerations:

- Supine Hypotension Syndrome:
  - If mother has hypotension before delivery, place patient in left lateral recumbent position or manually displace gravid uterus to the left if supine position necessary
- Knee-chest position may create safety issues during rapid ambulance transport and requires clinical judgement regarding risk/benefit.
- Do **not** routinely suction the infant's airway (even with a bulb syringe) during delivery
- Newborns are very slippery, take care not to drop the infant
- Do not pull on the umbilical cord while the placenta is delivering
- If possible, transport between deliveries if mother is expecting twins
- Secure infant in appropriate restraining device for transport

PRE-ECLAMPSIA/ECLAMPSIA

Aliases:
Pregnant seizures, toxemia of pregnancy

Patient Care Goals:
- Recognize serious conditions associated with pregnancy and hypertension
- Provide adequate treatment for eclampsia-related seizures

Patient Presentation:
- Female patient, more than 20-weeks gestation, presenting with hypertension and evidence of end-organ dysfunction including renal insufficiency, liver involvement, neurological, or hematological involvement
- May occur up to 6-weeks post-partum but is rare after 48 hours post-delivery.
- Severe features of pre-eclampsia include:
  - Severe hypertension (SBP > 160, DBP > 110)
  - Headache
  - Mental confusion
  - Vision changes
  - Right upper quadrant or epigastric pain
  - Pulmonary edema
  - Evidence of low platelets (bruising, petechiae)
  - Focal neurologic deficits
- Eclampsia:
  - Pre-eclampsia symptoms plus seizures
  - Any pregnant patient >20 weeks gestation, or is post-partum who is seizing should be presumed to have eclampsia
- This does not apply to pregnant patients with chronic hypertension without signs/symptoms of end-organ dysfunction OR pregnancy <20 weeks gestation

Treatment and Interventions:
- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- For actively seizing patient administer midazolam (see **Seizure** protocol and **FRG**)
- Initiate EKG monitoring
- Establish IV access as indicated (see **Vascular Access** protocol)
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Treat shock as indicated (see **Shock** protocol)
- Transport to closest appropriate receiving facility
- Patients in second or third trimester of pregnancy should be transported on left side or with uterus manually displaced to left if hypotensive

Key Considerations:

- Delivery of the placenta is the only definitive management for pre-eclampsia and eclampsia
- Clinical judgement required when deciding appropriate hospital destination keeping in mind patient's Obstetrician preference when feasible and safe.

Patient/Provider Safety Considerations:

- Magnesium toxicity (progression)
  - Hypotension followed by
  - Loss of deep tendon reflexes followed by
  - Somnolence, slurred speech followed by
  - Respiratory paralysis followed by
  - Cardiac arrest
- Treatment of magnesium toxicity
  - Stop magnesium infusion
  - ☎Give *calcium chloride* for pending respiratory arrest in consultation with Direct Medical Oversight (see **calcium** formulary and **FRG**)
  - Manage airway and respiratory distress per protocol

CARDIAC ARREST AND RESUSCITATION

CARDIAC ARREST AND RESUSCITATION

Patient Care Goals:

- High-quality chest compressions/CPR with minimal interruption from recognition of cardiac arrest until confirmation of ROSC or field termination of care
- Early recognition and defibrillation of shockable rhythms
- Rapid identification of potential reversible causes of cardiac arrest
- Return of spontaneous circulation (ROSC)
- Preservation of neurologic function

Patient Presentation:

- This protocol applies to patients with **non-traumatic** cardiac arrest
- Patients suffering cardiac arrest due to severe hypothermia (see **Hypothermia** protocol)
- Patients with identifiable Do Not Resuscitate or equivalent such as TPOPP order (see **DNR/Advanced Directives/Health Care Power of Attorney (POA)** protocol)
- Patients in cardiac arrest due to traumatic etiology (see **Traumatic Cardiac Arrest** protocol)

Treatment and Interventions: (see **Appendix I** and **Cardiac Arrest** checklist))

- The most important therapies for patients suffering from cardiac arrest are **prompt cardiac defibrillation** and **minimally interrupted, effective chest compressions**.
- For patients in cardiac arrest compressions should be immediately initiated while the AED or monitor/defibrillator equipment is being retrieved and applied and that defibrillation, if indicated, be attempted as soon as the device is ready for use.
- The maximum setting on the defibrillator should be used for initial and subsequent defibrillation attempts.
- Chest compressions should resume immediately after defibrillation attempts with no pauses for pulse checks for 2 minutes regardless of the rhythm displayed on the cardiac monitor
- All attempts should be made to prevent avoidable interruptions in chest compressions, such as pre-charging the defibrillator and hovering over the chest, rather than stepping away during defibrillations
- If feasible, IV or IO access should be obtained (IV preferred when can be obtained without delay)
- If IO is successful continue to attempt IV access and begin using IV route when established.
- Administer *epinephrine* (see **epinephrine** formulary and **FRG**) as soon as vascular access is obtained.
- Continue the two-minute cycles of chest compressions, followed by rhythm analysis and defibrillation of shockable rhythms

- Airway management should begin simultaneously with immediate compressions/defibrillation when enough providers are available on-scene. **However, compressions/defibrillation take priority over airway management when lacking in adequate resources/personnel.**
- Regarding airway management/ventilation consider the following principles:
  - **The airway management strategy should not interrupt compressions**
  - Successful resuscitation from cardiac arrest depends primarily on effective, minimally interrupted chest compressions and prompt defibrillation
  - **Airway management is of secondary importance and should not interfere with compressions and defibrillation**.
- Options for airway management include:
  - Immediate placement of SGA in adults with BVM ventilation at 10 breaths per minute (1 breath every 10 compressions), **applied during the upstroke between compressions**, without interrupting the compressions
  - When SGA unavailable BVM/Oral Airway ventilation (2-person BVM preferred) with continuous compressions with ventilation every 10th compression (10 breaths per minute) **applied during the upstroke between compressions**.
    - **Pediatric Consideration:** For multiple rescuer CPR in children, use 15:2 compression to ventilation ratio. (30:2 for single rescuer).
      - **BVM/oral airway is preferred method of airway management in pediatric patients for cardiac arrest**
        - **If BVM is unsuccessful SGA may be placed**
        - **Intubation should only be attempted when BVM and SGA have failed to adequately secure the airway.**
    - **Newborn/Neonates Consideration:** For neonates, use 3:1 compression to ventilation ratio (see **Newly Born/Neonatal Resuscitation** protocol)
  - Advanced airway placement:
    - Only place endotracheal tube if unable to ventilate through less invasive methods and do NOT pause compressions to place ET tube.
    - Ventilations are provided at 10 breaths/minute for adults
      - **Pediatric Consideration:** for children, 1 breath every 3-5 seconds is recommended (12-20 breaths/minute)
- **Consider use of an antiarrhythmic** for recurrent VF/Pulseless VT that is unresponsive to CPR, defibrillation and epinephrine. (amiodarone and lidocaine are equivalent in efficacy)
  - *Amiodarone* (see **amiodarone** formulary and **FRG**)
  - *Lidocaine* (see **lidocaine** formulary and **FRG**)
  - Once patient has received maximum dose of one antiarrhythmic can consider switching to other antiarrhythmic medication.
- Consider **Double Sequential Defibrillation (DSD)** for ADULTS with refractory pulseless (VF/VT) after 3 consecutive unsuccessful single defibrillations (AED shocks count toward total) and at least one dose of epinephrine and one dose of antiarrhythmic have been given.

- Crews should continue to utilize Double Sequential Defibrillation for ALL additional defibrillations delivered to the patient including if ROSC is achieved and the patient re-arrests.

- Mechanical CPR device can be placed after airway is effectively managed, vascular access is obtained and first dose of epinephrine has been administered, when device is available.
- Consider reversible causes of cardiac arrest which include the following:
  - Hypothermia (see **Hypothermia** protocol)
  - The dialysis patient/known hyperkalemic patient: Additions to care include the following:
    - Administer *calcium chloride* (see **calcium chloride** formulary and **FRG**) should be given early in cardiac arrest
    - Administer *sodium bicarbonate* (see **sodium bicarbonate** formulary and **FRG**)
  - Tricyclic antidepressant overdose (TCA) - Additions to care include:
    - Administer *sodium bicarbonate* (see **sodium bicarbonate** formulary and **FRG**)
  - Hypovolemia - Additions to care may include:
    - Administer *crystalloid* bolus (see **crystalloid** formulary and **FRG**)
  - Assess for tension pneumothorax and misplaced ETT
    - If tension pneumothorax suspected, perform needle decompression. Assess ETT, if misplaced, replace ETT
  - Hypoglycemia-Additions to care include:
    - Administer *dextrose 10%* (see **dextrose** formulary and **FRG**)
- If at any time during this period of resuscitation the patient regains return of spontaneous circulation, treat per Post-ROSC Care protocol (see **Post-ROSC** checklist)
- If resuscitation remains ineffective, consider termination of resuscitation when appropriate (see **Termination of Resuscitation** protocol/checklist)

Principles of Pit Crew CPR

- **Ensure 360-degree access to patient** with adequate room to provide resuscitation and room for appropriate number of personnel.
- A patient care leader should be designated upon initial patient contact
- Initial priorities are immediate compressions, searching for and defibrillating shockable rhythms, and airway management
- Roles that need to be filled when adequate personnel are available:
  - Compressor(s)
  - Monitor
  - Airway
  - IV/Meds
  - Scribe
  - Logistics (ex. Family Liaison/Logistics/Extrication plan if transported)

- Can Consider placement of mechanical CPR device as soon as the following tasks are completed
    - Airway managed
    - Vascular access is obtained
    - First epinephrine administered (when applicable)
- De-emphasize need for second IV/IO line as initial priority
- Place the monitor so that the airway manager, compressors and monitor roles can all see the monitor screen at all times
- Use the **Cardiac Arrest checklist**
- Minimize patient movement post-ROSC for 10 minutes (requires clinical judgement)
- CUSS
    - Everybody on scene is empowered to say something in a professional and collegial manner when they observe an actual safety event or a potential safety even by CUSSing.
    - **C**- "I have some **Concerns**"
    - **U**- "I am **Uncomfortable**"
    - **SS**- "I see a potential **Safety Situation**"

Key Considerations:

- Effective chest compressions and defibrillation are the most important therapies to the patient in cardiac arrest. Effective chest compressions are defined as:
    - Ensuring metronome use
    - Depth of at least 2 inches (5 cm) and less than 2.4 inches (6cm) for adults and children or 1.5 inches (4 cm) for infants; adolescents who have entered puberty should receive the same depth of chest compressions as an adult
    - Allow for complete chest recoil (avoid leaning)
    - Minimize interruptions in compressions
    - Avoid rescuer fatigue by rotating rescuers at least every 2 minutes.
    - Quantitative end-tidal CO2 should be used to monitor effectiveness of chest compressions
    - If ETCO2 less than 10 mmHg during the initial phases of resuscitation, attempt to improve chest compression quality
    - Use real-time feedback for CPR quality during resuscitation.
- Chest compressions are usually the most rapidly applied therapy for the patient in cardiac arrest and should be applied as soon as the patient is noted to be pulseless. If the patient is being monitored with pads in place at the time of arrest, immediate defibrillation should take precedence over all other therapies, however, if there is any delay in defibrillation (for instance, in order to place pads), chest compressions should be initiated while the defibrillator is being applied.
- Chest compressions should be reinitiated immediately after defibrillation as pulses, if present, are often difficult to detect and rhythm and pulse checks interrupt compressions
- Continue chest compressions between completion of AED analysis and AED charging.

- Effectiveness of chest compressions decreases with any movements therefore patients should be resuscitated as close to the point at which they are first encountered and should only be moved if the conditions on scene are unsafe or do not operationally allow for resuscitation
- Chest compressions are also less effective in a moving vehicle
- It is also dangerous to EMS providers, patients, pedestrians, and other motorists to emergently transport patients in cardiac arrest.
- For these reasons and because in most cases the care provided by EMS providers is equivalent to that provided in emergency departments, **resuscitation should occur on scene in most scenarios for medical cardiac arrest patients.**
- The maximum setting on the defibrillator should be used for initial and subsequent defibrillation attempts. (see **FRG** for defibrillation dosing)
- Principles of airway management in cardiac arrest:
    - Airway management should not interrupt chest compressions
    - Carefully follow ventilation rate and prevent hyperventilation
    - Squeeze bag on upstroke of chest compression
    - Consider limited tidal volumes and do not over squeeze BVM bag (use one hand only)
- It is realistic for EMS providers to tailor the sequence of rescue actions to the most likely cause of arrest
- **Pediatric Considerations**: Special attention should be applied to the pediatric population and airway management/respiratory support. Given that the most likely cause of cardiac arrest is respiratory, airway management may be considered early in the patient's care
- However, the order of Circulation-Airway-Breathing is still recommended as the order of priority by the American Heart Association for pediatric resuscitation in order to ensure timely initiation of chest compressions to maintain perfusion, regardless of the underlying cause of the arrest
- In addition, conventional CPR is preferred in children, since it is associated with better outcomes when compared to compression-only CPR
- Special Circumstances in Cardiac Arrest
    - Trauma, treat per **Traumatic Cardiac Arrest protocol**
    - Pregnancy
        - The best hope for fetal survival is maternal survival
        - Position the patient in the supine position with a second rescuer performing manual uterine displacement to the left in an effort to displace the gravid uterus and increase venous return by avoiding aortocaval compression
        - If manual displacement is unsuccessful, the patient may be placed in the left lateral tilt position at 30°. This position is less desirable than the manual uterine displacement as chest compressions are more difficult to perform in this position
        - Chest compressions should be performed slightly higher on the sternum than in the non-pregnant patient to account for elevation of the diaphragm and abdominal contents in the obviously gravid patient

        - Defibrillation should be performed as in non-pregnant patients
        - Early attempt to contact MD1 or MD2 via medical director recorded line for field response to any potential maternal cardiac arrest for possible peri-mortem C-section, but transport should not be delayed
        - Rapid transport to closest facility for possible peri-mortem C-section is indicated.
    - Arrests of respiratory etiology (including drowning) – In addition to the above, consider early management of the patient's airway.

Patient/Provider Safety Considerations:

- Performing manual chest compressions in a moving vehicle may pose a provider safety concern and mechanical CPR device should be utilized when available.
- In addition, manual chest compressions during patient movement are less effective in regards to hands on time, depth, recoil and rate and mechanical CPR devices should be utilized during patient extrication/movement when available.
- Ideally, patients should be resuscitated on-scene unless environmental/logistics/operational/clinical concerns dictate otherwise.
- Risks and benefits should be considered before patient movement in cardiac arrest situations.

POST-ROSC CARE

Patient Care Goals:

- Optimize oxygenation, ventilation and perfusion in order to positively impact neurologic and other function after the return of spontaneous circulation from a resuscitated cardiac arrest
- Recognize pending re-arrest
- Secure airway if not already secure
- Ensure adequate vascular access
- Identify possible STEMI/ACUTE MI or other arrhythmias requiring attention

Patient Presentation:

- Patient with sustained spontaneous circulation following cardiac arrest resuscitation

Treatment, and Interventions: (**see POST-ROSC** CHECKLIST)

- Support life-threatening problems associated with airway, breathing, and circulation. Monitor continuously for reoccurrence of cardiac arrest by assigning provider to continuously palpate femoral pulse (especially important during transfer/movement).
- Minimize patient movement post-ROSC for 10 minutes (requires clinical judgement)
- Administer oxygen as appropriate with a target of achieving 94-98% saturation. Do not hyperoxygenate. Goal is NOT 100%.
- Do not hyperventilate. Maintain a ventilation rate guided by $ETCO_2$ to achieve ETCO2 values between 35-45 mmHg.
- For hypotension (see **Shock** protocol):
  - Adults: Systolic BP<90mmHg
  - Pediatric: Hypotension for age (see **Table 1. Abnormal Vital Signs**)

Table 1. Abnormal Vital Signs

Age	Heart Rate	Respiratory Rate	Systolic BP	Temp (°C)
0 d – 1 mo	>205	>60	<60	<36 or >38
≥ 1 mo – 3 mo	>205	>60	<70	<36 or >38
≥ 3 mo – 1 yr	>190	>60	<70	<36 or >38.5
≥ 1 yr – 2 yr	>190	>40	<70 + (age in yr x 2)	<36 or >38.5
≥ 2 yr – 4 yr	>140	>40	<70 + (age in yr x 2)	<36 or >38.5
≥ 4 yr – 6 yr	>140	>34	<70 + (age in yr x 2)	<36 or >38.5
≥ 6 yr – 10 yr	>140	>30	<70 + (age in yr x 2)	<36 or >38.5
≥ 10 yr – 13 yr	>100	>30	<90	<36 or >38.5
> 13 yr	>100	>16	<90	<36 or >38.5

- Perform serial 12-lead EKG's
- Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
- Treat seizures as indicated (see **Seizure** protocol)
- Ensure adequate vascular access when possible (see **Vascular Access** protocol)
- Post-cardiac arrest patients with evidence or interpretation consistent with ST elevation myocardial infarction (STEMI)/ACUTE MI should have early notification to hospital of STEMI activation.

Key Considerations:

- Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided. ETCO2 should be guiding ventilation rate/volume.
- Most patients immediately post resuscitation will require ventilatory assistance.
- The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring. A significant percentage of post-ROSC patients will re-arrest.
- A moderate number of post-ROSC patients may have evidence of ST elevation MI on EKG
- Common causes of post-resuscitation hypotension include hyperventilation, hypovolemia, and pneumothorax
- Consider placement of mechanical compression device prior to transport
- Ensure adequate number of personnel during transport.
- Do **NOT** routinely use lights and sirens when transporting a cardiac arrest OR Post-ROSC patient.

TRAUMATIC CARDIAC ARREST

Patient Care Goals:

- Return of spontaneous circulation
- Treatment and resolution of the underlying pathophysiology leading to the traumatic cardiac arrest
- When appropriate, transport to the closest and most capable hospital within the defined trauma system

Patient Presentation:

- Patients suffering blunt or penetrating trauma with cardiac arrest after arrival of EMS clinicians or while under the care of EMS clinicians (witnessed arrest or recent arrest with continued signs of life)
- When the mechanism of injury does not correlate with the clinical condition, suggesting a nontraumatic cause of cardiac arrest, standard resuscitative measures should be followed (see **Cardiac Arrest** protocol).
- In victims of blunt or penetrating trauma with rigor mortis, lividity, or evidence of injuries incompatible with life (including decapitation, hemicorporectomy) (see **Determination of Death/Withholding Resuscitative Efforts** protocol)
- Assess for signs of life, including pulses, respiratory effort, motor activity, pupillary responses, and cardiac electrical activity.
- If a **BLUNT** trauma patient has ANY of the following present **AND** time of cardiac arrest + transport time is **<10 minutes**, begin resuscitation and expedite transport:
  - Respiratory effort
  - Motor effort (spontaneous movement)
  - Cardiac electrical activity
  - Pupillary Activity
- If a **PENETRATING** trauma patient has ANY of the following present **AND** time of cardiac arrest + transport time is **<15 minutes**, begin resuscitation and expedite transport:
  - Respiratory effort
  - Motor effort (spontaneous movement)
  - Cardiac electrical activity
  - Pupillary Activity
- Begin CPR, apply mechanical CPR device, and expedite transport
- Perform bilateral needle decompression for any patient with signs of thoracic/abdominal injury
- Manage Airway as indicated (see **Airway/Ventilation Management** protocol)
- Manage massive hemorrhage (see **Extremity/Pelvic trauma/External hemorrhage control** protocol)
- Place a pelvic binder on all patients with blunt or blast trauma suffering traumatic arrest
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Initiate volume resuscitation (see **Shock** protocol)

Determination of Death/Withholding Resuscitation

- In **BLUNT** traumatic arrest if the patient has ALL the following AND/OR the time of cardiac arrest + transport time is **>10 minutes**:
  - No respiratory effort
  - No motor effort
  - No cardiac electrical activity (asystole)
  - No pupillary response
- In **PENETRATING** traumatic arrest if the patient has ALL the following AND/OR the time of cardiac arrest + the transport time is **>15 minutes**:
  - No respiratory effort
  - No motor effort
  - No cardiac electrical activity (asystole)
  - No pupillary response

Key Considerations

- Management of traumatic cardiac arrest requires a balance of rapid, focused evaluation followed by prompt treatment of reversible life threats, including management of massive hemorrhage, airway management, decompression of tension pneumothorax, and resuscitation
- Evidence for the benefit of CPR in traumatic cardiac arrest is limited. Treatment priorities should initially focus on control of massive hemorrhage (including management of pelvis fractures with binding), airway management, and consideration of bilateral needle thoracostomy.
- Unless there is an immediate and correctable cause, patients suffering traumatic cardiacarrest have the best chance for survival when arrival time to a hospital is within minutes
- In an effort to reduce on-scene time, consider IV/IO access and initiation of resuscitationduring transport
- Consider the duration of resuscitation and transport, and consider contact with Direct Medical Oversight to discuss as indicated.

DETERMINATION OF DEATH/WITHHOLDING RESUSCITATION

Patient Care Goals:

- All clinically dead patients will receive all available resuscitative efforts including cardiopulmonary resuscitation (CPR) unless contraindicated by one of the exceptions defined below.

Patient Presentation:

- A clinically dead patient is defined as any unresponsive patient found without effective respirations and without a palpable pulse.
- Resuscitation should be started on all patients who are found apneic (or with agonal breathing) and pulseless **unless the following conditions exist** (does not apply to victims of lightning strikes/electrocution, drowning, or hypothermia):
    - Medical cause or traumatic injury or body condition clearly indicating biological death (irreversible brain death), limited to:
        - Decapitation: the severing of the head from the remainder of the patient's body
        - Decomposition or putrefaction: the skin is bloated or ruptured, with or without soft tissue sloughed off. The presence of at least one of these signs indicated death occurred beyond a time for successful resuscitation to be possible.
        - Transection of the torso: the body is completely cut across below the shoulders and above the hips through all major organs and vessels. The spinal column may or may not be severed
        - Incineration: 90% of body surface area with full thickness burns as exhibited by ash rather than clothing and complete absence of body hair with charred skin
        - Injuries incompatible with life (such as massive crush injury, complete exsanguination, severe displacement of brain matter)
        - In **BLUNT** traumatic arrest if the patient has ALL the following AND/OR the time of cardiac arrest + transport time is **>10 minutes**:
            - No respiratory effort
            - No motor effort
            - No cardiac electrical activity (asystole)
            - No pupillary response
        - In **PENETRATING** traumatic arrest if the patient has ALL the following AND/OR the time of cardiac arrest + transport time is **>15 minutes**:
            - No respiratory effort
            - No motor effort
            - No cardiac electrical activity (asystole)
            - No pupillary response

- Non-traumatic arrest with obvious signs of death including dependent lividity or rigor mortis

OR

- A valid DNR order (form, card, bracelet, medallion, jewelry) or other actionable medical order (e.g. TPOPP) is present

Treatment and Interventions:

- No CPR is required if any of the above exceptions exist
- If CPR has been initiated but an above exception has been subsequently confirmed, CPR may be discontinued without Direct Medical Oversight.
- If any of the findings are different than those described above, clinical death is not confirmed and resuscitative measures should be immediately initiated or continued. The Termination of Resuscitation Guidelines should then be implemented when appropriate (see **Termination of Resuscitation** protocol)
- Do Not Resuscitate order (DNR/TPOPP) **with** signs of life:
  - If there is a DNR bracelet/medallion/jewelry or valid out-of-hospital DNR form and there are signs of life (pulse and respirations), provide standard appropriate treatment under existing protocols matching the patient's condition.
  - To request permission to withhold treatment under these conditions for any reason obtain Direct Medical Oversight.
  - If there is documentation of a Do Not Intubate, TPOPP, or other advanced directive, the patient should receive full treatment per protocols with the exception of any intervention specifically prohibited in the patient's advanced directive.
  - If for any reason an intervention that is prohibited by an advanced directive is being considered, Direct Medical Oversight should be obtained.

Key Considerations:

- At a likely crime scene, disturb as little potential evidence as possible.
- Photocopies, faxes and electronic media formats of advanced directives will be honored.
- Advanced Directives should be documented and filed with EMS report when available.

Patient Safety Considerations:

- In cases where the patient's status is unclear and the appropriateness of withholding resuscitation efforts is questioned, EMS personnel should initiate CPR immediately and then contact Direct Medical oversight.
- Scene safety should be considered when making determinations to withhold or terminate resuscitation. If family/bystanders/environment are threatening violence, EMS providers may elect to begin resuscitation/continue resuscitation to avoid escalation.

Law Enforcement and Medical Examiner guidance:

- Once arrest has been terminated the local Law Enforcement agency has jurisdiction of the scene and the Medical Examiner has jurisdiction of the body and they determine how the body is to be handled once terminated.
- Medical trash generated by EMS Providers during resuscitation should be picked up and disposed of properly.
- Devices inside or on the patient (SGA, ET tube, IV/IO catheters, EKG stickers etc.) should be left in place.
- Coordinate and discuss with on-scene Law Enforcement to ensure appropriate scene management occurs so as not to impair any Medical Examiner death investigation.

TERMINATION OF RESUSCITATION

Patient Care Goals:

- When there is no response to prehospital cardiac arrest treatment, it is acceptable and often preferable to cease futile resuscitation efforts in the field.
- In patients with cardiac arrest, prehospital resuscitation is initiated with the goal of returning spontaneous circulation before permanent neurologic damage occurs. In most situations, ALS providers are capable of performing an initial resuscitation that is equivalent to an in-hospital resuscitation attempt, and there is usually no additional benefit to emergency department resuscitation in most cases.
- CPR that is performed during patient packaging and transport is much less effective than CPR done at the scene. Additionally, EMS providers risk physical injury while attempting to perform CPR in a moving ambulance while unrestrained. In addition, continuing resuscitation in futile cases places other motorists and pedestrians at risk, increases the time that EMS crews are not available for another call, impedes emergency department care of other patients, and incurs unnecessary hospital charges.
- Lastly, return of spontaneous circulation is dependent on a focused, timely resuscitation. The patient in arrest should be treated as expeditiously as possible, including quality, uninterrupted CPR and timely defibrillation as indicated.
- When cardiac arrest resuscitation becomes futile, the patient's family should become the focus of the EMS providers. Families need to be informed of what is being done and transporting all cardiac arrest patients to the hospital is not supported by evidence and inconveniences the family by requiring a trip to the hospital where they must begin grieving in an unfamiliar setting. Most families understand the futility of the situation and are accepting of ceasing resuscitation efforts in the field.

Patient Presentation:

- Any cardiac arrest patient that has received resuscitation in the field but has not responded to treatment
- When resuscitation has begun and it is found that the patient has a DNR order or other actionable medical order (ex. TPOPP)
- This does not apply to the following:
    - Consider continuing resuscitation for patients in cardiac arrest associated with medical conditions that may have a better outcome despite prolonged resuscitation, including hypothermia (although under certain circumstances, Direct Medical Oversight should be contacted for termination of resuscitation in these conditions)

Treatment and Interventions:

- **Non-traumatic Cardiac Arrest**:
  - If all of the following criteria have been met resuscitation may be terminated without contacting Direct Medical Oversight:
    - Quality chest compressions performed during resuscitation
    - Appropriate oxygenation/ventilation techniques applied for situation
    - Vascular Access achieved
    - Defibrillation/Rhythm appropriate medications have been administered according to protocol
    - A minimum of 25 minutes of EMS resuscitation provided for UNWITNESSED cardiac arrest.
    - A minimum of 40 minutes of EMS resuscitation for WITNESSED cardiac arrests.
    - ≥5 minutes since last epinephrine dose
    - No ROSC at any point during treatment
    - No refractory or recurrent v-fib/v-tach
    - No neurological activity (eye opening, pupillary response, agonal breathing, motor responses)
    - Persistent asystole/agonal/slow PEA rhythm (<60 bpm)
    - Reversible causes identified and managed when possible
    - If patient is a minor, the parent/guardian is agreeable to discontinuing efforts.
    - All EMS providers on-scene agree to TOR.
- **Traumatic Cardiac Arrest**:
  - **BLUNT traumatic arrest**: Resuscitation efforts may be terminated in any blunt trauma patient who has all the following AND/OR the time of cardiac arrest + transport time is **>10 minutes**:
    - No respiratory effort
    - No motor effort
    - No cardiac electrical activity (asystole)
    - No pupillary response
  - **PENETRATING traumatic arrest**: Resuscitation efforts may be terminated in any penetrating trauma patient who has all the following AND/OR the time of cardiac arrest + transport time is **>15 minutes**:
    - No respiratory effort
    - No motor effort
    - No cardiac electrical activity (asystole)
    - No pupillary response
- If resuscitation is not terminated, expeditious transport is indicated
- All EMS personnel involved in the patient's care agree that discontinuation of the resuscitation is appropriate
- Direct Medical Oversight can be obtained if any confusion exists about whether to terminate resuscitation.

Key Considerations:

- Recent evidence has shown that, in order to capture over 99% of potential survivors from medical cardiac arrest (especially VF and pulseless VT arrests), resuscitation should be continued for approximately 40 minutes. This does not imply, however, that all resuscitations should continue this long (e.g. asystolic rhythms/slow, wide PEA rhythms.
- Logistical factors should be considered, such as collapse in a public place, family wishes, and safety of the crew and public.
- Survival and functional neurologic outcomes are unlikely if ROSC is not obtained by EMS. It is dangerous to crew, pedestrians, and other motorists to attempt to resuscitate a patient during ambulance transport and should be limited when possible.
- Quantitative end-tidal carbon dioxide measurements of less than 10 mmHg or falling greater than 25% despite resuscitation indicates a poor prognosis and provide additional support for termination
- Focus attention on the family and/or bystanders. Explain the rationale for termination
- Consider support for family members such as other family, friends, clergy, faith leaders, or chaplains

Patient/Provider Safety Considerations:

- All patients who are found in ventricular fibrillation or whose rhythm changes to ventricular fibrillation should in general have full resuscitation continued on scene.
- Cardiopulmonary arrest patients in whom mechanism of injury does not correlate with clinical condition, suggesting a non-traumatic cause of arrest, should have standard ALS resuscitation initiated.
- Scene safety should be considered when making determinations to withhold or terminate resuscitation. If family/bystanders/environment are threatening violence, EMS providers may elect to begin resuscitation/continue resuscitation to avoid escalation.

Law Enforcement and Medical Examiner guidance:

- Once arrest has been terminated the local Law Enforcement agency has jurisdiction of the scene and the Medical Examiner has jurisdiction over the body and they determine how to handle once terminated.
- Medical trash generated by EMS Providers during resuscitation should be picked up and disposed of properly.
- Devices inside or on the patient (SGA, ET tube, IV/IO catheters, EKG stickers etc.) should be left in place.
- Coordinate and discuss with on-scene Law Enforcement to ensure appropriate scene management occurs so as not to impair Medical Examiner death investigation.

TRAUMA

TRAUMA PATIENT UNIVERSAL MANAGEMENT

Patient Care Goals:

- Rapid assessment and management of life-threatening injuries
- Safe movement of patient both on-scene and during transport
- Rapid and safe transport to the appropriate receiving facility

Patient Presentation:

- Patients of all ages who have sustained an injury as a result of trauma, including:
  - Blunt injury
  - Penetrating injury
  - Burns

Patient Assessment:

- **Primary survey:**
  - **Hemorrhage control**
    - Assess for and stop severe hemorrhage (see **Extremity/Pelvic trauma/External hemorrhage control** protocol)
  - **Airway**
    - Assess airway patency by asking the patient to talk
    - Look for injuries that may lead to airway obstruction including unstable facial fractures, expanding neck hematoma, blood or vomitus in the airway, facial burns/inhalation injury
    - Evaluate mental status for ability to maintain patency of airway (patients with a GCS less than or equal to 8 are more likely to need assistance with maintaining airway patency). The decision to escalate airway care should ONLY be based on clinical evaluation findings and provider judgement, regardless of GCS.
  - **Breathing**
    - Assess respiratory rate and pattern
    - Assess symmetry of chest wall movement
    - Listen bilaterally on lateral chest wall for breath sounds
  - **Circulation**
    - Assess perfusion and measure blood pressure and heart rate
    - Assess capillary refill time, skin color, temperature
  - **Disability**
    - Perform rapid neurologic status assessment
    - Assess gross motor movement of extremities
    - Evaluate for clinical signs of traumatic brain injury with herniation including:
      - Unequal pupils
      - Posturing

- **Exposure**
  - Rapid evaluation of entire body to identify sites of penetrating wounds or other blunt injuries.
  - Be sure to roll patient and examine the back
  - Prevent hypothermia

Treatment and Interventions:

- **Hemorrhage control**
  - Stop hemorrhage (see **Extremity/Pelvic hemorrhage/External hemorrhage** control protocol)
  - **Airway**
    - Establish patent airway with cervical spine precautions if appropriate, (see **Airway/Ventilation Management** and **Spinal Care** protocols)
    - If respiratory efforts are inadequate, assist with BVM ventilation and consider airway adjuncts. If patient is unable to maintain airway, consider oral airway (nasal airway should not be used with significant facial injury or possible basilar skull fracture unless no other means of airway protection are available)
    - If impending airway obstruction or altered mental status resulting in inability to maintain airway patency, consider more definitive airway according to (**Airway/Ventilation Management** protocols).
  - **Breathing**
    - If absent or diminished breath sounds in a hypotensive patient, consider tension pneumothorax and perform needle decompression
    - For open chest wound, place semi-occlusive dressing (chest seal)
    - Monitor oxygen saturation and, if indicated, provide supplemental oxygen to maintain normoxia.
  - **Circulation**
    - Establish vascular access as indicated (this should NOT delay transport in unstable patients) (see **Vascular Access** protocol)
    - Consider fluid resuscitation for following:
      - Adults: Systolic BP<90mmHg
      - Pediatric: Hypotension for age (lowest acceptable systolic blood pressure in mmHg):
        - Less than 1 yo: <60 mmHg
        - 1-10 yo: <70 mmHg + (age in years x2)
        - Greater than 10 yo: <90 mmHg
      - However, if normal mental status lower BP's may be tolerated and do NOT require IV fluids.
      - Isolated Head injury: target SBP >110 mmHg. Hypotension should be avoided to maintain cerebral perfusion
      - Head Injury AND penetrating trauma in same patient requires clinical judgement for fluid resuscitation and Direct Medical Oversight should be contacted for guidance.

- Pediatrics
    - If child demonstrates tachycardia for age with signs of poor perfusion give *crystalloid* and reassess. (see **crystalloid** formulary and **FRG**)
    - Target normal BP for age (see vital signs in **FRG**)
- **Disability**
    - If clinical signs of traumatic brain injury (see **Head Injury** protocol)
- **Exposure**
    - Avoid hypothermia
    - Remove wet clothing
    - Cover patient to prevent further heat loss and maintain modesty

- **NOTE**: Patients with major hemorrhage, hemodynamic instability, penetrating torso trauma, or signs of traumatic brain injury often require rapid surgical intervention. Minimize scene time (goal is under 10 minutes) and initiate rapid transport to the appropriate trauma center.
- For evisceration of abdominal or thoracic contents, cover with moist dressing and transport to trauma center. Do not attempt to forcefully pack eviscerated contents back into abdominal or thoracic cavity.
- **Transport Destination**:
    - Decisions regarding transport destination should be based on the CDC Field Triage Guidelines for Injured Patients (see **Appendix A**)

Additional treatment considerations:

- Maintain spine precautions as clinically indicated (see **Spinal Care** protocol)
- Splint obvious extremity fractures as time and clinical situation allow (see **Extremity/Pelvic Trauma/External hemorrhage management** protocol)
- Provide pain management as needed (see **Pain Management** protocol)

Key Considerations:

- Target scene time less than 10 minutes for unstable patients or those likely to need surgical intervention
- Frequent reassessment of the patient is important
- If patient develops difficulty with ventilation, reassess breath sounds for development of tension pneumothorax
- If extremity hemorrhage is controlled with pressure dressing or tourniquet, reassess for evidence of continued hemorrhage
- If mental status declines, reassess ABCs and repeat neurologic status assessment
- Signs of hemorrhagic shock include: tachycardia, hypotension, pale, cool clammy skin, capillary refill greater than 2 seconds

Traumatic Arrest: Withholding and Termination of Resuscitative Efforts: (see **Traumatic Cardiac Arrest** protocol/**Determination of Death/Withholding Resuscitation** protocol/**Termination of Resuscitation protocol**)

Patient/Provider Safety Considerations:

- Life-threatening injuries identified on primary survey should be managed immediately with rapid transport to a trauma center, while the secondary survey is performed enroute
- Monitor patient for deterioration over time with serial vital signs and repeat neurologic status assessment
- Patients with compensated shock may not manifest hypotension until severe blood loss has occurred
- Patients with traumatic brain injury may deteriorate as intracranial swelling and hemorrhage increase
- Anticipate potential for progressive airway compromise in patients with trauma to head and neck
- Scene safety should be considered when making determinations to withhold or terminate resuscitation. If family/bystanders/environment are threatening violence, EMS providers may elect to begin resuscitation/continue resuscitation to avoid escalation.

BLAST INJURIES

Patient Care Goals:

- Identify multi-system injuries which may result from a blast, including possible toxic contamination
- Prioritize treatment of multi-system injuries to minimize patient morbidity/mortality

Patient Presentation:

- Patients exposed to explosive force. Injuries may include any or all of the following:
  - Blunt trauma
  - Penetrating trauma
  - Burns
  - Pressure-related injuries (barotrauma)
  - Toxic chemical contamination

Treatment and Interventions:

- **Hemorrhage control**
  - Control any external hemorrhage (see **Extremity/Pelvic Trauma/External hemorrhage Management** protocol)
- **Airway**
  - Secure airway as needed (see **Airway/Ventilation Management** protocol)
  - If thermal or chemical burn to airway is suspected, consider early airway control (which may be accomplished with SGA if difficult intubation is expected)
- **Breathing**
  - Administer oxygen as appropriate with a target of achieving 94-98% saturation.
  - Assist respirations as needed
  - Cover any open chest wounds with semi-occlusive dressing (chest seal
  - If patient has evidence of tension pneumothorax, perform needle decompression
- **Circulation**
  - Establish vascular access as necessary (see **Vascular Access** protocol)
  - Administer *crystalloid* as needed (see **General Trauma management** guideline)
- **Disability**
  - If evidence of head injury, treat per the (**Head Injury** protocol)
  - Implement spinal motion restriction if appropriate (see **Spinal Care** protocol)
  - Monitor GCS/mental status during transport to assess for changes
- **Exposure**
  - Keep patient warm to prevent hypothermia

Key Considerations:

- Patients sustaining blast injury may sustain complex, multi-system injuries including: blunt and penetrating trauma, shrapnel-related injuries, barotrauma, burns, and toxic chemical exposure
- Consideration of airway injury, particularly airway burns, should prompt early airway management when clinically necessary (requires clinical judgement)
- Minimize IV fluid resuscitation in patients without signs of shock
- Consider injuries due to barotrauma such as:
    - Tension pneumothorax
    - Tympanic membrane perforation resulting in deafness which may complicate the evaluation of their mental status and their ability to follow commands
- Transport to a trauma or burn center as appropriate

Patient Safety Considerations:

- Ensuring scene safety is especially important at the scene of an explosion.
- Consider possibility of subsequent explosions, structural safety, possible toxic chemical contamination, the presence of noxious gasses, and other hazards
- In a possible terrorist event, consider the possibility of secondary explosive devices
- Remove patient from the scene as soon as is practical and safe
- If the patient has sustained burns (thermal, chemical, or airway), transport to burn center

BURNS

Patient Care Goals:

- Minimize tissue damage and patient morbidity from burns
- Provide pain management when indicated
- Transport to appropriate destination

Patient Presentation:

- Patient may present with any of the following from thermal injury:
  - Airway involvement – stridor, hoarse voice
  - Mouth and nares involvement – redness, blisters, soot, singed hairs
  - Breathing involvement – rapid, shallow, wheezes, rales/crackles
  - Skin burns – Estimate Total Burn Surface Area (TBSA) and depth (superficial, partial vs. full thickness) see **FRG** for rule of 9's/BSA chart
  - Associated trauma – blast, fall, assault

Treatment and Interventions:

- Stop the burning process
- Follow ABCs of resuscitation per the **General Trauma Management** guideline
- Consider spinal motion restriction as indicated (see **Spinal Care** protocol).
- Administer high-flow oxygen for all burn patients rescued from an enclosed space or with any concern for Carbon Monoxide exposure (see **Carbon Monoxide Poisoning/Smoke Inhalation** protocol)
- Monitor SpO_2 and $ETCO_2$ as clinically indicated
- Initiate cardiac monitoring
- Establish vascular access as indicated (avoid placement through burned skin when possible) (see **Vascular Access** protocol)v
- Consider *hydroxocobalamin* administration for any patient with any of the following involved in enclosed-space fire: (see **hydroxocobalamin** formulary and **FRG**)
  - Altered mental status
  - Respiratory distress
  - Shock
  - Seizures
  - High-index of suspicion for cyanide toxicity
- If patient presents with signs of shock:
  - Consider other causes, such as trauma or cyanide toxicity
  - Administer IV fluids (see **Shock** protocol)
- If patient not in shock:
  - Do NOT administer IV fluids routinely
- Prevent heat loss and keep the patient warm
- Consider pain management (see **Pain Management** protocol)

- Cover burns with dry dressing or clean sheet
    - Do not apply any gels or ointments
- Remove all clothing/constricting bands (watches, jewelry, rings etc.)
- Transport to burn center is preferred (trauma center is acceptable if airway compromise and requires clinical judgement)

Key Considerations:

- Airway burns can rapidly lead to upper airway obstruction and respiratory failure
- Onset of stridor and change in voice are sentinel signs of potentially significant airway burns, which may rapidly lead to airway obstruction or respiratory failure
- Have a high index of suspicion for cyanide poisoning in a patient with depressed GCS, respiratory difficulty and cardiovascular collapse or seizure in the setting of an enclosed-space fire. Administer hydroxocobalamin when in doubt.
- Particularly in enclosed-space fires, carbon monoxide toxicity is a consideration and pulse oximetry may not be accurate (see **Carbon monoxide/Smoke Inhalation protocol**)
- Consider decontamination and notification of receiving facility of potentially contaminated patient (e.g. methamphetamine (meth) lab incident)
- If the patient is in shock within one hour of burn, it is generally not from the burn. Evaluate the patient carefully for associated trauma or cyanide toxicity.
- If the patient is not in shock, do NOT administer IV fluids as short transport times, inaccuracies with calculating TBSA and inability to control IV fluid drip rates in EMS environment offer no advantage, but may cause harm with over-hydration.
- Pain management is critical in acute burns
- $ETCO_2$ monitoring may be particularly useful to monitor respiratory status in patients receiving significant doses of pain medication
- Cardiac monitor is important in electrical burns and chemical inhalations
- TBSA is calculated only based on percent of second (partial thickness)/ third degree (full thickness) burns – First degree(superficial) burns are not included in this calculation
- Consider transport directly to burn center if partial or full thickness burns (TBSA) greater than 10%, involvement of hands/feet, genitalia, face, and/or circumferential burns, airway/inhalational/electrical burns
- Estimate TBSA burned and depth of burn
    - Use “Rule of 9’s” (see burn related tables in **FRG**)
    - First- degree burns (skin erythema only) are not included in TBSA calculations
- Evaluate distal circulation in circumferentially burned extremities

CRUSH INJURY

Patient Care Goals:

- Recognizing traumatic crush injury mechanism
- Minimize systemic effects of the crush syndrome

Patient Presentation:

- Patient with traumatic crush mechanism of injury

Treatment and Interventions:

- If severe hemorrhage is present, see **Extremity/Pelvic Trauma/External hemorrhage management** protocol.
- Manage airway as indicated (see **Airway/Ventilation Management** protocol)
- Initiate EKG monitoring and obtain 12-lead EKG.
- Monitor for dysrhythmias or signs of hyperkalemia before and immediately after release of pressure and during transport
- Establish IV access (see **Vascular access** protocol)
- Administer *crystalloid* for shock (prior to extrication if possible) (see **crystalloid** formulary and **FRG**)
- ☎Contact Direct Medical Oversight early for any suspected crush/prolonged entrapment patient PRIOR to release for guidance regarding ongoing fluid resuscitation management.
- Consider pain management (see **Pain Management** protocols)
- Consider the following post extrication:
  - Continued resuscitation with *crystalloid* (see **crystalloid** formulary and **FRG)**
  - If EKG suggestive of hyperkalemia:
    - Administer IV fluids and consider administration of:
      - *Calcium chloride* (see **calcium chloride** formulary and **FRG**)
      - *Albuterol* continuously (see **albuterol** formulary and **FRG**)
      - *Sodium bicarbonate* (see **sodium bicarbonate** formulary and **FRG**)
- Transport to a trauma center

Key Considerations:

- A patient with a crush injury may initially present with very few signs and symptoms. Therefore, maintain a high index of suspicion for any patient with a compressive mechanism of injury.
- A fatal medical complication of crush syndrome is hyperkalemia. Suspect hyperkalemia if T waves become peaked, QRS becomes prolonged (greater than 0.12 seconds), absent P wave, or prolonged QTc, bradycardias, junctional rhythms, non-specific intraventricular conduction delays.
- Continue fluid resuscitation through extrication and transfer to hospital.
- Typically crush syndrome is of little concern if patient has been trapped for less than several hours.

EXTREMITY/PELVIC TRAUMA/EXTERNAL HEMORRHAGE

Patient Care Goals:

- Minimize blood loss from extremity hemorrhage
- Avoid hemorrhagic shock as a result of extremity hemorrhage
- Recognize unstable pelvic fractures associated with hypotension and provide pelvic binding
- Minimize pain and further injury as a result of potential fractures or dislocations

Patient Presentation:

- Traumatic hemorrhage (external hemorrhage)
- Unstable pelvic fractures associated with hypotension due to blunt trauma
- Potential extremity injuries, fractures and/or dislocations

Treatments and Interventions:

- Manage external hemorrhage/bleeding through the following:
  - Apply direct pressure to bleeding site followed by pressure dressing.
  - If direct pressure/pressure dressing is ineffective or impractical:
    - If the bleeding site is amenable to tourniquet placement, apply tourniquet to extremity
      - Tourniquet should be placed 2-3 inches (or 2-3 fingerbreadths) proximal to wound, not over a joint, and tightened until bleeding stops and distal pulse is eliminated
      - If bleeding continues, place a second tourniquet proximal to the first
      - Mark time of tourniquet placement.
- If the bleeding site is not amenable to tourniquet placement (i.e. junctional injury to groin/axilla), pack wound tightly with a hemostatic gauze and apply direct pressure.
- Manage hemorrhage associated with unstable pelvic fractures accompanied by hypotension through the following:
  - Apply pelvic binder at level of greater trochanters
  - If possible, internally rotate legs by wrapping feet together
  - There is no role for pelvic binding in isolated Hip Fracture / Dislocation
- Provide pain management as indicated (see **Pain management** protocol)
  - If tourniquet placed, an alert patient will likely require pain medication to manage tourniquet pain
- Stabilize suspected fractures/dislocations
  - Strongly consider pain management (see **Pain management** protocol) before attempting to move a suspected fracture if patient stable and transport to definitive care can safely be delayed.
  - If angulated fracture/deformity and distal vascular function is compromised, gently attempt to restore normal anatomic position (do NOT force)

- Reassess distal neurovascular status after any manipulation or splinting of fractures/dislocations
- Use splints as appropriate to limit movement of suspected fracture
- Elevate extremity fractures above heart level whenever possible to limit swelling
- Apply ice/cool packs to limit swelling in suspected fractures or soft tissue injury - do not apply ice directly to skin

Key Considerations:

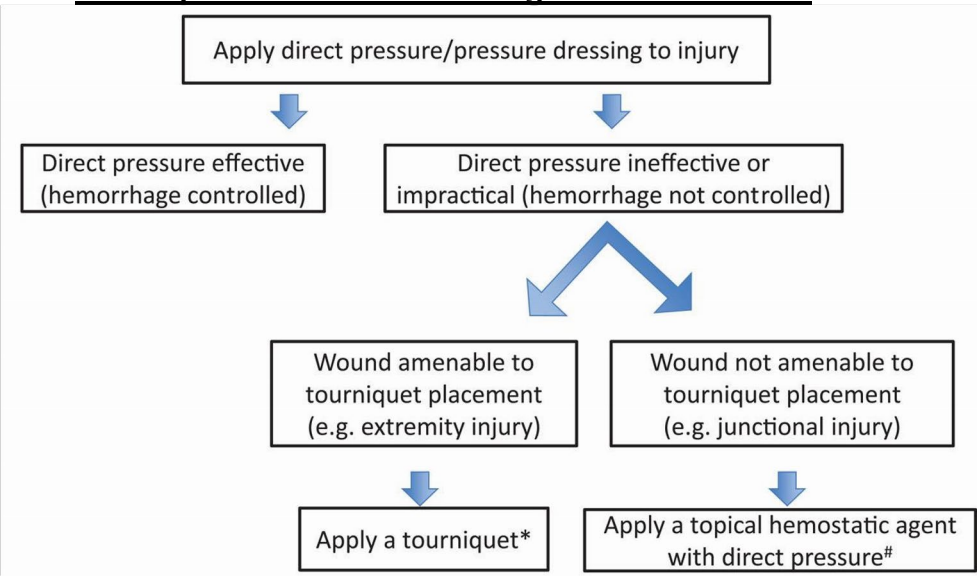
- Tourniquet may be placed initially to stop obvious severe hemorrhage, then replaced later with pressure dressing after stabilization of ABC's and packaging of patient. Tourniquet should generally not be removed if:
  - Amputation or near-amputation
  - Unstable or complex multiple-trauma patient
  - Unstable clinical or tactical situation
- If tourniquet is replaced with pressure dressing, leave loose tourniquet in place so it may be retightened if bleeding resumes
- Survival is markedly improved when a tourniquet is placed *before* shock ensues
- Commercial/properly tested tourniquets are preferred over improvised tourniquets
- If hemostatic gauze is not available, plain gauze tightly packed into a wound has been shown to be effective
- Arterial pressure points are not effective in controlling hemorrhage
- Amputated body parts should be transported with patient for possible re-plantation
  - It should remain cool but dry
  - Place the amputated part in a plastic bag
  - Place the bag with the amputated part on ice (if available) in a second bag
  - Do not let the amputated part come into direct contact with the ice
  - **NOTE**: *KU is only center that performs re-plantation of amputations and consider transport to KU for isolated, peripheral amputations if stable*)
- It is important to check the following and to document when evaluating extremity trauma before and after manipulation/movement/intervention:
  - Neurologic status of extremity distal to injury
  - Vascular status of extremity

Patient/Provider Safety Considerations:

- If tourniquet is required:
  - Ensure that it is sufficiently tight to occlude the distal pulse, in order to minimize risk of compartment syndrome
  - Ensure that it is well marked and visible and that all subsequent providers are aware of the presence of the tourniquet
  - Do not cover with clothing or dressings
  - Mark time of tourniquet placement prominently on the patient
  - If pressure dressing or tourniquet used, frequently re-check to determine if bleeding has restarted. Check for blood soaking through the dressing or continued bleeding distal to the tourniquet.

- It is acceptable to adjust, replace, reassess and remove tourniquets if necessary if provider feels minor bleeding only and placed by civilian or Law Enforcement prior to arrival.
- It is also acceptable to adjust, replace, and reassess a tourniquet whenever deemed necessary in judgement of EMS provider.

Prehospital External Hemorrhage Control Protocol



* Use of tourniquet for extremity hemorrhage is strongly recommended if sustained direct pressure is ineffective or impractical; Use a commercially-produced tourniquet which has been demonstrated to occlude arterial flow and avoid narrow, elastic, or bungee-type devices; Utilize improvised tourniquets only if no commercial device is available

* Apply a topical hemostatic agent, in combination with direct pressure, for wounds in anatomic areas where tourniquets cannot be applied and sustained direct pressure alone is ineffective or impractical; only apply topical hemostatic agents in a gauze format that support wound packing

FACIAL/DENTAL TRAUMA

Patient Care Goals:

- Preservation of a patent airway
- Preservation of vision
- Preservation of dentition

Patient Presentation:

- Patients with isolated facial injury, including trauma to the eyes, nose, ears, midface, mandible, dentition

Treatment and Interventions:

- Manage Airway as indicated (see **Airway/Ventilation Management** protocol)
- Establish vascular access as indicated (see **Vascular Access** protocol)
- Initiate EKG monitoring as indicated
- Provide pain management as indicated (see **Pain Management** protocol)
- **Avulsed tooth**:
  - Avoid touching the root of the avulsed tooth. Do not wipe off tooth
  - Pick up at crown end. If dirty, rinse off with water for 10 seconds
  - Place in milk or saline as the storage medium.
  - Alternatively, an alert and cooperative patient can hold tooth in mouth using own saliva as storage medium
- **Eye trauma**:
  - Place eye shield for any significant eye trauma
  - If globe is avulsed, do not put back into socket. Cover with moist saline dressings and then place cup over it
  - Consider *tetracaine* for analgesia as indicated (see **tetracaine** formulary and **FRG**)
  - Treat nausea/vomiting as indicated (see **Nausea/Vomiting** protocol)
- **Mandible injury/fracture that is unstable**:
  - Expect patient cannot spit/swallow effectively and have suction readily available
  - Preferentially transport sitting up with emesis basin/suction available (in the absence of a suspected spinal injury, see **Spinal Care** protocol)
- **Epistaxis** (from trauma)
  - squeeze nose (or have patient do so) for 20 minutes continuously
  - Consider *oxymetazoline* topically (see **oxymetazoline** formulary and **FRG**) (do NOT have patient blow nose forcefully in trauma)
- **Nose/ear avulsion**:
  - Recover tissue if it does not waste scene time
  - Transport with tissue wrapped in dry sterile gauze in a plastic bag placed on ice (if available)
  - Severe ear and nose lacerations can be addressed with a protective moist sterile dressing

Key Considerations:

- Airway may be compromised because of fractures or bleeding
- After nasal fractures, epistaxis may be posterior and may not respond to direct pressure over the nares with bleeding running down posterior pharynx, potentially compromising airway
- Protect avulsed tissue and teeth
- Avulsed teeth (PERMANENT TEETH ONLY) may be successfully re-implanted if done so within 15 minutes of avulsion and should only be done if EMS provider is comfortable performing the procedure, tooth is intact, free of debris, and patient is cooperative and no concerns for airway deterioration.

Patient/Provider Safety Considerations:

- Frequently reassess the airway to evaluate for possible deterioration
- Maintenance of a patent airway is the highest priority; therefore, conduct cervical spine assessment for field clearance (see **Spinal Care** protocol) to enable transport sitting up for difficulty with bleeding, swallowing, or handling secretions.
- However, airway protection is paramount and if cervical collar impedes airway it should be removed.

HEAD INJURY

Patient Care Goals:

- Limit disability and mortality from head injury by:
  - Promoting adequate oxygenation and ventilation
  - Promoting adequate cerebral perfusion
  - Limiting development of increased intracranial pressure
  - Limiting secondary brain injury

Patient Presentation:

- Patient with blunt or penetrating head injury

Treatment and Interventions:

- Primary survey (see **General Trauma Management** protocol)
  - Manage Airway as indicated (see **Airway/Ventilation Management** protocol)
  - Maintain cervical stabilization as indicated (see **Spinal Care** protocols)
  - Provide oxygen to maintain normoxia (94-98% saturations)
  - For patients with a moderate or/severe head injury who are unable to maintain their airway: use continuous waveform capnography, with a target EtCO2 of 35-45 mmHg
  - For patients with a severe head injury with signs of herniation: hyperventilate to a target EtCO2 of 30-35 mmHg as a short-term option, and only for severe head injury with signs of herniation
  - Control bleeding of head/scalp/face with direct pressure
  - Initiate EKG monitoring as indicated
  - Establish IV access as indicated (see **Vascular Access** protocol)
  - Obtain blood glucose level and treat as indicated (see **Hypoglycemia**/**Hyperglycemia** protocol)
  - Isolated moderate/severe closed head injury:
    - Avoid hypotension in order to maintain cerebral perfusion
      - Adult: Maintain SBP greater than 110mmHg
      - Pediatric:
        - <1 month old: Maintain SBP > 60 mmHg
        - 1-12 months: Maintain SBP >70 mmHg
        - 1-10 years old: Maintain SBP >70 mmHg + (age in years x2) (see **FRG** for vitals)
  - Perform and trend neurologic status assessment
  - Transport patient with Severe head injury with head of bed elevated 30 degrees (requires clinical judgement)
  - Transport to appropriate facility (see **Appendix A**)

Key Considerations:

- Early signs of deterioration:
  - Confusion
  - Agitation
  - Drowsiness/Somnolence
  - Vomiting
  - Severe headache
- Signs of herniation may include any of the following:
  - Decreasing mental status
  - Abnormal respiratory pattern
  - Asymmetric/unreactive pupils
  - Decorticate posturing
  - Cushing's response (bradycardia and hypertension)
  - Decerebrate posturing

Patient/Provider Safety Considerations:

- Do not hyperventilate patient unless signs of impending herniation and then target ETCO2 of 30-35mmHg.
- Maintain high index of suspicion for concomitant cervical spine injury in patients with moderate/severe head injury
- Elderly patients with ankylosing spondylitis or severe kyphosis should be padded and immobilized in a position of comfort and may not tolerate a cervical collar.
- Cervical collars should never compromise management of airway/oxygenation/ventilation**.**
- Do not delay transport to initiate IV access

SPINAL CARE

Patient Care Goals:

- Select patients for whom spinal motion restriction (SMR) is indicated
- Minimize patient morbidity from the use of immobilization devices

Patient Presentation:

- Patients with a traumatic mechanism of injury or concern for possible traumatic mechanism of injury
- This does NOT apply to isolated penetrating trauma to head/face/neck/torso as these patients should not have SMR initiated

Assessment:

- Assess the scene to determine the mechanism of injury
- Mechanism alone should not determine if a patient requires spinal motion restriction – however, mechanisms that have been associated with a higher risk of injury are:
  - Motor vehicle crashes (including automobiles, all-terrain vehicles, and snowmobiles)
  - Axial loading injuries to the spine
  - Falls greater than 10 feet
- Assess the patient in the position found for findings associated with spine injury:
  - Altered mental status
  - Neurologic deficits
  - Midline spinal pain or tenderness
  - Evidence of intoxication
  - Other severe/distracting injuries, particularly associated torso injuries

Treatment and Interventions:

- Place patient in cervical collar if there are any of the following:
  - Patient complains of midline neck or spine pain
  - Any midline neck or spinal tenderness with palpation
  - Altered mental status with concerning mechanism of injury
  - Focal or neurologic deficit
  - Any evidence of alcohol or drug intoxication
  - Another severe or painful distracting injury is present (particularly torso)
  - Torticollis in children (if placement of collar is not tolerated due to increased pain and/or need to force movement of neck avoid placement of collar)
  - A communication barrier that prevents accurate assessment with concerning mechanism of injury.
  - If none of the above apply, patient may be managed without a cervical collar

- If extrication is required:
    - From a vehicle: After placing a cervical collar, if indicated, children in a booster seat and adults should be allowed to self-extricate as long as non-focal neuro exam and willing to do so and does not exacerbate any other injuries. For infants and toddlers already strapped in a car seat with a built-in harness, extricate the child while strapped in his/her car seat
    - Other situations requiring extrication: A scoop stretcher or long spine board may be used for extrication, but should be removed once on ambulance cot unless logistics prevent timely removal.
    - Helmet removal: Do so while keeping the neck manually immobilized to the extent possible. All shoulder pads (football/helmet/other) and other protective gear should be removed PRIOR to transport when possible. When available, on-site professional, team athletic training staff should be utilized for expertise with player equipment.
- Do not transport patients on rigid long boards unless the clinical situation warrants long board use. An example of this may be an unstable patient where removal of a board will delay transport and/or other treatment priorities.
- Patients should be transported to the nearest appropriate facility, in accordance with the CDC Guidelines for Field Triage of Injured Patients (see **Appendix A**)
- Patients with severe kyphosis or ankylosing spondylitis may not tolerate a cervical collar. These patients should be immobilized in a position of comfort

Key Considerations:

- Providers should not manually stabilize (aka: hold c-spine) alert and spontaneously moving patients, since patients with pain will self-limit movement, and forcing immobilization in this scenario may unnecessarily increase discomfort and anxiety
- Certain populations with musculoskeletal instability may be predisposed to cervical spine injury. However, evidence does not support or refute that these patients should be treated differently than those who do not have these conditions. These patients should be treated according to protocol like other patients without these conditions
- Age alone should not be a factor in decision-making for prehospital spine care, yet the patient's ability to reliably be assessed at the extremes of age should be considered.
- Communication barriers with infants/toddlers or elderly patients with dementia may prevent the provider from accurately assessing the patient
- Spinal motion restriction should be considered a medical decision requiring judgement of risks/benefits.
- Patients who are likely to benefit from SMR should undergo this treatment
- Patients who are not likely to benefit from SMR, who have a low likelihood of spinal injury, should not have SMR employed
- Ambulatory patients may be safely immobilized on gurney with cervical collar and straps and do not require a spine board
- Reserve long spine board/scoop stretcher use for the movement of patients whose injuries limit ambulation and who meet criteria for the use of spinal motion restriction
- Remove from the long board/Scoop stretcher as soon as is practical.

- Pregnant patients may be allowed to lay on their side (left side) if more comfortable while flat on the cot. They may also require manual, lateral displacement of uterus to the left if circumstance requires them to be supine to avoid hypotension.

Patient/Provider Safety Considerations:

- Patients with penetrating injury to the neck should not be placed in a cervical collar or other spinal precautions regardless of whether they are exhibiting neurologic symptoms or not. Doing so can lead to delayed identification of injury or airway compromise, and has been associated with increased mortality.
- Be aware of potential airway compromise or aspiration in immobilized patient with nausea/vomiting, or with facial/oral bleeding.
- Anterior portion of cervical collar should be undone/removed if necessary if impedes airway/oxygenation/ventilation.
- Excessively tight immobilization straps can limit chest excursion and cause hypoventilation
- Prolonged immobilization on spine board can lead to ischemic pressure injuries to skin
- Prolonged immobilization on spine board can be very uncomfortable for patient
- Children are abdominal breathers, so immobilization straps should go across chest and pelvis and not across the abdomen, when possible
- The preferred position for all patients with spine management is flat and supine. There are three circumstances under which raising the head of the bed to 30 degrees should be considered:
    - Respiratory distress/airway/oxygenation/ventilation management issues
    - Suspected isolate severe head trauma with concerns for elevated ICP
    - Promotion of patient compliance if supine is causing discomfort

PATIENT SELF-DETERMINATION FOR CARE AND AUTONOMY

DECIDING HOSPITAL DESTINATION

Patient Care Goals:

- Deliver the patient to the most appropriate hospital destination for the presenting complaint.
- Maintain awareness of hospital capabilities and status for receiving patients
- Respect patient autonomy.

Principles for Deciding Hospital Destination:

- Note: This section is consistent with the Metro Kansas City Area Ambulance Diversion Guidelines as adopted by MARCER and the Greater Kansas City Health Alliance
- Patients are transported to the hospital of their choice in the greater Kansas City metropolitan area in most instances.
- Johnson County EMS providers reserve the right not to transport to facilities outside the Johnson County area.
- Patients may be transported to the following free standing Emergency Departments/Microhospitals (see **Appendix H**) if they have minor injury or minor illness and provider believes there is a low likelihood that patient will require secondary transport to a regular hospital. When the provider is in doubt, contact free standing/Microhospital Direct Medical Oversight for further guidance prior to transport.
  - Providers will inform patients that a secondary transport to another facility may be required.
- Transport destination for trauma patients should be determined according to the criteria in the **Johnson County Trauma Plan** (see **Appendix A**).
- Patients with major burns should be transported to the appropriate adult or pediatric burn center unless life-saving measures are needed (this requires clinical judgement may involve Direct Medical Oversight for additional guidance)
- No patient will be transported to a hospital that is “out of service”.
- Transport destination for CVA patients should be determined according to the **Stroke protocol**.
- Transport destination for STEMI/ACUTE MI patients should be to the closest appropriate facility capable of emergent revascularization.
- Transport women participating in Children’s Mercy’s high-risk prenatal care program to CMH-Main Campus.

Exceptions to honoring a hospital's diversion status:

- For the patient in non-traumatic cardiac arrest, transport to the closest facility that is not "out of service".
- Unstable/Critical patients will be transported to the closest appropriate hospital (medical patients to the closest facility, trauma patients to trauma centers, pediatric trauma patients to a pediatric trauma center, and pediatric medical patients as directed by Direct Medical Oversight) without regard to diversion status options except for hospitals that are "out of service".
- "Unstable/Critical" is evidenced by, but not limited to, at least one of the following conditions:
    - Unable to establish or maintain an airway
    - Inability to ventilate
    - Unremitting shock
- A patient may be transported to a facility that is experiencing HIGH VOLUME-OPEN, CATCHMENT AREA-OPEN, and REGIONAL SATURATION-OPEN status as long as the patient is informed of this status (unless it is out of service).
- If a patient is to be directly admitted or is an OB patient in suspected labor, contact their hospital of choice and notify them (do not request permission) of the impending arrival of a patient who will be taken directly to the appropriate unit.

PATIENT REFUSALS

Definition of a "Patient" (for purposes of refusals):

- A "Patient" is defined as one of the following:
  - An individual who requests evaluation.
  - An individual who lacks decision-making capacity.
  - An individual who has EMS evaluation requested on their behalf by citizens/bystanders/family/other healthcare provider/Law Enforcement that the EMS provider also feels needs to be evaluated. (requires provider judgement)

Overview:

- Patients generally have a right to refuse care and transportation for any illness or injury. EMS personnel have a duty to assess every patient, inform patients of significant examination findings, and determine the patient's ability to understand the potential complications surrounding that patient's decision to refuse care.
- If an individual (or the parent or legal guardian of the individual) refuses care and/or ambulance transport to a hospital after EMS providers have been called to the scene, providers should **determine the patient's Capacity** to make decisions.
- **Competency** is generally a legal status of a person's legal ability to make decisions and in general, adults are presumed to have competency and therefore the legal ability to make decisions regarding their care unless there is specific documentation/knowledge stating contrary (ex. minors, prisoners, guardianship etc.)

Assessment:

- Decision-Making Capacity:
  - An individual who is alert, oriented (**cognition intact**), and has the ability to understand the circumstances surrounding his/her illness or impairment, as well as the possible risks associated with refusing treatment and/or transport, typically is considered to have decision-making capacity. The individual should be able to weigh different options and understand the risk/benefit of each option.
  - The individual's judgment must also not be significantly impaired by illness, injury or drugs/alcohol intoxication (*this is in the judgement of the EMS providers*). Individuals who have attempted suicide, verbalized suicidal intent, or have other factors that lead EMS providers to suspect suicidal intent, should **NOT** be regarded as having decision-making capacity and may not refuse transport to a medical facility.

Treatment and Interventions:

- Obtain a complete set of vital signs and complete an initial assessment, paying particular attention to the individual's neurologic and mental status.
- Determine the individual's capacity to make a valid judgment concerning the extent of his/her illness or injury; if the EMS provider has doubts about whether the individual has the mental capacity to refuse or if the patient lacks capacity, the EMS provider may contact Direct Medical Oversight as needed.
- If patient has capacity, clearly explain to the individual and all responsible parties the possible risks and overall concerns with regards to refusing care.
- Perform appropriate medical care with the consent of the individual.
- Complete the patient care report clearly documenting the initial assessment findings and the discussions with all involved individuals regarding the possible consequences of refusing additional out-of-hospital care and/or transportation.

Special Considerations – Minors

- **K.S.A. 38-123b. Consent by minor 16 or over to hospital, medical or surgical treatment or procedures.** Notwithstanding any other provision of the law, any minor sixteen (16) years of age or over, **where no parent or guardian is immediately available**, may give consent to the performance and furnishing of hospital, medical or surgical treatment or procedures and such consent shall not be subject to disaffirmance because of minority. The consent of a parent or guardian of such a minor shall not be necessary in order to authorize the proposed hospital, medical or surgical treatment or procedures.
    - Note, in Kansas statute above regarding consent for medical treatment the provision states that **"*where no parent or guardian is immediately available*"** a 16-year-old or older may provide consent. However, EVERY attempt should be made to contact parent or guardian of any patient younger than 18 years old and is preferable when available.
    - EMS providers may provide emergency treatment and transport when a parent/guardian is not available to provide consent. This is known as the emergency exception rule or the doctrine of implied consent. For minors, this doctrine means that the EMS provider can presume consent and proceed with appropriate treatment and transport if the following four conditions are met:
        - The child is suffering from an emergent condition that places his or her life or health in danger.
        - The child's legal guardian is unavailable or unable to provide consent for treatment or transport.
        - Treatment or transport cannot be safely delayed until consent can be obtained.
        - The EMS provider administers only treatment for emergency conditions that pose an immediate threat to the child.
    - As a general rule, when the EMS provider's authority to act is in doubt, EMS providers should always do what they believe to be in the best interest of the minor.
    - If a minor is injured or ill and no parent/guardian contact is possible, the provider may contact Direct Medical Oversight for additional guidance as needed.

Key Considerations:

- It is important that EMS providers explain to the patient and/or guardian that EMS providers are not a substitute for an evaluation at a hospital by a physician and that EMS providers cannot provide medical screening. This discussion should be documented in the Electronic Health Record.
- An adult or emancipated minor who has demonstrated possessing sufficient mental capacity for making decisions has the right to determine the course of his/her medical care, including the refusal of care. These individuals must be advised of the risks and consequences resulting from refusal of medical care
- An individual determined to lack decision-making capacity by EMS providers should not be allowed to refuse care against medical advice or to be released at the scene. Mental illness, drugs, alcohol intoxication, or physical/mental impairment may significantly impair an individual's decision-making capacity.
- The determination of decision-making capacity may be challenged by communication barriers or cultural differences.
- EMS providers should not put themselves in danger by attempting to treat and/or transport an individual who refuses care.
- Always act in the best interest of the patient – EMS providers, with the support of Direct Medical Oversight, must strike a balance between abandoning the patient and forcing care.
- Involve Law Enforcement when appropriate to assist in decision-making.

Key Documentation Elements:

- Minors who are not emancipated and adults with a legal guardian: guardian name, contact, and relationship
- Any efforts made to contact guardians if contact could not be made
- What the patient's plan is after refusal of care and/or transport
- Who will be with the patient after EMS departs
- Patient was advised that they can change their mind and EMS can be contacted again at any time
- Patient was advised of possible risks to their health resulting from refusing care and/or transport
- Patient voices understanding of risks. A quotation of the patient's actual words, stating they understand, is best
- Reason for patient refusing care. A quotation of the patient's actual words, stating they understand, is best
- Direct Medical Oversight contact (when applicable)
- Any assessments and treatments performed

DNR/ADVANCED DIRECTIVES/HEALTH CARE POWER OF ATTORNEY (POA)

Patient Care Goals:

- Acknowledge and maintain the variety of ways that patients can express their wishes about cardiopulmonary resuscitation or end-of-life decision making.

Patient Presentation:

- Patients must have one of the following documents or a valid alternative (such as identification bracelet/medallion/jewelry indicating wishes) immediately available.
  - **TPOPP** (Transportable Physician Orders for Patient Preferences) – explicitly describes acceptable interventions for the patient in the form of medical orders, must be signed by a physician in order to be valid.
  - **Do Not Resuscitate (DNR)** – identifies that CPR and intubation are not to be initiated if the patient is in cardiac arrest.
  - **Advance directives** – document that describes acceptable treatments under a variable number of clinical situations including some or all of the following: what to do for cardiac arrest, whether artificial nutrition is acceptable, organ donation wishes, dialysis, and other parameters. The directives frequently do not apply to emergent or potentially transient medical conditions.
  - In the absence of formal written directions (ex. TPOPP, DNR, Advanced Directives), and in the presence of a person with Power of Attorney for healthcare and/or guardianship, that person may prescribe limits of treatment and should be utilized in decision-making.

Treatment and Interventions:

- If the patient has a valid exclusion to resuscitation then no CPR or airway management should be attempted, however this does not exclude comfort measures including medications for pain as appropriate (see **End-of-Life/Palliative Care** protocol)
- If CPR has been initiated and a valid exclusion to resuscitation has been subsequently verified, CPR should be discontinued without Direct Medical Oversight.
- There is no need to wait for 5 minutes after the last medication administration to stop all resuscitation if a valid exclusion to resuscitation has been determined. However, it is prudent to keep the patient on the heart monitor and to assess the patient for any signs of life for at least 5 minutes after stopping resuscitation.
- If there is a valid exclusion to resuscitation and there are signs of life (pulse and respirations), EMS providers should provide standard appropriate treatment under existing protocols according to the patient's condition
- If the patient has a TPOPP, it may provide specific guidance on how to proceed in this situation
- Directives should be followed as closely as possible and Direct Medical Oversight contacted as needed

- If for any reason an intervention that is prohibited by an advanced directive is being considered, Direct Medical Oversight should be obtained

Key Considerations:

- Determining if a DNR/TPOPP document is valid requires the following:
  - Displays the patient's name and the physician's name
  - Revocation is not signed
  - Signed by the patient or recognized decision-maker (ex. guardian, parent, POA)
  - Signed by physician
- If there is question about the validity of the form/instrument, the best course of action is to proceed with the resuscitation until additional information can be obtained.
- If there is a personal physician present at the scene who has an ongoing relationship with the patient, that physician may decide if resuscitation is to be initiated or terminated. When there is conflict Direct Medical Oversight should be obtained.
- If there is a registered nurse from a home healthcare or hospice agency present at the scene who has an ongoing relationship with the patient, and who is operating under orders from the patient's private physician, that nurse may decide if resuscitation is to be initiated**.** If there is conflict Direct Medical Oversight should be obtained.
- Power of Attorney is only in effect when the patient does not have decision-making capacity. If a patient retains decision-making capacity the Power of Attorney is not in effect and the patient is able to make their own decisions regarding the care they receive.

Patient/Provider Safety Considerations:

- In cases where the patient's status is unclear and the appropriateness of withholding resuscitation efforts is questioned, EMS personnel should initiate CPR immediately and contact Direct Medical Oversight.
- Scene safety should be considered when making determinations to withhold or terminate resuscitation. If family/bystanders/environment are threatening violence, EMS providers may elect to begin resuscitation/continue resuscitation to avoid escalation.

END-OF-LIFE/PALLIATIVE CARE

Patient Care Goals:

- Provide relief from pain and other distressing symptoms
- Affirm dying as a normal process
- Integrate psychological and spiritual aspects of patient care when able
- Offer support to help the family cope during the patient's illness and in their own bereavement

Patient Presentation:

- Patient enrolled in hospice or palliative care for a terminal condition/illness.
- Complaint related to the condition/illness for which the patient is receiving hospice/palliative care services.
- Patient with valid TPOPP (Transportable Physician Orders for Patient Preferences) form.

Treatment and Interventions:

- Perform a patient assessment per Universal patient assessment guideline.
- Allow patient to be in position of comfort.
- Provide suctioning, manual airway support as indicated (do not be overly invasive when applying airway maneuvers).
- Treat and manage wounds as indicated.
- Treat pain as indicated (see **Pain Management** protocol and **FRG**)
- Treat nausea/vomiting as indicated (see **Nausea/Vomiting** protocol and **FRG**)
- Treat work of breathing with oxygen as indicated (do not need to apply oxygen based on pulse oximetry numbers, but only if improves patient comfort)
- Consider CPAP only if patient is chronically on CPAP/BiPAP AND they are alert enough to cooperate and it reduces their work of breathing and increases comfort.
- Treat bronchospasm as indicated (see **Respiratory Distress** protocols)
- Treat anxiety as indicated
  - *Lorazepam* from home comfort kit (see **Lorazepam** formulary)
  - *Midazolam* (see **Midazolam** formulary and **FRG**)
- Treat delirium/hallucinations as indicated
  - *Lorazepam* from home comfort kit (see **lorazepam** formulary)
  - *Haloperidol* from home comfort kit (see **haloperidol** formulary)
  - *Midazolam* (see **midazolam** formulary and **FRG**)
- Contact hospice personnel when available and transition care to hospice personnel as soon as appropriate.
- If comfort measures cannot be met at the current location transport non-emergently to hospital of choice.

Key Considerations:

- If the patient is able to communicate and has the capacity to make decisions regarding treatment and transport, consult directly with the patient before treatment and/or transport.
- If the patient lacks the capacity to make decisions regarding treatment and/or transport, identify any advanced care planning.
- Confirm advanced directives or other advanced care documentation to ensure valid.
- In collaboration with hospice or palliative care provider, coordinate with guardian, power of attorney, or other accepted healthcare proxy if non-transport is considered
- Document interactions with hospice/palliative care provider and/or guardian, power-of-attorney.
- If death occurs enroute to hospital in patient who has valid DNR continue on to destination for pronouncement.
- For peri-arrest patient presenting with valid advanced directive/hospice care deliver appropriate interventions for complaint per usual. However, be mindful and considerate of performing heroic measures (e.g. CPAP/SGA/intubation/IO etc.) and consult with patient and care-givers to understand previously expressed desires to limit care.

Patient/Provider Safety Considerations:

- Careful and thorough assessments should be performed to identify complaints not related to the illness for which the patient is receiving hospice or palliative care
- Care should be delivered with the utmost patience and compassion
- Scene safety should be considered when deciding on management and disposition.

MEDICATIONS

Reference: Generic names, class, pharmacologic action and contraindications (relative and absolute) were obtained from the websites medscape.com, epocrates.com and lexicomp.
NOTE: Not all contraindications listed on reference websites were included for the purposes of this document. Contraindications which were not pertinent to EMS providers were not included.

- **Onset of medication varies between routes.**
- **Peak effect is often different than onset of action.**
- **Duration of action varies depending on individual patient body habitus, co-morbidities, polypharmacy, liver and renal function and underlying pathology.**

MEDICATION LIST

Adenosine (Paramedic)

Class: Antidysrhythmic
Pharmacologic Action: Slows conduction through AV node and interrupts AV reentry pathways to restore normal sinus rhythm
Indications: Conversion of regular, narrow complex tachycardias (SVT) refractory to vagal maneuvers or when vagal maneuvers are impractical
Dosages and Administration:

- Adult:
  - 6mg IV/IO fast push
  - 12mg IV/IO fast push if initial dose is ineffective x1 dose only
- Pediatric:
  - 0.1mg/kg IV/IO fast push (max dose 6mg)
  - 0.2mg/kg IV/IO fast push if initial dose is ineffective (max dose 12mg) x1 dose only

Contraindications: Hypersensitivity, second or third degree AV Block (except those on pacemakers), sick sinus syndrome, confirmed atrial flutter or fibrillation
Precautions: Reduce dosage by ½ when administering to heart transplant patient or when given through central line
Side Effects: transient flushing, dyspnea, chest pain, metallic taste in mouth, transient asystole, transient heart blocks, PVC's/escape beats, cardiac arrest, bronchospasm, v-fib, hypotension.
Pregnancy/Breast Feeding Considerations: Risk cannot be ruled out. Drug should only be given if the potential benefits justify the potential risk to fetus. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: Rapid (typically within 30 seconds)
Duration of Action: Very brief and rapidly metabolized (typically less than 30 seconds)

Albuterol (Paramedic, AEMT, EMT/RN)

Class: short-acting Beta-2 agonist
Pharmacologic Action: Beta-2 receptor agonist with some beta-1 activity; relaxes bronchial smooth muscle, shifts potassium intracellularly
Indications – Bronchospastic lung disease, wheezing, respiratory distress believed to be from bronchospasm, hyperkalemia
Dosage and Administration:

- Adult:
  - Bronchospasm:
    - 8-10 puffs of patient's prescribed albuterol Metered-Dose Inhaler (MDI) and repeat as needed
    - 2.5mg/3ml NS via nebulizer and repeat as needed

- Suspected Hyperkalemia:
  - 2.5mg/3ml NS via nebulizer and repeat continuously (no more than 8 doses or 20mg maximum)

➢ Pediatric:
- Bronchospasm:
  - 4 puffs of patient's prescribed Metered-Dose Inhaler (MDI) and repeat as needed
  - 2.5mg/3ml NS via nebulizer and repeat as needed
- Suspected Hyperkalemia:
  - 2.5mg/3ml NS via nebulizer and repeat continuously (no more than 4 doses or 10mg maximum)

Contraindications – Hypersensitivity
Precautions: Use caution and monitor closely if known hypokalemia, tachycardia, CAD, hypertension, arrhythmia, chest pain
Side Effects: palpitations, tremors, chest pain, hypertension, dizziness, nervousness, tachycardia, cough, headache, nausea/vomiting.
Pregnancy/Breast Feeding Considerations: Generally considered safe with favorable risk/benefit profile.
Onset of Action: <5 minutes
Peak: 30 minutes
Duration of Action: 3-6 hours

Amiodarone (Paramedic, AEMT)

Class: Class III antidysrhythmics
Pharmacologic Action: Class III antidysrhythmic agent, which inhibits adrenergic stimulation; affects sodium, potassium, and calcium channels; markedly prolongs action potential and repolarization; decreases AV conduction and sinus node function
Indications: Management of ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT) refractory to defibrillation and epinephrine
Dosage and Administration:

➢ Adult:
- 300mg IV/IO and repeat one time at 150mg in 5 minutes as needed

➢ Pediatric:
- 5mg/kg IV/IO and repeat one time at same dose as needed.

Contraindications – Hypersensitivity
Side Effects: Hypotension, heart block, bradycardia, CHF, arrhythmias
Pregnancy/Breast Feeding Considerations: Should only be given to pregnant women when life-threatening arrhythmia present. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: Unknown
Duration/half-life: Measured in days/weeks.

Aspirin (Paramedic, AEMT, EMT/RN)

Class: Antiplatelet agent, non-steroidal anti-inflammatory drug (NSAID)
Pharmacologic Action: Inhibits synthesis of prostaglandin by cyclooxygenase; inhibits platelet aggregation; has antipyretic and analgesic activity
Indications: Antiplatelet agent for the care of patients suspected of suffering from an acute coronary syndrome (ACS)
Dosage and Administration:

- Adult:
  - 324mg PO (chewed) unless EMS provider can confirm patient already took at least 324mg of *aspirin* within previous 6 hours
- Peds:
  - Not indicated

Contraindications: Hypersensitivity to aspirin or NSAIDs (aspirin-associated hypersensitivity reactions include aspirin-induced urticarial or aspirin-intolerant asthma), active GI bleeding, known thrombocytopenia, hemophilia, intracranial hemorrhage
Side Effects: none relevant
Pregnancy/Breast Feeding Considerations: Only administer to pregnant patients with ST-Elevation Myocardial Infarction (STEMI)/ACUTE MI. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: within 20 minutes (non-enteric coated and chewed)
Peak: 20 minutes
Duration of Action: 4-6 hours for analgesia, however permanent inhibition of platelet for life of platelet (7-10 days)

Atropine (Paramedic)

Class: Anticholinergic, parasympatholytic
Pharmacologic Action: Competitively inhibits action of acetylcholinesterase on autonomic effectors innervated by postganglionic nerves, positive chronotropes, increases AV node conduction and SA node automaticity
Indications: Management of nerve agent toxicity, symptomatic bradycardia (primary or related to toxin ingestion), organophosphate and carbamate insecticide toxicity, cholinergic toxicity
Dosage and Administration:

- Adult:
  - Symptomatic bradycardia:
    - 1mg IV/IO fast push and repeat every 3-5 minutes as indicated (max total dose 3mg)
  - Organophosphate/Cholinergic toxicity/nerve agent toxicity:
    - 2mg IV/IO/IM and repeat every 5 minutes until clearing/drying of respiratory secretions and cessation of bronchoconstriction (no max dose)

- Pediatric:
    - Symptomatic bradycardia:
        - 0.02mg/kg IV/IO fast push (minimum single dose 0.1mg; max single dose 0.5mg) and repeat in 3-5 minutes one time as needed. (max total dose 3mg)
    - Organophosphate/Cholinergic toxicity/nerve agent toxicity:
        - If IV/IO:
            - 0.02mg/kg IV/IO fast push and repeat every 3-5 minutes as needed (no max dose)
        - If NO IV/IO:
            - <2y/o: 0.05mg/kg IM every 5-10 minutes as needed (no max dose)
            - 2-10 y/o: 1mg IM every 5-10 minutes as needed (no max dose)
            - >10y/o: 2mg IM every 5-10 minutes as needed (no max dose)

Contraindications: No absolute contraindications
Relative Contraindications: Narrow-angle glaucoma, GI obstruction, severe ulcerative colitis, toxic megacolon, bladder outlet obstruction, myasthenia gravis, hemorrhage w/cardiovascular instability, thyrotoxicosis
NOTE: Ineffective in hypothermic bradycardia
Side Effects: dry mouth, blurred vision, mydriasis, urinary retention, CNS excitation, tachycardia and palpitations.
Pregnancy/Breast Feeding Considerations: Atropine should be administered in pregnant women as antidote and for life-threatening emergencies. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: IM within 30 minutes for secretions, IM within 15-30 minutes for increased heart rate, IV immediate.
Peak: IM 30-60 minutes for secretions, IM 45-60 minutes for increased heart rate, IV 0.7-4 minutes.
Duration of Action: IM <4 hours for secretions, IV 3-5 minutes

Calcium Chloride (Paramedic)

Class: Antidotes, calcium salt
Pharmacologic Action: Essential for neurotransmission, muscle contraction, and many signal transduction pathways including ensuring normal cardiac function
Indications: Management of wide-complex QRS EKG rhythm with confirmed or suspected hyperkalemia, crush syndrome, beta-blocker overdose, calcium channel blocker overdose, magnesium toxicity
Dosage and Administration:

- Adult:
  - Cardiac Arrest (suspected hyperkalemia):
    - 1 Gram IV/IO push (*requires Direct Medical Oversight for repeat dosing*)
  - Overdoses/Toxicity, suspected hyperkalemia, crush syndrome with a pulse: (*requires consultation with Direct Medical Oversight*)
    - 1 Gram IV/IO over 5 minutes
- Pediatric:
  - Cardiac Arrest (suspected hyperkalemia):
    - 20mg/kg IV/IO push (max dose 1 Gram) (*requires Direct Medical Oversight for repeat dosing*)
  - Overdoses/Toxicity, suspected hyperkalemia, crush syndrome with a pulse:
    - 20mg/kg IV/IO over 5 minutes (max dose 1 Gram)*(requires consultation with Direct Medical Oversight)*

Contraindications – Hypercalcemia, documented hypersensitivity
WARNING: Be cautious of peripheral IV use as significant tissue necrosis at injection site may occur, therefore confirm widely patent line with saline flush PRIOR to admin of calcium. Do not push sodium bicarbonate and calcium through same line without flushing well between doses to avoid precipitation in line.
Side Effects: vasodilation, hypotension, bradycardia, arrhythmias, flushing, dizziness, nausea
Pregnancy/Breast Feeding Considerations: Calcium should be administered in pregnant women as antidote and for life-threatening emergencies. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: rapid
Duration of Action: depends on underlying physiology and albumin levels.

Dextrose 10% (Paramedic, AEMT)

Class: Glucose-elevating agent; carbohydrate
Pharmacologic Action: increases blood sugar levels
Indications: Management of symptomatic hypoglycemia
Dosage and Administration:

- Adults with symptomatic hypoglycemia (<60mg/dL for non-diabetics OR <80mg/dL in diabetic):
  - Unable to protect airway
    - Up to 25 Grams (250ml) of Dextrose 10% (D10) IV/IO slow push/infusion titrated to effect and repeat as needed to max total dose of 50 Grams 500ml)
- Pediatric with symptomatic hypoglycemia (<60mg/dL):
  - Unable to protect airway
    - Up to 0.5 Grams/kg (5ml/kg) of Dextrose 10% (D10) IV/IO slow push (max single dose 25 Grams) and repeat as needed to max total dose of 10ml/Kg or 500ml (whichever is less)

Contraindications: Hyperglycemia
Precautions: Consider consultation with Direct Medical Oversight prior to administration for pediatric seizure patient who has chronic seizures with hypoglycemia and on ketogenic diet. Use a large, patent vein prior to administration of D10 to reduce irritation and extravasation likelihood.
Pregnancy/Breast Feeding Considerations: Safe in pregnancy and breastfeeding.
Onset of Action: rapid when given IV
Duration of Action: depends on metabolism, underlying physiology and dose.

Diphenhydramine (Paramedic, AEMT)

Class: Antihistamine – first generation
Pharmacologic Action: Histamine H1-receptor antagonist of effector cells in respiratory tract, blood vessels, and GI smooth muscle, possess anticholinergic properties
Indications: For urticarial and/or pruritus in the management of patients suffering from allergic reaction. Anaphylaxis treatment (ONLY AFTER EPINEPHRINE) as well as for the management of patients suffering from acute dystonic reactions
Dosage and Administration:

- Adult:
  - 50mg IV/IO/IM one dose only
- Pediatric:
  - 1mg/kg IV/IO/IM one dose only

Contraindications: Documented hypersensitivity, premature infants and neonates
Precautions: Use caution in elderly, children. May worsen sedation if given with other sedatives. Use caution if acute asthma exacerbation (not related to anaphylaxis).

Side Effects: Sedation, drowsiness, dizziness, confusion, tachycardia, dry mouth, nausea, vomiting, drying of airway secretions, seizures, paradoxical CNS excitement, urinary retention
Pregnancy/Breast Feeding Considerations: Safe in pregnancy, however use caution when administering to patient in active labor as may cause respiratory depression in newborn. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: rapid when given IV
Peak: approximately 2 hours
Duration of Action: 4-18 hours depending on age/liver function

DuoDote (Paramedic, AEMT, EMT/RN)

Class: antidote for suspected nerve agent poisoning
Pharmacologic Action: see atropine; pralidoxime (2-PAM) reactivates cholinesterase
Indications: Management for suspected nerve agent poisoning when available
Dosage and Administration:

- Adult:
  - Mild or Mild-to-Moderate signs and symptoms of exposure:
    - EMS provider self-administer ONE duodote autoinjector
    - Administer ONE duodote autoinjector to patient
  - Severe signs and symptoms of exposure:
    - EMS provider self-administer THREE duodote autoinjectors
    - Administer THREE duodote autoinjectors to patient
- Pediatric:
  - Requires Direct Medical Oversight for guidance

Contraindications: hypersensitivity
Side Effects: blurry vision, dizziness, headache, nausea, drowsiness, tachycardia, hypertension, muscle weakness
Pregnancy/Breast Feeding Considerations: Duodote should be administered in pregnant women as antidote and for life-threatening emergencies. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: within minutes
Duration of Action (Pralidoxime): IM/IV 2-5 hours depending on age
Peak: IM 35 minutes, IV 5-15 minutes

Epinephrine (Paramedic, AEMT) (EMT/RN-Auto-injectors only)

Class: Alpha/beta adrenergic agonist
Pharmacologic Action: Strong alpha-adrenergic effects, which cause an increase in cardiac output and heart rate, resulting in systemic vasoconstriction Strong beta-1- and moderate beta-2-adrenergic effects, resulting in increased heart rate and bronchial smooth muscle relaxation
Indications: For use in the management of patients suffering anaphylaxis, shock, cardiac arrest, bradycardia, and IM form for refractory acute asthma
Dosage and Administration:

- Adult:
  - Cardiac Arrest: (**Paramedic, AEMT**)
    - 1mg (1:10,000) IV/IO push and repeat every 5 minutes as indicated
  - Anaphylaxis: (**Paramedic, AEMT, EMT/RN**)
    - 0.3mg (1:1,000) IM and repeat every 5 minutes as needed
    - Epinephrine auto-injector IM and repeat as available every 5 minutes as needed
    - If hypotension present after administering 3 doses IM, consider push dose epinephrine
  - Severe/Refractory Asthma: (**Paramedic**)
    - 0.3mg (1:1,000) IM and repeat every 15 minutes as needed
  - Cardiogenic shock, hypovolemic shock, obstructive shock, distributive shock, anaphylactic shock:
    - 5-10 mcg IV/IO push and repeat every 3 minutes as needed to maintain a MAP >65mmHg or SBP >100mmHg
    - Admixture: 1mg/1mL mixed in 1000mL NS (concentration is 1mcg/1mL)
- Pediatric:
  - Cardiac Arrest: (**Paramedic, AEMT**)
    - 0.01mg/kg (1:10,000) IV/IO repeated every 5 minutes as indicated (max single dose 1mg)
  - Anaphylaxis: (**Paramedic, AEMT, EMT/RN**)
    - 0.01mg/kg (1:1,000) IM (max single dose 0.3mg) and repeat every 5 minutes as needed
    - Epinephrine auto-injector IM and repeat as available every 5 minutes as needed
  - Severe/Refractory Asthma: (**Paramedic**)
    - 0.01mg/kg (1:1,000) IM (max single dose 0.3mg) and repeat every 15 minutes as needed (max single dose 0.3mg)
  - Cardiogenic, neurogenic, septic shock: (**Paramedic**)
    - 0.01mg/kg (1:10,000) IV/IO push
  - Symptomatic bradycardia: (**Paramedic**)
    - 0.01mg/kg (1:10,000) IV/IO repeated every 3-5 minutes as indicated (max single dose 1mg)

Contraindications: Hypersensitivity to epinephrine
Precautions: Monitor closely when administering to patients with a pulse, who are elderly, or have history of CAD, CVA and/or uncontrolled hypertension.

Side Effects: nervousness, anxiety, tremors, pallor, nausea, vomiting, headache, dizziness, diaphoresis, tachycardia, palpitations, respiratory distress, arrhythmias
Pregnancy/Breast Feeding Considerations: Safe in pregnancy and breast feeding.
Onset of Action: rapid when given IV, within 5-10 minutes when given IM
Duration of Action: 5 minutes

Fentanyl (Paramedic, AEMT)

Class: Synthetic opioid, opioid analgesics
Pharmacologic Action: Narcotic agonist-analgesic of opiate receptors; inhibits ascending pain pathways, thus altering response to pain; increases pain threshold; produces analgesia, respiratory depression, and sedation
Indications: Management of acute pain, discomfort associated with maintenance of advanced airway compliance and other painful procedures such as pacing/synchronized cardioversion
Dosage and Administration:

- Adult:
  - 25-100mcg IV/IO/IM/IN and repeat as needed every 5-10 minutes
    - Max repeat dose of 50mcg
    - Max total dose of 200mcg
- Pediatric:
  - IV/IO/IM and IN
    - May repeat color appropriate dose (see below) as needed every 5-10 minutes.
    - Max Initial dose of 100mcg
    - Max repeat dose of 50mcg
    - Max total dose of 200mcg

Color	IV/IM/IO*	Intranasal*
Grey 3kg	0.06 mL	0.1 mL
Grey 4kg	0.06 mL	0.1 mL
Grey 5 kg	0.1 mL	0.2 mL
Pink	0.15 mL	0.25 mL
Red	0.2 mL	0.35 mL
Purple	0.2 mL	0.4 mL
Yellow	0.3 mL	0.5 mL
White	0.4 mL	0.7 mL
Blue	0.4 mL	0.9 mL
Orange	0.5 mL	1 mL
Green	0.7 mL	1 mL

* Fentanyl 50 mcg/mL concentration

Contraindications: Hypersensitivity to fentanyl
Side effects: dizziness, euphoria, confusion, hypotension, respiratory depression, nausea, vomiting
WARNING*:* Consider lower dosing regimen with patients age 65 and older, debilitated, chronically ill, critically ill or when used in conjunction with other CNS depressants
Precautions: Be careful not to repeat doses too quickly as peak effect of fentanyl is approximately 10 minutes. Respiratory depressant effect of fentanyl may last longer than analgesic effect.
Pregnancy/Breast Feeding Considerations: Analgesia should not be withheld solely for pregnancy with discussion regarding risk/benefit. There is low risk for EMS related dosing, however caution should be used when administering during labor/delivery as may depress newborn. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: immediate when given IV, IM 7-8 minutes, IN 5-10 minutes
Peak: IV route will not see maximal effect on analgesia/respiratory depression for 5-10 minutes, IN 15-20 minutes, IM 15 minutes
Duration of Action: IV 30-60 minutes, IM 1-2 hours

Glucagon (Paramedic, AEMT)

Class: Hypoglycemia antidotes, glucose-elevating agents,
Pharmacologic Action: Insulin antagonist. Stimulates cAMP synthesis to accelerate hepatic glycogenolysis and gluconeogenesis causing increase in blood glucose level
Indications: Management of symptomatic hypoglycemia without IV/IO access
Dosage and Administration:

- Adults with symptomatic hypoglycemia (<60mg/dL for non-diabetics OR <80mg/dL in diabetic)
  - Inability to obtain IV/IO in reasonable time frame:
    - 1mg IM one dose only
- Pediatric with symptomatic hypoglycemia (<60mg/dL):
  - Inability to obtain IV/IO in reasonable time frame:
    - <25kg (grey-blue on length-based tape) 0.5mg IM one dose only
    - ≥25kg (orange-green on length-based tape) 1mg IM one dose only

Contraindications: Hypersensitivity
WARNING: Nausea and vomiting are common adverse effects following the administration of glucagon
Side Effects: nausea, vomiting, rash, tachycardia, hypertension, hyperglycemia
Pregnancy/Breast Feeding Considerations: Safe in pregnancy and breast feeding.
Onset of Action to raise blood glucose by 20mg/dL: 10-15 minutes
Peak: 30 minutes
Duration of Action: may continue to raise blood glucose for 60-90 minutes

Haloperidol (Paramedic)

Class: typical antipsychotic
Pharmacologic Action: Dopamine receptor antagonist causing sedation
Indications: Management of patient for end-of-life care/hospice experiencing nausea or delirium with home comfort kit
Dosage and Administration:

- Adult:
  - 2-5mg PO one dose from home comfort kit

Contraindications: hypersensitivity, depressed mental status, coma, Parkinson's disease
Pregnancy/Breast Feeding Considerations: Generally should not be given during pregnancy. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.

Hydrocortisone succinate (Paramedic, AEMT)

Class: Corticosteroid Pharmacologic
Action: Glucocorticoid; elicits mild mineralocorticoid activity and moderate anti-inflammatory effects; controls or prevents inflammation by controlling rate of protein synthesis, suppressing migration of polymorphonuclear leukocytes (PMNs) and fibroblasts, and reversing capillary permeability
Indications: Management of adrenal insufficiency
Contraindications: Untreated serious infections (except tuberculous meningitis or septic shock), idiopathic thrombocytopenic purpura, intrathecal administration (injection), documented hypersensitivity
Dosage and Administration: Follow dosing regimen per home kit or contact Direct Medical Oversight for further guidance.

Hydroxocobalamin (Paramedic)

Class: Cyanide antidote
Pharmacologic Action: Vitamin B12 with hydroxyl group complexed to cobalt which can be displaced by cyanide resulting in cyanocobalamin (which is non-toxic) that is renally excreted in urine
Indications: Management of confirmed or suspected cyanide toxicity and any symptomatic smoke inhalation patient
Dosage and Administration:

- Adult:
  - Mix 200ml saline into 5 Gram vial, swirl 60 seconds to mix, administer vial over 15 minutes
  - Metronome to set rate of administration (see **FRG**)
- Pediatric:
  - Mix 200ml saline into 5 Grams vial, swirl 60 seconds to mix and use length-based tape to find dose to be administered over 15 minutes
  - ≤18kg (grey, pink, red, purple, yellow &white) -1.25 Grams (1/4 bottle) over 15 minutes
  - 19-36kg (blue, orange, & green)-2.5 Grams (1/2 bottle)
  - >36kg -5 Grams (adult dose)
  - Metronome to set rate of administration (see **FRG**)

Contraindications: none relevant
WARNING: Will cause discoloration of the skin and urine, can interfere with pulse oximetry.
Side Effects: nausea, vomiting, headache, flushing/erythema, hypertension, infusion site reaction, restlessness, itching, hives
Pregnancy/Breast Feeding Considerations: Hydroxocobalamin should be administered in pregnant women as antidote and for life-threatening emergencies. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: rapid
Duration of Action: unknown but half-life 26-31 hours

Instaglucose (other sugar containing substances) (Paramedic, AEMT, EMT/RN)

Class: Glucose-elevating agents; carbohydrate
Pharmacologic Action: increases blood sugar levels
Indications: Management of symptomatic hypoglycemia
Dosage and Administration:

- Adults with symptomatic hypoglycemia (<60mg/dL for non-diabetics OR <80mg/dL in diabetic):
  - If conscious and protecting airway and able to take PO:
    - Administer one tube of Instaglucose or Cake frosting PO or equivalent sugary food (ex. candy, table sugar, honey, non-diet soda/pop) and repeat as needed
- Pediatric with symptomatic hypoglycemia (<60mg/dL):
  - If conscious and protecting airway and able to take PO:
    - Administer one tube of Instaglucose or Cake frosting PO or equivalent sugary food (ex. candy, table sugar, honey, fruit juice, non-diet soda/pop) and repeat as needed

Contraindications: Hyperglycemia
Precautions: Consider consultation with Direct Medical Oversight prior to administration for pediatric seizure patient who has chronic seizures with hypoglycemia and on ketogenic diet.
Pregnancy/Breast Feeding Considerations: Safe in pregnancy and breastfeeding.
Onset of Action: 10 minutes when given orally
Peak: 40 minutes when given orally
Duration of Action: depends on metabolism, underlying physiology and dose.

Ipratropium (Paramedic, AEMT, EMT/RN)

Class: Anticholinergic
Pharmacologic Action: Anticholinergic (parasympatholytic) agent; inhibits vagally mediated reflexes by antagonizing acetylcholine action; prevents increase in intracellular calcium concentration that is caused by interaction of acetylcholine with muscarinic receptors on bronchial smooth muscle, causes bronchodilation
Indications: Bronchospastic lung disease, wheezing, respiratory distress believed to be from bronchospasm (co-administered with albuterol)
Dosage and Administration:

- Adult:
  - 0.5mg/2.5ml unit dose inhalation treatment per nebulizer together with albuterol and repeat as needed.
- Pediatric:
  - 0.5mg/2.5ml unit dose inhalation treatment per nebulizer together with albuterol and repeat as needed.

Contraindications - Hypersensitivity to ipratropium, atropine, or derivatives.
Side Effects: cough, nervousness, dry mouth, dizziness, headache, oral irritation, nausea, may worsen angle-closure glaucoma
Pregnancy/Breast Feeding Considerations: Safe in pregnancy. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: within 15 minutes
Peak: 1-2 hours
Duration of Action: 2-8 hours

Isopropyl Alcohol Preps (Paramedic, AEMT, EMT/RN)

Class: Secondary alcohol
Pharmacology: In addition to traditional role as antiseptic, may be used as antiemetic
Indications: Nausea and vomiting
Dosage and Administration:

- Adult:
  - Allow patient to inhale deeply as frequently as required the vapor from isopropyl alcohol prep held 1-2 cm below the nares
- Pediatric:
  - Allow patient to inhale deeply as frequently as required the vapor from isopropyl alcohol prep held 1-2 cm below the nares (**patient must be old enough to understand and self-administer**)

Contraindications: Patient unable to understand and self-administer
Pregnancy/Breast Feeding Considerations: unknown safety in pregnancy via inhalation of vapors and should generally be avoided. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: unknown, presumed to be rapid via inhalation
Duration of Action: unknown

Ketamine (Paramedic)

Class: General anesthetic, dissociative anesthesia, non-opioid analgesic
Pharmacologic Action: produces dissociative anesthesia at high doses, blocks NMDA receptors, produces analgesia at lower doses, adjunct to opioid analgesics
Indications:

- Management of pain refractory to fentanyl
- Management of pain in patient with contraindication to fentanyl administration
- Management of pain for patient in shock
- Management of pain for patient who refuses opioids

Dosage and Administration:

- Adult:
  - 20mg in 100ml of Crystalloid (IV/IO) to run in over 5-10 minute infusion and can repeat as needed 10 minutes after completion of infusion one time (max total dose of 40mg)

Contraindications: hypersensitivity to ketamine, ACS, CVA, psychosis
Precautions: severe hypertension, 3rd trimester pregnancy
Side Effects: respiratory depression, laryngospasm, hypertension, hypotension, bradycardia, tachycardia, delirium, hallucinations, flushing, increased secretions, nausea, vomiting, nystagmus, twitching.
Pregnancy/Breast Feeding Considerations: Generally should not be given during pregnancy as fentanyl would be preferred agent, but may consider this on case-by-case basis in consultation with Direct Medical Oversight. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: rapid when given IV
Peak and Duration: unknown, but likely 5-15 minutes from completion of infusion

Lactated Ringers (Crystalloid) (Paramedic, AEMT)

Class: Crystalloid
Pharmacologic Action: Isotonic fluid used to expand intravascular volume
Indications:

- Maintain patent vascular access route
- Flush medications through vascular lines
- Dilute medications for administration
- Provide fluid for volume expansion and fluid replacement
- Fluid resuscitation for crush syndrome

Dosage and Administration:

- Adult:
  - Fluid bolus:
    - 250ml-500ml and repeat as needed
  - Fluid resuscitation for crush syndrome: (*requires consultation with Direct Medical Oversight*)
    - 500-1000ml/hr
  - Medication flush:
    - Follow all medications administered through vascular access with 5-10ml
- **Pediatric**:
  - Fluid bolus (≥1 month old):
    - 20ml/kg and repeat as needed
  - Fluid bolus (<1 month old):
    - 10ml/kg and repeat as needed
  - Fluid resuscitation for crush syndrome: (*requires consultation with Direct Medical Oversight*)
    - 10ml/kg/hr
  - Medication flush:
    - Follow all medications administered through vascular access with 5ml

Contraindications: **INCOMPATIBLE WITH KETAMINE**
Pregnancy/Breast Feeding Considerations: Safe in pregnancy and breast feeding.

Lidocaine (Paramedic, AEMT)

Class: Class Ib antidysrhythmics, sodium channel blocker, amide local anesthetic
Pharmacologic Action: combines with fast sodium channels and thereby inhibits recovery after repolarization, resulting in decreasing myocardial excitability and conduction velocity
Indications: Management of v-fib and pulseless v-tach refractory to defibrillation and epinephrine, sustained VT with a pulse, IO analgesia
Dosage and Administration:

- Adult:
  - Cardiac Arrest (VF/VT): (**Paramedic, AEMT**)
    - 1-1.5mg/kg IV/IO and repeat x1 dose in 5 minutes as needed
  - Sustained VT with a pulse: (**Paramedic**)
    - 1-1.5mg/kg IV/IO and repeat x1 dose in 5 minutes as needed
  - IO analgesia: (**Paramedic, AEMT**)
    - 40mg IO slow push, then 10ml crystalloid fast push, then administer 20mg IO slow push
- Pediatric:
  - Cardiac Arrest (VF/VT): (**Paramedic, AEMT**)
    - 1-1.5mg/kg IV/IO and repeat x1 dose in 5 minutes as indicated
  - Sustained Ventricular Tachycardia: (**Paramedic**)
    - 1-1.5mg/kg IV/IO (*requires consultation with Direct Medical Oversight*)
  - IO analgesia: (**Paramedic, AEMT**)
    - 0.5mg/kg IO slow push (max 40mg), followed by 5ml NS fast push, then administer 0.25mg/kg IO slow push

Contraindications - Hypersensitivity to lidocaine or amide-type local anesthetic, Adams-Stokes syndrome, SA/AV/intraventricular heart block in the absence of artificial pacemaker. CHF, cardiogenic shock, second and third degree heart block (if no pacemaker is present), Wolff-Parkinson-White Syndrome
Precautions: use with caution with hypotension, hypovolemia or shock. Use with caution in CHF, elderly patients.
Side Effects: toxicity indicators are: seizures, drowsiness, altered mental status, agitation, slurring speech, tinnitus, paresthesia, hallucinations, visual disturbances, and muscle twitching. Can also cause heart block, hypotension, and bradycardia
Pregnancy/Breast Feeding Considerations: Pregnancy/Breast Feeding Considerations: Lidocaine should be administered in pregnant women for life-threatening emergencies. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: IV 45-90 seconds
Duration of Action: 10-20 minute

Lorazepam (Paramedic)

Class: Anticonvulsants, other; antianxiety agent; anxiolytics; benzodiazepines
Pharmacologic Action - Sedative hypnotic with short onset of effects and relatively long half-life; by increasing the action of gamma-aminobutyric acid (GABA), which is a major inhibitory neurotransmitter in the brain, lorazepam may depress all levels of the CNS, including limbic and reticular formation
Indications: Management of anxiety, nausea or delirium for end-of-life care/hospice with home comfort kit.
Dosage and Administration:

- Adult:
  - 0.5mg-2mg PO one dose from home comfort kit

Contraindications - Documented hypersensitivity, severe respiratory depression, pregnant patients
Pregnancy/Breast Feeding Considerations: Generally should not be given to pregnant patients unless life-threatening emergency and no alternatives available. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: unknown when given PO (typically less than 20 minutes)
Peak: 2 hours when given PO
Duration of Action: 6-12 hours

Midazolam (Paramedic, AEMT)

Class: Anticonvulsants, anxiolytic, benzodiazepine
Pharmacologic Action: Binds receptors at several sites within the CNS, including the limbic system and reticular formation; effects may be mediated through gaba-aminobutyric acid (GABA) receptor system; increase in neuronal membrane permeability to chloride ions enhances the inhibitory effects of GABA; the shift in chloride ions causes hyperpolarization (less excitability) and stabilization of the neuronal membrane
Indications: Management of seizures, sedation to facilitate maintenance of advanced airway compliance, management of agitated or violent patients/behavioral emergencies, suspected nerve agent poisoning, sedation for electrical therapy (pacing, cardioversion), management of uncontrolled shivering with active cooling, anxiety associated with end-of-life/palliative care, eclampsia-related seizures.
Dosage and Administration:

- Adult:
  - Active Seizure (**Paramedic, AEMT**)
    - If no IV/IO:
      - 10mg IM, repeat at 5mg every 5 minutes as needed until termination of seizure activity IV/IO/IM/IN, to a max total dose of 20mg
    - If IV/IO established prior to seizure activity:
      - 5mg IV/IO, repeat at 5mg every 5 min as needed to a max total dose of 20mg

- Sedation for electrical therapy (pacing/cardioversion) and to facilitate compliance with medical procedures (ex. advanced airway compliance, positive pressure ventilation, CPAP compliance, post-code sedation/compliance, shivering from active cooling) (**Paramedic**)
    - 2.5-5mg IV/IO/IM/IN, repeat every 5 minutes as needed to a max total dose of 10mg
- Agitated or violent patient/Behavioral emergency: (**Paramedic**)
    - 5-10mg IV/IO/IM/IN and repeat every 5 minutes as needed to a max total dose of 20mg
- Anxiety associated with end-of-life/palliative care: (**Paramedic**)
    - 2.5mg IV/IM/IN one time (*Requires consultation with Direct Medical Oversight for any repeat doses)*

➢ Pediatric:

- Active seizure: (**Paramedic, AEMT**)
    - If ***no*** IV/IO in place:
        - Administer midazolam IM or IN per corresponding length-based tape color (see table below).
        - Repeat every 5 minutes until termination of seizure activity or a max total dose of 10 mg is reached.
    - If IV/IO established *prior* to onset of seizure activity:
        - Administer midazolam IV or IO per corresponding length-based tape color below.
        - Repeat every 5 minutes until termination of seizure activity or a max total dose of 10 mg is reached.
- Sedation for electrical therapy (pacing/cardioversion) and to facilitate compliance with medical procedures (ex. advanced airway compliance, positive pressure ventilation, post code sedation/compliance, shivering from active cooling): (**Paramedic**)
    - Administer Midazolam per the corresponding length-based tape color (see table below).
    - Repeat as needed every 5 minutes to a max total dose of 10mg.

Midazolam Dosing Table

Color	**IV/IO***	**IM/IN***
Grey 3kg	0.06 mL	0.12 mL
Grey 4kg	0.08 mL	0.16 mL
Grey 5kg	0.1 mL	0.2 mL
Pink	0.13 mL	0.26 mL
Red	0.17 mL	0.34 mL
Purple	0.2 mL	0.4 mL
Yellow	0.25 mL	0.5 mL
White	0.3 mL	0.6 mL
Blue	0.4 mL	0.8 mL
Orange	0.5 mL	1 mL
Green	0.65 mL	1 mL

* Midazolam 5mg/ml concentration

Contraindications - Documented hypersensitivity
WARNING: May cause respiratory depression, arrest, or apnea. Consider lower dosing regimen with patients age 65 and older, debilitated, chronically ill, critically ill or when used in conjunction with other CNS depressants. IN dosing may take 10 minutes for full effect. Avoid repeat dosing too quickly to avoid over-sedation.
NOTE: Dosage must be individualized and titrated to desired effect. Individualized response may vary with age, physical status, and concomitant medications.
Side Effects: Drowsiness, fatigue, dizziness, confusion, vomiting, respiratory depression, hypoventilation, hypotension, tonic/clonic movements and twitching, paradoxical hyperactivity
Pregnancy/Breast Feeding Considerations: Generally, should be avoided in pregnancy UNLESS seizing or risk/benefit is in favor of administration. Consultation with Direct Medical Oversight should be sought for any administration except for seizures. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: IM within 5 minutes for children, IM within 15 minutes for adults, IV 3-5 minutes (children and adults), IN 5 minutes (children and adults).
Peak: IV 3-5 minutes, IM children 15-30 minutes, IM adults 30-60 minutes IN children 10 minutes
Duration of Action: IM/IV 2-6 hours

Naloxone (Paramedic, AEMT) (EMT/RN-IM Auto-injectors and IN routes only)

Class: Opioid reversal agent
Pharmacologic Action: Competitive opioid antagonist by blocking opioid receptor reversing respiratory depression, sedation and hypotension
Indications: Reversal of acute opioid toxicity resulting in hypoventilation or symptomatic hypotension
Dosage and Administration:

- Adult:
  - Administer commercially available naloxone auto-injector IM OR naloxone intranasal spray and repeat as needed every 5 minutes
  - 0.5mg-2mg IV/IO/IM/Intranasal titrated to reversal of respiratory depression and may be repeated as needed every 3-5 minutes to a max total dose of 4mg
- Pediatric:
  - Administer commercially available naloxone auto-injector IM OR naloxone intranasal spray and repeat as needed every 5 minutes
  - 0.5mg-2mg IV/IO/IM/Intranasal titrated to reversal of respiratory depression and may be repeated as needed every 3-5 minutes to a max total dose of 4mg

Contraindications: Hypersensitivity
WARNING: Administration of naloxone can result in the sudden onset of opiate withdrawal (agitation, tachycardia, pulmonary edema, arrhythmias, cardiac arrest, nausea, vomiting, and, in neonates, seizures)
Side Effects: nausea, vomiting, opiate withdrawal symptoms, diarrhea, agitation, tremors, diaphoresis, hypertension, dyspnea
Pregnancy/Breast Feeding Considerations: Naloxone should be administered in pregnant women as antidote for life-threatening emergencies. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: IV 2 minutes, IM 2-5 minutes, IN 8-13 minutes
Peak: IM 15 minutes, IN 20-30 minutes
Duration of Action: 30-120 minutes depending on route, IV shorter duration than IM.

Nitroglycerin (Paramedic, AEMT, EMT/RN)

Class: Nitrates, anti-anginal
Pharmacologic Action: Organic nitrate which causes systemic venodilation, decreasing preload. Cellular mechanism: nitrate enters vascular smooth muscle and converted to nitric oxide (NO) leading to activation of cyclic guanosine monophosphate (cGMP) and vasodilation. Relaxes smooth muscle via dose-dependent dilation of arterial and venous beds to reduce both preload and afterload, and myocardial O2 demand. Also improves coronary collateral circulation.
Indications: As an anti-anginal medication for the management of chest pain as well as a reducer of preload for patients suffering from acute pulmonary edema/CHF exacerbation with hypertension
Dosage and Administration:

- Adult:
  - Suspected chest pain of cardiac origin
    - 0.4mg SL and repeat every 5 minutes as needed
  - Respiratory distress associated with acute pulmonary edema/CHF exacerbation with hypertension
    - 0.4mg SL and repeat every 5 minutes as needed

Contraindications: Hypersensitivity to nitrates, or if sildenafil (Viagra®, Revatio®), vardenafil (Levitra®, Staxyn®), tadalafil (Cialis®, Adcirca®) or other erectile dysfunction or pulmonary hypertension agent has been used within 48 hours. Also avoid use in patients receiving intravenous epoprostenol (Flolan®) or treporstenil (Remodulin®) for treatment of pulmonary hypertension
Nitrates are contraindicated in the presence of hypotension (SBP < 100 mm Hg or ≥30 mm Hg below baseline), extreme bradycardia (< 50 bpm), tachycardia in the absence of heart failure (>100 bpm).
WARNING*:* Never administer nitrates after ROSC achieved.
Precautions: Use caution if Inferior Wall STEMI/ACUTE MI and/or Right Ventricular Infarct concern.
Side Effects: Hypotension, tachycardia, syncope, headache, dizziness, nausea, vomiting

Pregnancy/Breast Feeding Considerations: Can be given for respiratory distress associated with pulmonary edema with uncontrolled hypertension (CHF with pulmonary edema). Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: Sublingual 1-3 minutes
Peak: 4-15 minutes
Duration of Action: 25 minutes

Norepinephrine (Paramedic)

Class: Alpha/beta adrenergic agonist
Pharmacologic Action: Stimulates alpha and beta-1 adrenergic receptors; produces inotropic and vasopressor effects
Indications: As a pressor agent used in the management of shock (cardiogenic, hypovolemic, obstructive, distributive, and neurogenic)
Dosage and Administration:

- Adult:
  - 10mcg/min, titrated to a MAP >65mmHg or systolic pressure > 100mgHg or until bradycardia resolves
  - Admixture: 4mg/4ml ampule mixed in 500ml NS (concentration 8mcg/ml)
  - Metronome to set rate of administration (see **FRG**)

Contraindications: Hypersensitivity, hypotension due to blood volume deficit, peripheral vascular thrombosis (except for lifesaving procedures)
WARNING: Norepinephrine is a vesicant and can cause severe tissue damage if extravasation occurs. Ensure patent IV that aspirates and flushes easily preferably in large vein in forearm or more proximal.
Side Effects: dysrhythmias, hypertension, bradycardia, anxiety, headache, dyspnea, extravasation/pain at infusion site
Pregnancy/Breast Feeding Considerations: Norepinephrine should be administered in pregnant women for life-threatening emergencies. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: rapid
Duration of Action: 1-2 minutes

Normal Saline (Crystalloid) (Paramedic, AEMT)

Class: Crystalloid
Pharmacologic Action: Isotonic fluid used to expand intravascular volume
Indications:

- Maintain patent vascular access route
- Flush medications through vascular lines
- Dilute medications for administration
- Provide fluid for volume expansion and fluid replacement
- Fluid resuscitation for crush syndrome

Dosage and Administration:

- Adult:
  - Fluid bolus:
    - 250ml-500ml and repeat as needed
  - Fluid resuscitation for crush syndrome: (*requires consultation with Direct Medical Oversight*)
    - 500-1000ml/hr
  - Medication flush:
    - Follow all medications administered through vascular access with 5-10ml
- **Pediatric**:
  - Fluid bolus (≥1 month old):
    - 20ml/kg and repeat as needed
  - Fluid bolus (<1 month old):
    - 10ml/kg and repeat as needed
  - Fluid resuscitation for crush syndrome: (*requires consultation with Direct Medical Oversight*)
    - 10ml/kg/hr
  - Medication flush:
    - Follow all medications administered through vascular access with 5ml

Contraindications: none
Pregnancy/Breast Feeding Considerations: Safe in pregnancy and breast feeding.

Ondansetron (Paramedic, AEMT)

Class: Antiemetic, selective 5-HT3 antagonist
Pharmacologic Action: Mechanism not fully characterized; selective 5-HT3 receptor antagonist; binds to 5-HT3 receptors both in periphery and in CNS, with primary effects in GI tract. Has no effect on dopamine receptors and therefore does not cause extrapyramidal symptoms.
Indications: Management of nausea or vomiting
Dosage and Administration:

- Adult:
  - 4mg IV/IO/IM/ODT one dose only
- Pediatric (>2 years old):
  - 0.1mg/kg IV/IO/IM slow push (max single dose 4 mg) one dose only
  - 4mg ODT for patient measuring "white" or greater on Broselow tape one dose only

NOTE: EKG monitoring is recommended in patients who have electrolyte abnormalities, CHF, or bradyarrhythmias or who are also receiving other medications that cause QT prolongation
Contraindications: Hypersensitivity and <2 years old
WARNING: May cause dose-dependent QT prolongation, avoid in patients with congenital long QT syndrome
Precautions: First trimester pregnancy may be associated with some small absolute increase risk to fetus regarding cleft palate and cardiac defects (conflicting data) but consider discussion with patient prior to administration.
Pregnancy/Breast Feeding Considerations: Generally considered safe in pregnancy. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: 20-30 minutes
Duration of Action: 3-6 hours depending on age and underlying physiology

Oxymetazoline (Paramedic)

Class: topical intranasal decongestant
Pharmacologic Action: Alpha-adrenergic agonist; stimulates alpha-adrenergic receptors and produces vasoconstriction in the arterioles of the nasal mucosa causing drying of secretions and decongestion
Indications: Management of epistaxis
Dosage and Administration:

- Adult:
  - 1-2 sprays per nostril one dose only
- Pediatric >6 yo:
  - 1-2 sprays per nostril one dose only

Contraindications - Hypersensitivity
Onset of Action: 10 minutes
Duration of Action: 12 hours

Racemic epinephrine 2.25% solution (nebulized) (Paramedic)

Class: adrenergic agonist
Pharmacologic Action: stimulates alpha and beta adrenergic receptors, reducing mucosal edema
Indications: Management of moderate-to-severe croup, moderate-to-severe angioedema of tongue/airway associated with anaphylaxis, severe pediatric bronchiolitis
Dosage and Administration:

- Adult:
  - Severe oral mucosal/airway edema associated with anaphylaxis can consider 0.5ml of racemic epinephrine (2.25%) diluted with 3ml with NS and nebulized one time (only **AFTER IM epinephrine** administered)
- Pediatric:
  - Moderate-to-severe croup with stridor at rest and presence of retractions
    - 0.5ml of racemic epinephrine (2.25% solution) diluted with 3ml with NS and administered via nebulizer one dose only
  - Severe respiratory distress associated with bronchiolitis
    - 0.5ml of racemic epinephrine (2.25% solution) diluted with 3ml with NS and administered via nebulizer one dose only

Contraindications: none pertinent to EMS
Precautions: use cautiously in adults with history of ACS, CVA, hypertension, CHF especially when given after IM epinephrine.
Side Effects: tachycardia, paleness/duskiness around lips/face, dry mucous membranes, hypertension, tremors, and anxiety
Pregnancy/Breast Feeding Considerations: Racemic epinephrine should be administered in pregnant women for life-threatening emergencies. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: 1 minute by inhalation
Peak: 10-30 minutes
Duration of Action: 2-3 hours

Sodium Bicarbonate (Paramedic)

Class: alkalinizing agent, antidote
Pharmacologic Action: Increases blood and urinary pH by releasing a bicarbonate ion, which in turn neutralizes hydrogen ion concentrations, attempts to correct metabolic acidosis, enhances protein binding of certain medications (TCAs) thus inactivating them in the body and promotes excretion of others
Indications: Management of cardiac arrest in cases in which either hyperkalemia or tricyclic antidepressant (TCA) overdose are suspected as contributory, QRS prolongation (>100ms) in known or suspected TCA overdose/Beta-blocker overdose, wide-complex QRS in sympathomimetic toxicity (ex. cocaine), known or suspected hyperkalemia with wide-complex QRS (ex. dialysis patient, crush syndrome)
Dosage and Administration:

- Adult:
  - Cardiac Arrest (suspected hyperkalemia or known TCA overdose)
    - 1mEq/kg IV/IO push for cardiac arrest (*requires consultation with Direct Medical Oversight for repeat dosing*)
  - Overdoses/Toxicity, suspected hyperkalemia, crush syndrome with a pulse:
    - 1mEq/kg IV/IO over 5 minutes *(requires consultation with Direct Medical Oversight)*
- Pediatrics:
  - Cardiac Arrest (suspected hyperkalemia or known TCA overdose)
    - 1mEq/kg IV/IO push for cardiac arrest (*requires consultation with Direct Medical Oversight for repeat dosing*)
  - Overdoses/Toxicity, suspected hyperkalemia, crush syndrome with a pulse:
    - 1mEq/kg IV/IO over 5 minutes *(requires consultation with Direct Medical Oversight)*

Contraindications: Documented hypersensitivity, severe pulmonary edema, known alkalosis, hypernatremia, hypocalcemia, hypokalemia
Precautions: DO NOT mix with other drugs in same line (flush between medications), may need to increase ventilation (monitor ETCO2) as bicarb generates CO2 and may worsen intracellular acidosis, large sodium load may cause hypervolemia/volume overload.
Pregnancy/Breast Feeding Considerations: Generally, not recommended during pregnancy. Safe during breast feeding.
Onset of Action: Rapid when given IV
Duration of Action: IV 8-10 minutes

Tetracaine (Paramedic)

Class: topical ophthalmic anesthetic, ester local anesthetic
Pharmacologic Action: Inhibits sodium ion channels, stabilizing neuronal cell membranes and inhibiting nerve impulse initiations and conduction resulting in anesthesia
Indications: Eye pain due to chemical exposure and/or concern for corneal abrasion
Dosage and Administration:

- Adult:
  - 1-2 drops instilled in the affected eye and may repeat every 5-10 minutes as needed
- Pediatric (> 2 years old):
  - 1-2 drops instilled in the affected eye and may repeat every 5-10 minutes as needed

Contraindication: Hypersensitivity to ester anesthetics
Precautions: do not force eye open or fight with patient to use drops
Side Effects: This WILL CAUSE BURNING SENSATION when instilled. Please warn patient and use with clinical judgement in pediatric patients who may be more distressed by transient burning sensation.
Pregnancy/Breast Feeding Considerations: Generally considered safe in pregnancy. Breast-feeding should be interrupted during administration and not resumed until cleared by physician.
Onset of Action: 30 seconds
Duration of Action: 10-20 minutes

APPENDICES

APPENDIX A - JOHNSON COUNTY TRAUMA PLAN

*Based on the American College of Surgeons 2021 National Guideline for the Field Triage of Injured Patients

RED CRITERIA

High Risk for Serious Injury

Injury Patterns	Mental Status & Vital Signs
• Penetrating injuries to head, neck, torso, and proximal extremities • Skull deformity, suspected skull fracture • Suspected spinal injury with new motor or sensory loss • Chest wall instability, deformity, or suspected flail chest • Suspected pelvic fracture • Suspected fracture of two or more proximal long bones • Crushed, degloved, mangled, or pulseless extremity • Amputation proximal to wrist or ankle • Active bleeding requiring a tourniquet or wound packing with continuous pressure	All Patients • Unable to follow commands (motor GCS < 6) • RR < 10 or > 29 breaths/min • Respiratory distress or need for respiratory support • Room-air pulse oximetry < 90% Age 0–9 years • SBP < 70mm Hg + (2 x age in years) Age 10–64 years • SBP < 90 mmHg or • HR > SBP Age ≥ 65 years • SBP < 110 mmHg or • HR > SBP

*Patients meeting any **ONE** of the above **RED** criteria should be transported to a **Level I or II** trauma center.*

YELLOW CRITERIA

Moderate Risk for Serious Injury

Mechanism of Injury	EMS Judgment
• High-Risk Auto Crash – Partial or complete ejection – Significant intrusion (including roof) • >12 inches occupant site OR • >18 inches any site OR • Need for extrication for entrapped patient – Death in passenger compartment – Child (age 0–9 years) unrestrained or in unsecured child safety seat – Vehicle telemetry data consistent with severe injury • Rider separated from transport vehicle with significant impact (eg, motorcycle, ATV, horse, etc.) • Pedestrian/bicycle rider thrown, run over, or with significant impact • Fall from height > 10 feet (all ages)	Consider risk factors, including: • Low-level falls in young children (age ≤ 5 years) or older adults (age ≥ 65 years) with significant head impact • Anticoagulant use • Suspicion of child abuse • Special, high-resource healthcare needs • Pregnancy > 20 weeks • Burns in conjunction with trauma • Children should be triaged preferentially to pediatric capable centers If concerned, take to a trauma center

*Patients meeting any **one** of the **YELLOW CRITERIA WHO DO NOT MEET RED CRITERIA** should be **preferentially** transported to a **trauma center**.*

- **Determination of Trauma Patient Destination**
  - Criteria for identifying trauma center candidates are based on the 2021 American College of Surgeons National Guideline for the Field Triage of Injured Patients.

  - Injured patients who require the resources of a trauma facility are transported to one of the following designated trauma centers:
    - Age 15 years old or older:
      - The University of Kansas Health System (Adult and Pediatric Burn Center)
      - Overland Park Regional
      - Research Medical Center (Adult Burn Center)
      - Saint Luke's-Plaza
      - University Health Truman Medical Center
    - Age 0-14 years old to the following:
      - Children's Mercy Hospital-Downtown (Pediatric Burn Center)

  - During multiple casualty incidents, other regional trauma centers may be used for patient transport as directed by the Medical Branch Director

  - The decision on which trauma center to use is based on the scene location and travel time to the nearest open trauma center, the patient's age, and discretionary factors determined by on-scene personnel and Direct Medical Oversight.

  - Adult patients with major burns should be transported to **a designated adult burn center** unless immediate life-saving procedures are necessary.

  - Pediatric patients with major burns should be transported **to a designated pediatric burn center** unless immediate life-saving procedures are necessary.

- **Communication with Trauma/Burn Centers**
  - See **Biomedical Communications/Documentation** protocol

- **Selecting Appropriate Mode of Transport for Trauma/Burn Patients**
  - For patients meeting criteria for transport to a trauma/burn center, the mode of transport will initially be determined based on scene location and travel time to the nearest appropriate, open trauma/burn center.
  - On-scene crews should use discretion in identifying the mode-of-transport that will offer the greatest benefit to the patient and minimize transport time without placing undo risk to patient and EMS Providers.

- Helicopter transport to the nearest appropriate trauma center should be considered for patients who have identified RED Criteria from the National Guideline for the Field Triage of Injured Patients and who are at scene where the travel time by ground is greater than 30 minutes (drive time to hospital is not only consideration, but EMS Providers should consider ETA of helicopter to scene, landing zone proximity, off-load and on-load times when making determination to wait for helicopter)
- Helicopter transport may be considered in any area where conditions are not conducive to ground transportation.
- Ground transport to the nearest appropriate trauma center shall be considered for patients who meet RED or YELLOW criteria, and who are at a scene where the travel time by ground is 30 minutes or less.
- Pediatric patients should be transported to the nearest trauma center when necessary to correct any of the following (requires clinical judgement):
    - Inability to establish or maintain an airway
    - Inability to ventilate
    - Unremitting shock (uncontrollable or exsanguinating hemorrhage, loss of heart rate or blood pressure)

APPENDIX B - PHYSICIAN/NURSE PRACTITIONER/PHYSICIAN ASSISTANT ON SCENE

The direction of out-of-hospital care at the scene of a medical emergency should be the responsibility of the individual in attendance who is most appropriately trained and knowledgeable in providing out-of-hospital emergency stabilization and transport. The EMS Provider is responsible for management of the patient and acts as an agent of EMS Medical Director unless the patient's physician/nurse practitioner/physician assistant is present and the personal physician/nurse practitioner/physician assistant wishes to direct the on-scene care.

- **Private physician/nurse practitioner/physician assistant**:
  - A private physician/nurse practitioner/physician assistant is an individual who provides evidence of medical licensure in Kansas, has established a provider/patient relationship prior to this event, wishes to take charge of a medical emergency and is willing to accompany the patient to the hospital.
- **Intervener physician/nurse practitioner/physician assistant**:
  - An intervener physician/nurse practitioner/physician assistant is an individual who provides evidence of medical licensure in Kansas, has not established a provider/patient relationship prior to this event, wishes to take charge of a medical emergency and is willing to accompany the patient to the hospital.

Key Considerations:

- If the **Private physician/nurse practitioner/physician assistant** is present and wishes to assume responsibility for the patient's care:
  - The EMS Provider should defer to the orders of the private physician/nurse practitioner/physician assistant. Direct Medical Oversight should be contacted.
  - EMS Providers retain the right to re-establish medical direction with the Direct Medical Oversight if they believe that the emergency care rendered by the private physician/nurse practitioner/physician assistant is inconsistent with quality patient care and/or violates Johnson County EMS protocol. Johnson County EMS Providers shall not comply with orders that exceed their scope of practice.
  - Revert back to Direct Medical Oversight at any time when the private physician/nurse practitioner/physician assistant is no longer in attendance.
  - The Private Physician/nurse practitioner/physician assistant must sign the patient care report.

- If an **Intervener physician/nurse practitioner/physician assistant** is present and wishes to assume responsibility for the patient's care:
    - Verify that the individual is a physician (MD or DO)/nurse practitioner/physician assistant licensed in Kansas.
    - Provide the Intervener physician/nurse practitioner/physician assistant with the Physician/nurse practitioner/physician assistant Information Card.
    - The Intervener physician/nurse practitioner/physician assistant must agree to abide by the terms of the card.
    - If he/she does not agree with the items on the card, then the Intervener physician/nurse practitioner/physician assistant cannot assume role of Direct Medical Oversight.
    - If the Intervener physician/nurse practitioner/physician assistant still wishes to assume Direct Medical Oversight, immediately contact Johnson County EMS System approved Direct Medical Oversight for guidance.
    - It is Johnson County EMS system approved Direct Medical Oversight's decision to relinquish or retain medical direction.
    - The EMS Provider shall not accept orders from the Intervener physician/nurse practitioner/physician assistant on the scene unless the orders are in accordance with the current protocols or Direct Medical Oversight specifically advises that the EMS Provider should follow those orders.
    - The Intervener physician/nurse practitioner/physician assistant must accompany the patient to the hospital.
    - The Intervener physician/nurse practitioner/physician assistant must sign the patient care report.

APPENDIX C - AIR MEDICAL TRANSPORT

Patient Care Goals:

- Ensure appropriate utilization of air medical transport for patients who meet indications
- Ensure that patient care is seamlessly transitioned to flight crew in a safe and efficient manner.

Situations when air transport may be beneficial to the patient include the following:

- Critical patients when rapid surgical intervention or other in-hospital treatment is emergent and air evacuation may be more expedient than ground transport.
- Helicopter transport may be considered in any area where terrain or traffic conditions are not conducive to ground transportation.
- Patients deemed by direct medical oversight to require the services of a specific medical facility other than the closest hospital when air evacuation is more expedient than ground transport.
- Seasonal conditions that make access difficult and increase transport times of ground ambulances (ex. snowdrifts, flooding etc.).
- In multiple casualty situations to augment ground ambulance services.

Activation and Preparation for Air Medical Transport:

- When it has been determined that air transport will be utilized, a helicopter response will be requested through the Johnson County Emergency Communications Center. The choice of helicopter service will be based on the scene location and service availability.
- Ensure that treatment is administered to the patient(s) in accordance with Johnson County Emergency Medical Services Protocols prior to the arrival of the helicopter(s).
- Ensure that communication with the appropriate receiving facilities is established (see **Biomedical Communications/Documentation** protocol).
- Determine which patients will be evacuated by air, and ensure that they are packaged for transport prior to arrival of the helicopter to reduce overall scene time.
- Assist, if necessary, in establishing the helicopter landing zone (LZ). Police and fire personnel will handle the majority of landings; however, EMS personnel should be knowledgeable in landing procedures should they be needed to assist.

Transition of Care to Flight Crew:

- Upon arrival of the helicopter, the ground medical crew will:
  - Ensure that report is given to the helicopter medical crew including approximate time of injury, suspected injuries, patient condition, treatment initiated, to what hospital the patient will be transported as designated by the Johnson County Trauma Plan (see **Appendix A**) or Direct Medical Oversight.
  - Assist with the transport of patient(s) to the helicopter ambulance and provide additional assistance as needed.
  - Upon transfer of patient care to flight crew, the helicopter crew may operate according to their own protocols.

APPENDIX D - EMS RESPONSE TO EVENTS REQUIRING REHAB

This protocol is meant to complement the JCFEMSCA Model Procedure on Rehab. Providers should be familiar with the contents of the model procedure.

- An ambulance will respond to all incidents that pose a threat to the physical well-being of citizens or Fire/EMS providers. In addition to caring for patients with immediate illness or injuries, EMS providers will be available to other responding Fire/EMS personnel for medical monitoring, overseeing hydration needs, temperature management, and assisting with recovery from fatigue.

Principles of Rehab:

- EMS providers tasked with providing rehab should continually observe other Fire/EMS personnel for signs of over-exertion, fatigue, dehydration, and heat/cold-related illness.
- All EMS providers are empowered to immediately notify the IC/Safety Officer if there are any medical/safety concerns regarding any Fire/EMS personnel at the incident.

Procedures for Rehab:

- All Fire/EMS personnel entering rehab need to be documented into the Fire/EMS personnel Rehabilitation Log as they enter and exit the rehab area.
- All Fire/EMS personnel entering rehab will receive an initial assessment that is to be documented on the Rehabilitation Assessment Form and repeated in 15 minutes.
- Fire/EMS personnel who meet rehab release criteria vitals upon entering rehab do not need a second set of vitals (They still need observation and hydration documentation).
- Fire/EMS personnel who enter rehab with vital signs or complaints that meet criteria to become a patient should not be assessed or treated in rehab. They should be taken immediately to the Treatment Group for full assessment and initiation of treatment. A Patient Care Report will be completed.
- Fire/EMS personnel should be monitored and rested for 20 minutes and on high-impact days for 30 minutes. (see model procedure for definition of “high impact day”)
- Fire/EMS personnel who meet rehab release criteria after 20 minutes (30 minutes for high-impact days) will be discharged.
- Fire/EMS personnel who do NOT meet release criteria after initial rest period of 20 minutes (30 minutes for high-impact days) will remain in rehab for an additional 10 minute rest period for a total of 30 minutes (40 minutes for high-impact days). If they still do not meet release criteria after 30 minutes (40 minutes for high-impact days), they should not be allowed to return to active duty at the incident and the IC/Safety Officer should be notified immediately.

Rehab Release Criteria:

- Fire/EMS personnel in rehab may be released back to the operation/incident if they meet all of the following:
  - **Pulse**: <120 after twenty minutes (30 minutes for high-impact days)
  - **Respirations**: Normal work of breathing, no signs of respiratory distress.
  - **BP**: SBP >90 and <160, DBP <100.
  - **SpO2**: >94%
  - **Temp**: ≤ 101.0 F and ≥ 97.0 F
  - **Mental Status/Neuro**: Normal behavior. No signs of agitation, anxiety, drowsiness or confusion. Able to converse normally and ambulate with steady gait.
  - **Chief complaints**: has none other than minor musculoskeletal/skin issues (ex. Scrapes, blisters, bruise)
  - **Hydration**: Able to consume water/fluids without any nausea/vomiting while in rehab.

Criteria for Fire/EMS Personnel at an incident to become a patient:

- **Pulse:** >150 after 20 minutes of rest (30 minutes for high-impact days)
- **BP:** SBP <80, SBP>220 or DBP>120
- **Respirations**: increased work of breathing or any respiratory distress.
- **SpO2:** ≤94% post-rehab
- **Temp:** ≥101.0 F or ≤ 97.0 F post-rehab
- **Mental Status/Neuro: altered from baseline in any way (ex. confused, drowsy, syncope, or agitation).**
- **Chief complaint: has any chief complaint other than minor musculoskeletal/skin issues (ex. Blisters, bruise, scrapes)**
- **Hydration**: unable to consume any water/fluids during rehab (ex. nausea/vomiting).

Refer to appropriate protocol regarding treatment.

APPENDIX E - AUTHORIZATION TO ADMINISTER IMMUNIZATIONS

- Under these standing orders, eligible healthcare professionals may vaccinate persons under criteria established by the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices.
    - **Procedure:**
        - Identify individuals for vaccine administration in the appropriate target groups according to information provided by the CDC
        - Screen all patients for contraindications and precautions.
        - Provide all patients (or, in the case of a minor, their parent or legal representative) with a copy of the most current federal Vaccine Information Statement (VIS).
        - Provide appropriate HIPAA Notice of Information Practices documentation or relevant privacy protections policy (determined by agency).
        - Use appropriate equipment as outlined by the CDC.
        - Administer appropriate dose of the vaccine intramuscularly (IM) in deltoid muscle for adult patients or in the lateral thigh for pediatric patients lacking adequate deltoid mass.
        - Document the vaccine administration information and follow up in the following places:
            - Vaccine log or medical chart: Patient name, date of vaccine administration; manufacturer and lot number; vaccination site and route; and name and title of person administering the vaccine.
            - Personal immunization record or card: Date and location of vaccination; appropriate vaccine information and name of person administering vaccine.
        - Be prepared for management of a medical emergency related to the administration of vaccine by having access to EMS protocols available, as well as appropriate equipment and medications.
        - Report all adverse reactions to a vaccine to the federal Vaccine Adverse Event Reporting System (VAERS) at http://vaers.hhs.gov/reportevent.html or (800) 822-7967.

APPENDIX F - MULTI-CASUALTY INCIDENTS

MCI Level	Number of Patients	County / Regional Resources Utilized	Response
Level V	5-9	County	• 5 ALS Ambulances • 1 Med-Act Battalion Chief • 2 Fire Battalion Chiefs • 5 Fire Apparatus • County Chiefs' Page • EMSystem: Poll the two closest Hospitals, two closest Trauma Centers and Children's Mercy Hospital by the Johnson County ECC.
Level IV	10-24	County	All Level V Resources, Plus • 5 ALS Ambulances • 1 Med-Act Battalion Chief • 1 Fire Battalion Chief • 5 Fire Apparatus • County Chiefs' Page • EMSystem: Poll the three closest Hospitals, three closest Trauma Centers, and Children's Mercy Hospital by the Johnson County ECC.
Level III	25-49	County / Regional	All Level V & IV Resources, Plus • 5 ALS ambulances • 1 Fire Battalion Chief • 5 Fire Apparatus • County Chiefs' Page • EMSystem: MCI Alert to all metro hospitals. This will be accomplished by one of the other two EMResource Coordination Centers (EMCC) so that the ECC can focus on the incident within the county. • The alternate EMCC will also notify all regional EMS agencies via the PS DISP talkgroup of the MCI Alert. • Activation of Johnson County Emergency Management

MCI Level	Number of Patients	County / Regional Resources Utilized	Response
Level II	50-100	County / Regional	All Level V, IV, & III Resources, Plus • Unified Command shall request the appropriate resources and quantity as necessary for the incident. Regional resources should be requested according to the MARCER MCI Plan. • COMM1 • Med-Act MCI Supply Trailer (U1171) • County Chiefs' Page • EMSystem: MCI Alert to all metro hospitals. This will be accomplished by one of the other two EMResource Coordination Centers (EMCC) so that the ECC can focus on the incident within the county. • The alternate EMCC will also notify all regional EMS agencies via the PS DISP talkgroup of the MCI Alert. • Activation of Johnson County Emergency Management
Level I	≥ 100	County / Regional	All Level V, IV, III, & II Resources, Plus • Unified Command shall request the appropriate resources and quantity as necessary for the incident. Regional resources should be requested according to the MARCER MCI Plan • County Chiefs' Page • EMSystem: MCI Alert to all metro hospitals. This will be accomplished by one of the other two EMResource Coordination Centers (EMCC) so that the ECC can focus on the incident within the county. • The alternate EMCC will also notify all regional EMS agencies via the PS DISP talkgroup of the MCI Alert. • Activation of Johnson County Emergency Management

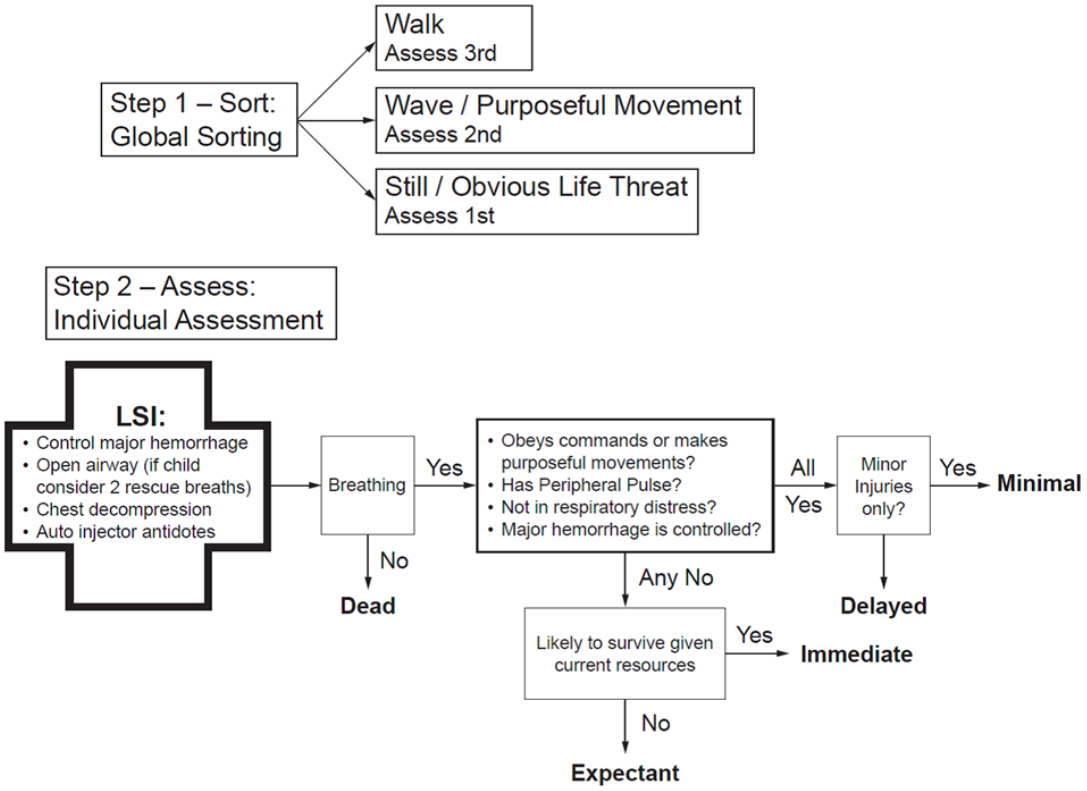
Patient Care Goals:

- To ensure that during multi-casualty incidents patients are appropriately triaged using a systematic, reliable method.
- Allocate resources appropriately to ensure maximum benefit to the most patients.

Multi-Casualty Incident Triage:

- **Green – Minimal/Non-emergent**. This patient is suffering from a minor injury or illness not likely to deteriorate to a life-threatening condition
- **Yellow – Delayed/Urgent**. This patient is suffering from an injury or illness that is not likely to deteriorate to a life-threatening condition if medical care is not provided immediately; however, there is a risk of deterioration if medical care is not provided in a "timely" fashion.
- **Red – Immediate/Emergent**. The red patient is one whose injury or illness has resulted in life-threatening shock or hypoxia or has the potential for the rapid development of life-threatening shock or hypoxia if immediate medical care is not provided.
- **Black** – **Expectant/Death/Non-emergent**. This patient is dead, has suffered an obviously mortal wound, or has sustained an injury or illness requiring resources beyond those available.

SALT



LSI: Life-saving intervention

Minimal= Green
Delayed= Yellow
Immediate= Red
Expectant/Dead= Black

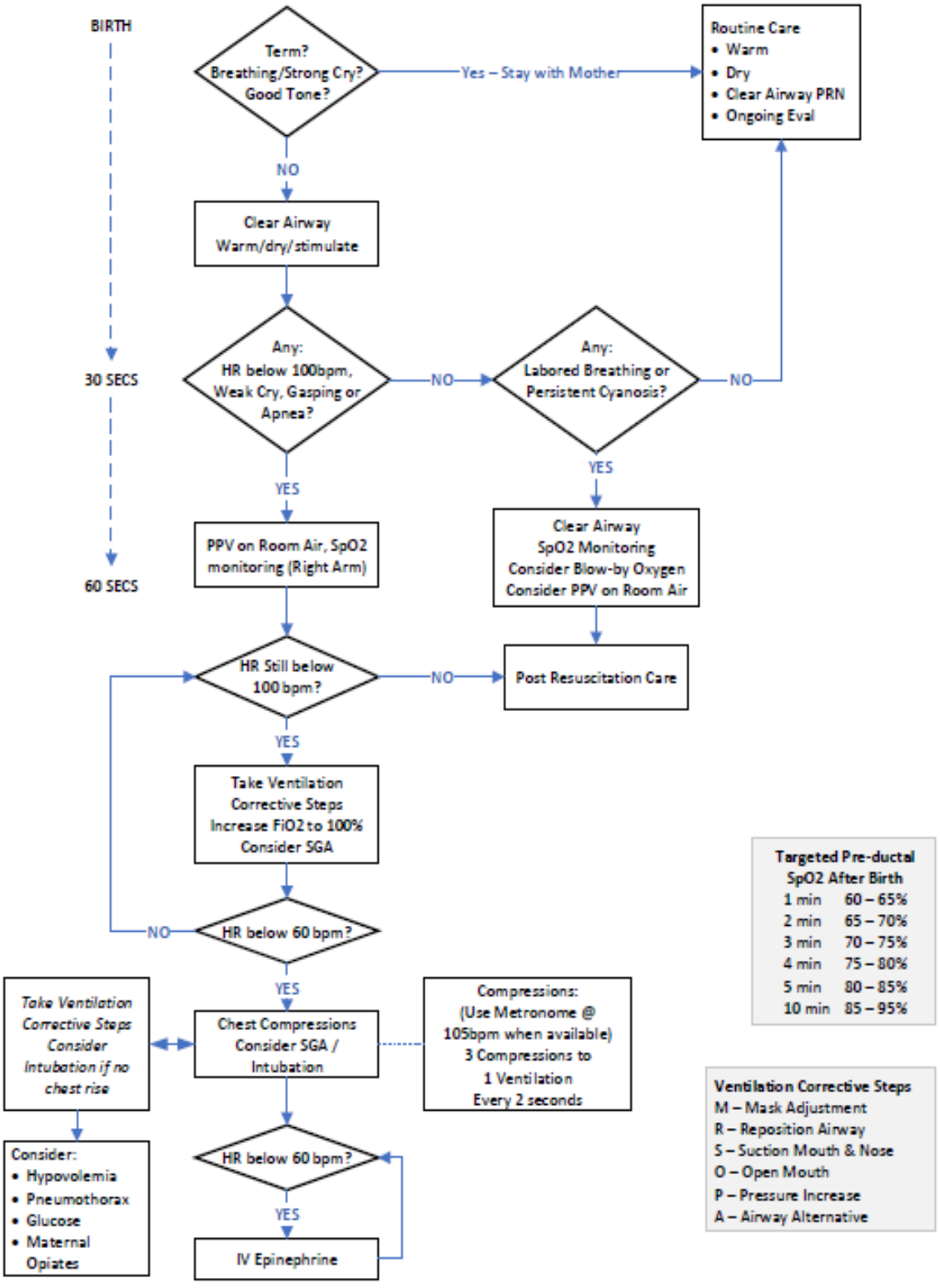
APPENDIX H - HOSPITAL CAPABILITY CHART

	Base Hospital	Free Standing/ Microhospital	Trauma Center	Burn Care Facility	STEMI Receiving Center	Stroke Designation	Hyperbaric Capability	L&D Unit	Forensic Nursing
Advent Health College Blvd		✓							✓
Advent Health Lenexa (Prairie Star)		✓							✓
Advent Health Lenexa City Center					✓				✓
Advent Health Shawnee Mission					✓	P		✓	✓
Advent Health South Overland Park					✓	P		✓	✓
Belton Regional Medical Center			III					✓	
Cass Regional Medical Center			III						
Centerpoint Medical Center			II		✓	P		✓	
Children's Mercy Hospital	✓		I	P		P			✓
Children's Mercy Hospital Kansas	✓								
Excelsior Springs Hospital									
Kansas City VA Medical Center					✓				
Lawrence Memorial					✓	P		✓	
Leavenworth VA									
Lee's Summit Medical Center			III		✓	P			
Liberty Hospital			II		✓	P		✓	
Menorah Medical Center	✓				✓	P		✓	
North Kansas City Health			II		✓	P		✓	
Overland Park Regional Medical Center	✓		II		✓	P		✓	
Overland Park Regional at Shawnee		✓							
Overland Park Regional at Olathe		✓							
Providence Medical Center			III		✓	P		✓	
Research Medical Center	✓		I	A	✓	C		✓	
St. John's Hospital					✓				
St. Joseph Hospital	✓				✓	P			
St. Luke's Community Hospital at Leawood		✓							
St. Luke's Community Hospital at Roeland Park		✓							
St. Luke's Hospital — Plaza	✓		I		✓	C		✓	
St. Luke's Hospital — East					✓	P		✓	
St. Luke's Hospital — Northland					✓	P			
St. Luke's Hospital — South	✓				✓	P			

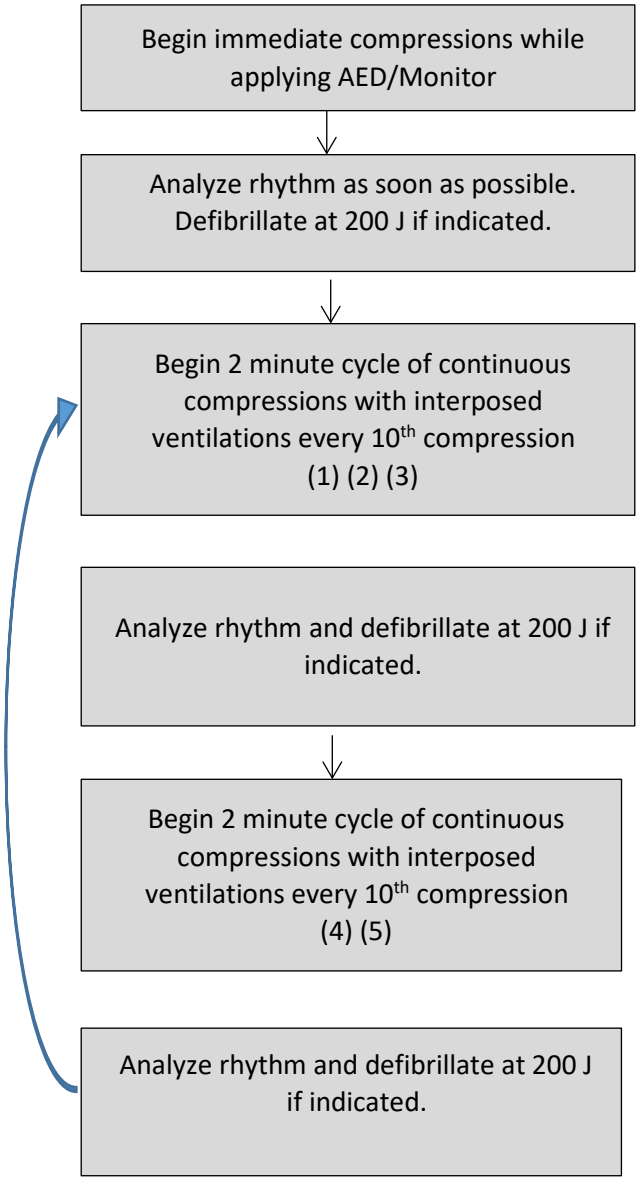
St. Mary's Medical Center					✓	P			
University Health Lakewood								✓	
University Health Truman	✓		I		✓			✓	
University of Kansas Hospital	✓		I	A,P	✓	C	✓	✓	✓
University of Kansas Olathe	✓				✓	P		✓	
University of Kansas Paola									

*For Burn Care Facilities A=Adult and P=Pediatric
*For Stroke Designation C=Comprehensive Center and P=Primary Center
*L&D Unit – Facility has labor and delivery units available for labor/obstetrics/newborn delivery capabilities
*This list is not intended to be an all-inclusive list of acceptable transport destinations

APPENDIX I - NEONATAL RESUSCITATION



APPENDIX J - ADULT CARDIAC ARREST ALGORITHM & PIT CREW CA RESPONSE FLOWCHART



Legend

(1) Begin Ventilation:
If SGA available place immediately with oxygen at 12-15L/min, with ETCO2.

If SGA unavailable, begin ventilations using OPA/NPA and BVM with oxygen @ 12-15 L/min, with ETCO2

(2) Establish IV/IO access

(3) Administer Epinephrine 1 mg every 5 minutes

(4) Amiodarone/Lidocaine for refractory V-fib/pulseless V-tach after two shocks and one dose of epinephrine.

(5) Suspected hyperkalemic arrest (renal failure/dialysis patient):

- Administer Calcium chloride
- Administer sodium bicarbonate
- Flush IV line between meds

Note: Pulse checks should only be done if ECG analysis indicates a potentially perfusing rhythm.

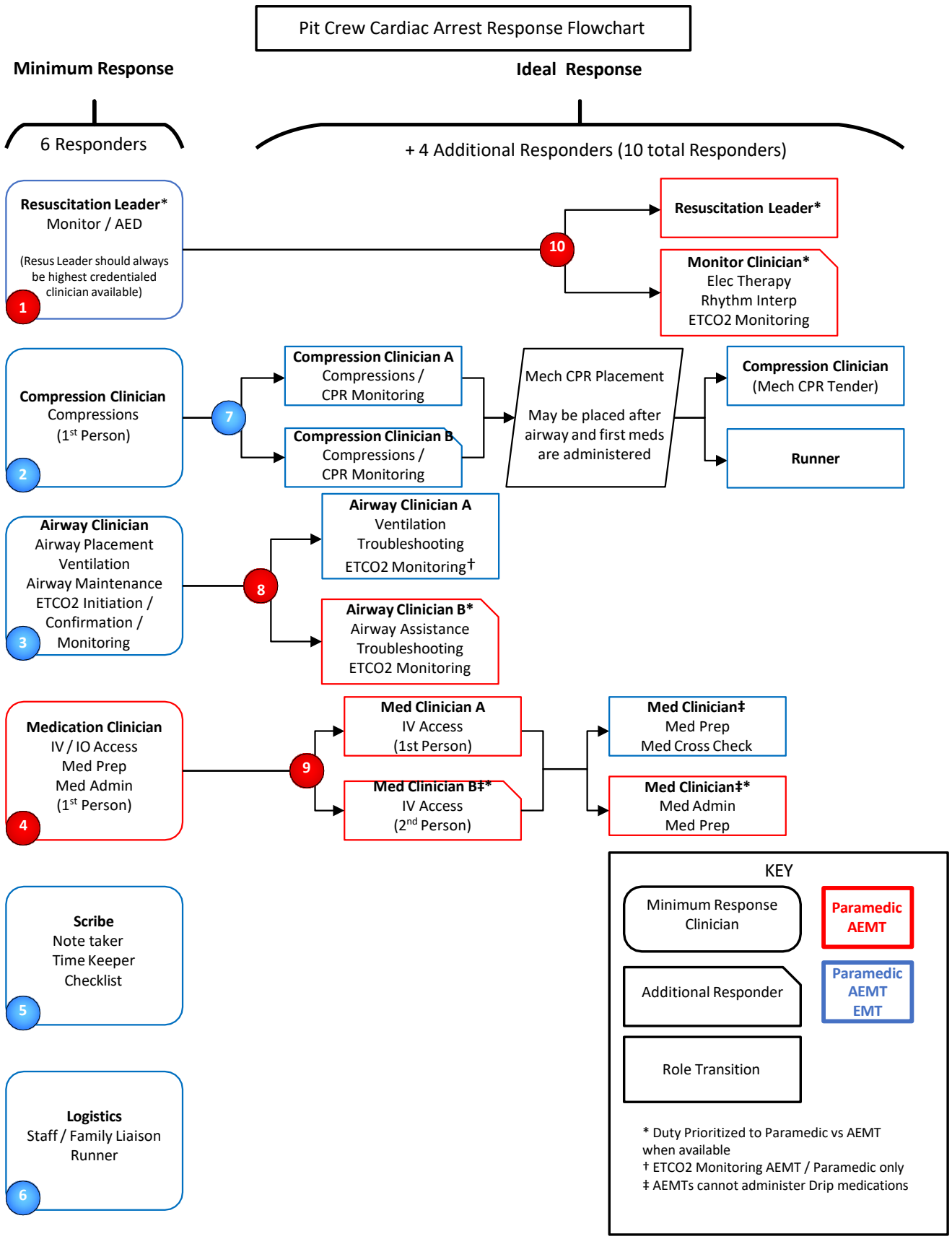
Airway/Ventilation:

- 2 person BVM technique preferred
- Do NOT over-ventilate
- No pause in compressions for airway care
- If choking is high on differential immediately perform direct laryngoscopy with Magill forceps
- Consider gastric decompression once SGA placed
- Intubation should only be attempted if BVM/SGA have failed to adequately secure airway.

Compressions:

- Rate of 100-120 per minute. Set metronome at 105/min.
- Allow for full chest recoil
- Depth of at least 2" and no more than 2.5"
- Minimize pauses to less than 10 seconds
- Switch compressor every two minutes
- Mechanical CPR device may be applied after airway effectively managed, vascular access obtained, and first epi administered if device is available

Double Sequential Defibrillation if indicated


Pit Crew Cardiac Arrest Response Flowchart
Minimum Response
Ideal Response
6 Responders
+ 4 Additional Responders (10 total Responders)
Resuscitation Leader*
Monitor / AED
(Resus Leader should always be highest credentialed clinician available)
1
10
Resuscitation Leader*
Monitor Clinician*
Elec Therapy
Rhythm Interp
ETCO2 Monitoring
Compression Clinician
Compressions
(1st Person)
2
7
Compression Clinician A
Compressions / CPR Monitoring
Compression Clinician B
Compressions / CPR Monitoring
Mech CPR Placement
May be placed after airway and first meds are administered
Compression Clinician
(Mech CPR Tender)
Runner
Airway Clinician
Airway Placement
Ventilation
Airway Maintenance
ETCO2 Initiation / Confirmation / Monitoring
3
8
Airway Clinician A
Ventilation
Troubleshooting
ETCO2 Monitoring†
Airway Clinician B*
Airway Assistance
Troubleshooting
ETCO2 Monitoring
Medication Clinician
IV / IO Access
Med Prep
Med Admin
(1st Person)
4
9
Med Clinician A
IV Access
(1st Person)
Med Clinician B‡*
IV Access
(2nd Person)
Med Clinician‡
Med Prep
Med Cross Check
Med Clinician‡*
Med Admin
Med Prep
Scribe
Note taker
Time Keeper
Checklist
5
Logistics
Staff / Family Liaison
Runner
6
KEY
Minimum Response Clinician
Paramedic AEMT
Additional Responder
Paramedic AEMT EMT
Role Transition
* Duty Prioritized to Paramedic vs AEMT when available
† ETCO2 Monitoring AEMT / Paramedic only
‡ AEMTs cannot administer Drip medications

APPENDIX K – JOHNSON COUNTY NALOXONE LEAVE-BEHIND PROGRAM

Purpose

The purpose of the Johnson County EMS System Naloxone Leave-Behind Program is to reduce fatalities from opioid overdoses by ensuring that naloxone is readily available to individuals at risk. Naloxone, an opioid antagonist, can reverse the effects of an opioid overdose if administered in a timely manner. EMS-based naloxone leave-behind programs are an evidence-based practice to decrease deaths from opioid overdoses by making naloxone accessible to those most likely to witness an overdose, such as patients who have experienced an overdose while with their friends or family.

History

Kansas SB 287 signed by the governor on 5.10.2024 grants the authority for EMS to distribute certain over-the-counter medications including, but not limited to, naloxone. EMS-based naloxone leave-behind programs have been implemented in various regions across the United States to combat the opioid crisis. These programs empower EMS personnel to provide naloxone kits to individuals who are at high risk of an overdose. Studies have demonstrated the effectiveness of these programs in reducing opioid-related mortality rates by increasing the availability and use of naloxone during critical moments.

Johnson County EMS System Naloxone Leave-Behind Policy and Protocol

- Providing naloxone does NOT preclude other treatment protocols nor the need for transportation to an emergency department. Oxygenation, ventilation, and then restoration of a patient's respiratory drive are the primary goals. Transport to an emergency department is preferred.
    - Every individual suspected of suffering from a drug overdose shall be considered for treatment and transport to an appropriate medical facility based on Johnson County protocols for follow-up care and treatment services.
- Eligibility for Naloxone Leave-Behind:
    - EMS clinicians are authorized to leave intranasal naloxone kits in any of the following circumstances and with any of the following parties:
        - Patients whose condition improves after receiving naloxone.
        - Patients identified as having an opioid use disorder.
        - When follow up visits are conducted after an overdose.
        - Friends and/or family members of the above patients.
        - At community events.

- Distribution and Education:
  - Naloxone must be distributed in its original packing.
  - EMS personnel must educate the patient, friends, and/or family members on the proper use of naloxone. This includes:
    - How to recognize the signs of an opioid overdose.
    - Step-by-step instructions on administering intranasal naloxone (included with medication).
    - The importance of calling emergency services (911) immediately after administering naloxone.
- Documentation:
  - When distributed on a call scene, EMS clinicians must document the distribution of naloxone in the patient care report, including the purpose for distribution, to whom the leave-behind naloxone was distributed and details on the education provided.
  - MIH/Community Paramedics should document the distribution of naloxone, including to whom the leave-behind naloxone was given and details on the education provided, in their client visit records.
  - When naloxone is distributed in a community event setting, a record must be kept including the purpose of distribution, to whom the naloxone was distributed, and the total number of doses distributed.
- Follow-Up:
  - Follow-up information and resources for addiction treatment should be provided to patients and their families.
  - Referral should be made to a Johnson County EMS System resource such as CORP, CHiPs, or Olathe FD MIH.

CHECKLISTS

ADULT STEMI/ACUTE MI Checklist

- ☐ Monitor EKG interpretive program reads: **"STEMI"** or **"ACUTE MI"**

  OR

  ALS provider identifies STEMI or ACUTE MI
  - Contact Hospital ASAP
    - Announce "STEMI ALERT"
    - Provide ETA
    - Transmit 12-lead ECG
- ☐ Obtain bilateral BPs
- ☐ Set BP for q 5 min
- ☐ Administer 324 mg ASA if not taken within previous 6 hours (adults only)
- ☐ Place electrical therapy pads
- ☐ Consider medication as indicated for pain:
  - Fentanyl Citrate
  - Nitroglycerin (adults only)
    - If inferior wall MI suspected, USE CAUTION when administering nitroglycerin
  - Confirm NO erectile agent use within 48 hours: Tadalafil (Cialis®), Vardenafil hcl, (Levitra®, Staxyn), and Sildenafil Citrate (Viagra®)

NOTES

Adult Cardiac Arrest Checklist

Initial Priorities

- ☐ **Assign** initial team roles
- ☐ **Manage Pulselessness and Rhythm**
  - Ensure 360° access
  - Ensure monitor is visible
  - Chest compressions with feedback
  - Apply Pads and Puck – Analyze Rhythm
  - Metronome set to 105 bpm
  - Pre-Charge defibrillator
- ☐ **Oxygenation/Ventilation**
  - Manage Airway
  - Confirm placement – Apply EtCO2
  - DO NOT OVER-VENTILATE
- ☐ **CONSIDER EARLY:**
  - Dialysis / Kidney Disease?*
  - Maternal Arrest / Pregnancy?*

  **See Back for Further Info*
- ☐ **Vascular Access** - IV / Medications
  - First epinephrine

Ongoing Priorities

- ☐ **Assign further roles PRN**
- ☐ **Communicate Between Team Members to Confirm effectiveness of all interventions:**
  - ETCO2 Waveforms / Airway Management
  - Compression Feedback
  - IV/IO Patency / Medication Effectiveness
- ☐ **Consider Double Sequential Defib**:
  - 3 unsuccessful single defibrillations
  - At least one dose of epinephrine and one dose of anti-arrhythmic
- ☐ **Mechanical CPR** (Time): _____
  - May be applied after airway, IV, 1st Epi
- ☐ **Obtain Blood Glucose:** _____
- ☐ **Essential History:**
  - Arrest witnessed?
  - Pertinent events prior to arrest?
- ☐ **Other Reversible Causes**
  - Hyperkalemia, Hypoglycemia, Hypothermia, Tension Pneumo, Toxins/OD

Roles

- ☐ Resus Leader: _____ _____
- ☐ Monitor
- ☐ Compressor(s)
- ☐ Airway(s)
- ☐ IV / Medication(s)
- ☐ Scribe
- ☐ Logistics

Monitor / Defib

- ➢ Monitor visible to Resus Leader, Compressors, Airway
- ➢ Manual Mode vs AED Mode PRN
  - "ANALYZE" for AED Mode
  - "EXIT" to exit AED Mode
- ➢ 200J for Adults
- ➢ Pre-charge 10-15 sec. prior to rhythm check
  - "DISARM" if no shock
- ➢ Monitor ETCO2 and CPR Feedback

Airway / Ventilation

- ➢ First ventilation via SGA is ideal
- ➢ Confirm ETCO2 waves / EZ-Cap if BLS
- ➢ Breath on upstroke every 10th Compression
- ➢ Continuously monitor ETCO2 waveform
- ➢ Troubleshoot PRN
  - Reposition / Resize SGA / securing strap
  - Reposition patient
  - Suction
  - Change to ET or BVM as appropriate

IV / Medications

- ➢ Blood Glucose Check
- ➢ IV preferred over IO
- ➢ Medication Cross Check
- ➢ Epinephrine 1:10,000 1mg (10mL)
  - Repeat $\overline{q}$ 5 mins PRN
- ➢ Amiodarone 300mg (6mL)
  - Repeat x1 @ 150mg $\overline{p}$ 5 min PRN
- ➢ Lidocaine – See FRG

Resus Start	**Airway** Time / Type / Size	**IV/IO** Type / Time / Location	**Epi** Times		**Lido** Time
Resus End					
					Amio Time

Adult Cardiac Arrest Checklist

NOTES

Kidney Disease / HyperK^{+} / Missed Dialysis

- Calcium Chloride – 1g x1 – Call for repeat
  - Give CaCl immediately after 1st Epi.

Time/Dose Given: _____ _____

- Sodium Bicarb – 1meq/kg x1 – Call for repeat
  - See Bicarb dosing chart in FRG

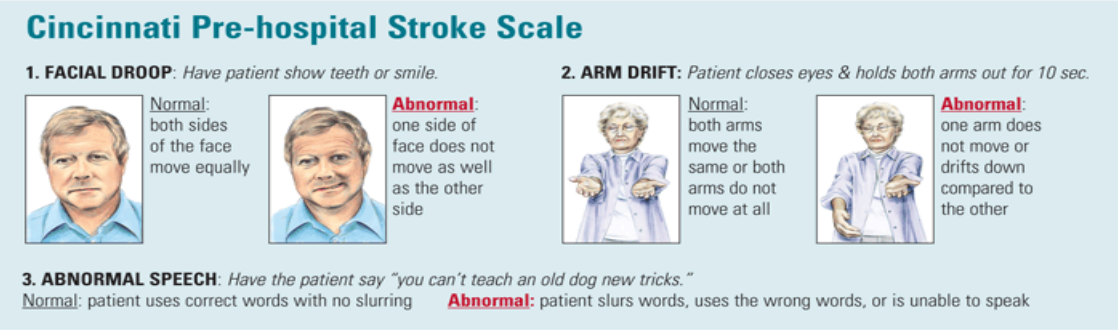
Time/Dose Given: _____ _____

Pregnant Patient / Maternal Cardiac Arrest

- Call MD1/MD2 for Field Response EARLY
- Position Supine with 2nd Rescuer performing Left Lateral Uterine Displacement
- Chest Compressions should be done slightly higher on sternum than normal to account for diaphragm displacement.
- Rapid Transport to closest facility for peri-mortem C-Section

CVA Checklist

If Cincinnati Stroke Scale is POSITIVE (any one of the three tests shows abnormal findings), then assessment should include FAST-ED/Large Vessel Occlusion Screen. **LVO Screen by Paramedic Only**



Item	FAST-ED Score	Descriptions
Facial Weakness/Asymmetry		**Ask the patient to smile or show teeth or gums**
Symmetrical Movement	0	Facial movement is symmetrical
Asymmetrical Movement	1	Unequal smile or grimace, or obvious facial asymmetry
Arm weakness		**Ask the patient to close eyes & lift the patient's arms together palms up to 90 degrees if sitting and 45 degrees if supine and ask them to hold the position for 10 seconds, then let go.**
Normal	0	Both arms remain up >10 sec. or slowly drift down equally
Mild	1	One arm drifts down in <10 sec. but has antigravity strength
Moderate/Severe	2	Cannot maintain the arm against gravity and drops immediately
Speech Content		**Ask the patient to say a common phrase such as "You can't teach an old dog new tricks." Have the patient name 3 common items.**
Normal	0	Speech content normal AND names 2-3 items correctly (if speech is slurred but makes sense and naming is correct score as normal)
Abnormal	1	Speech content clearly abnormal OR names only 0-1 items correctly
Speech Comprehension		**Ask the patient: "Show me two fingers"**
Normal	0	Patient shows two fingers
Abnormal	1	Patient cannot understand/does not show two fingers
Eye deviation		**Ask the patient to follow your finger while holding their head still**
Absent	0	No deviation, eyes move to both sides equally
Partial	1	Patient has clear difficulty when looking to one side (left or right)
Forced Deviation	2	Eyes are deviated to one side and do not move to the other side (e.g. cannot follow finger)
Denial/Neglect-Weakness		**Ask the patient: "Are you weak anywhere?"**
Normal	0	The patient recognizes that they are weak
Abnormal	1	The patient is weak but does NOT recognize they are weak
Denial/Neglect		**While holding the patient's weak arm, ask the patient: "Whose arm is this?"**
Normal	0	Patient recognizes the weak arm belongs to them
Abnormal	1	Patient does NOT recognize the weak arm belongs to them

Screening Process for Stroke Routing

*This Checklist applies ONLY to adult patients (≥18 years old) with signs and symptoms of a CVA and **POSITIVE** Cincinnati Stroke Screen.*

- ☐ FAST-ED/Large Vessel Occlusion Screen (LVO). Document score (**≥ 4 = positive** LVO screen)____
- ☐ Notify dispatch on radio of **"code stroke"**
- ☐ Notify hospital of **"code stroke"** as soon as possible
- ☐ Determine Last known well time and document _____
    - This is the last confirmed time the patient was symptom free, NOT the time symptoms were first noticed.
    - Name and phone number of individual who last saw the patient at normal baseline

      _____ (____) _____ - _____
- ☐ If the Last Known Well Time <24 hours or Unknown, transport based on FAST-ED Screen POSITIVE or NEGATIVE:
    - **FAST-ED Screen POSITIVE (≥4):** Transport to the closest Comprehensive Stroke Center
    - **FAST-ED Screen NEGATIVE (≤3):** Transport to the Closest Stroke Center regardless of Comprehensive or Primary
- ☐ If the Last Known Well Time is >24 hours, transport to the Closest Stroke Center regardless of Comprehensive or Primary

COMPREHENSIVE Stroke Centers = KUMC, Research, St. Luke's Plaza

PRIMARY Stroke Centers = Advent Shawnee Mission, Advent South OP, Menorah, Olathe, OPR, St. Luke's South, St. Joseph

*Patients <18 years old with signs and symptoms concerning for CVA should be transported to Children's Mercy Hospital-Main regardless of time.

Hypoglycemia Refusal Checklist

Refusal Checklist for Hypoglycemia:

- If symptoms of hypoglycemia resolve after treatment, release without transport should only be considered if **all** of the following are true:
    - Patient has diagnosis of Type I or Type II Diabetes
    - No apparent disease process other than isolated hypoglycemia
    - Patient has no further complaint (ex. chest pain, vomiting, shortness of breath etc.)
    - Repeat blood sugar is >80 mg/dL (adult) and >60mg/dL (pediatric)
    - Patient takes insulin OR metformin to control diabetes
    - Normal mental status and normal neurological exam
    - Did NOT have a seizure from hypoglycemia
    - Patient can promptly obtain and will eat a meal containing carbohydrates
    - A reliable adult will be staying with the patient.
        - Patient should be instructed to contact their primary healthcare practitioner ASAP to discuss medication regimen.
        - Patient should be instructed to recheck their blood glucose frequently in the following hours.

Medication Cross-Check

Medication Cross-Check

*This Checklist should be used for **ALL** medication administration. All medications administered should be verified with the Field Reference Guide (electronic or hard copy).*

REQUIRED VERIFICATION ITEMS (with 2nd provider):

Yes	No	
		Verify Right Patient
		Verify Right Medication and Concentration (visually verify name and concentration (ex. mg/ml) on medication label
		Verify Right Indication for administering this medication
		Any Contraindications? (discuss VS, allergies, expiration date, PMH, etc.)
		Verify Right Route (state IV/IM/IO/IN, PO, SL, auto-injector, atomizer, aerosol, etc.)
		Verify Right Dose and Volume

If the answer to **ANY** REQUIRED VERIFICATION ITEMS is **outside the shaded boxes**, **STOP**. All discrepancies or disagreements MUST be resolved prior to continuation of the process.

Remember:

- NEVER administer the contents of a syringe that is not labeled OR without visualizing the vial from which it was immediately drawn
- Only draw up in a syringe the actual amount of medication intended to be given at that time.

PEDIATRIC Cardiac Arrest Checklist

*****USE THIS CHECKLIST FOR PATIENTS WHO CAN BE MEASURED WITH THE BROSELOW TAPE*****
(If your patient is longer than the Broselow Tape, use the ADULT Cardiac Arrest Checklist)

Initial Priorities

- ☐ **Assign** initial team roles
- ☐ **Manage Pulselessness and Rhythm**
  - Ensure 360° access
  - Ensure monitor is visible
  - Chest compressions with feedback

  **See compression box for CPR ratios*
  - Apply Pads and Puck – Analyze Rhythm
  - Metronome set to 105 bpm
  - Pre-Charge defibrillator
- ☐ **Determine Broselow Color: _____**
- ☐ **Oxygenation/Ventilation**
  - Manage Airway
  - Confirm placement – Apply EtCO2
  - DO NOT OVER-VENTILATE
  - **Vascular Access**
  - First epinephrine

Ongoing Priorities

- ☐ **Assign further roles PRN**
- ☐ **Communicate Between Team Members to Confirm effectiveness of all interventions:**
  - ETCO2 Waveforms / Airway Management
  - Compression Feedback
  - IV/IO Patency / Medication Effectiveness
- ☐ **Obtain Blood Glucose: _____**
- ☐ **Essential History:**
  - Arrest witnessed?
  - Pertinent events prior to arrest?
- ☐ **Other Reversible Causes**
  - Hypo / Hyperglycemia, Hypothermia, Toxins/OD, Tension Pneumo

Roles

- ☐ Resus Leader: _____ _____
- ☐ Monitor
- ☐ Compressor(s)
- ☐ Airway(s)
- ☐ IV / Medication(s)
- ☐ Scribe
- ☐ Logistics

Monitor / Defib

- Visible to Resus Leader, Compressor, Airway
- Manual Mode vs AED Mode PRN
  - Anterior / Posterior Pad Placement
  - Peds Pads (Broselow Grey – Orange)
    - < 25kg / 55lb and 0-8 years
  - Adult Pads (Broselow Orange and Larger)
    - > 25kg / 55lb or > 8 years
  - See FRG for weight-based Joule settings
- Monitor ETCO2 and CPR Feedback

Compressions

- 2-Thumb CPR Technique preferred on infants
- Compression / Ventilation Ratio:
  - 0-1 Month: 3:1
  - > 1 Month: 15:2
  - Continuous Compressions with Advanced Airway: 1 breath $\overline{q}$ 3-5 seconds

Airway / Ventilation

- BVM / Oral Airway is preferred
  - Troubleshoot / Reposition / Suction PRN
  - Progressive SGA to ET if BVM unsuccessful
- See Compression / Ventilation Ratios above
- Confirm ETCO2 waves / EZ-Cap if BLS
- Continuously monitor ETCO2 waveform

IV / Medications

- Blood Glucose Check
- Medication Cross Check
- See FRG for weight-based dosing
  - Epinephrine
  - Amiodarone / Lidocaine

Resus Start	**Airway** Time / Type / Size	**IV/IO** Type / Time / Location	**Epi** Times		**Lido** Time
Resus End					
					Amio Time

PEDIATRIC Cardiac Arrest Checklist

*****USE THIS CHECKLIST FOR PATIENTS WHO CAN BE MEASURED WITH THE BROSELOW TAPE*****
(If your patient is longer than the Broselow Tape, use the ADULT Cardiac Arrest Checklist)

NOTES

Post-ROSC Checklist

- ☐ Confirm ROSC/ continuously monitor pulse
  - Time of ROSC: _____
- ☐ Minimize patient movement for 10 minutes as able
- ☐ Switch to monitor mode
- ☐ Obtain BP –
  - ADULTS
    - Maintain systolic BP > 100 mmHg
    - Fluid challenge
    - Vasopressor PRN
  - PEDIATRICS
    - Maintain Systolic BP > 70 + (age in yr x 2)
    - Epinephrine for pediatrics PRN
- ☐ Optimize oxygenation/ ventilation:
  - Maintain SpO_2 94 – 98%
- ☐ Continuous $EtCO_2$ monitoring
  - Avoid hyperventilation
  - $EtCO_2$ 35-45 mmHg
- ☐ Obtain serial 12 Lead ECG's
- ☐ Glucose Check: _____ mg/dL
- ☐ Assure Vascular Access – 2 Different Sites
- ☐ Transport considerations:
  - All Post Resuscitation care initiated
  - Mechanical compression device (if available)
  - Assure adequate personnel

NOTES

RSI Checklist

Screening Process for Mental Health/Substance Abuse Patients Checklist

This Checklist applies ONLY to patients with isolated psychiatric complaints and/or substance abuse/intoxication. Treat any medical/trauma problem according to protocol.

Patients meeting the shaded criteria in the checklist should be transported directly to RSI by EMS or by Law Enforcement.

REQUIRED CRITERIA:

Yes	No	
		Is patient (≥18 y/o) with a complaint of psychiatric or substance abuse/intoxication?
		Is the patient able and willing to cooperate with your history and physical exam?
		Is the patient able to ambulate with only minimal assistance?
		Is their Oxygen Saturation ≥94% on room air?
		Blood Alcohol Content is ≤ 0.40 by either EMS or Law Enforcement?
		Patient denies (and EMS does not suspect) intentional **OR** accidental overdose of any substance or medication.
		Patient denies attempting suicide or homicide. (Ideation **only** does not disqualify patient).
		Does patient have **ANY** additional medical or traumatic complaints?
		Does EMS suspect or observe any medical or traumatic conditions upon exam?
		Does patient require chemical or physical restraints?
		Is patient currently residing in a skilled nursing/ long-term care or rehab facility?

If the answer to **ANY** REQUIRED CRITERIA is **outside the shaded boxes**, then transport patient to the appropriate Emergency Department.

PREFERRED CRITERIA:

Yes	No	
		Systolic BP between 90 mmHg and 160 mmHg, Diastolic BP <100 mmHg
		Pulse between 60 and 120 beats/min?
		Respiratory Rate between 10 and 20 breaths/min?
		Blood glucose level between 80 and 200 mg/dL?
		Temperature between 96ºF and 101ºF?
		Patient denies current pregnancy (and is not obviously gravid)

If the answers to **ALL** of the criteria (REQUIRED AND PREFERRED) are in the shaded boxes**,** then provide biocom report to RSI for transport or allow Law Enforcement to transport. If the answer to any of the PREFERRED criteria is **NO**, then contact RSI via biocom for a transport decision.

Termination of Resuscitation (Non-Traumatic Arrest)

If **ALL** of the following criteria have been met, discontinuation of resuscitative efforts may be allowed **without** Direct Medical Oversight:

- ☐ Appropriate oxygenation / ventilation techniques applied
  - Airway confirmed with presence of $EtCO_2$ waveform at time of termination
- ☐ Vascular Access achieved
- ☐ Defibrillation / Rhythm appropriate medications administered according to protocol
- ☐ **UNWITNESSED** - Minimum of 25 minutes of EMS resuscitation
- ☐ **WITNESSED** - Minimum of 40 minutes of EMS resuscitation
- ☐ At least **5** minutes since last Epinephrine
- ☐ No ROSC at any point in the arrest
- ☐ No recurring / refractory V-Fib / V-Tach
- ☐ No neurological activity (i.e. eye opening, agonal breathing or motor response)
- ☐ Persistent asystole / agonal / slow PEA rhythm (<60/min) present
- ☐ Reversible causes identified / managed
- ☐ ALL providers agree to termination
- ☐ If patient is a minor, the parent / guardian agrees to termination
- ☐ Time of TOR: _____

POST-TERMINATION

- Dispose of medical trash
- Devices inside or on patient should be left in place
- Coordinate scene management with LEO PRN

NOTES