Patient Care Guidelines

PARTNERS IN EMS

Regions Hospital

Updated 11/25

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What's New

November 2025

- Guideline - Adult Seizure
  - Clarified midazolam dosage/route
- Guideline - Post-Intubation
  - Updated language
  - Updated ketamine dosage for post intubation sedation
- Medication - Tranexamic Acid (TXA)
  - Removed instructions to dilute in NS for adult and pediatric administration
- Medication - Glucagon
  - Removed SQ injection option
- Medication - Epinephrine 1:10,000
  - Removed use for severe anaphylaxis and asthma
- Medication - Ketamine
  - Updated dosing for post intubation
- Procedure - Spinal Motion Restriction
  - Updated language from spinal immobilization to spinal motion restriction
- Procedure - Intramuscular Injection (New)
- Procedure - Pelvic Circumferential Compression Device Application (New)

May 2025

- Documentation standards
  - Added expectation to acknowledge abnormal values
  - Added expectation to repeat q5-15 minutes depending on patient condition
  - Added expectation to document GCS or AVPU
- Miscellaneous Updates
  - Removed all "STAB" references and replaced with "Red Medical/Trauma"
  - Clarified several medication doses
- Guideline - Adult/Pediatric Asystole/PEA
  - Emphasized the use of ultrasound
- Guideline - Adult Pain Control
  - Added an option for IV acetaminophen
- Guideline - Adult/Pediatric Overdose Ingestion
  - Updated naloxone dosing to allow for 4mg nasal spray
  - EKG is now optional for isolated opiate OD/ingestions
  - Updated exclusion criteria for buprenorphine to specify methadone use within last 10 days instead of 30 days
  - Added a COWS reference in the Buprenorphine Field Start reference
- Guideline - Traumatic Injuries
  - Added a Blood Product Transfusion procedure
- Guideline - Crush Syndrome
  - Updated pediatric IV fluid bolus dose

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INTRODUCTION

The Emergency Medical Services (EMS) Program at Regions Hospital has developed these policies and guidelines. All statements contained in this manual are informative only and represent that which is believed to be the highest standard of care relating to any particular set of circumstances. It is the intention of the Regions Hospital EMS medical director(s) that this manual be used as consultative material in striving for optimal patient care. It is recognized that any specific procedure is always subject to modification depending upon the circumstances of a particular case. Further, the medical control physician may deviate from these guidelines based on medical judgment.

This edition replaces all previous editions and becomes effective on May 1, 2025.

REGIONS HOSPITAL EMERGENCY MEDICAL SERVICES

Regions Hospital Emergency Medical Services is a program of Regions Hospital. Our services encompass the full spectrum of out-of-hospital emergency care oversight including:

- Medical direction and consultation
- Quality assurance
- Event medicine
- Education
- Community Paramedicine
- Supply chain and pharmaceutical services
- Research
- Legislative advocacy

Regions Hospital EMS is located at:

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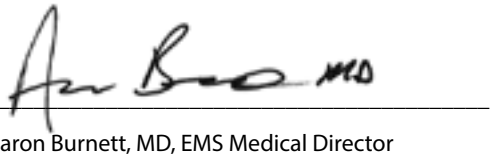
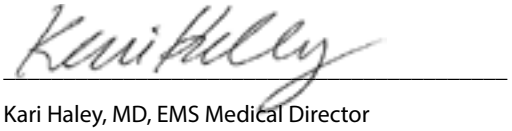
Regions Hospital EMS
Mail stop: 13801B
640 Jackson Street
St. Paul, Minnesota 55101-2595

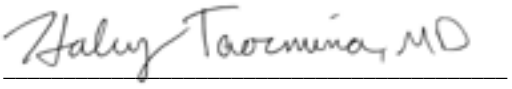
These guidelines and policies have been approved by:



Aaron Burnett, MD, EMS Medical Director — Nov. 1, 2025



Kari Haley, MD, EMS Medical Director — Nov. 1, 2025



Haley Taormina, MD, EMS Medical Director — Nov. 1, 2025

http://regionsems.com/ Regions EMS Regions EMS Regions Hospital EMS

Mission Statement

It is the mission of Regions Hospital Emergency Medical Services (EMS) to advance and improve the delivery of out-of-hospital patient care through education, medical oversight, research, and legislative advocacy.

System Philosophy

Regions Hospital EMS believes that all out-of-hospital providers are the on-scene extension of the medical directors. Further, we believe that:

- Every patient has the right to a prompt and appropriate EMS response.
- Strong internal and external customer relations are crucial to a quality system.
- The development of strong partnerships between in-hospital and out-of-hospital providers will improve continuity of care for patients.
- Every patient should have access to 911, emergency medical dispatch priority reference systems, pre-arrival instructions, and emergency medical dispatchers.
- Systems should allow for transport to the most appropriate facility, based on patient choice or condition.
- Every provider should demonstrate clinical excellence through strong patient care skills, continuing medical education, and sound medical judgment.
- The EMS system should have an integrated continuum of care that provides for first response, basic life support (BLS), advanced life support (ALS), and specialized transportation. Services should also establish relationships for mutual aid response.
- Every response should have the appropriate number of responders, vehicles and equipment to meet the needs of the patient.
- Research provides evidence-based justification for critical decisions regarding out-of-hospital care.
- All out-of-hospital providers (First Responder, BLS and ALS) should have community education plans to educate the public on issues of proper access, identification of medical emergencies, pre-arrival care (CPR and first aid), and injury/illness prevention.
- Affiliations with institutions of higher learning will promote professionalism and advance the role of out-of-hospital providers in the health care environment.
- Having a strong voice in local, state, and national legislative issues will promote EMS systems improvement.
- Continuous quality improvement (CQI) practices will drive the quest for excellence.

Performance Standards

Based on current industry literature and trends, the following are components of a high performing EMS agency and are considered to be ideals to strive for. Regions Hospital EMS recommends that agencies attempt to incorporate the following performance standards into their EMS system as they plan for the future.

- Response Times
  - Metropolitan Area: Every request for emergency medical response will be answered by trained first responders within 4 minutes of the initial call. This will be followed by ALS care within 8 minutes of the initial call. A metropolitan area is defined as a primary service area (PSA) having a population density of ≥ 150 persons per square mile.
  - Rural Area: Every request for emergency medical response will be answered by trained first responders within 8 minutes of the initial call. This will be followed by ALS care within 15 minutes. A rural area is defined as a PSA with a population density of < 150 persons per square mile.
- All services will be accessed by 911 Public Service Answering Points (PSAP's). These PSAP's will have an emergency medical dispatch priority reference system with telecommunicators who have had emergency medical dispatch (EMD) training and who deliver pre-arrival instructions to callers.
- EMS agencies at all levels should have a community education plan which addresses the following issues:
  - How to access 911
  - When to call 911
  - Pre-arrival care (CPR & First Aid)
  - Injury and illness prevention
- Each responding agency should have a service plan which includes the following elements:
  - Dispatching criteria for first responder, basic life support (BLS) and advanced life support (ALS) units based on call triaging.
  - ALS intercept criteria and agencies.
  - Critical care transport guidelines for interfacility transfers.
  - Guidelines for appropriate utilization of helicopter services for scene responses.
  - A mutual aid response plan.
- Within a particular EMS system, the following minimum staffing, training, and equipment levels shall be maintained for each response:
  - First Responders: A minimum of one person trained to the level of EMR (defined by the EMR curriculum or other as approved by the appropriate state regulatory board)
  - In those communities providing BLS: Two state licensed EMTs shall accompany the patient during transport.
  - In those communities providing ALS: One state licensed Paramedic shall respond to every scene, unless a validated telephone triage system is utilized to dispatch an appropriate BLS response. Whenever possible, two Paramedics shall accompany each patient who is unstable or potentially unstable.
  - Vehicle: Will comply with state and local standards.
  - Equipment: Will comply with state statutes and medical direction requirements
- All providers will meet continuing medical education (CME) requirements and annual skills assessments as set forth by state statutes, regulatory rules, and/or medical direction. Each service will follow an established orientation plan for new employees, which includes a system orientation. Providers will maintain current recognition in the following areas:
  - Telecommunicators: EMD and AHA Healthcare Provider CPR or its equivalent.
  - EMRs: AHA Healthcare Provider CPR or equivalent, EMR (with biannual refresher), and AED
  - EMTs: AHA Healthcare Provider CPR or equivalent
  - Paramedics: AHA Healthcare Provider CPR or equivalent and ACLS; recommended: PALS

- Patients should be transported to the most appropriate facility based upon a patient's competent choice or emergent medical or traumatic condition
- All service providers will collect, collate and share prospective and retrospective data for the purpose of continuous quality improvement and quality assurance.
- Participation in research projects, identified by the medical director or individual services, is strongly encouraged and will be conducted using methods and design approved by the Regions Hospital Institutional Review Board (IRB). The Regions Hospital EMS Research Coordinator will supervise these projects. Product evaluations will also be conducted by Regions Hospital EMS and appropriate services to test the effectiveness and appropriateness of new pieces of equipment.
- Regions Hospital will provide primary clinical training sites and educational support to those institutions that enhance the overall professional preparation of out-of-hospital care providers. Individual providers are encouraged to pursue academic degrees in the field of Emergency Health Services when appropriate.
- Agencies and organizations within the EMS system will actively pursue strategies that positively impact the provision of outof-hospital care through individual legislative contacts and membership in professional organizations that pursue similar goals.

SCOPE OF PRACTICE

The Critical Care Paramedic (CCP) will render care to critically ill or injured patients who are being transported to a facility that provides an equal or higher level of care for continued treatment. In addition to standard ALS equipment utilized routinely by paramedics, the CCP may be required to manage special equipment and/or medications to be used on a patient provided by the transferring hospital. The CCP may need to perform advanced procedures, as well as monitor and administer medications not routinely used by ALS Paramedics. When called for (should be considered when manual ventilations are being performed, non-standard ventilator settings are necessary, or more than 2 titratable drips are in use), additional critical care personnel such as a respiratory therapist, ICU/ER nurse, physician, or another paramedic may accompany the patient to assist in providing care. The CCP will be the team member in charge but will recognize and respect the expertise of the other care givers on board.

The decision to transfer a patient rests solely with the transferring physician. This physician bears responsibility for the transfer decisions and must:

- Determine whether the benefits of transfer outweigh the risks.
- Ensure that the patient is properly stabilized prior to departure, to the best of the sending facility's capabilities.
- Be responsible for complying with currently accepted community standards of practice regarding interfacility transfer.

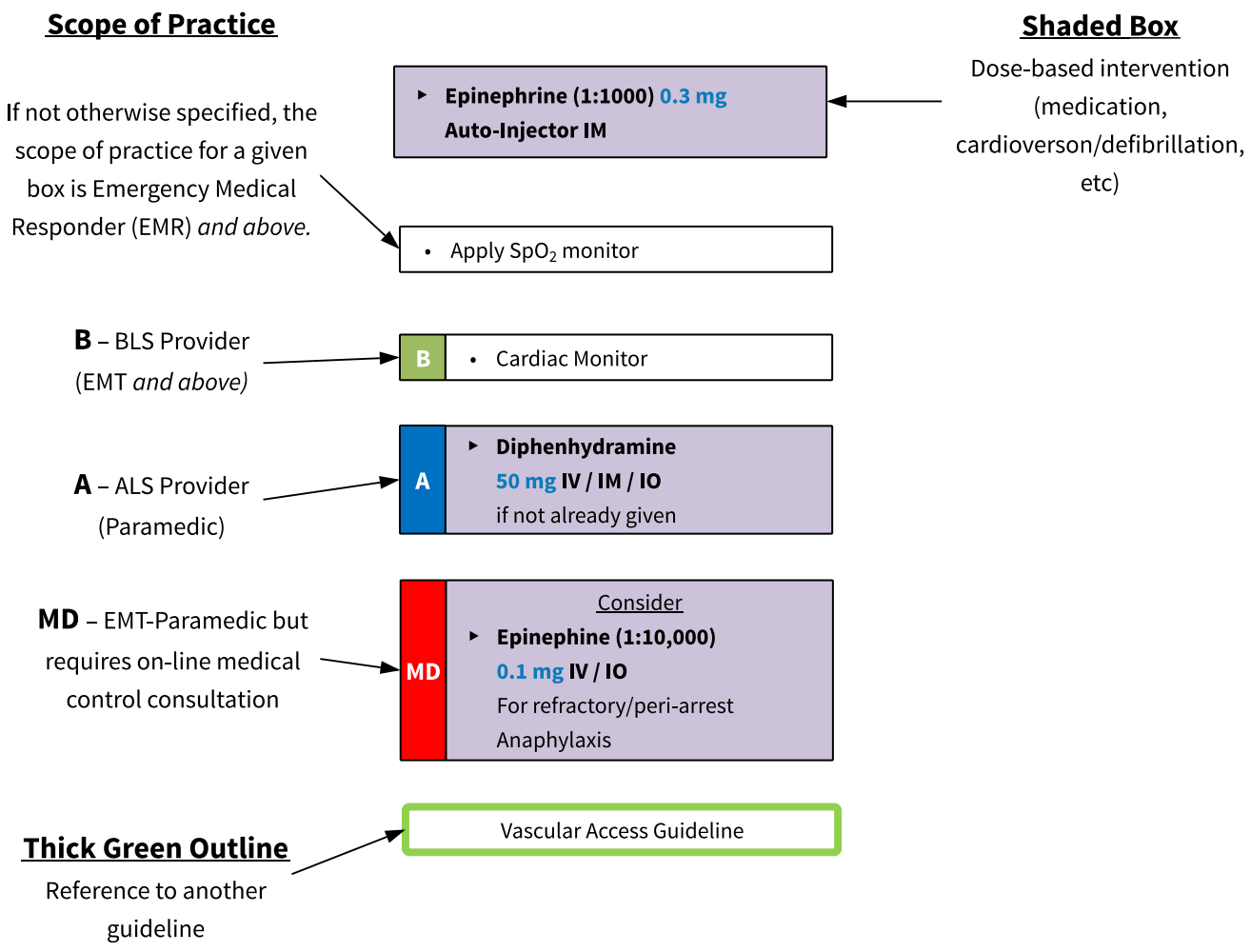
For the purposes of these guidelines, MRCC stands for Medical Resource Control Center, which refers to on-line medical control. This can be obtained by hailing East Metro MRCC on the 800mhz Minnesota ARMER radio system using talkgroup "MRCC-E", by phone at (651)-254-2990, or by contacting the hospital designated as medical control for either the transporting agency or for the specific patient encounter.

Any medication given via intravenous infusion that must be infused at a defined rate, or titrated based on specific parameters, must be infused via an infusion pump. "Estimating" drip rates is not authorized.

Any medication authorized for intravenous delivery may also be administered via an intraosseous line.

Legend

How To Interpret These Guidelines



Additional information regarding the detailed Wisconsin EMS Scope of Practice can be found at:

https://www.dhs.wisconsin.gov/ems/licensing/scope.htm

Special Note: The scope of practice for the AEMT level of care authorized by these guidelines is the same as that for the EMT level of care in the state of Minnesota. The only advanced intervention authorized by these guidelines for an AEMT above the EMT scope of practice in the state of Wisconsin is vascular access (IV/IO).

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All pre-hospital communications should be channeled through the East Metro MRCC. The MRCC is staffed 24 hours/day by specially trained nurses and paramedics; emergency medicine physicians are available at all times. A Regions Hospital Emergency Medicine physician, at the request of the ambulance crew or the MRCC operator, may monitor any call to MRCC. Certain cases are designated as mandatory physician-monitored calls. The MRCC operator or monitoring physician will relay patient information given by ambulance crews to the receiving hospital with as much advance notice as possible. Ambulance crews should give patient reports to medical control as soon as possible to allow receiving hospitals time to prepare for patient arrival or so that the crew may be notified early of the need for diversion. **Contact with MRCC should be accomplished with at least a 5 minute ETA whenever possible.**

PROCEDURE:

- The East Metro MRCC shall be referred to as "East Metro Medical Control." Initial contact with MRCC shall be made on the 800 MHz EMRCC talkgroup or VHF EMS Statewide (National), or by telephone (651-254-2990) as appropriate for each service. During an MCI, contact should be made by radio when possible. Ambulance crews should identify their service name, unit number, transport destination, criticality, chief complaint, and ETA. If crews have a critical patient or specialty team activation and EMRCC is busy, they may use the REGMD talkgroup as back up. If calling on the phone or radio, announce immediately you have a critical patient.
- Contact with medical control should be made after initial evaluation of the patient, especially if the EMS agency will have a short ETA or if they have a critical patient (i.e. TTA, Cath Lab Activation). If an ambulance is responding to a confirmed critical situation or will be attending to a patient a significant distance from the ambulance, contact may be made with medical control prior to arrival to arrange for on-scene communications or to alert a receiving hospital.
- EMS agencies using 800 MHz may be assigned to the REGMD talkgroup to speak with a medical control physician. Assignment to REGMD includes but is not limited to the following circumstances:
    - The ambulance crew intends to give a lengthy report or will be relaying information on multiple patients and does not want to "tie up" the EMRCC talkgroup for long periods of time.
    - The ambulance crew will be a significant distance from the ambulance and must set portable and vehicular radios to the same channel/talkgroup.
    - The ambulance crew will be involved in the care of a critically ill or injured patient and wishes exclusive use of a radio channel/talkgroup for physician medical control.
    - During MCI events a regional or statewide TAC talkgroup may be more appropriate.
- If the ambulance crew wishes to consult with a physician they should state that request clearly to the medical control operator who will summon a physician to the radio. Crews are encouraged to follow written guidelines before seeking physician consultation, but EMS agencies can consult with a physician any time they have questions concerning patient care.
- MRCC operators are available to state or clarify written guidelines as necessary.
- Radio report format will vary, based on the condition of the patient:
    - Any report on a patient who the provider deems as stable and requires minimal interventions, does not require a specific transport destination or specific alert criteria (Trauma, Cath Lab Activation, STAB Room, or Stroke Code), the report will include: the crew, agency, chief complaint, triage color or criticality, patient age, patient gender, destination hospital, ETA, and any pertinent or abnormal vital signs.
    - For patients who are deemed unstable, the report will be inclusive of the above information and will also include all vital signs, response to treatments, and any other pertinent information the crew feels they should include. In these patients, MRCC may ask for more clarifying information. If the provider is very busy with patient care, the provider should alert MRCC as early possible so MRCC can alert the receiving hospital in a timely fashion.
- The medical control operator number (and physician name if consulted) should be recorded on the run report.
- In addition to the radio report, a verbal report from the crew to the receiving nurse or physician who accepts care of the patient must be made prior to hospital departure. This report must include the above information and any changes that occurred in the patient's

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condition during transport. The receiving nurse or physician must sign off on the run report form.

- When assigned a separate TAC channel or talkgroup for medical communications, the ambulance crew will notify medical control upon arrival at the hospital or when no further communication is anticipated, so the channel in use may be reassigned as necessary.
- In the following situations, consultation with a medical control physician is mandatory.
  - Non-transport of all pediatric patients < 6 months
  - Non-transport of all third trimester OB patients with trauma.
  - Non-transport of patients who have had a hypoglycemic episode who are on oral hypoglycemic medications (except for metformin)
  - Administration of certain medications; see specific guidelines
  - Termination of resuscitation efforts
  - Non-transport of any pediatric patient < 18 years for whom a parent/guardian cannot be contacted
- Requests to MRCC may have to be prioritized during periods of high activity. EMS personnel may be asked to "stand-by" until the MRCC operator can clear higher priority calls.

SPECIAL NOTES:

- The emergency medicine staff physician has the authority to override the medical control operator and re-prioritize requests for service.
- In the rare event that communication difficulty, significant delay, or failure results in the inability of EMS personnel to contact medical control for treatment orders that are normally administered only after medical control or physician consultation, the EMT or paramedic may initiate those treatments that, in the opinion of the provider, are life-saving or necessary to stabilize the patient and in which they have received training. The performance of those treatments must be carried out as outlined in the guidelines and must be consistent with the provider's level of training. Any pediatric treatments administered in this way, must be given after referring to a pediatric medication/treatment reference chart (weight-based resuscitation tape). Providers should attempt alternative communication methods (e.g. cellular phone) when difficulties arise. Treatments carried out without medical control or physician permission, due to communication failure, must be reported by the EMT or paramedic to the On Call Clinical Supervisor as soon as possible.

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ALS Continuing Medical Education

As part of the medical direction agreement with your service, Regions EMS will offer a variety of continuing medical education opportunities that will meet the NREMT National Core Competency Requirements (NCCR) for recertification. Additional CME will be provided to meet a portion of the Local Core Competency Requirements (LCCR), and Regions EMS education staff will work with each agency to identify other agency-specific training that may fulfill additional LCCR and Individual Core Competency Requirements (ICCR) to meet the full NREMT recertification requirements. CME activities may include:

- Case Reviews
- Advanced Lab (critical thinking, cadaver, pediatric, airway etc.)
- CME Education Sessions

The medical director or a representative from the Regions EMS office may require paramedics to attend a CME activity. This requirement will be communicated to your service ahead of time. Your service, however, may require you attend all or some CME activities. Consult your Training Officer for your service's attendance policy. Additionally, Regions EMS offers other courses that may be required for recertification such as:

- ACLS
- PALS
- BLS for HealthCare Providers

All education activities attended through Regions EMS will be kept on record for a minimum of 10 years. Transcripts are available directly to the EMS provider. Training records for all the members of a service may be requested by the Service Director, Chief or EMS Training Officer.

Regions Hospital Employees – not otherwise affiliated with an EMS service

If you are a Regions Hospital employee, hold a current Paramedic certification, and are not otherwise affiliated with an EMS service, you may request to affiliate with Regions EMS for NREMT purposes. As part of your recertification process, you will be required to set up a time to demonstrate skills competency for the medical director prior to NREMT approval. Our office may also request to see other training

records. In addition, your employment status with Regions must be current at time of recertification, and your working skill set within your department must be deemed as competent by your immediate supervisor.

BLS Continuing Education

As part of the medical direction agreement with your service, Regions EMS will provide CME to fulfill the NREMT National Core Competency Requirements (NCCR - 20 hours) and a portion of the Local Core Competency Requirements (LCCR). This CME content may be delivered in a modular format over a 2 –year recertification period. Components of this may also be delivered online as distributed education. CME will include practical and written testing as required. At least 1 make up session will be offered at the end of each quarter at no cost. BLS providers are also invited to attend a modular education session at another service location as long as it is the correct curricular content. Modular schedules will be available to the service and may be requested from the Regions EMS office at any time.

Regions EMS education staff will work with each agency to identify other agency-specific training that may fulfill additional LCCR and Individual Core Competency Requirements (ICCR) to meet the full NREMT recertification requirements.

- If a modular session(s) is missed due to an approved leave, Regions EMS will work with your service to provide a makeup session prior to recertification.
- If a modular session(s) is missed, and NOT due to an approved leave, the BLS provider may have an opportunity to make up this session for a fee depending on instructor availability.

Training records will be kept on file for a minimum of 10 years. Transcripts are available directly to the EMS provider. Training records for all the members of a service may be requested by the Service Director, Chief or EMS Training Officer.

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Regions Hospital Employees – not otherwise affiliated with an EMS service

If you are a Regions Hospital employee, hold a current EMT certification, and are not otherwise affiliated with an EMS service, you may request to affiliate with Regions EMS for NREMT purposes. As part of your recertification process, you may be required attend a Regions Hospital EMS standard refresher if you choose to recertify using this method. You may also be required to provide documentation of continuing medical education. Your employment status must be good at the time of recertification, and your required skill set within your department must be deemed competent by your immediate supervisor.

Controlled Substance Management

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Purpose: Provides policy and procedures for controlled substance monitoring, auditing, compliance, and delivery logistics for pre-hospital EMS services.

Policy: Appropriate controlled substance use, replacement, and auditing for EMS services is the responsibility of the medical directors for those services. Regions EMS will ensure procedures are followed to meet the requirements of Regions Pharmacy, the appropriate State Board of Pharmacy, and the federal Drug Enforcement Administration (DEA).

Definitions:

- Controlled Substances (CS) - Including but not limited to: Any DEA schedule 1 or 2 narcotic (currently fentanyl, hydromorphone, and morphine), any DEA schedule 3 or 4 substance deemed controlled by the Medical Director (currently midazolam, ketamine, and lorazepam)
- Authorized staff – Regions EMS medical directors or staff with Limited Power of Attorney from the medical directors for DEA Form 222 signatures and electronic ordering.

Procedures:

- Controlled substance administration – Any CS administration and wasting by pre-hospital EMS services must be verified by 2 service personnel. The first signer must be the crew member administering and/or wasting the medication. The second signer must have witnessed the administration and/or wasting of the medication. These names must be entered on the patient care report and on the CS pharmacy order form to replace the medication.
- Controlled substance ordering and replacement – Each EMS service will determine the re-order thresholds for their controlled substances. When a CS order is needed, the correct order form will be completed and transmitted to the Regions EMS supply chain staff. Each service order form will have unique identifiers on it. Forms cannot be used between different stations or base addresses. Crews are responsible for completing the form, including the date of the response, the incident number (ICR#), medication given, dose administered, dose wasted (if any), total dose requested, ordering MD, signer #1 and signer #2. Multiple doses for single patients can be in one entry. Names and/or ID numbers can be entered electronically or manually. A short note should be included in the event of an unusual event. Examples: expired/wasted, opened and not used, broken vial, seal not intact, etc.
    - Each order received at Regions EMS will be time/date stamped and evaluated for completeness and accuracy. The back page of the order form provides tracking and verification of the order through the ordering and delivery process. Any errors on the form should be returned to the sender for corrections. All information on the order will be entered into the individual service's
    - CS log kept on a secure drive that is backed up regularly. Initial auditing of the information will include monitoring for excessive wasting, duplicate ICR #'s on different orders, excessive dosing, and correct documentation on the order.
    - When the order has passed the initial process, the order is scanned (front and back) into the secure drive in the pending orders folder. The scanned copy will be e-mailed to Regions Pharmacy in their secure mailbox. Orders received at the pharmacy before 2:00 pm will be processed and ready for delivery the next business day.
    - An authorized Regions EMS staff member will pick up the CS order at the pharmacy with appropriate HealthPartners identification and the original printed order in hand. The order will be verified in the presence of pharmacy staff and the medications will be sealed in the bag from the pharmacy. The center part of the back page will be completed confirming the transfer of the correct medications/dosages, a properly completed DEA form #222 with the order, to include printed names and signatures from Regions EMS and pharmacy staff along with the date and time.
    - The DEA form #222 will be completed and will accompany the medications to be transferred. There can be no errors on the 222 form. If there are ANY ERRORS on the form, it must be voided (the word VOID across the middle of the form) and a new form must be completed. Regions EMS staff are responsible for ensuring the forms are completed correctly. Once verified, authorized EMS staff will sign the form.
    - The medications and paperwork (CS form and DEA 222) are then delivered to the address provided on the forms. A designated representative from the EMS agency will verify the delivery bag has not been tampered with, the medications inside match the order and they have accepted the paperwork for storage at the station. The bottom section of the CS order form is completed

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to include printed names and signatures from the agency representative and Regions EMS staff along with date and time. The completed CS order form and DEA Form 222 must be scanned into the Regions secure drive for redundancy in recordkeeping.

- The appropriate service log must be updated with the delivery date and the DEA 222 form number for tracking purposes. Also, the DEA 222 form number and disposition (completed order or voided) must be entered in the service log.

- CS Delivery Audits – Random audits of each service address will take place on a regular basis. These audits will be completed in conjunction with CS deliveries. The services will not be notified of these audits. The audits will check par levels, medication storage and DEA 222 form accountability. Minor irregularities will be handled with the station supervisor during the site visit. Any major deficiencies will follow the annual audit process below. All irregularities must be documented on the audit form and kept in the permanent station record.
- Annual CS Internal Audits – These are conducted annually at each DEA service address (station or base). The services are given 2 weeks' notice in advance of the upcoming audit. This audit involves a more in-depth look at the service's controlled substances to include secure storage, par level verification with the daily CS log sheets and a careful exam for broken seals or other tampering. There will also be an evaluation of a random number of CS patient reports to verify appropriate medication and dosage administration for the patient's illness/injury, proper documentation of CS administration and wasting and correct dates and personnel information. All of the CS order forms and DEA 222 forms that have not been audited previously will be evaluated for completeness and accuracy.
  - Any major deficiencies must be referred to the service's administration for corrective action. The service's medical director will also be informed. The service will be given 7 business days to advise Regions EMS of their course of action. Major deficiencies include, but are not limited to:
    - Missing or unaccounted medications from the par level check
    - Broken seals or otherwise tampered with controlled substances
    - Daily inventory log sheets with conflicting, unexplained entries
    - Unaccounted for usage or wasting of CS on patient reports when compared to the matching CS order
    - Missing or unsecured DEA 222 forms and CS orders
  - Minor deficiencies found will be discussed with the station supervisor and corrected during the audit, if possible. Minor deficiencies include, but are not limited to:
    - Incorrect documentation of run dates or numbers from patient reports
    - Missing signature(s) on forms where the medications are appropriately accounted for
    - Other documentation issues where the medication can be accounted for by other means
- Controlled Substance Storage – Each agency must have safeguards in place to maintain adequate security of controlled substances.
  - Agencies must have appropriate storage for controlled substances which comply with Title 21 Code of Federal Regulations Part 1301 (https://www.deadiversion.usdoj.gov/21cfr/cfr/1301/1301_71.htm).
  - Controlled substance inventory levels will be established for each agency with input from the Medical Director.
  - Each agency should maintain an accountability log to track access to the controlled substances.
  - Each agency should maintain a process for regular controlled substance inventory reconciliation. At a minimum this should occur at shift change.
- Documentation Storage – The DEA has strict requirements for storage of documentation related to controlled substance ordering and administration. Each agency must maintain, at each physical address for which there is a DEA registration number, a method to securely store documentation. All DEA 222 forms and CS order forms associated with a given DEA number must be stored indefinitely at the address on file with the DEA for that given registration number.
- Suspected Diversion – In the event that suspicion for CS diversion exists, and cannot be excluded by basic investigatory means, the

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situation will be reported to the Regions Hospital "Code N" team. This team will then be tasked with coordination with agency leadership to further investigate the situation and develop a plan for additional surveillance if needed, as well as reporting to appropriate state and federal agencies, including but not necessarily limited to the DEA, EMSRB, State Board of Pharmacy, and HPSP

Credentialing

Regions Hospital EMS			
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Credentialing is the process by which providers establish an oversight/regulatory relationship with the Medical Director. This process allows the Medical Director to attest to clinical competency of individual providers and assign an individual scope of practice. An individual's credentialing level is dependent on the combination of state certification level, additional training, and clinical role within the system. Specifically, providers do not have to credential at the highest level that their state certification allows (i.e. - a paramedic can choose to credential at the BLS level if it better suits their role in the system). Providers may only practice within the scope of practice established by the Medical Director for their credentialed level. Refer to the Regions EMS Credentialing Manual for the credentialing procedure and requirements.

Do Not Resuscitate

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PURPOSE:

Regions Hospital EMS recommends that the decision to withhold cardiopulmonary resuscitation (CPR) through a Do Not Resuscitate (DNR) order or Physician Orders for Life-Sustaining Treatment (POLST) rest with the patient and his/her physician. This guideline is intended for patients receiving fully supervised medical care who might be expected to suffer cardiac or respiratory failure in the near future. Prehospital personnel under the medical direction of Regions EMS will honor directives limiting CPR in individuals who have refused this treatment, according to the Patient's Bill of Rights (MN Stat. 144.651, WI Stat. 154.17(2)).

AUTHORIZED DEFINITIONS:

- Do-Not-Resuscitate (DNR, DNAR, No code, No CPR): This category does involve active and aggressive medical treatment intended to sustain life up to the point of beginning CPR. DNR does not mean that the medical care of any other medical condition will be changed or limited. In the event of an acute cardiopulmonary arrest, no CPR will be initiated. This order means that prehospital personnel will not initiate or continue CPR on a patient in cardiac arrest once a valid DNR order is identified. If the first person finding the patient has a question about whether or not a pulse or spontaneous breathing exists, 9-1-1 should be called and the paramedics summoned to determine the patient's status.
- CPR (Cardiopulmonary Resuscitation) - This is the process of chest compression and artificial breathing as defined by the American Heart Association. Advanced levels of CPR mandate airway management, ventilatory assistance, chest compressions, defibrillation and giving appropriate drugs. The category of CPR implies full resuscitation, using any or all of the above techniques as appropriate.
- Hospice or Comfort Care - This category is appropriate for patients who request death-allowing care, knowing that death is expected and prolongation of life is not a goal. Care is intended to provide comfort and attention to basic human needs, allowing life to continue "as is" without medical intervention to sustain or prolong life beyond the natural course of events. In general, calling 9-1-1 is not appropriate for patients in this category. In situations where there are immediate needs for choking, pain relief, or comfort, 9-1-1 may be called. Transport to a hospice should only be performed after consultation with a hospice representative.

RIGHTS AND RESPONSIBILITIES:

- Physician responsibilities:
  - The patient's primary physician is responsible for obtaining DNR or POLST forms, discussing them with the family and ensuring that the form is properly completed with the necessary signatures.
  - The physician should keep one copy in the permanent medical record and give the original to the patient.
  - The order should be written in the order section of the medical chart (if one is available) and signed by the physician.
- Ambulance service responsibilities:
  - Each ambulance service in the Regions Hospital EMS system will operate in accordance with this guideline to allow prehospital personnel to honor the DNR and POLST orders.
  - Each ambulance service has the obligation to inform appropriate personnel of the procedural guidelines when presented with a DNR form, POLST form, or signed order written in the medical record.
  - Prehospital personnel will not assume any responsibility for evaluating the decision-making process or administrative procedures used to develop the DNR or POLST orders. This responsibility rests with the attending physician and the licensed health care provider supervising care.
- Patient Responsibilities and Rights:
  - A patient has the right to refuse cardiopulmonary resuscitation and should be involved to the greatest degree possible in the decision-making process. Patients are encouraged to discuss these decisions with family members, if appropriate.
  - The form should be in a readily accessible location and caregivers should make its presence known during the provision of emergency medical services in the home.

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- The patient may revoke the order at any time by destroying the form or informing prehospital providers or family members of their wish for CPR in the event of cardiac arrest.

POLICY:

- POLST forms are helpful to identify the level of intervention desired by the patient. If not explicitly indicated, an intervention should be considered appropriate to perform.
- DNR orders are compatible with maximum therapeutic care and the patient should receive vigorous support (e.g. IV and drugs) up until the point of cardiac or respiratory arrest. Patients with DNR orders remain appropriate candidates for emergency evaluation, assistance, treatment and transport. 9-1-1 may still be used to summon emergency assistance for such patients who are suffering medical emergencies.
- Prehospital cath lab, stroke code, and TTA activation remain appropriate as indicated.
- DNR and POLST orders become valid on the day when the DNR or POLST form is properly completed, dated and signed by all required parties. Prehospital personnel will not honor DNR or POLST orders if they are not legible or properly signed and dated. DNR and POLST orders remain in effect indefinitely, but should be reviewed periodically.
- POLST forms are state-specific. Wisconsin does not recognize a POLST form from Minnesota. Alternatively, Wisconsin allows for a metal or plastic bracelet worn by individuals which indicates current DNR status. Both methods are respected by Regions EMS medical direction.
- A POLST form is encouraged but not required in the long-term care facility. In the nursing home, DNR orders written in the order section of the medical record are valid if signed by the physician. Electronic signatures when indicated are considered valid.
- When prehospital personnel arrive, the family, patient or staff should immediately present the resuscitation guidelines form. Until properly completed orders are presented, prehospital personnel will assume that no valid DNR or POLST orders exist and proceed with standing orders for resuscitation as medically indicated under medical control.
- The DNR or POLST order may be rejected and overridden if prehospital personnel have substantive reason to believe the order is invalid or in cases of unusual, suspicious or unnatural causes of cardiac arrest.
- In the event a patient changes his/her mind regarding the DNR or POLST order prior to cardiac arrest, or family members request resuscitation, or disagreement occurs at the time of cardiac arrest, resuscitative measures should be initiated by prehospital personnel and treatment decisions should be made by the physician responsible for care. In the event of uncertainty, resuscitative measures should be initiated and the Medical Control Physician contacted.
- Telephone orders will not be accepted by EMS personnel unless given by an authorized on-line medical control physician.
- Documents with alternative wording used to limit medical care, e.g., Living Wills and Supportive Care Plans, will not be interpreted by EMS personnel or honored during the provision of emergency medical care.
- Physicians present at the scene, who are willing to take responsibility for the emergency medical care, may verbally give orders to prehospital personnel to withhold or discontinue resuscitation. This should be documented on the ambulance report form with the physician's signature, name, address, and office telephone number.
- DNR or POLST orders may be revoked at any time by the patient who, by destroying the request form, will prevent implementation of the DNR or POLST order. The patient is responsible for informing his/her physician and the agency supervising care, if any, of this decision.
- A DNI order is generally initiated if it is felt that long-term care ventilatory support is not in the patient's interest or desire. It is often not applicable to the short-term situations in which EMS will use an advanced airway. Prehospital personnel will not be expected to determine whether the apnea is due to a reversible condition so they may place an advanced airway if they believe the patient's condition warrants.

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POLICY:

Every run report should contain the following information:

- **General Information:** Dispatch information (including times), crew members, units responding, etc.
- **Patient Information and Chief Complaint**
- **History of Present Illness and/or Mechanism of Injury**
- **Past medical history, allergies, and current medications**
- **Physical Exam:** Include any exam relevant to the chief complaint and/or clinical impression.
- **Treatments administered and response to treatments:** Document all treatment administered, including treatment delivered by first responders.
- **Vital signs:** One complete set of vital signs including BP, pulse, respirations, O2 saturations, mental status (GCS or AVPU), and a time-stamp. Additional vitals should be documented as appropriate considering the patient's condition and any treatments administered. If unable to obtain vitals, document why. Abnormal values should be acknowledged within the patient's specific clinical context. Vital signs should be repeated at least every 15 minutes for stable patients, or at least every 5 minutes for unstable patients.
- **Rationale for allowing the patient to be transported BLS if first evaluated by ALS**
- **Clinical Impression**
- **Signatures:** Each run report must be signed by the person who wrote it. Any provider listed in the report is part of the care team and should be given the opportunity to review the report if desired. If the patient refuses treatment or transport, they must sign a refusal statement. Document any instructions given to the patient. If patient is a minor, a parent or guardian must sign the form. If the patient refuses treatment/transport and also refuses to sign, then write "refused" in the box and have someone who witnessed the refusal co-sign the form.

SPECIAL NOTES:

- All information obtained during the course of patient care delivery is confidential.
- Services may use any run report that meets their needs as long as it is approved by Regions Hospital EMS and allows for the recording of the above information.
- A run report must be filled out each time an EMS provider has any contact with an individual requesting medical assistance. The only exception to this is a mass casualty incident.
- Complete one run report for each patient for which an assessment and/or treatment is provided.
- In severe trauma where scene times are delayed longer than 10 minutes, document reasons for extended scene times (i.e. extrication or unsecured scene).
- For written run reports, correct errors by drawing one line through the incorrect item and initialing by it. For electronic patient care records, follow the protocol for correcting errors that has been established within each system.
- A medical control operator number or physician name is required on all runs where MRCC contact is made.
- If possible, all documentation should be completed prior to leaving the facility. If you need to leave, and have additional information important to patient care, this must be communicated to the ER staff before leaving.
- Supplements or corrections to the run report already left at the hospital are accomplished using the standard process within each agency's EMR.
- Any suspicious situation regarding child or vulnerable adult neglect/abuse must be reported according to Minnesota and Wisconsin State Law.

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- Each agency should have a policy identifying the documentation requirements (if any) for an incident where EMS is cancelled by other responders prior to arriving on scene.
- Whenever EMS arrives on scene and one or more individuals refuses evaluation and treatment (such as a motor vehicle accident), all individuals should be logged in the narrative section of a single patient care report as having refused evaluation. Attempts should be made to obtain names and dates of birth, but if not possible then a gender and age estimate would be acceptable. If any individual agrees to an assessment, even if no interventions are provided, a separate PCR should be generated for that individual.

East Metro Ambulance Diversion

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BACKGROUND:

This policy is intended to effectively handle situations in the East Metropolitan Twin Cities Area where the diversion of an ambulance may be necessary. The diversion of ambulance patients away from the closest or normally most appropriate ED is undesirable and not supported by Regions EMS Medical Direction. Diversion of ambulances is not patient-centered, has not been shown to alleviate crowding or improve flow in receiving hospital emergency departments, and may result in:

- Unacceptably prolonged transport times.
- Prolonged out-of-hospital care when definitive hospital-based resources are needed especially for unstable or critically ill patients.
- Inappropriate attempts by field personnel to predict the specific diagnostic and therapeutic resources needed by individual patients.
- Delays in, or lack of, ambulance availability to the community because of diversion of units to distant hospitals.
- Transport of patients to a facility outside of their established healthcare system.

Regions EMS Medical Direction does recognize that there may be extraordinary situations when a hospital is forced to temporarily close due to critical safety events or infrastructure failures which render the facility physically incapable of providing patient care. In these situations it is expected that the hospital would be diverting all patients regardless of method or mode of arrival. Trauma Center Limited Divert Status may be necessary when a Level 1 Trauma Center is temporarily unable to manage a major trauma patient due to critical resource limitations (i.e., all available trauma surgeons or operating rooms are unavailable).

PROCEDURE:

When it becomes necessary for a hospital in the East Metropolitan Area (Dakota, Ramsey, and Washington Counties) to place that facility on Divert Status or Trauma Center Limited Divert Status, the following procedure shall be used:

Hospital Responsibility

The charge nurse on duty will contact the East Metropolitan Medical Resource Control Center (MRCC) at (651) 254-2990 to inform the MRCC operator of the specific details related to the diversion status. If a designated Level 1 Trauma Center must declare a Trauma Center Limited Divert status the charge nurse on duty will notify the MRCC as above and specifically define the type of patients that should be diverted to an alternate facility, expected length of time on divert, and suggested alternate destination. The charge nurse on duty will contact MRCC as above and inform the MRCC operator when the hospital is off of divert status and normal transportation of patients to that facility may resume. A hospital, regardless of its diversion status, must agree to care for any patient when medical control for the ambulance provider determines that it is the most appropriate transport destination (i.e. cardiac arrest patients).

MRCC Responsibility

When notified of a Divert, OB Divert, or Trauma Center Limited Divert Status by an East Metro area hospital the MRCC operator will:

- Log information relating to the current divert status in the MRCC including time and date of call.
- Notify the other East Metro hospitals which may be affected by the diversion of patients. This is generally accomplished through the MNTrac system for Minnesota hospitals.
- Log information relating to any patient diversions that actually take place during the period of time a hospital is on a divert status.
- Contact the hospital every hour after the initiation of the divert status to confirm that the need for that status continues to exist and to assure that there is no confusion regarding the termination of status.
- When notified that a hospital is off a divert status the MRCC operator will re-contact those facilities notified in step #2 above and inform them of the change, again typically accomplished through the MNTrac system. The operator will also log the date and time the status was terminated.

Ambulance Responsibility

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Ambulance crews should make every attempt to contact the MRCC or receiving facility as soon as possible when it is known that a hospital may be on a divert status to confirm the ability of that facility to receive the patient. Note: Any ambulance transporting a patient at the time a Divert Status is declared should continue transport to that hospital.

DEFINITIONS

Diversion (Divert Status)

The diversion of an ambulance from the intended receiving facility to an alternate receiving facility due to a critical safety event or significant infrastructure failure.

Obstetrics (OB) Divert

When Labor and Delivery units are on divert, hospitals may divert all non-traumatic obstetrics patients over 20 weeks gestation regardless of the Emergency Department Divert Status. Patients under 34 weeks with active signs of labor should never be diverted to Woodwinds or Regions (no specialized nurseries available at these facilities)

Trauma Center Limited Divert

ACS Designated Level 1 Trauma Centers (Regions Hospital) may declare a Trauma Center Limited Divert.

Emergency Transport Hold

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The following policy only applies for patients encountered within the State of Minnesota. In the State of Wisconsin, law enforcement officers have exclusive authority under Wisconsin Statutes Chapter 51 to determine the need for emergency detention and involuntary transport of an individual who is mentally ill, drug dependent, or developmentally disabled, and a substantial probability of physical harm to him/herself or others is evident by recent acts or omissions, attempts or threats. Minnesota Statute 253B, commonly known as the "Minnesota Commitment and Treatment Act", is the law that allows for a transport hold to be ordered by a licensed peace or health officer, for the transport of a patient to a medical facility, to protect that patient or others from imminent harm. A competent person of legal age has the right to both refuse and consent to medical assessment, treatment, and transportation. However, if there is reason to believe that the patient is mentally ill, developmentally disabled, chemically dependent or intoxicated and in imminent danger of injuring themselves or others if not immediately restrained, then a peace or health officer may take the patient into custody and transport him/her to a medical facility for evaluation.

POLICY:

- Every time a patient is transported against his/her will for the above-mentioned reasons, an Emergency Transportation Hold Form (example in Forms Section) must be completed.
- If, after assessment, the patient is refusing treatment and transport and, in the judgment of the EMS provider the patient requires further medical attention but does not have capacity to give informed consent or make an informed refusal, an emergency transport hold may be obtained by having either an on-scene peace officer or an on-line medical control physician authorize and sign the Emergency Transport Hold Form. The patient may then be transported against his/her will to an appropriate medical facility for further evaluation and treatment.
- Whenever possible, attempts should be made to get an on-scene peace officer to sign the transport hold. If an officer refuses, or is not present to sign it, verbal authorization from an on-line physician may be obtained through medical control. The MRCC operator will then have the authorizing physician sign the transport hold and fax a copy to the receiving facility, where the crew may pick up the form upon arrival.
- One copy of the form must be left with the patient run report form at the receiving hospital, one copy must remain attached to the original run report form, and one copy must be provided to the patient.

SPECIAL NOTES:

- *Mentally ill includes those patients under the influence of their disease (e.g. stroke, diabetes, Alzheimer's), and those under the influence of their injury (e.g. head injury).
- A peace officer is a sheriff, municipal or local police officer, or a state patrol officer when engaged in the authorized duties of office.
- An emergency transport hold authorizes the transport of an incompetent patient to a medical facility for further evaluation only. It does not automatically commit the patient to a 72-hour hold.
- A transport hold is not necessary if the patient is under arrest and a peace officer is either accompanying the patient in the ambulance or following in a squad car.
- Patients who are transported on a hold should be transported to a hospital where they have received care or within their own medical group/insurance company whenever possible.
- A health officer is defined in MN state statutes as any of the following:
  - A licensed physician
  - A licensed psychologist
  - A licensed social worker
  - A registered nurse working in an ER of a hospital
  - A psychiatric or public health nurse as defined in section 145A.02, subdivision 18
  - An advanced practice registered nurse (APRN) as defined in section 148.171, subdivision 3
  - A mental health professional providing mental health mobile crisis intervention services as described under section 256B.0624
  - A formally designated member of a prepetition screening unit established by section 253B.07

Exposure Control and Reporting

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All prehospital care providers are at risk for exposure to communicable/infectious blood borne and airborne diseases such as HIV, hepatitis, meningitis, tuberculosis, etc. The following policy is an attempt to define those risks.

DEFINITIONS:

- The following types of exposure can increase the risk of contracting a communicable/infectious disease:
  - Blood borne exposure: human blood or any body fluid visibly contaminated with blood
  - Other body fluid exposure:
    - Human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva, emesis, stool, urine, draining wounds or lesions
    - Other suspicious circumstances and/or generally unclean surroundings
  - Airborne exposure: Direct indoor contact with a patient with known or suspected active tuberculosis or any other pathogen transmitted by airborne routes. Inside a vehicle is considered indoors.
- A significant exposure is defined as:
  - Blood borne:
    - Contact of broken skin or mucous membrane of EMS personnel with a patient's blood, amniotic fluid, pericardial fluid, peritoneal fluid, pleural fluid, synovial fluid, cerebrospinal fluid, semen, vaginal secretions, or other body fluids grossly contaminated with blood.
    - A needle stick, scalpel or instrument wound, or other wound infected by an object that is contaminated with blood, and that is capable of cutting or puncturing the skin of EMS personnel.
  - Airborne: Direct indoor contact with a patient with known or suspected active TB.
  - Other: An exposure that occurs by any other method of transmission recognized by contemporary epidemiological standards as a significant exposure.

POLICY:

- Each service is responsible for compiling an exposure control plan and updating it annually.
- Each service is responsible for providing annual continuing education of exposure control plan for all employees at risk.
- Immunizations and screenings should be updated as recommended.
- If a bystander at the scene reports a possible exposure, they should be given the written Good Samaritan Information on Blood or Body Fluid Exposures.
- Under Minnesota State Law, EMS providers with a suspected exposure situation should seek treatment and evaluation at the hospital where they transported the patient suspected of the exposure (MN Statutes 144.7401-144.7415). That hospital is responsible for coordinating the exposure evaluation and post-exposure treatment regiment, but is not responsible for the cost of this treatment. In a situation where the patient is not transported, EMS providers may choose to be evaluated at the hospital of their choice.
- In Wisconsin, providers should refer to their agency's Exposure Control Plan for guidance.

SPECIAL NOTES:

- It is extremely important for EMS personnel to report potential or known exposures immediately following the exposure so that prophylactic treatment (if indicated) may begin immediately. Personnel who choose to have their exposure evaluated at Regions Hospital Emergency Department should report immediately to the charge nurse on duty.
- This policy is intended to supplement and not substitute for the standards set for General Industry in the Code of Federal Regulations. Said guidelines are the standard for services under the medical direction of Regions Hospital EMS.

Field Amputation

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PURPOSE:

To provide a rapid and uniform response to requests for mobile amputation from EMS Services in the field.

POLICY:

- All requests for field amputation will be immediately conveyed to the East Metro Medical Resource Control Center (MRCC) by the requesting field agency.
- MRCC will alert the Regions EMS Clinical Supervisors and all Regions EMS Medical Directors.
- The designated on-call EMS Supervisor (OCCS) will confirm the request with MRCC via phone and request the following information:
  - Physical location/address of the patient
  - Individual/agency filling the medical branch director (MBD) and incident commander (IC) roles in the incident command structure.
  - The 800mHz talkgroup that the responding EMS MD can use to contact the MBD/IC onscene.
- E-MRCC can patch radio talkgroups to facilitate 800mHz communication if necessary.
- The OCCS will confirm availability of an EMS medical director with a field amputation kit and relay availability to MRCC.
- The EMS MD may request the pharmacy pull to be activated. If the pharmacy pull is activated EMRCC will inform the ED Charge RN who will notify the ED Pharmacist to activate the pharmacy pull. The EMS MD would then respond to the ED to pick up the medications enroute to the scene.
- The EMS MD will respond to the scene in their marked Regions EMS vehicle and communicate their enroute and on-scene status with MRCC via the RH-EMS talkgroup. The RH-EMS talkgroup will be monitored by the OCCS, EMS MD and MRCC throughout the event.
- If a Regions EMS Medical Director is NOT available to respond to the scene, the field amputation request will be relayed to the on-call trauma surgeon.
- The Trauma Surgeon on call will immediately evaluate the request, and if they agree with the need for amputation, will immediately notify:
  - The Trauma Surgeon on backup call
  - The OR charge nurse
  - Regions Hospital Security to arrange scene transport
  - Blood Bank
  - The ED Pharmacist who will activate the Mobile Field Amputation pharmacy pull.
    - 1,000 mg ketamine (2 x 500 mg vials)
    - 100 mg rocuronium (2 x 50 mg vials)
    - 2 g calcium chloride (2 x 1 g/10 mL pre-made syringes)
    - 100 meq sodium bicarbonate (2 x 50 meq/ 50 mL vials)
    - 1 gram tranexamic acid (1 x 1 g vial)
    - 2 grams ceftriaxone (1 x 2 g vial)
- The Trauma Surgeon on call will determine if it is more expeditious for himself/herself or the backup Trauma Surgeon to travel to the emergency scene. Travel time from home to the hospital and transit time for the Mobile Amputation Pack (see below) will be taken into consideration.

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- The Mobile Amputation Pack will be kept in the Operating Room and clearly marked. Medications will be obtained by the Emergency Center Pharmacist at the time the pack is requested. Syringes and needles will be included with the amputation kit.
- A Trauma Surgeon will be transported to the scene by Security in a marked Regions Hospital vehicle. Need for field amputation will be reassessed and carried out if indicated. The patient will be immediately transported to the hospital, where the Trauma Team will then continue evaluation and definitive care.
- RH Security will update their dispatch when they are leaving the hospital and enroute to the scene. RH Security will relay info to EM-RCC who will relay info to on-scene MBD/IC. RH Security will likewise update their dispatch when they have arrived on-scene and this info will be relayed by security dispatch to EMRCC.
- Contents of the Hospital Based Mobile Amputation Pack: (add a sign to the Mobile Amputation Pack to read as: "Pick-up Battery-Operated Saw").
    - 2-three quarter sheets
    - 3-#10 scalpel blades
    - 3-#20 scalpel blades
    - 2-#3 scalpel handles
    - 1 amputation knife (wrap in paper)
    - 2-4-packs of towels
    - 3 pairs of gloves each small, medium and large
    - 3 packs 2-0 silk ties
    - 2 packs laparotomy pads
    - 1 hand saw (wrap in paper)
    - 2 Gigli saw handles
    - 1 Gigli saw blade
    - 8 Rankin clamps
    - 8 Carmalt clamps
    - 1 straight Mayo scissors
    - 1 curved Mayo scissors
    - 1 tissue protector
    - 3 masks with eye shields
    - 1 needle holder
    - 6-2-0 silk stick tie V20 needle
    - 2 yellow gowns
    - Ketamine 50mg/ml 10 cc bottle
    - Etomidate
    - Succinylcholine
    - Morphine (optional)
    - 2-30 cc bottles of 1% lidocaine w/ epinephrine
    - 2-18 gauge needles and 2-21 gauge needles
    - 2-12 cc syringes
    - 2-tourniquets

Medical Equipment

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Required Medical Equipment:

The following equipment must be carried on all ALS and BLS ambulances. These are in addition to the requirements mandated by the appropriate state EMS regulatory agency.

- All ALS and BLS ambulances are required to carry the following:
  - Adult airway and ventilation equipment:
    - Portable oxygen
    - Oral and nasal airways (assorted sizes)
    - BVM resuscitator with assorted masks
    - Masks and nasal cannulas for non-invasive delivery of oxygen
    - Supraglottic airway devices and lubricant as approved by the medical director
    - Airway restraint device
  - Pediatric airway and ventilation equipment:
    - Appropriately sized BVMs and masks to ventilate neonate, infant, and pediatric patients
    - Oral, nasal, and supraglottic airways of various sizes appropriate for pediatric patients
  - Suction equipment:
    - Large-bore suction tip
    - Bulb syringe
    - Manual and electric suction units
  - Splinting equipment:
    - Cervical collars
    - Splint devices to immobilize extremity fractures (SAM, long board, etc.)
  - Assorted bandages, dressings, and commercially manufactured tourniquets
  - Equipment to evaluate vital signs, including blood pressure cuffs of a variety of sizes to accommodate all age groups, stethoscope, and a pulse oximeter
  - Impedance threshold device (i.e. Res-Q-Pod)
- Additional equipment for BLS ambulances:
  - Automated external defibrillator
  - Services with training on IVs and medications must carry appropriate equipment for the starting and maintaining of IVs and for the administration of medications
  - Optional BLS equipment:
    - Glucometers (required for BLS services with medication training for Glucagon)
    - 12-lead ECG monitor
    - Pediatric EZ-IO needles
    - Nebulizer kits

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        - CPAP device
        - Services with training on IVs may also carry an intraosseous access device with assorted needle sizes
- Additional equipment for ALS ambulances:
    - Adult airway and ventilation equipment:
        - Nebulizer units
        - Laryngoscope handles and blades (2 straight, 2 curved)
        - ET tubes, sizes: 6.0, 6.5, 7.0, 7.5 and 8.0 mm.
        - Magill forceps
        - Tracheal hook (such as a Sklar hook) and #10 scalpel
        - Chest decompression needle kit
        - Nasogastric tubes
        - Quantitative electronic end-tidal CO2 detector
        - Gum bougie (Tracheal Tube Introducer)
        - PEEP Valve
        - CPAP device
    - Pediatric resuscitation equipment:
        - Laryngoscope handles and blades (2 straight)
        - Pediatric Magill forceps
        - Pediatric supraglottic airway devices as approved by the Medical Director
        - Meconium aspirator
        - Pediatric weight-based resuscitation tape
    - Monitor/defibrillator (with pacing and 12-lead capabilities)
    - Intraosseous access device with assorted needle sizes
    - Glucometer

Mandatory Equipment Brought to the Scene/Patient Side:

The following equipment should be brought to the patient side on all calls:

- Airway management equipment (basic and advanced), oxygen, ventilation equipment, and suction (manual).
- A monitor/defibrillator (manual or automatic)
- Equipment for the evaluation of vital signs

On all calls with potential for respiratory or airway compromise:

- RSI capable services: manual and battery operated suction, RSI medications, video laryngoscope if available

On all known obstetrical calls:

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- All equipment listed in above, OB Kit, and airway equipment appropriate for the newborn.

On all known pediatric calls:

- All equipment listed above and appropriate sized equipment for managing the airway and obtaining vital signs of the pediatric patient.

Medical Equipment Purchases:

According to state statutes (Minnesota statute 144E.265 and Wisconsin administrative code 110.49), it is the responsibility of the Medical Director to "provide standards on upgrading and purchasing equipment." Any new medical equipment purchases must be reviewed, prior to purchase, by the Regions Hospital EMS Medical Directors and/or the service's designated EMS Clinical Supervisor.

- Prior to purchasing or obtaining any device intended for use in the course of patient care, each agency must consult with Regions EMS Medical Direction to obtain approval for use of that device.
- Regions EMS Medical Directors will refrain from recommending specific vendors when multiple options exist, and instead provide recommendations and expectations for functional requirements of the device. The agency would then proceed with their standard purchasing workflow to select a vendor that meets the specified requirements. The final device selection is subject to final approval by Regions EMS.
- Prior to providing any recommendations or approval, Regions EMS shall disclose to the agency any relevant conflicts of interest, financial or otherwise, with any vendor or individual that could be perceived as influencing the recommendations or approval.
- Service directors or EMS Coordinators must schedule training on each new device for all personnel. Whenever possible, this training should be done by the product representative from whom the device was purchased or utilizing training materials as provided by the device manufacturer. The Regions EMS Medical Directors must approve the agency's initial training plan as well as establish any credentialing requirements (if appropriate) for providers who intend to utilize the device. New equipment may not be put in service until the training has been completed.
- Records documenting the training must be maintained by each individual service, and review of these records may be requested at any time by the Medical Director or their designee.
- The agency must be willing to commit adequate effort and resources to any quality assurance and continuous quality improvement initiatives as required by Regions EMS Medical Direction related to the device.
- Following implementation, any device failures or adverse events must be reported to Regions EMS as soon as reasonably possible.

Medication Administration

Regions Hospital EMS			
POLICY:	Medical Equipment		
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DATE:	September 1, 2020	REVIEWED:	July 2023

POLICY:

- Basic life support services may carry and administer the following medications:
  - Oxygen
  - Dextrose (oral)
  - Acetaminophen
  - Ibuprofen (MN only)
- EMTs may assist the patient in taking certain medications as prescribed by their personal physician after consulting with Medical Control Physician.
- In addition to those listed above, basic life support services with medication training may carry and administer the following medications (EMTs may not change their scope of practice until appropriate training and medical direction approval have been obtained):
  - Albuterol
  - Aspirin
  - Glucagon
  - Nitroglycerin
  - Epinephrine (1:1,000)
- Basic life support services with additional training in intravenous access may also carry and administer the following intravenous solutions:
  - 0.9% normal saline
  - Dextrose 5% in water
  - Dextrose 10% in water
- In addition to those medications listed above, advanced life support services may carry and administer the following medications:
  - Adenosine
  - Albuterol
  - Amiodarone
  - Atropine
  - Calcium chloride
  - Dexamethasone
  - Dextrose (up to 50% concentration)
  - Diphenhydramine
  - Droperidol
  - Epinephrine 1:1,000
  - Epinephrine 1:10,000
  - Epinephrine 2.25% racemic
  - Fentanyl
  - Glucagon
  - Haloperidol
  - Hydromorphone
  - Hydroxocobalamin
  - Ipratropium
  - Ketamine
  - Lidocaine 2%
  - Magnesium sulfate
  - Methylprednisolone
  - Midazolam
  - Morphine
  - Naloxone
  - Nitroglycerin
  - Ondansetron
  - Sodium bicarbonate
  - Tetracaine
  - Tranexamic acid
  - Vasopressin

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- In addition to those listed above, agencies performing RSI may carry and administer the following additional medications:
  - Etomidate
  - Rocuronium
  - Succinylcholine
  - Vecuronium
- General guidelines to be followed when giving medications:
  - Perform patient assessment.
  - Manage ABCs as indicated.
  - Establish intravascular access if indicated.
  - Attach monitor and obtain ECG if indicated.
  - Obtain complete set of vitals: BP, pulse, respirations, and O2 sats.
  - Inquire about patient allergies.
  - Obtain/estimate patient weight.
  - Obtain physician order, if required, and repeat the order back to the physician.
  - Check the medication for correct medication, correct concentration, correct dose, correct route, and expiration date.
  - Administer medication.
  - If administering during cardiac arrest, circulate drugs with chest compressions.
  - Repeat assessment (e.g. lung sounds, pain scale) and vitals.
  - Document drug, dosage, route, time, initials of person administering, and patient response.

SPECIAL NOTES:

- Use caution when administering medications to pregnant women. Consult with Medical Control Physician if there are any questions.
- In the intubated patient, albuterol and ipratropium should be administered with an adapter that permits in-line nebulization.
- Controlled substances including fentanyl, hydromorphone, morphine, ketamine, and midazolam have special documentation requirements.
- Any medication that may be administered via the IV route may also be administered via the IO route at the same dose.

Regions Hospital EMS			
POLICY:	Metro Area Hospital Specialty Designations		
NUMBER:	112	PAGE:	1 of 1
DATE:	January 1, 2017	REVIEWED:	July 2023

POLICY:

Patients should be transported to the hospital of their or their physician's choice. There are certain circumstances in which the patient's choice should be over-ridden by the ambulance provider or on-line medical direction. The following is a list of those appropriate diversions:

Burn Center

All patients with the following burn injuries must be transported to a verified Burn Center:

- Second and third degree burns > 10% TBSA
- Burns to hands, face, feet, perineum, or major joints
- Electrical burns, including lightening
- Chemical burns, especially hydrofluoric acid burns
- Inhalation injuries.

Patients with pre-existing medical conditions that may prolong recovery, complicate management, or affect mortality may also be diverted to a Burn Center.

Adult and Pediatric Trauma Centers

Refer to the Trauma Triage and Destination Plan found in the Reference section of the Regions EMS Patient Care Guidelines.

Level 1 Cardiac Centers

Patients with evidence of ST-Elevation MI (STEMI) on a 12-lead ECG and all resuscitated cardiac arrest victims should be transported to a cath lab capable facility. Providers should contact MRCC as soon as possible to activate the appropriate cath lab for patients with 12-lead ECGs demonstrating Acute MI, per the Prehospital Alert Criteria policy.

Hyperbaric Centers

All patients (including pregnant patients) transported with symptoms of severe CO poisoning and not exposed to smoke or fire should be transported to a hyperbaric center (HCMC). All patients, including pregnant patients, transported with signs and symptoms of CO exposure due to exposure to smoke or fire should be taken to the closest burn center. Patients in respiratory or cardiac arrest should be transported to the closest facility.

Specialized OB Centers

United Hospital remains the only Level III nursery in the East Metro. All patients in **active labor** who are between **20 and 32 weeks gestation** (5-8 months) should be transported to United Hospital. Special requests by OB patients in **active labor** who are between **28 and 32 weeks** to be transported to St. John's Hospital must be facilitated through MRCC.

Behavioral and Mental Health Centers

There is no formal regional specialty designation for pediatric, adolescent , or adult behavioral and mental health facilities. Patients should preferably be transported to an appropriate facility based on their personal preference, age, and hospital capabilities. This does not necessarily prohibit transport to other facilities based on case-specific circumstances.

Stroke Centers

Refer to the CVA / Suspected Stroke patient care guideline for triage and transport destination criteria.

Midwife On Scene

Regions Hospital EMS			
POLICY:	Midwife On Scene		
NUMBER:	123	PAGE:	1 of 2
DATE:	January 11, 2024	REVIEWED:	January 2024

POLICY:

This policy applies to situations when a midwife is encountered providing care in a private residence, freestanding birth facility, or other non-hospital facility. Midwives are highly trained and a valuable resource during neonatal or obstetrical emergencies. We encourage all providers to work collaboratively with midwives to provide the best care for patients.

Background and Definitions

There are several titles and credentials that exist within the field of midwifery:

- Certified Nurse Midwife (CNM): Must hold a Registered Nurse (RN) prior to or within a midwifery education program. Credentials include a graduate degree following completion of a 4-year bachelor's degree program. CNMs are regulated by the American College of Nurse-Midwives (ACNM) and training must be completed under direct supervision of a certified nurse midwife or certified midwife. The majority of CNMs attend births in a hospital setting. Many often provide primary and obstetrical care to their patients. CNMs are independent practitioners and do not require physician supervision. They can hold an independent license with prescribing authority in all states.
- Certified Midwife (CM): Requirements include successful completion of midwife-specific science and health courses and related health skills training prior to or within midwifery education program. Credentials include a graduate degree after completion of a 4-year bachelor's degree program. The majority of CMs attend births in a hospital setting. CMs meet the same core competencies, sit for the same board exam, and have identical scopes of practice as CNMs. The CM credential is currently only recognized in the following states: Arkansas, Colorado, Delaware, Hawaii, Maine, Maryland, New Jersey, New York, Oklahoma, Rhode Island, Virginia, and the District of Columbia. CMs may hold an independent license with prescribing authority in some states, but not in Minnesota or Wisconsin.
- Certified Professional Midwife (CPM): CPMs have no specific academic degree requirement other than a high school diploma or equivalent. Certification is based on competent demonstration of skills and knowledge. CPMs must undergo at least 2 years of training, attending at least 55 births. They attend births in home settings or freestanding birth centers. CPMs do not have prescribing authority but can obtain and administer certain medications.
- Traditional Midwifery: This term is used in MN State Statute to refer to any process of assisting or attending childbirth outside of the hospital.
- "Unlicensed" Midwife: MN is one of two states (Utah) that allows midwives to practice without being licensed. These midwives attend deliveries in home settings rather than healthcare settings. By nature of not being licensed, their practice is not uniformly governed.
- Doula: A person trained or experienced in providing support and guidance to a laboring patient. These individuals should not be considered medical providers.

Ambulance Personnel Responsibilities

- Identify self to midwife
- Inquire if the midwife is licensed either as a CPM or CNM (capable of administering medications)
- Inquire if the midwife would like to continue to participate in patient care
- Clarify the exact capabilities the midwife has and what they recommend for the patient
- Perform fetal heart rate monitoring
- Administer medications for post-partum hemorrhage if indicated
- Administer medications to slow labor if indicated
- Assist with positioning or specific maneuvers for the patient
- Assist with preventing or promoting pushing with contractions
- Facilitate administration of medications the midwife deems to be necessary which may include initiating IV access, pushing medica-

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POLICY:	Midwife On Scene		
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tions, providing IV fluids, etc. If medications are given outside of the current patient care guidelines, the midwife should accompany the patient to the hospital in the ambulance. (If only a vitamin K injection or erythromycin eye ointment are given to the newborn, the midwife does not need to accompany the child to the hospital)

- EMS maintains final decision-making authority for all patient care, including whether or not a midwife will accompany the patient in the ambulance. *

Midwife at Scene Responsibilities

- Introduce self to the EMS crew, including credentials
- Offer guidance and assistance as able
- Describe recommended adjuncts that you can provide (fetal heart monitoring, medications, positioning, etc.) and explicitly state if you are expecting/willing to accompany the patient to the hospital
- If medications are recommended/given that are outside the agency's guidelines, you must accompany the patient in the ambulance to the hospital
- Midwives who are not licensed (either CPM or CNM) may offer advice and/or accompany the patient to the hospital (at the joint discretion of the ambulance personnel and the midwife) but may not authorize administration of any medication.

***Regions EMS medical direction strongly suggests working collaboratively with midwives and in the event of an emergency allow them to assist with patient care.** This may include accompanying the patient to the hospital in the ambulance. If a midwife makes requests of EMS personnel that are contrary to these guidelines, or appear in the EMS personnel's judgment to be contrary to the patient's best interests, or to perform a procedure that is beyond the crew's level of training and scope of practice, EMS personnel should request that the midwife carry out those orders or consult with a medical control physician.

Regions Hospital EMS			
POLICY:	Non-Transportation		
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DATE:	January 1, 2017	REVIEWED:	July 2023

POLICY:

The following are the requirements for all non-transportation cases:

- Each patient (any person requesting medical assistance) shall be given a physical assessment consisting of a primary survey, vital signs (B/P, pulse, respirations, oxygen saturation and mental status) and exam of the affected body part, following the Universal Patient Care guideline.
- Any refusal by the patient to submit to assessment should be documented on the patient care form to demonstrate that the patient was offered an assessment. If multiple patients are involved, the refusals may be documented on a single patient care report in accordance with the Documentation policy. For patients who agree to an assessment but refuse treatment or transport, the run report must include the following:
    - Results of physical assessment
    - Visual observations of the patient
    - Mental status assessment. Patient should be:
        - Alert: awake with eyes open
        - Oriented to person, time and place
        - Coherent: speaking in complete sentences with logical thought processes (not psychotic, manic, severely delusional or paranoid).
        - Able to understand the EMS provider, which may involve the use of a telephone interpreter.
        - Absence of any one of the above may indicate lack of capacity to make good decisions. Incompetent or incapacitated patients cannot legally refuse medical care.
- Reason for the patient's refusal, attempts to get others involved, and the consequences and alternatives to non-transport should be included.
- Concluding statement for each incident of patient refusal should include a plan such as the following: "Patient was strongly advised to seek medical attention as soon as possible."
- Signature of the patient (or legal guardian if a minor) on the run form. If patient refuses to sign, write "refused" in signature area and have witness to refusal sign as well. A valid witness is any family member or bystander of legal age, a police officer, or if no other options exist, a crew member.
- Every high-risk non-transport (as determined by the treating provider) must be cleared through medical control by the highest EMS medical authority at the scene before leaving the patient's side. Document physician name or medical control operator number on the run form. All children < 6 months of age, third trimester OB patients involved with trauma, those patients whose hypoglycemia is due to oral hypoglycemic medications (other than metformin), cardiac arrest with resuscitation attempted, and minors under
- 18 years of age for whom a parent or guardian cannot be contacted must have clearance by a medical control physician for non-transport.
- Medical control may clear a patient for non-transport following a hypoglycemic episode if the patient:
    - Is now conscious, alert, and oriented
    - Is able to manage their diabetes
    - Has a blood sugar of at least 70 mg/dL
    - Is not currently taking oral hypoglycemic agents other than metformin
    - Is at least 2 years of age (minors must be in the care of an adult)

Regions Hospital EMS			
POLICY:	Non-Transportation		
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SPECIAL NOTES:

- Documentation of non-transports should be as complete as transported runs because of the increased liability that is assumed when patients are left at the scene. From a legal standpoint, the run report will be the evidence that appropriate actions were taken. Patient care and assessment that is not documented can be easily challenged as to whether it actually occurred.
- Alcohol or chemical intoxication does not justify inaction and may render a patient to not have capacity to refuse. If, after appropriate assessment and consultation with medical control, treatment and transport are deemed unnecessary, transportation to a detoxification facility may be arranged.
- In the event that the parent or legal guardian of an uninjured or non-ill minor cannot be reached, the child may be left in the care of a responsible adult (> 18y.o.), after consulting with a medical control physician.
- Consult with medical control regarding non-transport of emancipated minors.An emancipated minor is anyone under the age of 18 years who:
    - Has been married
    - Is on active duty in the uniformed services of the United States
    - Has been emancipated by a court of competent jurisdiction
    - Is deemed financially independent
    - Is otherwise considered emancipated under Minnesota or Wisconsin State law for the relevant jurisdiction
- An EMS run sheet should be written for each person requesting medical assistance at the scene. Signature sheets are acceptable forms of documentation for individuals at the scene who do not wish to have medical assistance.

On-Call Clinical Supervisor

Regions Hospital EMS			
POLICY:	EMS On-Call Clinical Supervisor		
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DATE:	January 1, 2017	REVIEWED:	July 2023

POLICY:

Regions Hospital EMS recognizes that providing EMS is a 24-hour/day, 7 day/week operation. An EMS On-Call Clinical Supervisor (OCCS) is available to respond to the medical direction needs of customers at all hours. The OCCS should also be contacted so that Medical Direction is kept informed of unusual circumstances or events that occur in services under their medical oversight. The OCCS should be contacted/notified as soon as possible for the following events:

- Mass casualty incident/disaster (natural or manmade)
- Prolonged extrication involving industrial or agricultural equipment
- EMS vehicle accidents involving injury to the patient(s) or crew members
- Death or serious injury of:
    - Any provider under the medical direction of Regions Hospital EMS
    - Any bystander on the scene of a call
- Any patient care complaint/inquiry received by a service requiring immediate follow-up
- Advanced procedures which might require urgent follow-up or feedback, such as surgical cricothyrotomy, any procedure with a significant adverse event, and any research-defined events as determined by medical direction
- Any question of an emergent nature that requires immediate advice from Medical Direction
- Any event that has high media profile
- Any event with the potential need for CISM. This should be communicated from the EMS administration at each service to the EMS OCCS.

PROCEDURE:

- Contact MRCC at (651) 254-2990 and ask them to contact the OCCS.
- Provide MRCC with your name, service, and a callback number.
- The OCCS will contact the service for further details.

Physician On Scene

Regions Hospital EMS			
POLICY:	Physician On Scene		
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DATE:	January 1, 2017	REVIEWED:	July 2023

POLICY:

Regions EMS physicians, including the medical director, assistant medical directors and EMS fellows, may act as on scene medical control on any call to which they respond. The following policy applies to non-Regions EMS physicians. Medical control should be notified as early as possible that there is a physician at the scene.

- Ambulance Personnel Responsibilities:
  - Identify self to the physician.
  - Inquire if the physician is licensed to practice medicine in the appropriate state, and medical specialty.
  - Inquire if the physician wishes to be responsible for the patient. If so, explain to the physician on scene that they must:
    - Instruct/supervise all prehospital personnel at the scene.
    - Accompany the patient in the ambulance to a hospital.
  - Document the identification of any on-scene physician that participates in patient care.
- Physician at Scene Responsibilities:
  - If the physician declines responsibility, prehospital personnel should follow the Regions EMS established patient care guidelines.
  - If the physician accepts responsibility:
    - Medical control is notified of a physician at scene.
    - No monitoring medical control physician is necessary.
    - Radio communications are maintained.
    - Physician at scene accompanies the patient to the hospital.
    - The physician accompanying EMS will give a verbal report to the MD at the receiving hospital.
  - If the physician wishes to assist only:
    - He or she may communicate with the online medical control physician, however, the physician at scene has no medical control authority.
    - The physician at scene is not required to accompany the patient to the hospital.

SPECIAL NOTES:

If a physician makes requests of EMS personnel in a clinical setting that are contrary to these guidelines or appear, in the EMS personnel's judgment, to be contrary to the patient's best interests, or that a procedure is beyond the crew's level of training and scope of practice, EMS personnel should request that the physician carry out those orders or consult with a medical control physician. Once the on-scene physician is no longer physically present, EMS personnel should follow established care guidelines.

Prehospital Alert Criteria

Regions Hospital EMS			
POLICY:	Prehospital Alert Criteria (Trauma, Stroke, STEMI, STAB)		
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Trauma Team Activation Criteria

ALS units can request a Trauma Team Activation (TTA) from the field when one or more of the signs and symptoms listed in the "Traumatic Injuries" guideline are present or when the paramedic feels the patient is unstable due to a traumatic injury. BLS units should contact the online medical control physician immediately for a TTA evaluation (Also see the Trauma Triage and Destination Plan found in the Reference section).

TTAs are called based on anatomic and physiologic criteria. They are not called based on the mechanism of injury. Mechanism of injury may mandate that the patient be transported to a Trauma Center but mechanism alone does not necessarily warrant a TTA. There may be times when patients have significant mechanisms of injury but appear to be stable. If the provider feels that a patient is a candidate for evaluation at a trauma center, the EMS provider should bring the patient to a trauma center.

MRCC Operators are authorized to activate a TTA when criteria are met based on the report provided by prehospital providers. Operators are also expected to reference the Trauma Triage and Destination Plan to prompt transporting crews regarding appropriate hospital destinations when appropriate.

Red Medical/Trauma

Patients transported by EMS who are critically ill or injured or in severe distress but do not meet the current TTA, Cath Lab, or Stroke Code criteria, and would benefit from immediate physician evaluation can be called a "Red" medical or trauma patient. Examples of patients who are candidates for Red Medical or Trauma requests include (but are not limited to): Trauma patients who have a significant mechanism of injury but do not meet the physiologic or anatomical criteria to justify a TTA, status epilepticus, severe COPD on CPAP, open or severely painful fractures, hypotensive medical patients, unstable cardiac arrhythmias, any unstable vital signs in a non-trauma patient, choking patients, status asthmaticus, or overdose with depressed level of consciousness or unstable vital signs. This list is not all inclusive, and the paramedic should feel comfortable declaring a "Red Medical" or "Red Trauma" on any patient meeting the above criteria.

Cath Lab Activation

Patients with cardiac symptoms who have ST elevation of > 2mm in two or more contiguous precordial leads or >1mm in the limb leads, and the QRS complex is narrower than 0.12 (3 small boxes) seconds, should be transported to a Level 1 Cardiac Center as approved by the East Metro Physician Advisory Committee (EMPAC) (see Metro Hospital Designations policy). ALS providers are encouraged to request a Cath Lab Activation via MRCC as soon as the ST elevation is identified, to allow for prompt response of hospital staff and resources.

Stroke Code

Any patient exhibiting signs of acute stroke, defined as exhibiting 1 of the 3 signs and symptoms measured on the Cincinnati Prehospital Stroke Scale, symptom onset within 24 hours, and a normal blood glucose qualifies for a Stroke Code prehospital alert. EMS providers should request that MRCC provide notification of Stroke Code status to receiving hospital prior to arrival.

Regions Hospital EMS			
POLICY:	Quality Assurance and Improvement		
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According to state statutes in Minnesota and Wisconsin, it is the responsibility of the Medical Director to "participate in the development and operation of continuous quality improvement programs including, but not limited to, case review and resolution of patient complaints." Ambulance services who receive medical oversight from Regions Hospital EMS will have and operate continuous quality improvement programs that will include, but not be limited to: data collection, annual skills assessment, critical thinking lab, critical case review, patient care report review, continuing medical education, cardiac arrest and advanced procedures review, guideline comprehension and customer surveys.

Minnesota statutes 145.61-145.67 and 144E.32 provide protection from liability for recognized peer review activities. The same protection is provided by Wisconsin statutes 146.37-146.38. Regions Hospital EMS, as a hospital department consisting of EMS professionals, forms this peer review committee with the goals of improving the health care for our patients and reducing morbidity and mortality in our communities. The Regions Hospital EMS Quality Assurance and Peer Review Committee will be limited to EMS professionals, administrative staff, and medical advisors and will consist of the following members:

- Regions EMS Physician Medical Directors and any Physician EMS Fellow(s)
- Regions EMS Clinical Supervisors
- Regions EMS Manager
- Regions EMS Director
- East Metro MRCC Manager
- Additional Medical Advisors who may be called upon from time to time to advise the committee. These medical advisors may include but are not limited to:
    - Ambulance Service Providers with expertise in aspects of prehospital medicine as they relate to a case under review
    - Hospital based medical experts including physicians, registered nurses and other clinical staff
    - Necessary administrative staff to support the committee, including the EMS education supervisor to correlate with prior or ongoing education initiatives.

Regions Hospital EMS			
POLICY:	Quality Steering Committee		
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PURPOSE

According to state statutes in Minnesota and Wisconsin, it is the responsibility of the Medical Director to "participate in the development and operation of continuous quality improvement programs including, but not limited to, case review and resolution of patient complaints." The Quality Steering Committee (The Committee) for Regions Hospital EMS is tasked to provide recommendations to the Quality Assurance and Peer Review Committee in the areas related to patient safety, operational performance, and clinical quality. This Committee provides recommendations to the EMS medical directors and clinical supervisors regarding quality metrics, monitoring, oversight, and remediation. The Committee's primary responsibilities are to:

- Support the overall vision and mission of Regions Hospital EMS for patient safety and quality.
- Review system-wide performance against the quality and efficiency targets set by the Quality Assurance and Peer Review Committee.
- Review and approve safety related goals and objectives and report performance against targets to the Quality Assurance and Peer Review Committee.
- Provide educational offerings on safety, quality, and related topics
- Review and recommend the content and format of the system-wide quality dashboard.
- Establish priorities for quality initiatives that emphasize improving clinical quality and patient safety.
- Facilitate transparency by providing insight into the process of reporting quality information to stakeholders, partner agencies, and (when appropriate) the public.
- Benchmark with other industries to broaden insight into innovation in quality improvement.
- Establish recommendations for clinical credentialing of EMS providers to the Quality Assurance and Peer Review Committee.

MEMBERSHIP

Minnesota statutes 145.61-145.67 and 144E.32 provide protection from liability for recognized peer review activities. The same protection is provided by Wisconsin statutes 146.37-146.38. Regions Hospital EMS, as a hospital department consisting of EMS professionals, forms this Quality Steering Committee (The Committee) with the goals of improving the health care for our patients and reducing morbidity and mortality in our communities. The Committee will be limited to EMS professionals, administrative staff, and medical advisors and will consist of the following members:

- Regions EMS Physician Medical Director of Quality
- Regions EMS Clinical Supervisor representative(s)
- Regions EMS administrative representative(s)
- Regions EMS education representative(s)
- Regions EMS data analyst(s)
- Necessary administrative staff to support The Committee
- Additional Medical Advisors who may be called upon from time to time to advise The Committee. These medical advisors may include but are not limited to:
    - Physicians
    - Clinical supervisors
    - Education staff
    - Administrative staff
    - Ambulance Service Provider

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- Hospital-based medical experts including but not limited to physicians, registered nurses and other clinical staff

MEETINGS

The Committee shall meet on a regular basis as determined by the Medical Director of Quality or Regions Hospital EMS administrative leadership.

Safe Transport of Pediatric Patients

Regions Hospital EMS			
POLICY:	Safe Transport of Pediatric Patients		
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Without special considerations, children are at risk of injury when transported by EMS. EMS providers must provide appropriate stabilization and protection to pediatric patients during EMS transport. The Regions EMS Medical Direction staff are available for consultation, however agencies should refer to the relevant local, state, and federal legislation for guidance.

Regions Hospital EMS			
POLICY:	Specialized Transportation Systems		
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Combined Tiered Transport Systems

Patient with the following presentations may be transported by BLS:

- Brief and improving altered level of consciousness (GCS 14 or 15)
- Minor burns (<10% TBSA) in adults, (<5% TBSA) in patients under 12 or over 60 years of age
- Simple fractures (not requiring pain management)
- Uncomplicated OB, psychiatric, or suicidal patients
- Syncopal episodes in patients < 30 years
- Other uncomplicated traumatic or medical complaints not requiring cardiac monitoring, airway intervention, or IV medication administration, and is deemed to be a low risk for deterioration during transport

Both ALS and BLS provider MUST agree that patient is appropriate for BLS transport. Patients with uncontrolled moderate to severe pain despite appropriate treatment should be transported ALS. BLS providers who have had training in IV therapy may transport patients who have maintenance IVs. If there is any disagreement remaining, ALS should transport. Any issues should be dealt with after the incident through the department's peer review quality improvement process.

Interfacility Transports

Prehospital providers that participate in interfacility transfers must have written guidelines and appropriate training for the particular type of patient they will encounter. The provider should not accept a transfer if he/she does not feel comfortable assuming responsibility for patient care due to level of training or lack of knowledge regarding equipment in use on the patient. Appropriately trained staff from the transferring facility may accompany the transporting ambulance if necessary to provide safe transport (i.e. respiratory therapists, RN's, MD's).

Red Lights and Siren Recommendations

After assessing the risk versus benefit to the patient and finding him/her to be in one of the categories below, it is appropriate for these patients to be transported to a medical facility using lights and siren:

Airway:	Compromised airway, upper airway stridor
Breathing:	Severe respiratory distress, difficulty with oxygenation or ventilation
Circulation:	Cardiac arrest, hypotension, symptomatic tachycardia or bradycardia, shock from any cause, or STEMI
Trauma:	Any patient meeting Tier 1 trauma team activation criteria
Neurologic:	GCS <= 13, seizures unresponsive to treatment, significantly altered mental status from baseline, or new/evolving focal neurologic deficit
Obstetrical:	Prolapsed cord, premature labor, breech presentation, ectopic pregnancy, abnormal fetal presentation, 3rd trimester bleeding, or post-partum complications for mother or baby
Other:	Any patient felt to be in imminent danger upon discretion of the crew or any patient triaged as a red category

Bariatric Transportation

Regions Hospital EMS recognizes the special needs of bariatric patients and the challenge they present to caregivers:

- No patient that requires immediate 911 emergency transport will be denied transportation. If the bariatric patient is too large to be transported by a service, the patient will receive medical care at the scene to attempt to stabilize the medical emergency until such time as the appropriate equipment and transport vehicle can be secured for transportation.
- All EMS agencies should have equipment designed to monitor and treat the bariatric patient, regardless of their ability to transport

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the patient.

- All EMS agencies should have a written policy to address the following concerns:
  - Weight limits of stretchers, backboards, lifting tarps, and ambulance load limits.
  - Procedures and policies for extricating large patients from places of residence.
  - Mutual aid agreements with agencies with specialized transport capabilities.

Termination of Resuscitation

Regions Hospital EMS			
POLICY:	Termination of Resuscitation		
NUMBER:	121	PAGE:	1 of 2
DATE:	January 1, 2017	REVIEWED:	July 2023

POLICY:

Ambulance personnel may forego resuscitation on patients who are obviously dead at the scene or who have confirmed "Do Not Resuscitate" (DNR) or appropriate POLST orders. Obvious Death is indicated by no cardiac or respiratory activity in a warm patient combined with any of the following: rigor mortis, lines of lividity (pooling of blood in the dependent areas of the body), decapitation, severed trunk, or 100% BSA full thickness burns. In a cold situation, Obvious Death is indicated by no cardiac or respiratory activity following a prolonged pulse check with any of the following: injury incompatible with life (such as decapitation or severed trunk), ice formation in the airway, or the chest wall is frozen and so stiff that compressions are impossible.

- Obtain and document history including:
  - How long down or when last seen alive?
  - Expected or unexpected death?
  - Any resuscitative efforts prior to EMS arrival?
  - Medical history
- Perform physical exam and document assessment of:
  - Absent pulses: the carotid and one other (radial, brachial, or femoral) pulse must be checked.
  - Absent respirations
  - Fixed and dilated pupils
  - Rigor mortis
  - Body temperature
  - Pooling of blood in the dependent (lowest areas of the body) due to gravity (lividity)
  - Asystole in 2 or more leads (ALS only)
  - Injuries incompatible with life (decapitation, severed trunk, 100% BSA burns)
- Medical control clearance
  - Medical control clearance is not required for patients who meet the criteria above.
  - Contact medical control with any questions/concerns; especially if possibility of hypothermia exists.
  - Once resuscitation (CPR) has begun, it may be terminated only AFTER physician declaration (in person or via radio communication) unless there is a valid DNR or appropriate POLST order present.

To the extent possible, try to avoid disturbance of possible crime scenes and leave bodies at the scene in position found.

SPECIAL NOTES:

- If there is any doubt about patient viability, initiate resuscitation measures immediately.
- Patients found in cold environments may still be viable despite cold body temperature.
- "Resuscitation" for the purposes of this guideline is defined as cardiopulmonary resuscitation (CPR) or any component of CPR, including cardiac compression, artificial ventilation (including mouth to mouth), defibrillation, administration of cardiac resuscitation medications and related procedures. "Resuscitation" does not include the Heimlich maneuver or similar procedure used to expel an obstruction from the throat, or the use of a cardiac monitor to perform a "quick look." It applies to any provider of "resuscitation," regardless of level of training, including, but not limited to, the lay public, first responders, EMS or other medical personnel. It does not obligate EMS personnel to attempt aggressive resuscitation in cases where the attempts will likely be futile, but rather to continue with basic life support (BLS) resuscitation until physician contact can be made.

Termination of Resuscitation

Regions Hospital EMS			
POLICY:	Termination of Resuscitation		
NUMBER:	121	PAGE:	2 of 2
DATE:	January 1, 2017	REVIEWED:	July 2023

- The medical examiner or funeral home transports persons pronounced dead at the scene unless specific arrangements are made in collaboration with law enforcement, EMS, the medical examiner or coroner, and the receiving funeral home.
- Patients not pronounced at the scene due to continued resuscitative efforts, family situations, or rescuer safety issues are transported to an appropriate receiving hospital.
- The Minnesota POLST form is the preferred method for patients to communicate their wishes to EMS providers within the state of Minnesota.
- In long term care facilities "DNR" or "DNAR" listed under the code status portion of the facilities physician order form may be considered valid do not resuscitate orders.

Transport Destinations and Care Plans

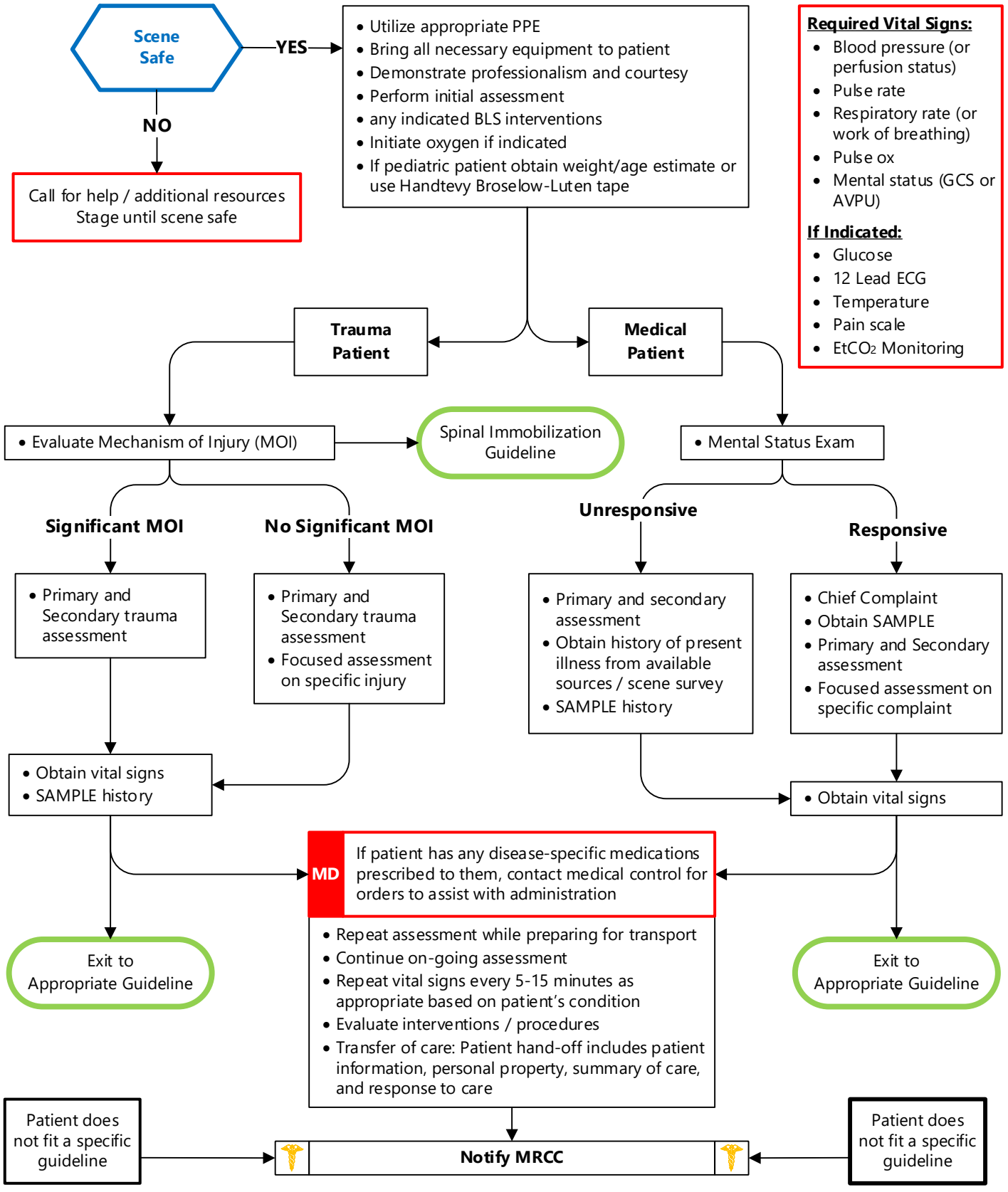
Regions Hospital EMS			
POLICY:	Transport Destinations and Care Plans		
NUMBER:	122	PAGE:	1 of 1
DATE:	January 1, 2017	REVIEWED:	July 2023

POLICY:

All sick or injured persons requesting transport shall be transported to an appropriate local emergency department of the patient's preference. Exceptions to this rule include:

- Patients whose conditions are covered by a formal destination plan (Trauma, Cardiac, Stroke, or OB) should be transported in accordance with those guidelines.
- All sick or injured patients requesting transport who do not express a preference should be transported to the closest appropriate local emergency department.
- Transport decisions should take into strong consideration a patient's pre-existing health care relationships. In general, patients should be taken to a hospital affiliated with a healthcare system in which they have a pre-existing patient-provider relationship unless the patient specifically requests otherwise. If a specialty designated center is recommended by a specific Destination Plan, consideration may be given to the patient's preferred hospital if it fits within the relevant Destination Plan.
- Select patients who may or may not be frequent utilizers of the EMS system may have a designated care plan as developed with the patient, his or her health care providers, one or more local hospitals, and/or a specific EMS agency. If the patient has a formal care plan approved by the Regions EMS Medical Director, then the patient should be treated and transported in accordance with that plan, unless they meet criteria for a specialty Destination Plan and their targeted hospital is not felt to be appropriate. For care plans not explicitly approved by the Regions EMS Medical Director, it would be appropriate to consider the preferred transport destination provided the patient does not meet criteria for a specialty Destination Plan, and transport to the preferred destination would not place an undue strain on the EMS system. In any case, do not hesitate to contact a supervisor or on-line medical control physician for guidance.
- If adverse travel conditions exist, or transport to a preferred hospital would result in an inappropriate lack of local EMS resources, an EMS supervisor or medical director may authorize diversion to a closer facility.
- Any transport for medical evaluation to a destination other than a licensed hospital must be approved by a medical control physician and an EMS service supervisor on a case by case basis.
- The list of hospitals that the service will transport a patient to is at the prerogative of the service manager.

Universal Patient Care



Universal Patient Care

Scene Safety Evaluation: Identify potential hazards to rescuers, patient and public. Identify number of patients and utilize triage guideline if indicated. Observe patient position and surroundings.

General: All patient care must be appropriate to your level of training and documented in the PCR. The PCR / EMR narrative should be considered a story of the circumstances, events and care of the patient and should allow a reader to understand the complaint, the assessment, the treatment, why procedures were performed and why indicated procedures were not performed as well as ongoing assessments and response to treatment and interventions.

Adult Patient: An adult should be suspected of being acutely hypotensive when Systolic Blood Pressure is less than 90 mmHg. Diabetic patients and women may have atypical presentations of cardiac related problems such as MI. General weakness can be the symptom of a very serious underlying process. Beta blockers and other cardiac drugs may prevent a reflexive tachycardia in shock with low to normal pulse rates.

Geriatric Patient: Hip fractures and dislocations have high mortality. Altered mental status is not always dementia. Always check Blood Sugar and assess for signs of stroke, trauma, etc. with any alteration in a patient's baseline mental status. Minor or moderate injury in the typical adult may be very serious in the elderly.

Pediatric Patient: Pediatric patient is defined by those which fit on the Broselow-Luten Resuscitation Tape, Age less than 12, weight 40 kg or less, or absence of signs of puberty. Patients off the Broselow-Luten tape should have weight based medications until age 12 or greater or weight greater than 40 kg. Special needs children may require continued use of Pediatric based guidelines regardless of age and weight. Initial assessment should utilize the Pediatric Assessment Triangle which encompasses Appearance, Work of Breathing and Circulation (skin appearance). The order of assessment may require alteration depending on the developmental state of the pediatric patient. Generally the child or infant should not be separated from the caregiver unless absolutely necessary during assessment and treatment.

Patient Refusal: Patient refusal is a high risk situation. Encourage your patient to accept transport to medical facility. Encourage patient to allow an assessment, including vital signs. Documentation of the event is very important including a mental status assessment describing the patient's capacity to refuse care. Guide to Assessing capacity:

- **Patient should be able to communicate a clear choice**: This should remain stable over time. Inability to communicate a choice or an inability to express the choice consistently demonstrates incapacity.
- **Relevant information is understood**: Patient should be able to display a factual understanding of their illness or situation that requires further medical attention, the options and risks and benefits.
- **Appreciation of the situation**: Ability to communicate an understanding of the facts of the situation. Patient should be able to recognize the significance of the potential outcome from his or her decision.
- **Manipulation of information in a rational manner**: Demonstrate a rational process to come to a decision. Should be able to describe the reasoning they are using to come to the decision, whether or not the EMS provider agrees with decision.

Contact MRCC for assistance with any high-risk refusal. Law enforcement should be involved with any involuntary transport unless patient condition and scene safety warrant rapid transport.

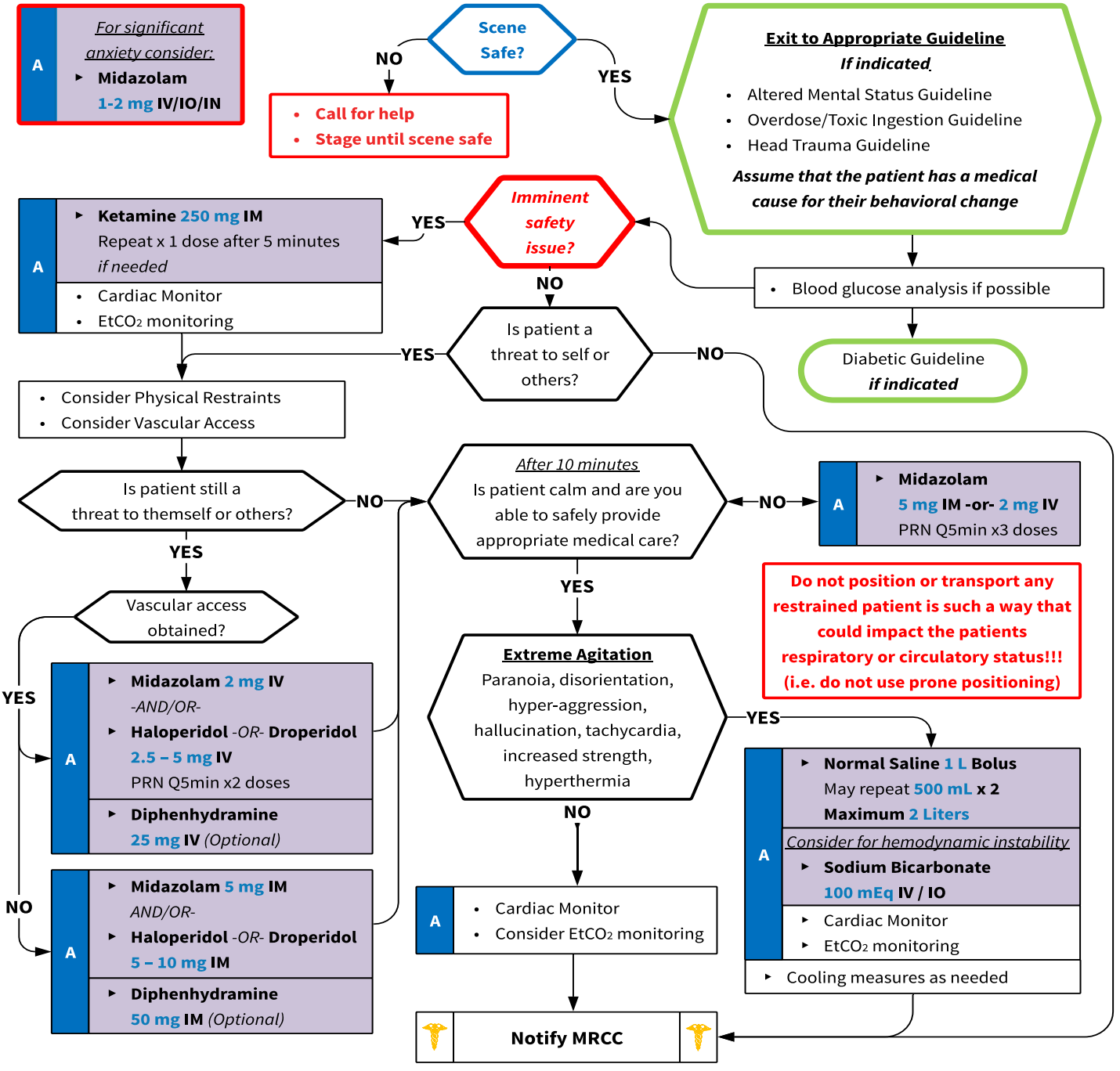
Special note on oxygen administration and utilization: Oxygen is ubiquitous in prehospital patient care and probably over utilized. Oxygen is a pharmaceutical with indications, contraindications as well as untoward side effects. Utilize oxygen when indicated and not because it is available. A reasonable target SpO2 for most patients is 94-99 % regardless of delivery device.

Pearls

- **Minimal exam if not otherwise noted is vital signs, mental status with GCS, and location of injury or complaint.**
- **Any patient contact which does not result in transport must have a completed patient care record with explicit disposition information, MRCC operator number, patient signature, and instructions provided, or documentation as to why this information was not obtained.**
- **Patients who refuse care prior to a full assessment should be logged together in a single PCR for the incident. It should be clear that contact was made with the patient, an assessment was offered, the patient refused, and no obvious impairment was suspected (medical, traumatic, or chemical).**
- **A pediatric patient is defined by fitting on the Broselow-Luten tape, Age < 12, Weight < 40 kg, or absence of signs of puberty.**
- Timing of transport should be based on patient's clinical condition and the transport policy.
- Blood Pressure is defined as a Systolic / Diastolic reading. A palpated Systolic reading may be necessary at times.
- SAMPLE: Signs / Symptoms; Allergies; Medications; PMH; Last oral intake; Events leading up to illness / injury

Behavioral Emergencies

History	Signs and Symptoms	Differential
• Situational crisis • Psychiatric illness/medications • Injury to self or threats to others • Medic alert tag • Substance abuse / overdose • Diabetes • Head trauma	• Anxiety, agitation, confusion • Affect change, hallucinations • Delusional thoughts, bizarre • behavior • Combative violent • Expression of suicidal / homicidal • thoughts • Impervious to pain • In severe cases can be naked, hyper-thermic, profusely diaphoretic	• Altered Mental Status differential • Alcohol Intoxication • Toxin / Substance abuse • Medication effect / overdose • Withdrawal syndromes • Depression • Bipolar (manic-depressive) • Schizophrenia • Anxiety disorders • Head trauma



Adult Behavioral Emergencies

Imminent danger or active threat

(Ketamine is appropriate)

Richmond Agitation Sedation Scale (RASS)

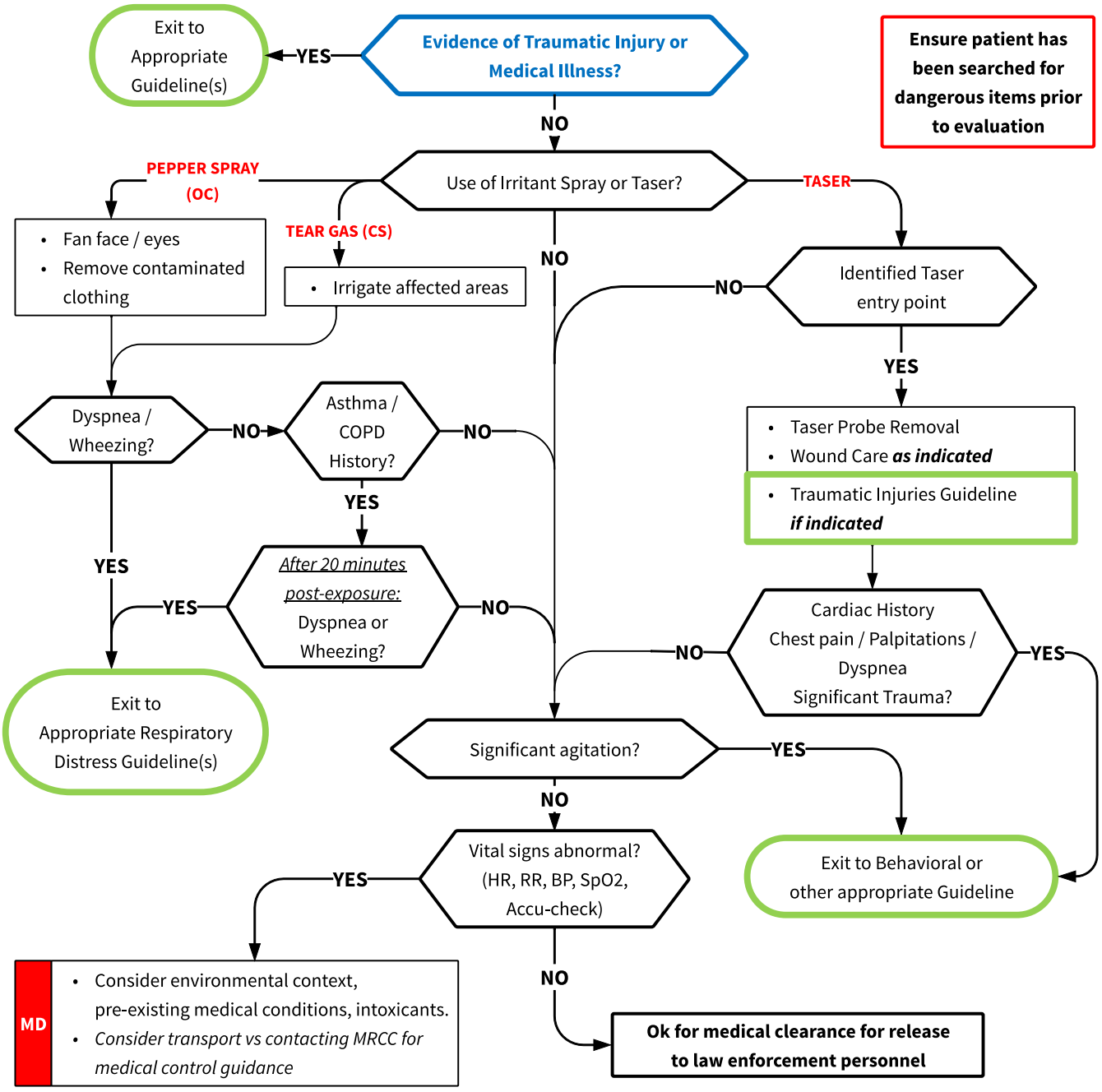
Target RASS	RASS Description
+ 4	Combative, violent, danger to staff
+ 3	Pulls or removes tube(s) or catheters; aggressive
+ 2	Frequent nonpurposeful movement, fights ventilator
+ 1	Anxious, apprehensive , but not aggressive
0	Alert and calm
- 1	awakens to voice (eye opening/contact) >10 sec
- 2	light sedation, briefly awakens to voice (eye opening/contact) <10 sec
- 3	moderate sedation, movement or eye opening. No eye contact
- 4	deep sedation, no response to voice, but movement or eye opening to physical stimulation
- 5	Unarousable, no response to voice or physical stimulation

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Neuro, Temperature**
- **Crew / responder safety is the main priority**
- **Any patient who is handcuffed or restrained by Law Enforcement and transported by EMS must be accompanied by law enforcement in the ambulance.**
- **Consider antipsychotics (Haloperidol) for patients with history of psychosis or extreme alcohol intoxication, or a benzodiazepine for patients with other presumed substance abuse. While benzodiazepines may be indicated for patients with alcohol intoxication, consider that alcohol and benzodiazepines together may lead to respiratory depression.**
- **All patients who receive either physical or chemical restraint must be continuously observed by ALS personnel on scene or immediately upon their arrival.**
- **If cardiac rhythm changes, evaluate QTc interval with a 12-lead EKG. If > 500ms, consider administering magnesium sulfate (2g). Consult with medical control if appropriate.**
- Be sure to consider all possible medical/trauma causes for behavior (hypoglycemia, overdose, substance abuse, hypoxia, head injury, etc.)
- Do not irritate the patient with a prolonged exam.
- Do not overlook the possibility of associated domestic violence or child abuse.
- If patient suffers cardiac arrest, consider a fluid bolus, calcium chloride, and sodium bicarbonate early
- Do not position or transport any restrained patient is such a way that could impact the patients respiratory or circulatory status (i.e. do not use prone positioning).
- **Special Note:** Patients with severe/extreme behavioral symptoms represent a medical emergency: Combination of delirium, psychomotor agitation, anxiety, hallucinations, speech disturbances, disorientation, violent / bizarre behavior, insensitivity to pain, hyperthermia and increased strength. Potentially lifethreatening and associated with use of physical control measures, including physical restraints and Tasers. Most commonly seen in male subjects with a history of serious mental illness and/or acute or chronic drug abuse, particularly stimulant drugs such as cocaine, crack cocaine, methamphetamine, amphetamines or similar agents. Alcohol withdrawal or head trauma may also contribute to the condition.
- **Extrapyramidal reactions:** Condition causing involuntary muscle movements or spasms typically of the face, neck and upper extremities. May present with contorted neck and trunk with difficult motor movements. Typically an adverse reaction to antipsychotic drugs like Haloperidol and may occur with your administration. When recognized give Diphenhydramine 50 mg IV / IO / IM in adults or 1 mg/kg IV / IO / IM in pediatrics.

Medical Clearance

History	Signs and Symptoms	Differential
• Traumatic Injury • Drug Abuse • Cardiac History • History of Asthma • Psychiatric History	• External signs of trauma • Palpitations • Shortness of breath • Wheezing • Altered Mental Status • Intoxication/Substance Abuse	• Delirium Secondary to Psychiatric Illness • Delirium Secondary to Substance Abuse • Traumatic Injury • Closed Head Injury • Asthma Exacerbation • Cardiac Dysrhythmia



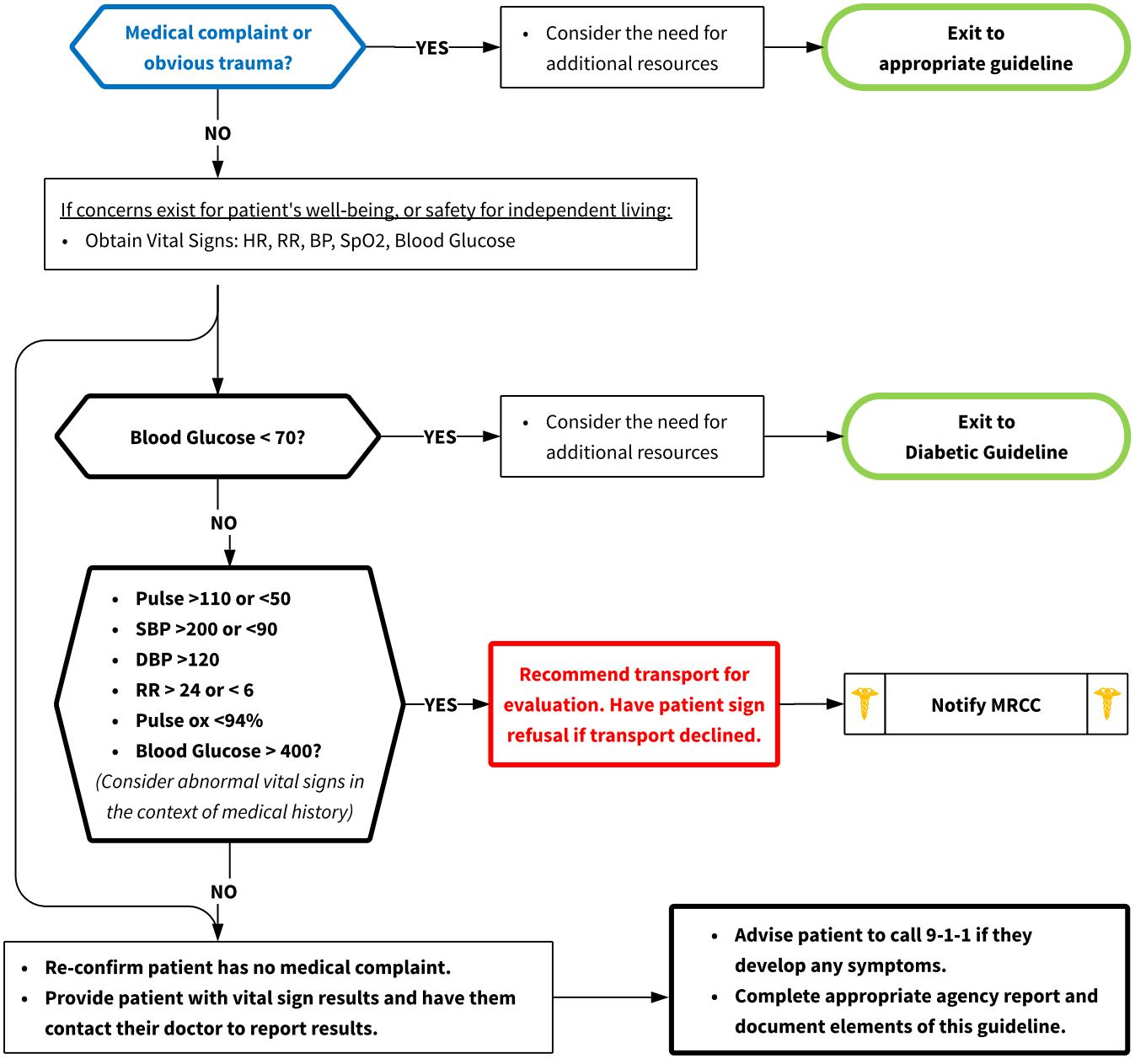
Medical Clearance

Pearls

- **Patient does not have to be in police custody or under arrest to utilize this protocol.**
- **Patients restrained by law enforcement devices must be transported accompanied by a law enforcement officer in the patient compartment who is capable of removing the devices. However when rescuers have utilized restraints in accordance with the Restraint Procedure, the law enforcement agent may follow behind the ambulance during transport if there are no safety concerns and the arrangement is agreeable to both EMS and Law Enforcement personnel on scene.**
- The responsibility for patient care rests with the highest authorized medical provider on scene.
- If an asthmatic patient is exposed to pepper spray and released to law enforcement, all parties should be advised to immediately contact EMS if wheezing/difficulty breathing occurs.
- All patients in police custody retain the right to participate in decision making regarding their medical care and may request or refuse medical care of EMS.
- If extremity / chemical / law enforcement restraints are applied, follow Restraint Procedure.
- **Consider utilizing the behavioral guideline as indicated for patients in police custody.**
- **All patients who receive either physical or chemical restraint must be continuously observed by ALS personnel on scene or immediately upon their arrival.**
- Do not position or transport any restrained patient in such a way that could impact the patient's respiratory or circulatory status (i.e. do not use prone positioning).

Welfare Check/Lift Assist

History	Signs and Symptoms	Differential
• Patient presents requesting "blood pressure check" • EMS responds to "lift assist" • Third party called 911 • Other situation in which patient does not have a medical complaint or obvious injury	• Assess for medical complaint • For patients with hypertension, particularly check for chest pain, shortness of breath, and/or neurologic changes • For citizen assist calls, particularly check for syncope, trauma from fall, or inability to ambulate	• Hypertensive urgency • Hypertensive emergency • Syncope • Cardiac ischemia • Cardiac dysrhythmia • Fracture • Head trauma

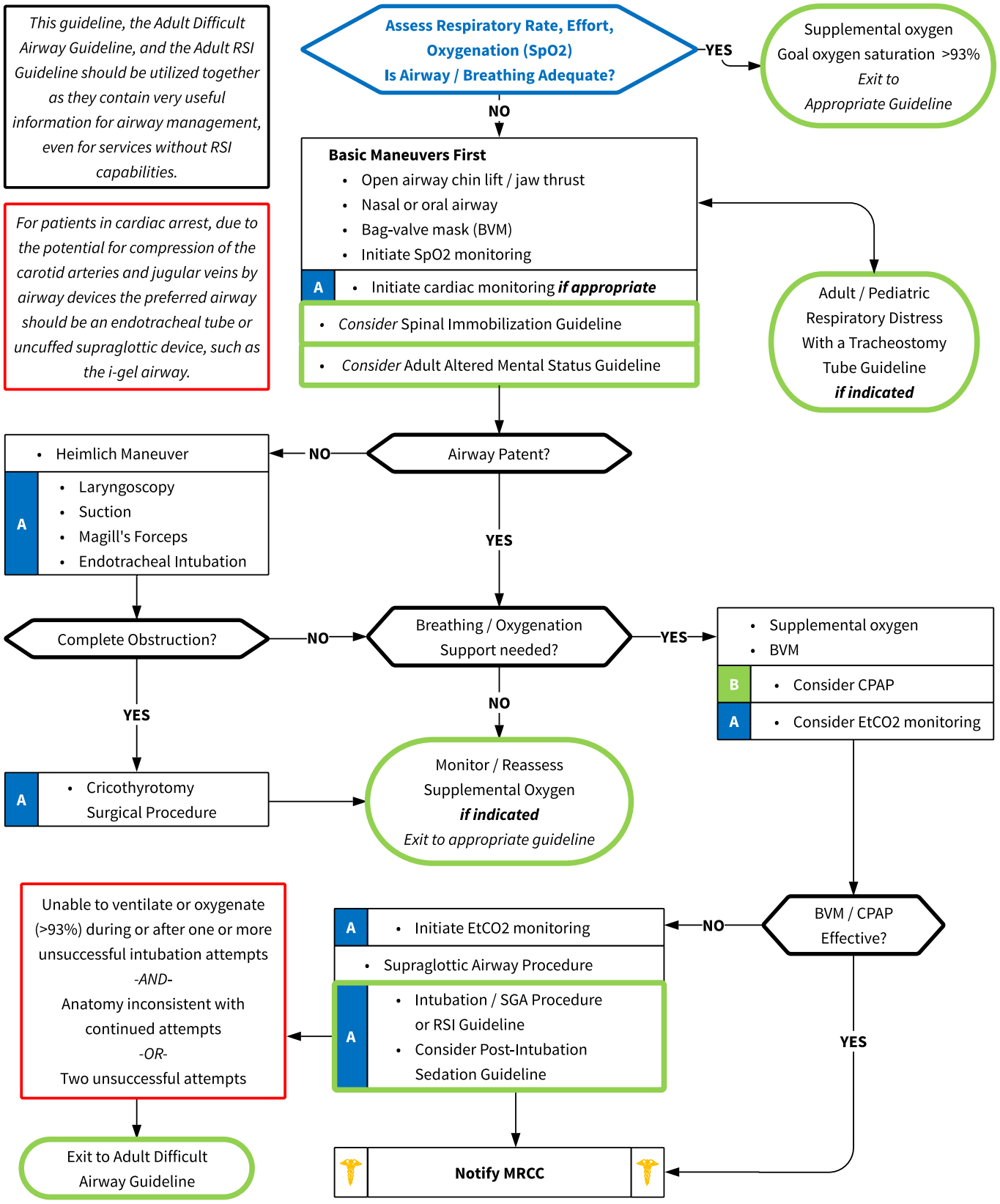


Welfare Check/Lift Assist

Pearls

- **This guideline applies to ALL responders**
- Patients who are denying more severe symptoms may initially present for a "routine check". Please confirm with the patient at least twice that they have no medical complaints.
- All persons who request a medical evaluation are considered patients and shall have a PCR completed.
- Should a patient refuse evaluation and/or decline further evaluation once begun, document as much as you can. Even patients who refuse vital signs can be observed and respirations measured. The PCR narrative (if required) is key in these and all cases, and must accurately and thoroughly describe the patient encounter.

Adult Airway



Adult Airway

Always weigh the risks and benefits of endotracheal intubation in the field against transport. All prehospital endotracheal intubations are considered high risk. If ventilation / oxygenation is adequate, transport may be the best option. The most important airway device and the most difficult to use correctly and effectively is the Bag Valve Mask (not the laryngoscope). Few prehospital airway emergencies cannot be temporized or managed with proper BVM techniques.

Difficult Airway Assessment

Difficult BVM Ventilation - MOANS:

- **M**ask seal inadequate due to facial hair, anatomy, blood or secretions / trauma
- **O**bese or late pregnancy
- **A**ge > 55
- **N**o teeth
- **S**tiff or increased airway pressures (Asthma, COPD, Obese, Pregnant)

Difficult Laryngoscopy - LEMON:

- **L**ook externally for anatomical distortions (small mandible, short neck, large tongue)
- **E**valuate 3-3-2 Rule (Mouth should fit 3 fingers, chin to neck should be 3 fingers, neck to thyroid should be 2 fingers)
- **M**allampati (difficult to assess in the field)
- **O**bstruction / Obese or late pregnancy
- **N**eck mobility

Difficult King / SGA - RODS:

- **R**estricted mouth opening
- **O**bstruction / Obese or late pregnancy
- **D**istorted or disrupted airway
- **S**tiff or increased airway pressures (Asthma, COPD, Obese, Pregnant)

Difficult Cricothyrotomy / Surgical Airway - SHORT:

- **S**urgery or distortion of airway
- **H**ematoma overlying neck
- **O**bese or late pregnant
- **R**adiation treatment skin changes
- **T**umor overlying neck

Trauma: Utilize in-line cervical stabilization during intubation, supraglottic device placement, or BVM use. During airway placement the cervical collar front should be open or removed to facilitate translation of the mandible / mouth opening.

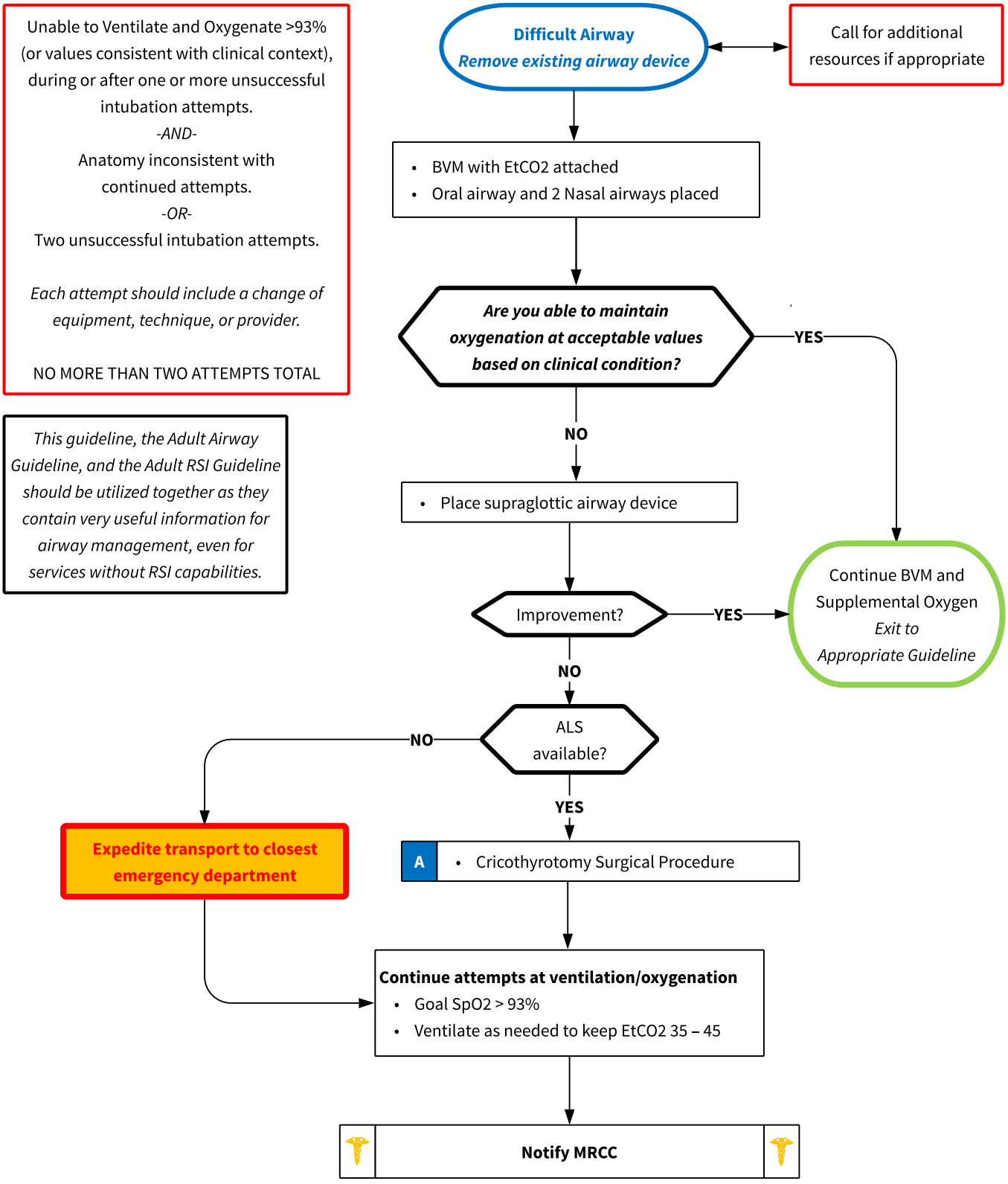
Key Documentation Elements:

- O2 sats prior to intubation
- Pre-oxygenation
- Suction used
- # of attempts (see Pearls below)
- Use of bougie
- Change in technique after unsuccessful attempt
- End-tidal CO2 waveform after placement

Pearls

- **This guideline is only for use in adult patients.**
- **Continuous capnography (EtCO2) is mandatory for the monitoring of all patients with an airway device.**
- **If effective oxygenation and ventilation is being maintained by BVM and/or basic airway adjuncts, it is acceptable to continue with basic airway measures.**
- **Consider CPAP if appropriate.**
- **If SpO2 drops below 90% during an endotracheal intubation attempt, stop and initiate BVM ventilations.**
- **An airway is considered secure when the patient is receiving appropriate oxygenation and ventilation.**
- **An Intubation Attempt is defined as passing the laryngoscope blade beyond the teeth with intent to place an endotracheal tube.**
- **An appropriate ventilatory rate is one that maintains an EtCO2 of 35-45. Avoid hyperventilation, except in cases of metabolic acidosis (DKA, Aspirin overdose, shock).**
- Paramedics should use a supraglottic device if orotracheal intubation is unsuccessful.
- Do not assume hyperventilation is psychogenic– use oxygen for goal Sp02 of 94-99%, not a paper bag.
- Cricoid pressure, external laryngeal manipulation, and BURP maneuver may assist with difficult intubations. They may worsen view in some cases.
- Hyperventilation in head trauma with signs of herniation should only be done to maintain a EtCO2 of 30-35.
- A gastric tube should be placed in all intubated patients if time allows.
- It is important to secure the endotracheal tube well and consider c-collar (in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.

Adult Difficult Airway



Adult Difficult Airway

A difficult airway occurs when a provider begins a course of airway management and identifies that standard airway management techniques (per the Adult Airway Guideline) will not succeed. Conditions which define a Difficult Airway:

- Failure to maintain adequate oxygen saturation (appropriate to clinical condition) after advanced airway attempts, OR
- Two (2) failed attempts at intubation by the most experienced prehospital provider on scene in a patient who requires an advanced airway to prevent death, OR
- Unable to maintain adequate oxygen saturation with BVM techniques and insufficient time to attempt alternative maneuvers. This should include appropriate airway adjuncts (oropharyngeal airway and 2 nasopharyngeal airways).

It should be noted that a patient with an airway complication is one who is near death or dying, not stable or improving. Patients who cannot be intubated or who do not have an Oxygen Saturation greater than 93% do not necessarily have a failed airway. Many patients who cannot be intubated may be easily sustained by basic airway techniques and BVM, with stable or optimal Oxygen Saturation, i.e. stable (not dropping) SpO2 values as expected based on the underlying pathophysiologic condition with otherwise reassuring vital signs.

The most important way to avoid an airway complication is to identify patients with expected difficult airway, difficult BVM ventilation, difficult King or SGA placement, difficult laryngoscopy and / or difficult cricothyrotomy. Please refer to the Adult Airway Guideline for information on how to identify the patient with a potentially difficult airway.

Positioning of patient: In the field, improper positioning of the patient and rescuer are responsible for many failed and difficult intubations. Often this is dictated by uncontrolled conditions present at the scene and we must adapt. However many times the rescuer does not optimize patient and rescuer positions. The sniffing position or the head simply extended upon the neck are probably the best positions. The goal is to align the ear canal with the suprasternal notch in a straight line parallel to the ground.

In the obese or late pregnant patient elevating the torso by placing blankets, pillows or towels will optimize the position. This can be facilitated by raising the head of the cot.

Use of cot to achieve optimal patient / rescuer position: The cot can be elevated and lowered to facilitate intubation. With the patient on the cot raise until the patients nose is at the level of your umbilicus which will place you at the optimal position.

Trauma: Utilize in-line cervical stabilization during intubation, supra-glottic device placement, or BVM use. During airway placement the cervical collar front should be open or removed to facilitate translation of the mandible / mouth opening.

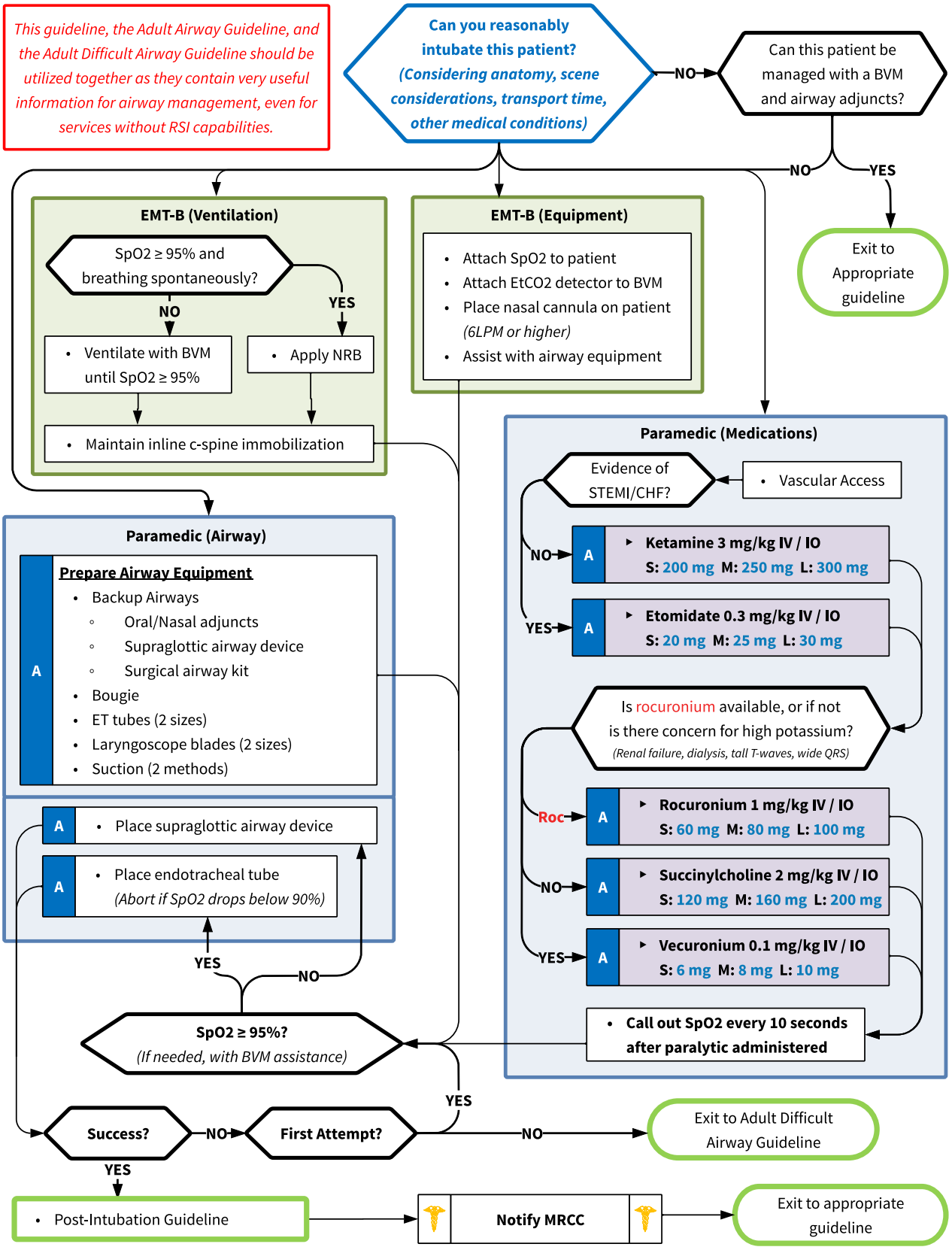
Cricothyrotomy / Surgical Airway Procedure: Use in adult patients only, defined as signs of puberty present or longer than the Broselow Tape. Relative contraindications include: Pre-existing laryngeal or tracheal tumors, infections or abscess overlying the cricoid area, or hematoma or other anatomical landmark destruction / injury.

A patient with a difficult airway may warrant diversion to the closest emergency department for airway management and stabilization prior to transfer to a facility capable of definitive care. You must consider the benefits of immediate airway management versus the risks of a delay in definitive care for the underlying condition when making this decision.

Pearls

- **If first intubation attempt fails, make an adjustment and then consider:**
  - Different laryngoscope blade / Video or other optical laryngoscopy device if available
  - Gum Elastic Bougie if not already used
  - Different ETT size
  - Change cricoid pressure, request external laryngeal manipulation, or apply BURP maneuver (Push trachea Back [posterior], Up, and to patient's Right)
  - Change head positioning
- Continuous pulse oximetry should be utilized in all patients with an inadequate respiratory function.
- Continuous EtCO2 should be utilized in all patients with respiratory failure and in all patients with advanced airways.
- **Notify MRCC AS EARLY AS POSSIBLE about a difficult / failed airway.**
- **If scene resources allow, do not hesitate to contact MRCC for Medical Control assistance regarding decision-making for patients with a difficult airway.**

Adult Rapid Sequence Airway



Adult Rapid Sequence Airway

Always weigh the risks and benefits of endotracheal intubation in the field against transport. All prehospital endotracheal intubations are considered high risk. If ventilation / oxygenation is adequate, transport may be the best option. The most important airway device and the most difficult to use correctly and effectively is the Bag Valve Mask (not the laryngoscope). Few prehospital airway emergencies cannot be temporized or managed with proper BVM techniques.

Difficult Airway Assessment

Difficult Laryngoscopy - LEMON:

- **L**ook externally for anatomical distortions (small mandible, short neck, large tongue)
- **E**valuate 3-3-2 Rule (Mouth should fit 3 fingers, chin to neck should be 3 fingers, neck to thyroid should be 2 fingers)
- **M**allampati (difficult to assess in the field)
- **O**bstruction / Obese or late pregnancy
- **N**eck mobility

Difficult King / SGA - RODS:

- **R**estricted mouth opening
- **O**bstruction / Obese or late pregnancy
- **D**istorted or disrupted airway
- **S**tiff or increased airway pressures (Asthma, COPD, Obese, Pregnant)

Indications for RSI

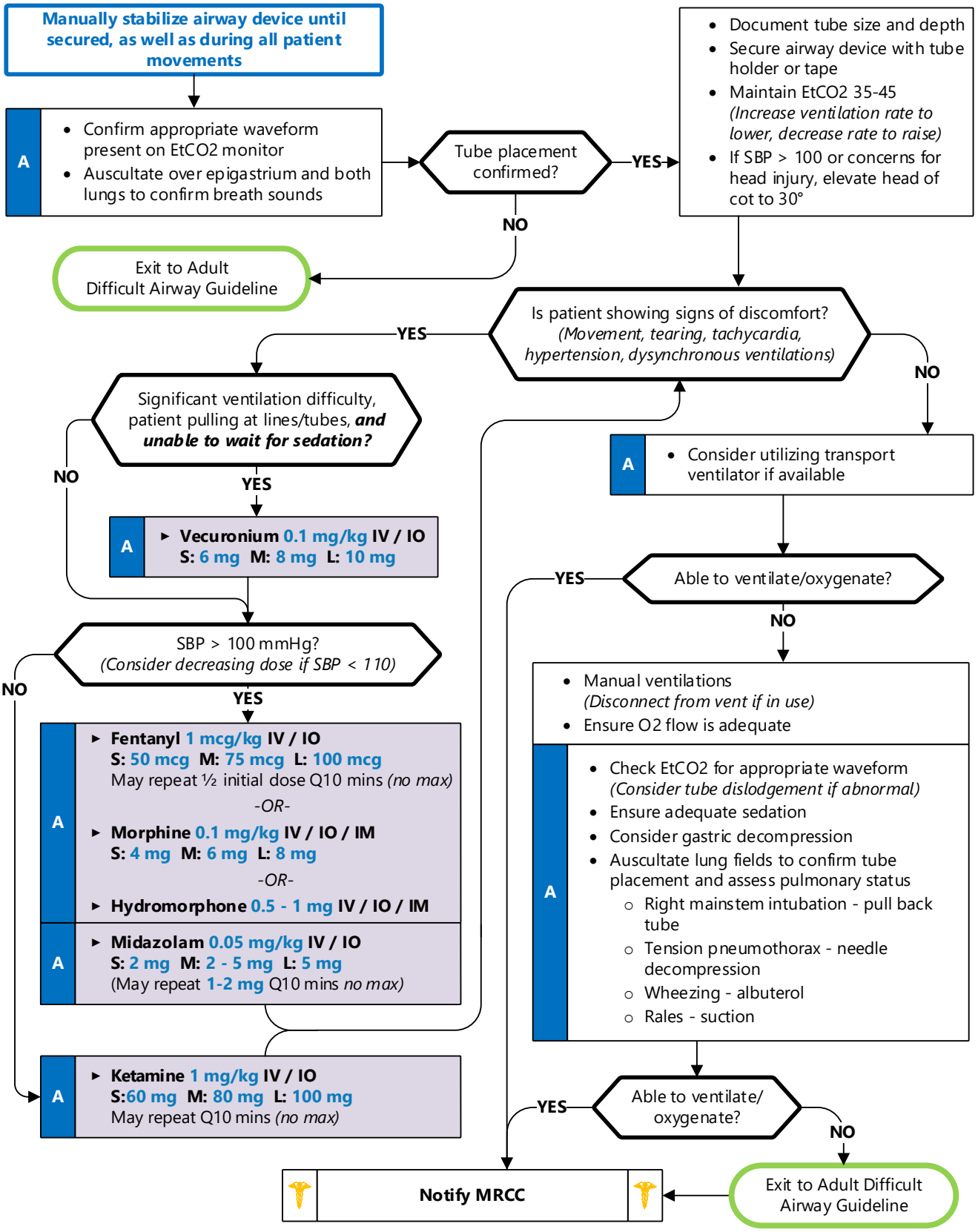
- Failure to protect the airway
- Inability to oxygenate Inability to ventilate
- Unstable hemodynamics/shock GCS < 9 in trauma
- Impending airway compromise Adult patient

Trauma: Utilize in-line cervical stabilization during intubation, King/SGA or BVM use. During airway placement the cervical collar front should be open or removed to facilitate translation of the mandible / mouth opening.

Pearls

- **This guideline requires at least 2 Paramedics**
- **Divide the workload – ventilate, suction, cricoid pressure, drugs, intubation**
- **Succinylcholine should not be given to dialysis or renal failure patients, crush injuries, history of neuromuscular disease, or burn patients more than 24 hours out from the initial injury due to the risk of potassium release. It is ok to use in patients with acute burn injuries.**
- **Once a patient has been given a paralytic drug, YOU ARE RESPONSIBLE FOR VENTILATIONS if desaturation occurs**
- **Continuous Waveform Capnography and Pulse Oximetry are required for intubation verification and ongoing patient monitoring**
- **An airway is considered secure when the patient is receiving appropriate oxygenation and ventilation.**
- **An Intubation Attempt is defined as passing the laryngoscope blade or endotracheal tube past the teeth with the intent to place an endotracheal tube.**
- **An appropriate ventilatory rate is one that maintains an EtCO2 of 35-45. Avoid hyperventilation, except in cases of metabolic acidosis (DKA, Aspirin overdose, shock).**
- If First intubation attempt fails, make an adjustment and try again
  - Different ETT size
  - Change head positioning
  - Use bougie or video device
  - Different laryngoscope blade
  - Change cricoid pressure; Not routinely recommended and may worsen your view
  - Consider applying BURP maneuver (Back [posterior], Up, and to patient's Right)
- Protect the patient from self extubation when the drugs wear off. Longer acting paralytics may be needed post-intubation
- A gastric tube should be placed in all intubated patients to limit aspiration and decompress stomach if time allows
- Hyperventilation in deteriorating head trauma should only be done to maintain a EtCO2 of 30-35.
- It is important to secure the endotracheal tube well and consider c-collar (in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.

Adult Post-Intubation Management



Adult Post-Intubation Management

Always weigh the risks and benefits of endotracheal intubation in the field against transport. All prehospital endotracheal intubations are considered high risk. If ventilation / oxygenation is adequate, transport may be the best option. The most important airway device and the most difficult to use correctly and effectively is the Bag Valve Mask (not the laryngoscope). Few prehospital airway emergencies cannot be temporized or managed with proper BVM techniques.

Difficult Airway Assessment

Difficult BVM Ventilation - MOANS:

- **M**ask seal inadequate due to facial hair, anatomy, blood or secretions / trauma
- **O**bese or late pregnancy
- **A**ge > 55
- **N**o teeth (roll gauze and place between gums and cheeks to improve seal)
- **S**tiff or increased airway pressures (Asthma, COPD, Obese, Pregnant)

Difficult Laryngoscopy - LEMON:

- **L**ook externally for anatomical distortions (small mandible, short neck, large tongue)
- **E**valuate 3-3-2 Rule (Mouth should fit 3 fingers, chin to neck should be 3 fingers, neck to thyroid should be 2 fingers)
- **M**allampati (difficult to assess in the field)
- **O**bstruction / Obese or late pregnancy
- **N**eck mobility

Difficult SGA Placement - RODS:

- **R**estricted mouth opening
- **O**bstruction / Obese or late pregnancy
- **D**istorted or disrupted airway
- **S**tiff or increased airway pressures (Asthma, COPD, Obese, Pregnant)

Trauma: Utilize in-line cervical stabilization during intubation, supra-glottic airway placement, or BVM use. During airway placement the cervical collar front should be open or removed to facilitate translation of the mandible / mouth opening.

Troubleshooting Ventilation/Oxygenation Problems

Airway Device Troubleshooting - DOPE:

- **D**islodgement (Check EtCO2 waveform, listen to lung sounds, check tube depth)
- **O**bstruction (Kink in tube, airway obstruction)
- **P**neumothorax (Listen to lung sounds, check tube depth, perform needle decompression)
- **E**quipment failure (Oxygen flowing, cuff inflated on tube)

Tube Stress Signs/Symptoms:

- Tachycardia (not due to shock)
- Hypertension
- Agitation
- Crying/tearing at the eyes
- Dyssynchrony with ventilations

Richmond Agitation Sedation Scale (RASS)

Target RASS	RASS Description
+ 4	Combative, violent, danger to staff
+ 3	Pulls or removes tube(s) or catheters; aggressive
+ 2	Frequent nonpurposeful movement, fights ventilator
+ 1	Anxious, apprehensive , but not aggressive
0	Alert and calm
- 1	awakens to voice (eye opening/contact) >10 sec
- 2	light sedation, briefly awakens to voice (eye opening/contact) <10 sec
- 3	moderate sedation, movement or eye opening. No eye contact
- 4	deep sedation, no response to voice, but movement or eye opening to physical stimulation
- 5	Unarousable, no response to voice or physical stimulation

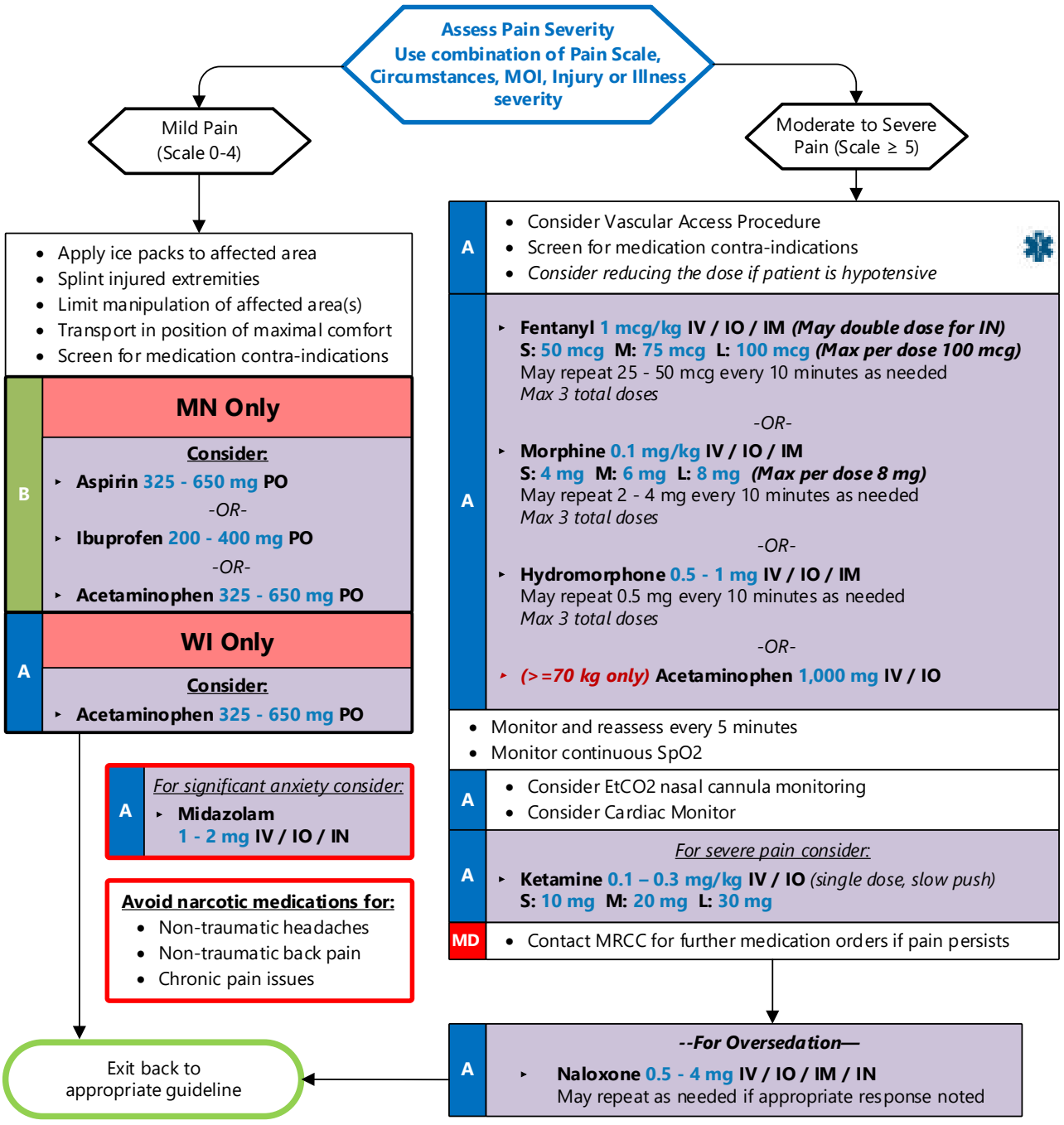
Goal RASS: -3 to -5 during transport

Pearls

- **Continuous capnography (EtCO2) is mandatory for the monitoring of all patients with an airway device.**
- **An airway is considered secure when the patient is receiving appropriate oxygenation and ventilation.**
- **An Intubation Attempt is defined as passing the laryngoscope blade past the teeth with the intent of placing an endotracheal tube.**
- **An appropriate ventilatory rate is one that maintains an EtCO2 of 35-45. Avoid hyperventilation, except in cases of metabolic acidosis (DKA, Aspirin overdose, shock).**
- Do not assume hyperventilation is psychogenic– use oxygen for goal SpO2 of 94-99%, not a paper bag.
- Hyperventilation should be avoided even with signs of deteriorating head trauma.
- A gastric tube should be placed in all intubated patients if time allows.
- It is important to secure the endotracheal tube well and consider c-collar (in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.

Adult Pain Management

History	Signs and Symptoms	Differential
• Age • Location, Duration • Severity (1 - 10) • If child or non-verbal use Wong Baker faces scale • Past medical history • Pregnancy Status • Drug Allergies and Medications	• Severity (pain scale) • Quality (sharp, dull, etc.) • Radiation • Relation to movement, respiration • Increased with palpation of area	• Per the specific protocol • Musculoskeletal • Visceral (abdominal) • Cardiac • Pleural / Respiratory • Neurogenic • Renal (colic)



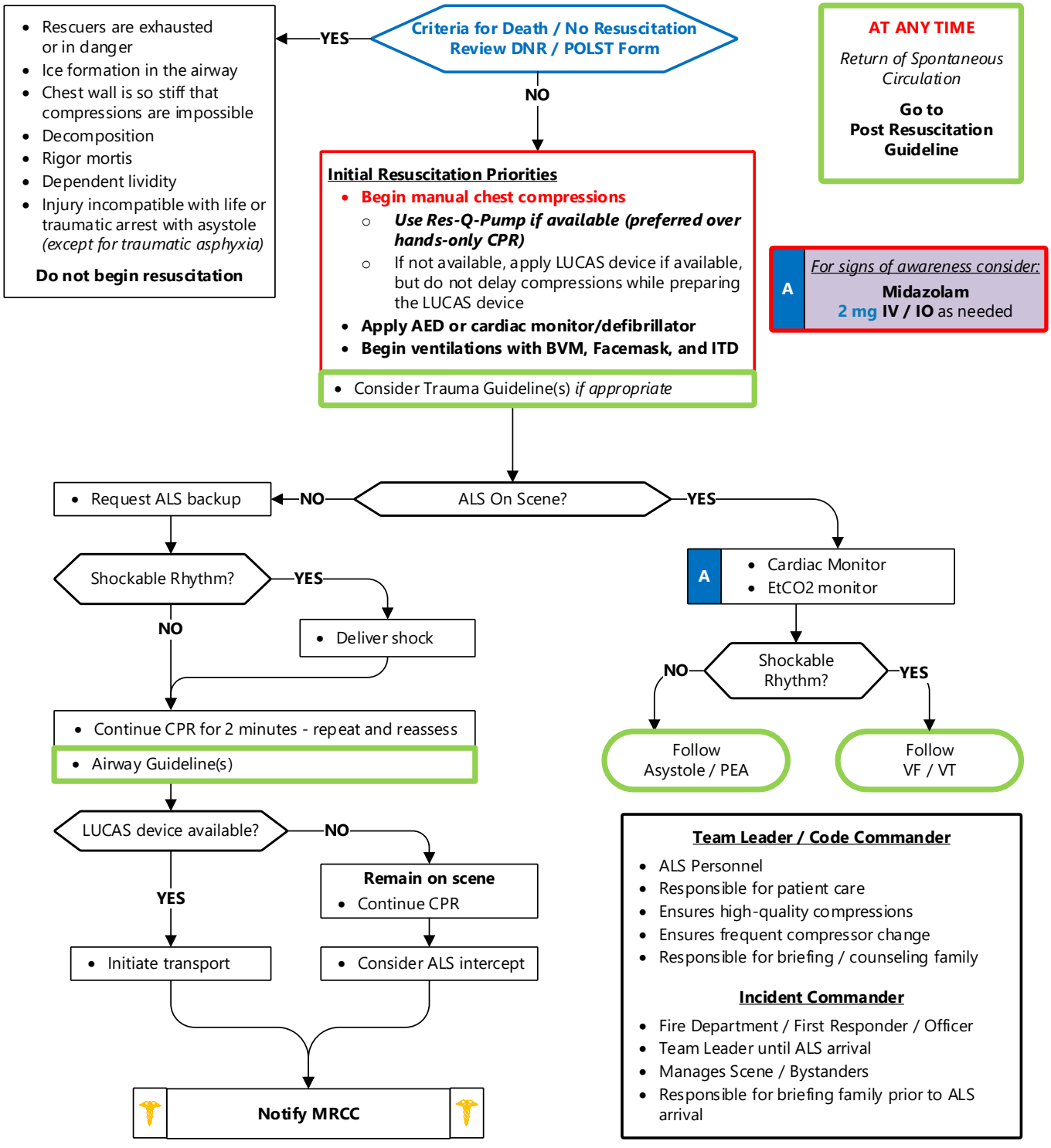
Adult Pain Management

Pearls

- **Recommended Exam: Respiratory Status, Mental Status, Area of Pain, Neuro**
- **Pain severity (0-10) is a vital sign to be recorded before and after PO, IV, IO, IM or IN medication delivery and at patient hand off. Monitor BP and respirations closely as sedative and pain control agents may cause hypotension and/or respiratory depression.**
- **Patients may display a wide variation of response to opioid pain medication. Consider the patient's age, weight, clinical condition, other recent drugs or alcohol, and prior exposure to opiates when determining initial opioid dosing. Weight-based dosing may provide a standard means for dose calculation, but does NOT predict patient response.**
- **Smaller than expected doses of opioids may cause respiratory depression or hypotension in the elderly, opiate naïve, volume depleted, and possibly intoxicated patients.**
- **DO NOT administer aspirin (or other NSAIDS such as ibuprofen) to patients who are pregnant.**
- **Both arms of the treatment may be used in concert. For patients in Moderate pain for instance, you may use the combination of an oral medication and parenteral if no contraindications are present.**
- **Aspirin and ibuprofen should not be used in patients with known renal transplant, patients who are taking blood thinners such as warfarin (Coumadin) or Plavix (unless given for symptoms of cardiac ischemia), in patients who have known drug allergies to NSAIDs (non-steroidal anti-inflammatory medications), with active bleeding, when intracranial bleeding is suspected, when GI Bleeding is suspected, or in patients who may need acute surgical intervention such as abdominal pain (other than suspected kidney stone), open fractures, or obvious deformities.**
- Vital signs should be obtained before administration, 10 minutes after administration, and before patient hand off with all pain medications.
- All patients who receive IM or IV medications must be observed 15 minutes for drug reaction in the event no transport occurs.
- Burn patients may require higher than usual opioid doses to effect adequate pain control. Do not hesitate to contact MRCC regarding the pain management strategy for patients in severe pain despite appropriate medications or those with significant burns.

Adult Cardiac Arrest

History	Signs and Symptoms	Differential
• Events leading to arrest • Estimated downtime • Past medical history • Medications • Existence of terminal illness	• Unresponsive • Apneic • Pulseless	• Medical vs. Trauma • VF vs. Pulseless VT • Asystole • PEA • Primary Cardiac event vs. Respiratory arrest or Drug Overdose



Team Leader / Code Commander

- ALS Personnel
- Responsible for patient care
- Ensures high-quality compressions
- Ensures frequent compressor change
- Responsible for briefing / counseling family

Incident Commander

- Fire Department / First Responder / Officer
- Team Leader until ALS arrival
- Manages Scene / Bystanders
- Responsible for briefing family prior to ALS arrival

Adult Cardiac Arrest

Cardiac Arrest Code Commander Checklist

- Code Commander is identified
- Time Keeper is identified
- Monitor is visible and a dedicated provider is viewing the rhythm with all leads attached
- Confirm that chest compressions are ongoing and adequate
- Defibrillations are occurring at 2 minute intervals for shockable rhythms
- O2 cylinder with adequate oxygen is attached to BVM
- EtCO2 waveform is present and value is being monitored
- ITD (Res-Q-Pod) is in place
- Vascular access has been obtained (IV or IO) with IV fluids being administered
- Underlying causes (including tension PTX) are considered and treated early in arrest
- Basic demographics and brief history have been obtained
- Gastric distention is not a factor
- Family is receiving care and is at the patient's side if desired

Post ROSC Cardiac Arrest Checklist

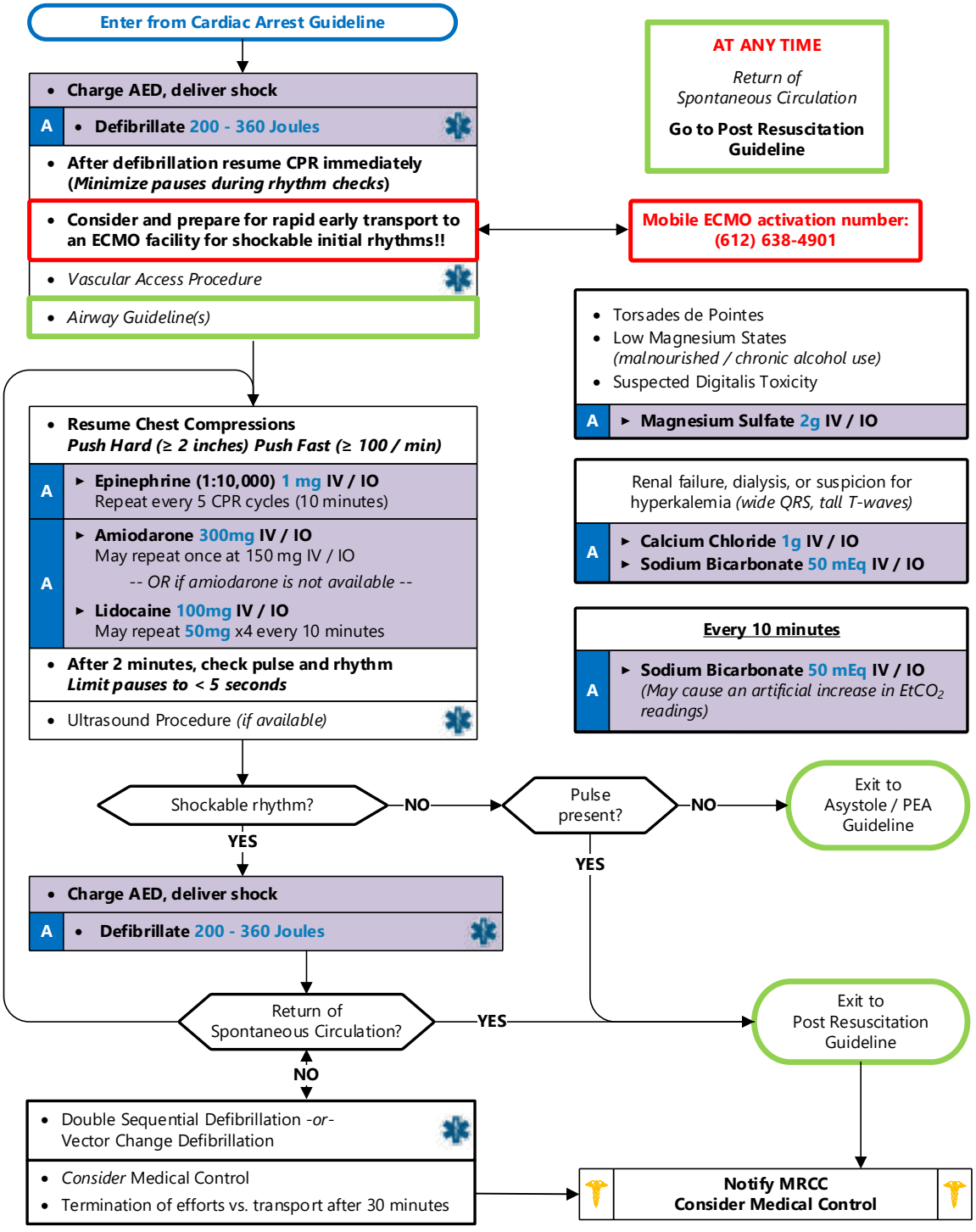
- **Airway**
  - ITD has been removed, ASSESS EtCO2 (should be >20 with good waveform)
  - Evaluate for post-resuscitation airway placement (e.g. ETT)
  - Mask is available for BVM in case advanced airway fails
- **Breathing**
  - Check O2 supply and SpO2 to TITRATE to 94-99%
  - Do not try to obtain a "normal" EtCO2 by increasing respiratory rate
  - Avoid hyperventilation
- **Circulation**
  - Assign a provider to maintain FINGER on pulse during all patient movements
  - Continuous visualization of cardiac monitor rhythm
  - Obtain 12 lead EKG; if STEMI evident, call CODE STEMI to the hospital
  - Assess for & TREAT bradycardias < 60 bpm
  - Obtain Blood Pressure -- Pressor agent(s) indicated for SBP < 90 or MAP < 60
  - When patient is moved, perform CONTINUOUS PULSE CHECKS and monitoring of cardiac rhythm
- **Other**
  - Once in ambulance, confirm pulse, breath sounds, SpO2, EtCO2, and cardiac rhythm
  - Appropriate personnel present in the back of the ambulance for transport

Pearls

- **Efforts should be directed at high quality compressions with limited interruptions and early defibrillation.**
- **Consider early IO placement if available and / or difficult IV access anticipated.**
- **DO NOT HYPERVENTILATE: Compressions to ventilations ratio should be 30:2 whether or not an ET tube has been placed.**
- **Do not interrupt compressions to place endotracheal tube.**
- **Delay advanced airway management until after second shock and/or 2 rounds of compressions.**
- Resuscitation is based on proper planning and organized execution. Procedures require space and patient access. Make room to work. Utilize team approach by assigning responders to predetermined tasks.
- Reassess, document endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.
- **Maternal Arrest** - Treat mother per appropriate protocol with immediate notification to MRCC and rapid transport. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV / IO access preferably at humeral head. Defibrillation is safe at all energy levels.
- **When faced with dialysis / renal failure patient experiencing cardiac arrest, consider early administration of Calcium Chloride and Sodium Bicarbonate to treat presumed hyperkalemia as possible etiology of arrest.**
- Consider possible CAUSE of arrest early: For example, resuscitated VF may be STEMI and more rapid transport is indicated.
- Consider traditional "Hs and Ts" for PEA: Hypovolemia, Hypoxia, Hydrogen ions (acidosis), Hyperkalemia, Hypothermia, Hypo/ Hyperglycemia, Tablets/Toxins/Tricyclics, Tamponade, Tension pneumothorax, Thrombosis (MI), Thromboembolism (Pulmonary Embolism), Trauma

Adult V-Fib/Pulseless V-Tach

History	Signs and Symptoms	Differential
• Estimated down time • Past Medical History • Medications • Events leading to arrest • Renal failure / Dialysis • DNR or POLST form	• Unresponsive, apneic, pulseless • Ventricular fibrillation or ventricular tachycardia on EKG	• Asystole • Artifact / Device Failure • Cardiac • Endocrine / Medicine • Drugs • Pulmonary



Adult V-Fib/Pulseless V-Tach

Shockable Rhythm Timeline
V-Fib / V-Tach

	BLS Provider Compressions	BLS Provider Ventilations	ALS Provider Monitor/Airway	ALS Provider Medications
Arrival	Start CPR Use ResQPump if available	BVM + ITD (ResQPod)	Shock Apply cardiac monitor	Vascular Access Infuse normal saline
2 minutes	Restart CPR immediately after pulse/rhythm check	Monitor EtCO2	Shock Prepare airway equipment	Epinephrine 1 mg (1:10,000)
4 minutes	Restart CPR immediately after pulse/rhythm check	Assist with airway management	Shock Airway management	Amiodarone 300 mg -or- Lidocaine 100 mg (repeat x1 in 10 minutes)
6 minutes	Restart CPR immediately after pulse/rhythm check	Ongoing ventilations (30:2 ratio)	Shock	
8 minutes	Restart CPR immediately after pulse/rhythm check		Shock	Amiodarone 150 mg
10 minutes	Restart CPR immediately after pulse/rhythm check		Shock Consider transport	Sodium Bicarbonate 50 mEq Repeat every 10 minutes
12 minutes	Restart CPR immediately after pulse/rhythm check		Shock	Epinephrine 1 mg (1:10,000) Repeat every 10 minnutes

H's/T's

- **Hypovolemia**
- **Hypoxia**
- Hydrogen ion (acidosis)
- Hypothermia
- Hypo / Hyperkalemia
- Hypoglycemia
- Tension pneumothorax
- Tamponade; cardiac
- **Toxins**
- Thrombosis; pulmonary (PE)
- Thrombosis; coronary (MI)

It is always important to perform a thorough physical exam and obtain a SAMPLE history to identify any reversible causes of cardiac arrest.

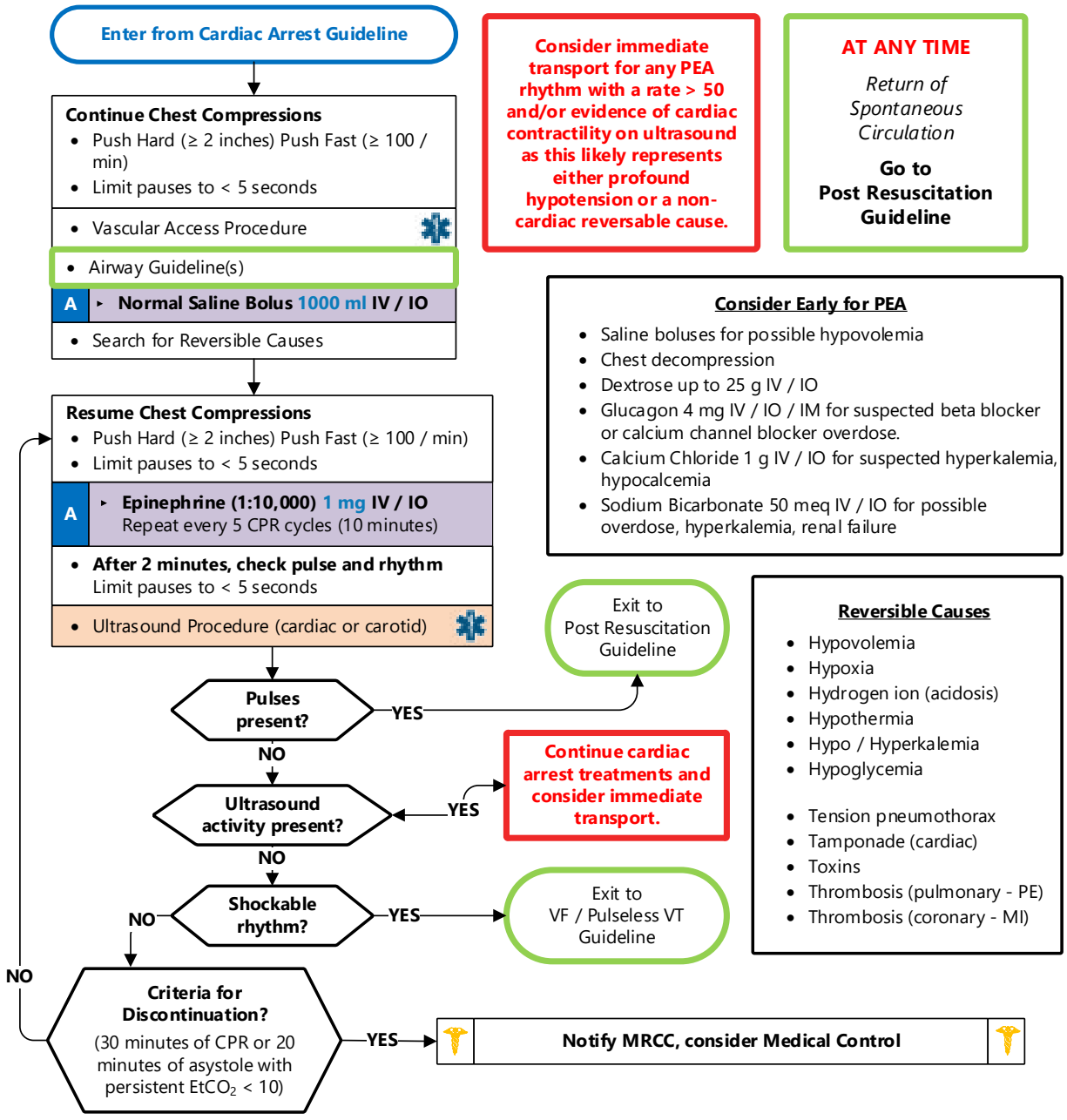
Pearls

- **Recommended Exam: Mental Status**
- **Efforts should be directed at high quality compressions with limited interruptions and early defibrillation when indicated. Consider early IO placement if available and difficult IV anticipated.**
- **DO NOT HYPERVENTILATE: Ventilate at a 30:2 compressions-to-ventilations ratio.**
- **Do not interrupt compressions to place endotracheal tube.**
- **Consider advanced airway management after second shock and/or 2 rounds of compressions.**
- High quality CPR and prompt defibrillation are the keys to successful resuscitation.
- Reassess and document endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.
- Do not stop CPR to check for placement of ET tube or to give medications.
- If BVM is ventilating the patient successfully, intubation should be deferred until other interventions have been completed.

Adult Asystole/PEA

History	Signs and Symptoms	Differential

• Past medical history
• Medications
• Events leading to arrest
• End stage renal disease
• Estimated downtime
• Suspected hypothermia
• Suspected overdose
  ◦ Tricyclic
  ◦ Digitalis
  ◦ Beta blockers
  ◦ Calcium channel blockers
• DNR, POLST form
	• Pulseless
	• Apneic
	• No electrical activity on ECG
	• No heart tones on auscultation
		• Hypovolemia (Trauma, AAA, other)
		• Cardiac tamponade
		• Hypothermia
		• Drug overdose (Tricyclic, Digitalis, Beta blockers, Calcium channel blockers)
		• Massive myocardial infarction
		• Hypoxia
		• Tension pneumothorax
		• Pulmonary embolus
		• Acidosis
		• Hyperkalemia



Non-shockable Rhythm Timeline
Asystole / PEA

	BLS Provider Compressions	BLS Provider Ventilations	ALS Provider Monitor/Airway	ALS Provider Medications
Arrival	Start CPR Use ResQPump if available	BVM + ITD (ResQPod)	Apply cardiac monitor	Vascular Access Infuse normal saline
2 minutes	Restart CPR immediately after pulse/rhythm check	Monitor EtCO2	Check monitor Prepare airway equipment	Epinephrine 1 mg (1:10,000)
4 minutes	Restart CPR immediately after pulse/rhythm check	Assist with airway management	Check monitor Airway management	Review H's/T's Interventions as indicated
6 minutes	Restart CPR immediately after pulse/rhythm check	Ongoing ventilations (30:2 ratio)	Check monitor	
8 minutes	Restart CPR immediately after pulse/rhythm check		Check monitor	
10 minutes	Restart CPR immediately after pulse/rhythm check		Check monitor	Sodium Bicarbonate 50 mEq Repeat every 10 minutes
12 minutes	Restart CPR immediately after pulse/rhythm check		Check monitor	Epinephrine 1 mg (1:10,000) Repeat every 10 minnutes

H's/T's

- **Hypovolemia**
- **Hypoxia**
- Hydrogen ion (acidosis)
- Hypothermia
- Hypo / Hyperkalemia
- Hypoglycemia
- Tension pneumothorax
- Tamponade; cardiac
- **Toxins**
- Thrombosis; pulmonary (PE)
- Thrombosis; coronary (MI)

It is always important to perform a thorough physical exam and obtain a SAMPLE history to identify any reversible causes of cardiac arrest.

Pearls

- ***Point-of-care Ultrasound (POCUS) is an important tool in the evaluation of cardiac activity for PEA rhythms. Sometimes there may be weak cardiac output that is not enough to generate a palpable pulse. Ultrasound evidence of contractility should prompt a decision to transport the patient to a hospital for advanced interventions to improve the cardiac output.***
- SURVIVAL FROM PEA OR ASYSTOLE is based on identifying and correcting the CAUSE: consider a broad differential diagnosis with early and aggressive treatment of possible causes.
- **Efforts should be directed at high quality compressions with limited interruptions and early defibrillation when indicated.**
- **Consider early IO placement if available and / or difficult IV access anticipated.**
- **DO NOT HYPERVENTILATE: Ventilate at a 30:2 compressions-to-ventilations ratio whether or not an ET tube has been placed.**
- **Do not interrupt compressions to place endotracheal tube.**
- **Defer advanced airway management until after 2 rounds of compressions (2 minutes each round)**
- Success is based on proper planning and execution. Procedures require space and patient access; make room to work.
- There is a potential association of PEA with hypoxia so placing a definitive airway with oxygenation early may provide benefit.
- PEA caused by sepsis or severe volume loss may benefit from higher volume of normal saline administration.
- Return of spontaneous circulation after Asystole / PEA requires continued search for underlying cause of cardiac arrest.
- Treatment of hypoxia and hypotension are important after resuscitation from Asystole / PEA.
- Asystole is commonly an end-stage rhythm following prolonged VF or PEA with a poor prognosis.
- Consider sodium bicarbonate early in the dialysis / renal patient, known hyperkalemia, or tricyclic overdose at 50 mEq IV / IO.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.
- Consider early use of the Overdose / Toxic Ingestion Protocol to guide interventions if appropriate.

Adult Post-Resuscitation Management

History	Signs and Symptoms	Differential
• Respiratory arrest • Cardiac arrest	• Return of pulse	• Continue to address specific differentials associated with the original dysrhythmia

Repeat Primary Assessment

- **Remove Imedance Threshold Device (Res-Q-Pod)**
- **Optimize Ventilation and Oxygenation**
  - Maintain SpO2 = 90-99%
  - Resp Rate 6 - 12 / minute for $EtCO_2$ 35-45
  - DO NOT HYPERVENTILATE
- Airway Guideline ***if indicated***
- Vascular Access Procedure ***if indicated***
- **12 Lead ECG Procedure**

A
- Cardiac Monitor
- Continuous EtCO2 monitoring

- Monitor Vital Signs / Reassess

Symptomatic Bradycardia?
- YES → Bradycardia Guideline
- NO ↓

STEMI?
- YES → Chest Pain and STEMI Guideline Transport to STEMI Receiving Facility
- NO ↓

Hypotension? *Systolic BP < 90*
- YES →

A
- ▸ **Normal Saline Bolus 500 mL IV / IO**
  May repeat as needed if lungs clear
  Maximum 2 L
- ▸ **Epinepherine 5 - 20 mcg IV / IO**
  Every 3 - 5 minutes, Titrate to SBP ≥ 90
  - *Dilute 0.1 mg epi (1 mL of 1:10,000) with 9 mL NS, total of 10 mL in syringe* ***(0.1 mg / 10 mL = 10 mcg/mL)***

MD
- ▸ **Norepinephrine 0.1 – 1 mcg/kg/min IV / IO**
  Titrate by 0.05 – 0.2 mcg/kg/min every 5 minutes as needed ****Critical Care only****

- NO ↓

ROSC with Antiarrhythmic given?
- YES → Arrhythmias are common and usually self limiting after ROSC and may not need further meds or drips. If Arrhythmia persists follow appropriate guideline:
  - Narrow Tachycardia
  - Wide Tachycardia
  - Bradycardia
- NO ↓

Post-Intubation Sedation Guideline ↓

Notify MRCC

Adult Post-Resuscitation Management

Post ROSC Cardiac Arrest Checklist

- **Airway**
  - ITD has been removed, ASSESS EtCO2 (should be >20 with good waveform)
  - Evaluate for post-resuscitation airway placement (e.g. ETT)
  - Mask is available for BVM in case advanced airway fails
- **Breathing**
  - Check O2 supply and SpO2 to TITRATE to 94-99%
  - Do not try to obtain a "normal" EtCO2 by increasing respiratory rate
  - Avoid hyperventilation
- **Circulation**
  - Assign a provider to maintain FINGER on pulse during all patient movements
  - Continuous visualization of cardiac monitor rhythm
  - Obtain 12 lead EKG; if STEMI evident, call CODE STEMI to the hospital
  - Assess for & TREAT bradycardias < 60 bpm
  - Obtain Blood Pressure -- Pressor agent(s) indicated for SBP < 90 or MAP < 60
  - When patient is moved, perform CONTINUOUS PULSE CHECKS and monitoring of cardiac rhythm
- **Other**
  - Once in ambulance, confirm pulse, breath sounds, SpO2, EtCO2, and cardiac rhythm
  - Appropriate personnel present in the back of the ambulance for transport

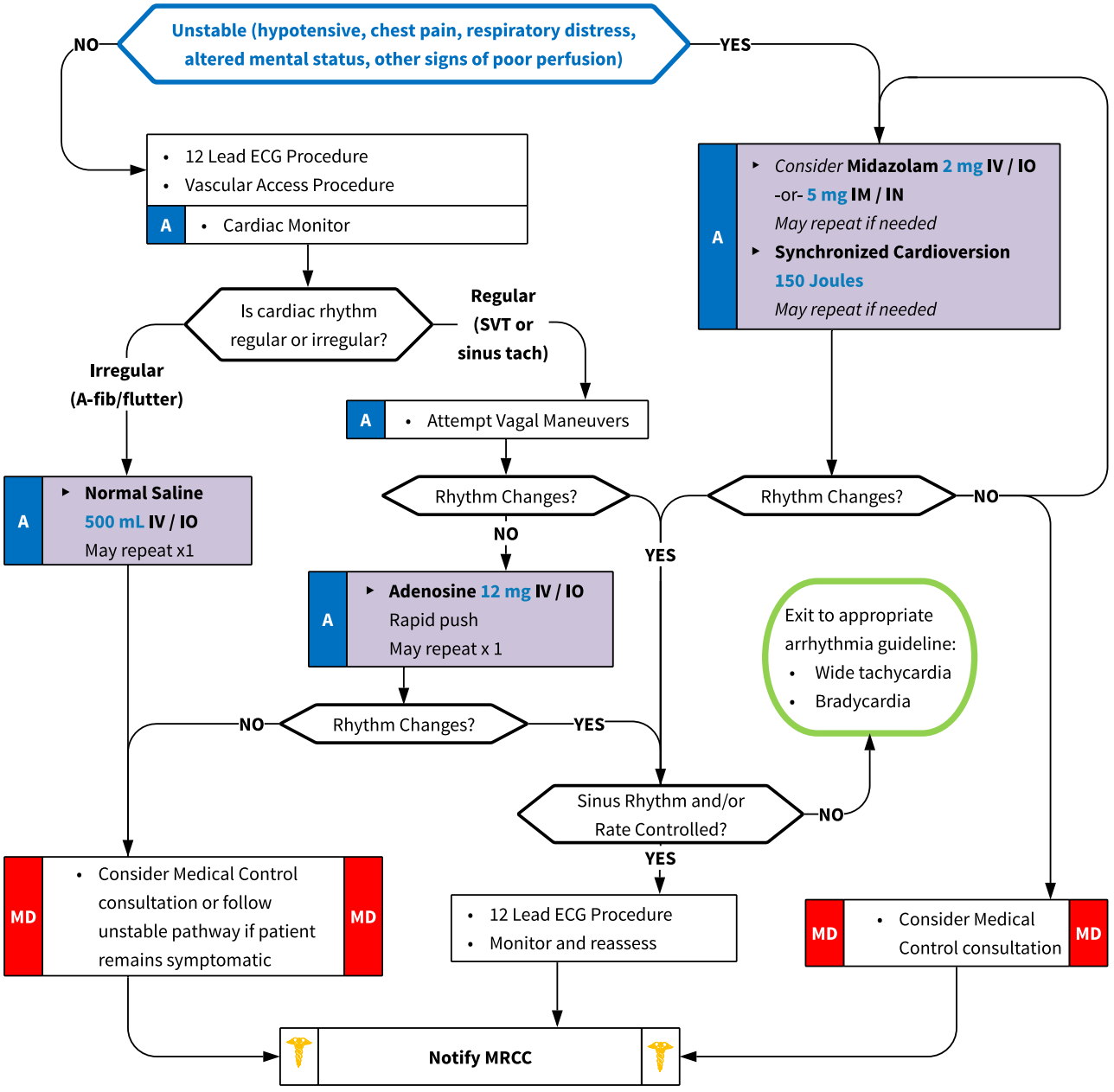
Pearls

- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro**
- **Continue to search for potential cause of cardiac arrest during post-resuscitation care.**
- **Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided at all costs.**
- **Initial EtCO2 may be elevated immediately post-resuscitation but will usually normalize. While goal is 35 – 45 mm Hg, avoid hyperventilation.**
- **Transport to facility capable of managing the post-arrest patient including hypothermia therapy, cardiac catheterization and intensive care service.**
- Most patients immediately post resuscitation will require ventilatory assistance.
- The condition of post-resuscitation patients fluctuates rapidly and continuously and they require close monitoring. Appropriate post-resuscitation management may require consultation with medical control.
- Common causes of post-resuscitation hypotension include hyperventilation, hypovolemia, pneumothorax, and medication reaction to ALS drugs.
- Titrate vasopressors to maintain SBP ≥ 90. Ensure adequate fluid resuscitation is ongoing.

Adult Narrow Complex Tachycardia

History	Signs and Symptoms	Differential

• Medications (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin)
• Diet (caffeine, chocolate)
• Drugs (nicotine, cocaine)
• Past medical history
• History of palpitations / heart racing
• Syncope / near syncope
	• Heart Rate > 150
	• Systolic BP < 90
	• Dizziness, CP, SOB, AMS, Diaphoresis
	• Potential presenting rhythm
	  ◦ Atrial/Sinus tachycardia
	  ◦ Atrial fibrillation / flutter
	  ◦ Multifocal atrial tachycardia
	  ◦ Ventricular Tachycardia
		• Heart disease (WPW, Valvular)
		• Sick sinus syndrome
		• Myocardial infarction
		• CHF
		• Electrolyte imbalance
		• Exertion, Pain, Emotional stress
		• Fever
		• Hypoxia
		• Hypovolemia or Anemia
		• Drug effect / Overdose (see HX)
		• Hyperthyroidism
		• Pulmonary embolus



Adult Narrow Complex Tachycardia

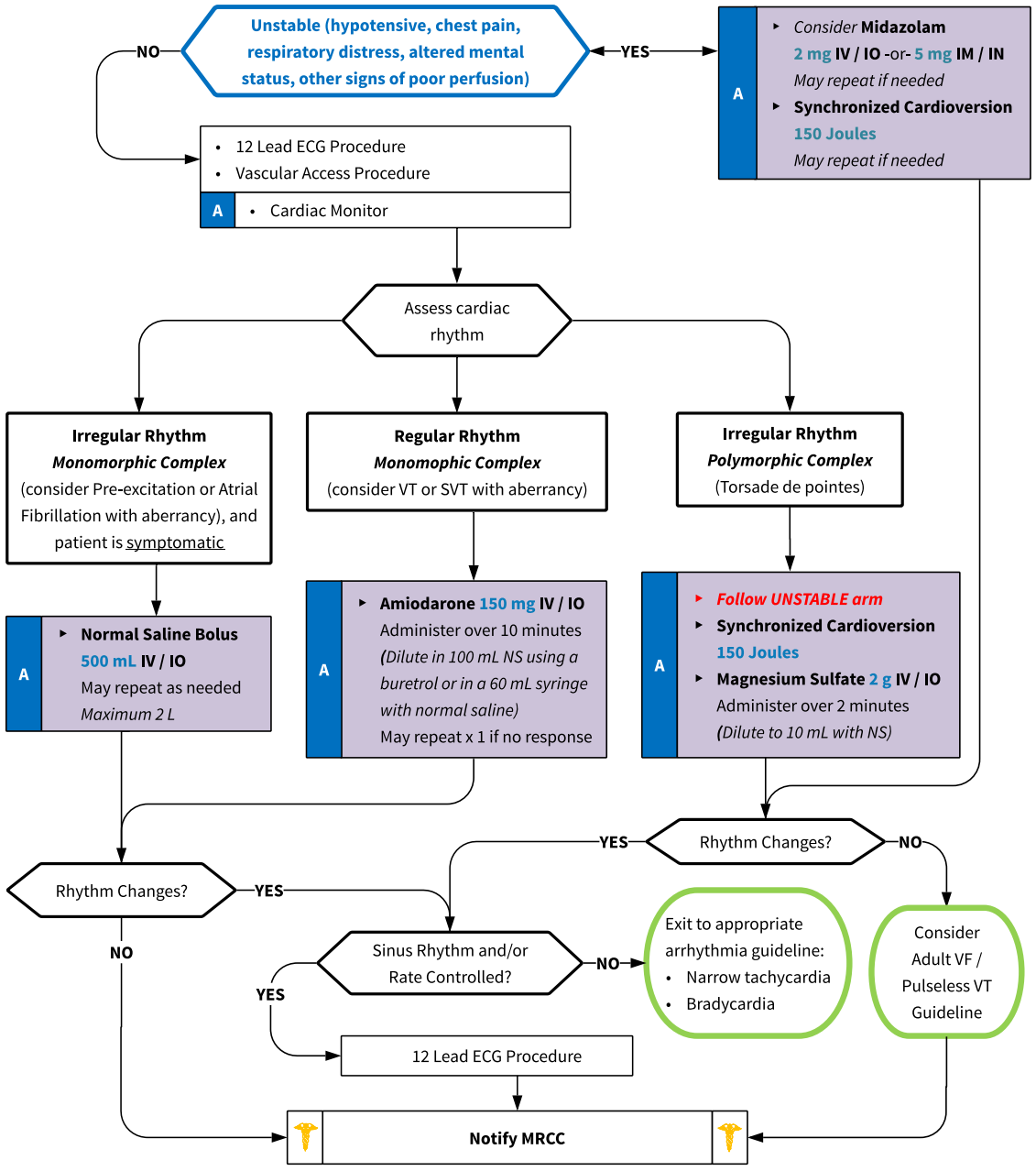
Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Most important goal is to differentiate the type of tachycardia (regular vs irregular) and if STABLE or UNSTABLE.**
- **If at any point patient becomes unstable move to unstable arm in algorithm.**
- **For ASYMPTOMATIC PATIENTS (or those with only minimal symptoms, such as palpitations) and any tachycardia with rate approximately 100-120 and a normal blood pressure, consider CLOSE OBSERVATION and/or fluid bolus rather than immediate treatment with an anti-arrythmic medication. A patient's "usual" atrial fibrillation, for example, may not require emergent treatment.**
- **Symptomatic tachycardia usually occurs at rates of 120 -150 and typically ≥ 150 beats per minute. Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.**
- **Serious Signs / Symptoms: Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute CHF. Significant breathing difficulty.**
- **Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.**
- **If patient has history of or 12 Lead ECG evidence of Wolfe Parkinson White (WPW) syndrome, DO NOT GIVE Adenosine. Cardioversion should be performed if patient becomes unstable.**
- Typical sinus tachycardia is in the range of 100 to [220 - patient's age] beats per minute.
- **Regular Narrow-Complex Tachycardias:**
  - Vagal maneuvers and adenosine are preferred. Vagal maneuvers may convert up to 25 % of SVT.
  - Adenosine should be pushed rapidly via proximal IV site followed by 10 mL Normal Saline rapid flush.
- **Irregular Tachycardias:**
  - Adenosine will not be effective in atrial fibrillation / flutter. It may help identify rhythm but generally is not helpful.
- **Synchronized Cardioversion:**
  - Recommended to treat UNSTABLE Atrial Fibrillation, Atrial Flutter and Monomorphic-Regular Tachycardia (SVT.)
- Monitor for respiratory depression and hypotension associated with Midazolam.
- Continuous pulse oximetry is required for all SVT patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.

Adult Wide Complex Tachycardia

History	Signs and Symptoms	Differential

• Medications (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin)
• Diet (caffeine, chocolate)
• Drugs (nicotine, cocaine)
• Past medical history
• History of palpitations / heart racing
• Syncope / near syncope
	• Heart Rate > 150
	• Systolic BP <90
	• Dizziness, CP, SOB, AMS, Diaphoresis
	• Potential presenting rhythm
	  ◦ Atrial/Sinus tachycardia
	  ◦ Atrial fibrillation / flutter
	  ◦ Multifocal atrial tachycardia
	  ◦ Ventricular Tachycardia
		• Heart disease (WPW, Valvular)
		• Sick sinus syndrome
		• Myocardial infarction
		• CHF
		• Electrolyte imbalance
		• Exertion, Pain, Emotional stress
		• Fever
		• Hypoxia
		• Hypovolemia or Anemia
		• Drug effect / Overdose (see HX)
		• Hyperthyroidism
		• Pulmonary embolus



Adult Wide Complex Tachycardia

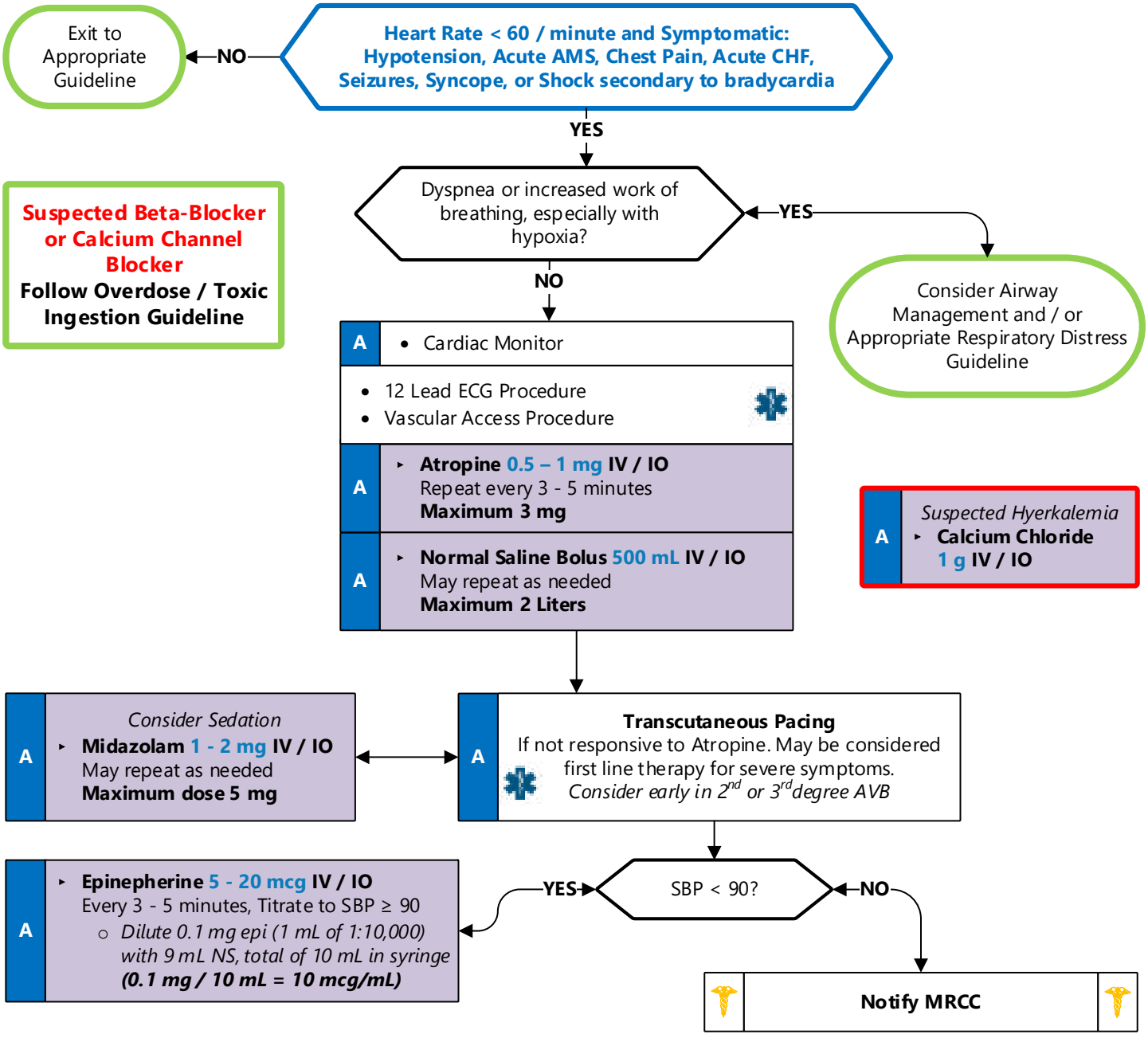
Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Most important goal is to differentiate the type of tachycardia (regular vs irregular) and if STABLE or UNSTABLE.**
- **If at any point patient becomes unstable move to unstable arm in algorithm.**
- **For ASYMPTOMATIC PATIENTS (or those with only minimal symptoms, such as palpitations) and any tachycardia with rate approximately 100-120 and a normal blood pressure, consider CLOSE OBSERVATION and/or fluid bolus rather than immediate treatment with an anti-arrythmic medication. A patient's "usual" atrial fibrillation with aberrancy, for example, may not require emergent treatment.**
- **A single-lead ECG is adequate to diagnose and treat an arrhythmia. A 12-lead ECG is not necessary to diagnose and treat, but is preferred when the patient is stable.**
- **Symptomatic tachycardia usually occurs at rates of 120 – 150 and typically ≥ 150 beats per minute. Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.**
- **Serious Signs / Symptoms: Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute congestive heart failure.**
- **Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.**
- Typical sinus tachycardia is in the range of 100 to (220 – patients age) beats per minute.
- **Regular Wide-Complex Tachycardias:**
  - **Unstable condition:**
    - » Immediate cardioversion
  - **Stable condition:**
    - » Typically VT (most common) or SVT with aberrancy. Amiodarone is the appropriate treatment for stable patients. Defibrillate unstable patients.
    - » Arrhythmias with suspicion of WPW should only be treated with medical control orders.
- **Irregular Tachycardias:**
  - Wide-complex, irregular tachycardia will usually require cardioversion. Consider medical control.
- Polymorphic / Irregular Wide- Complex Tachycardia:
  - This situation is usually unstable and immediate defibrillation is warranted.
  - When associated with prolonged QT this may be Torsades de pointes: Give 2g of Magnesium Sulfate slow IV / IO.
  - Without prolonged QT, likely related to ischemia and Magnesium may not be helpful.
- Monitor for respiratory depression and hypotension associated with Midazolam.
- Continuous pulse oximetry is required for all Wide Complex Tachycardia Patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.

Adult Bradycardia

History	Signs and Symptoms	Differential

• Past medical history
• Medications
  ◦ Beta-Blockers
  ◦ Calcium channel blockers
  ◦ Clonidine
  ◦ Digoxin
• Pacemaker
	• HR < 60/min with hypotension, acute altered mental status, chest pain, acute CHF, seizures, syncope, or shock secondary to bradycardia
	• Chest pain
	• Respiratory distress
	• Hypotension or Shock
	• Altered mental status
	• Syncope
		• Acute myocardial infarction
		• Hypoxia
		• Pacemaker failure
		• Hypothermia
		• Sinus bradycardia
		• Athletes
		• Head injury (elevated ICP) or Stroke
		• Spinal cord lesion
		• Sick sinus syndrome
		• AV blocks (1°, 2°, or 3°)
		• Overdose



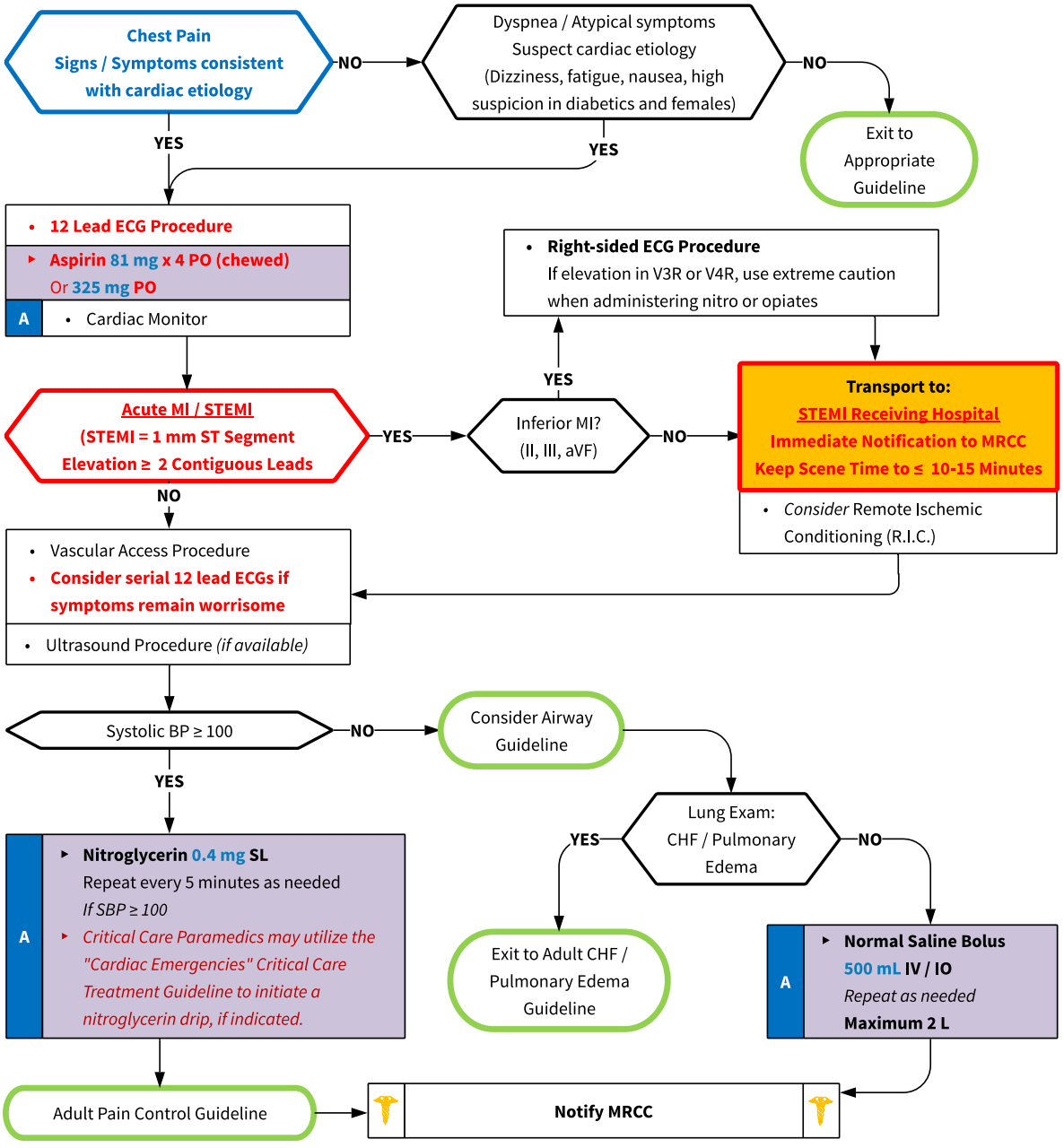
Adult Bradycardia

Pearls

- **Recommended Exam: Mental Status, Neck, Heart, Lungs, Neuro**
- **Bradycardia causing symptoms is typically < 50/minute. Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic, otherwise monitor and reassess**
- **Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount.**
- **Atropine vs. Pacing: Caution in setting of acute MI. The use of Atropine for PVCs in the presence of an MI may worsen heart damage. Providers should NOT DELAY Transcutaneous Pacing for patients with poor perfusion in the setting of acute MI or second or third degree heart block.**
- **Atropine is ineffective in cardiac transplantation.**
- For patients who are not in second or third degree heart block, pacing may be considered for bradycardia not responsive to atropine. Prepare to utilize transcutaneous pacing early if no response to atropine.
- **Wide complex or bizarre appearance of QRS complex with slow rhythm may indicate hyperkalemia.**
- Consider treatable causes for bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)
- Hypoxemia is a common cause of bradycardia. Be sure to oxygenate the patient and support respiratory effort.

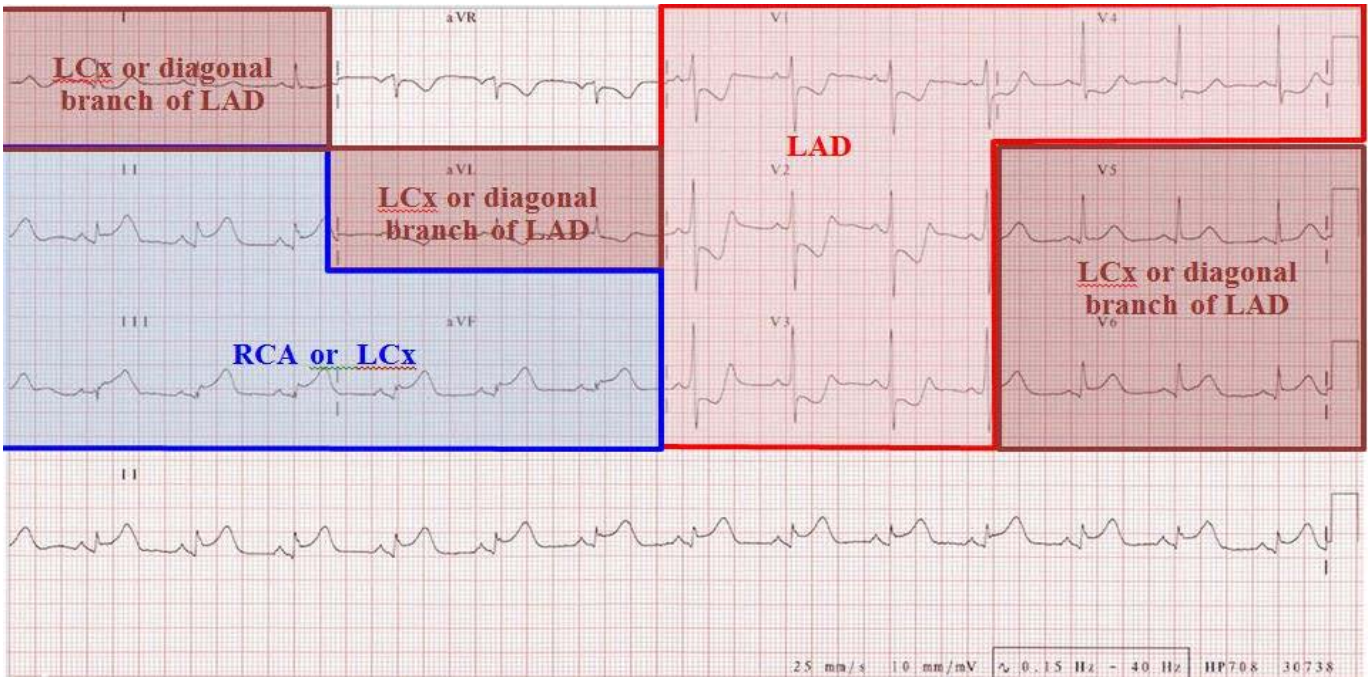
Adult Chest Pain/STEMI

History	Signs and Symptoms	Differential
• Age • Medications (Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil) • Past medical history (MI, Angina, Diabetes, post menopausal) • Allergies • Recent physical exertion • **P**alliation / **P**rovocation • **Q**uality (crampy, constant, sharp, dull, etc.) • **R**egion / **R**adiation / **R**eferred • **S**everity (1-10) • **T**ime (onset /duration / repetition)	• CP (pain, pressure, aching, vice-like tightness) • Location (substernal, epigastric, arm, jaw, neck, shoulder) • Radiation of pain • Pale, diaphoresis • Shortness of breath • Nausea, vomiting, dizziness • **Time of Onset**	• Trauma vs. Medical • Angina vs. Myocardial infarction • Pericarditis • Pulmonary embolism • Asthma / COPD • Pneumothorax • Aortic dissection or aneurysm • GE reflux or Hiatal hernia • Esophageal spasm • Chest wall injury or pain • Pleural pain • Overdose (Cocaine) or Methamphetamine



Adult Chest Pain/STEMI

STEMI/Culprit Vessel Localization Aid:



- ST Elevation in 2 or more leads: II, III, aVF = Inferior wall MI (vessel likely RCA or LCx)
- ST Elevation in 2 or more leads: I, aVL, V5, V6 = Lateral wall MI (vessel likely LCx or LAD branch) ST Elevation in 2 or more leads: V1, V2, V3, V4 = Septal/Anterior wall MI (vessel likely LAD) *Look for ST DEPRESSION in reciprocal leads (opposite wall) to confirm diagnosis.*

STEMI Criteria for pre-hospital cath lab activation:

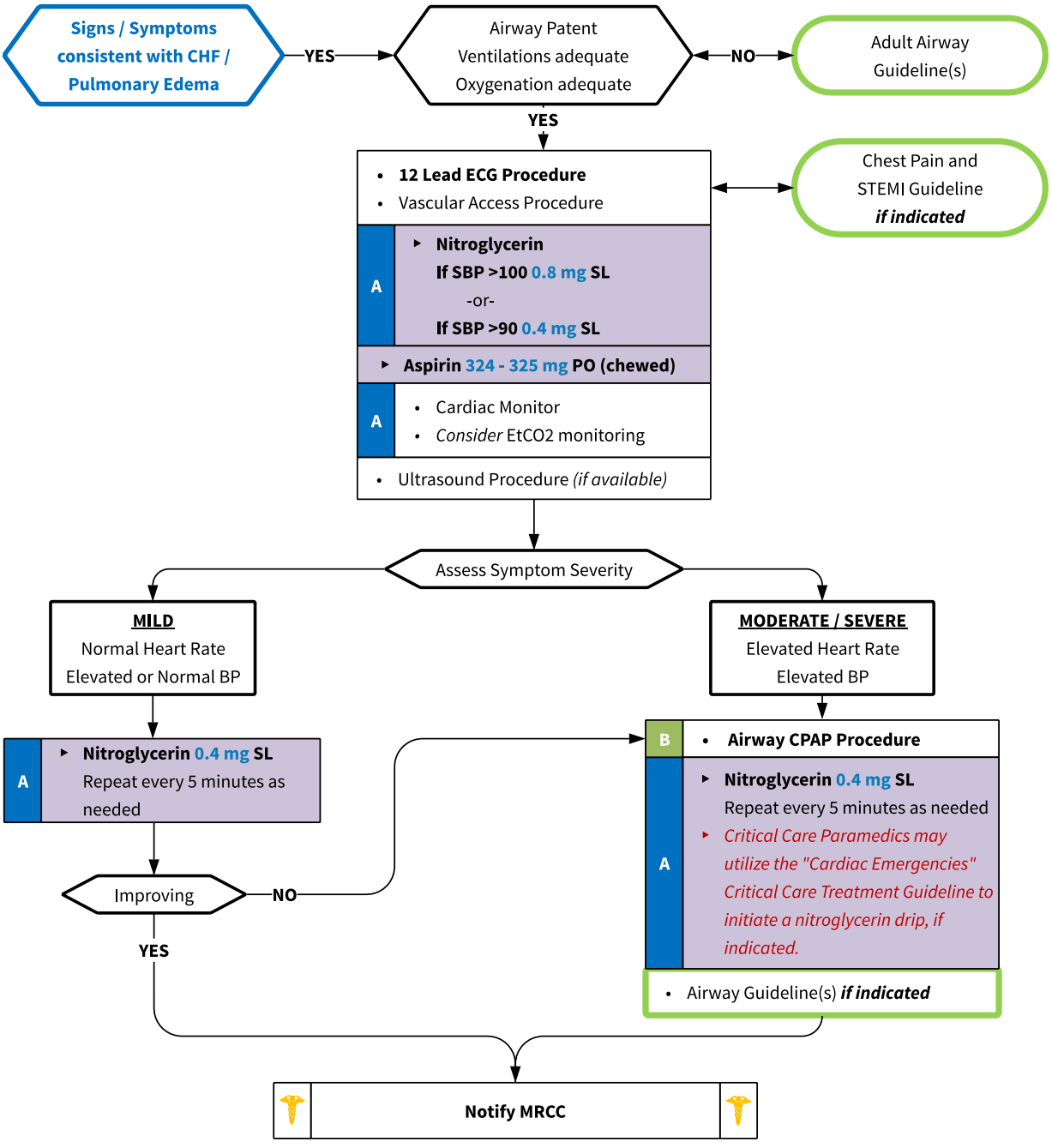
- Narrow QRS complex (< 120 ms or 0.12 sec)
- ST elevation ≥ 2mm in 2 or more anatomically adjacent V-leads
- ST elevation ≥ 1mm in 2 or more anatomically adjacent limb leads (I, II, III, aVF, aVL)
- Reciprocal ST depression
- New left bundle branch block (if confirmed to be new) with symptoms of cardiac ischemia

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Consider applying defibrillation patches to patients with LAD territory MI's due to high risk for cardiac arrest. RCA territory MI's have a high risk of cardiogenic shock and/or bradycardia requiring treatment.**
- **Avoid Nitroglycerin in any patient who has used Viagra (sildenafil) or Levitra (vardenafil) in the past 24 hours or Cialis (tadalafil) in the past 36 hours due to potential severe hypotension.**
- **Patients with STEMI (ST-Elevation Myocardial Infarction) should be transported to a STEMI receiving facility.**
- **If CHF / Cardiogenic shock resulting from inferior (II, III, aVF) MI, consider right Sided ECG. If ST elevation noted in transposed V3 or V4, nitroglycerin and / or opioids may cause hypotension requiring fluid boluses.**
- If patient has taken his own nitroglycerin without relief, consider potency of the medication.
- Monitor for hypotension after administration of nitroglycerin and narcotics.
- Nitroglycerin and opioids may be repeated per dosing guidelines.
- Diabetics, geriatric and female patients often have atypical pain, or only generalized complaints. Have a low threshold to perform a 12 lead EKG in these patients.
- Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (EMT-P.)
- **EMT-B may administer Nitroglycerin to patients who are already prescribed this medication.**

Adult CHF/Pulmonary Edema

History	Signs and Symptoms	Differential
• Congestive heart failure • Past medical history • Medications (digoxin, Lasix, Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil) • Cardiac history --past myocardial infarction	• Respiratory distress, bilateral rales • Apprehension, orthopnea • Jugular vein distention • Pink, frothy sputum • Peripheral edema, diaphoresis • Hypotension, shock • Chest pain	• Myocardial infarction • Congestive heart failure • Asthma • Anaphylaxis • Aspiration • COPD • Pleural effusion • Pneumonia • Pulmonary embolus • Pericardial tamponade • Toxic Exposure



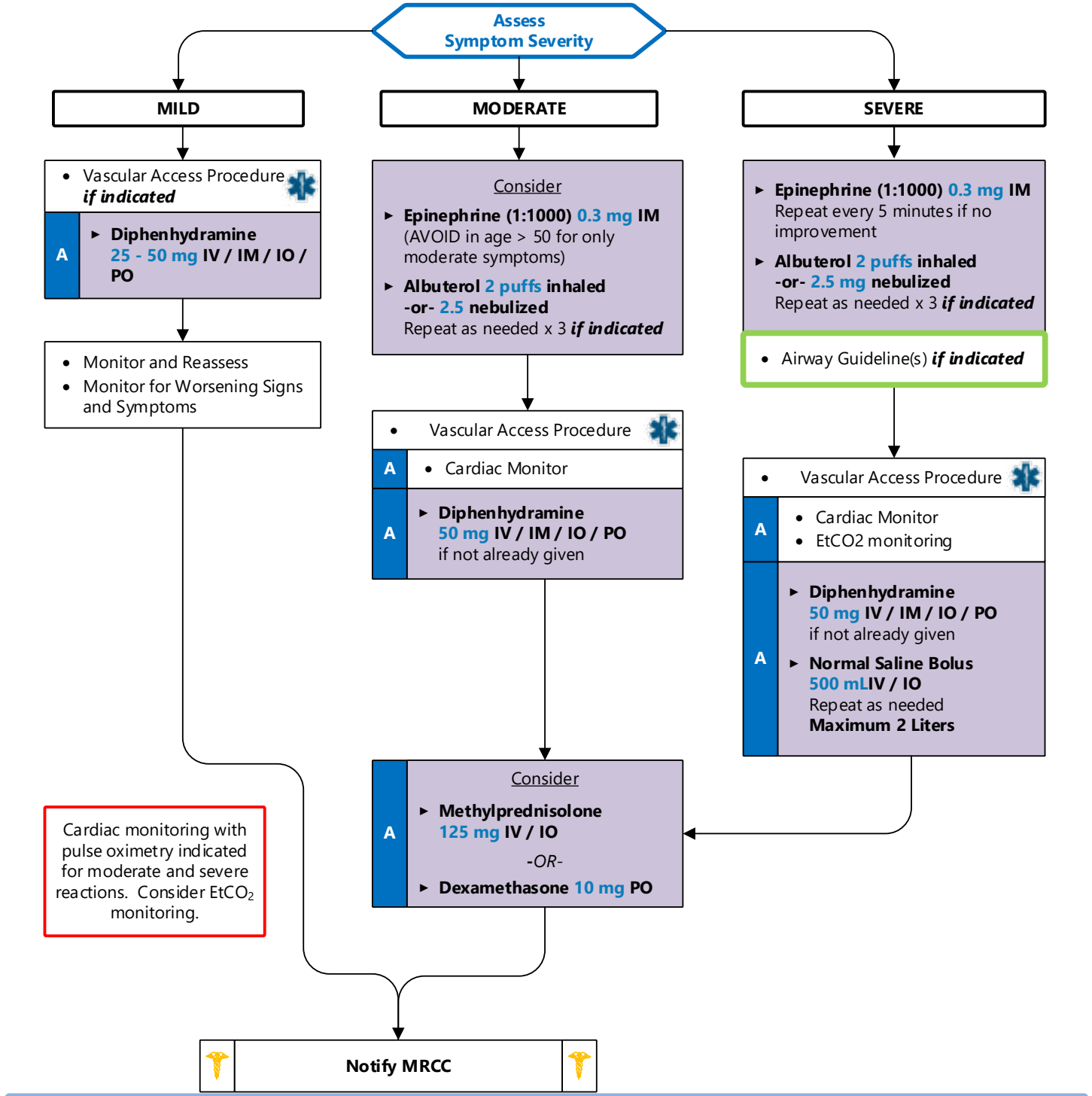
Adult CHF/Pulmonary Edema

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Avoid Nitroglycerin in any patient who has used Viagra (sildenafil) or Levitra (vardenafil) in the past 24 hours or Cialis (tadalafil) in the past 36 hours due to potential severe hypotension.**
- **Carefully monitor the level of consciousness, BP, and respiratory status with the above interventions.**
- **If CHF / Cardiogenic shock is resulting from inferior (II, III, aVF) MI, consider right sided ECG. If ST elevation is noted in transposed V3 or V4, nitroglycerin and / or opioids may cause hypotension requiring fluid boluses.**
- If patient has taken his own nitroglycerin without relief, consider potency (or lack of potency) of the medication.
- Consider myocardial infarction in all of these patients. Diabetics, geriatric and female patients often have atypical pain, or only generalized complaints.
- Allow the patient to be in a position of comfort to maximize their breathing effort.
- Document CPAP application using the CPAP procedure in the PCR. Document 12 Lead ECG using the 12 Lead ECG procedure.
- **EMT-B may administer Nitroglycerin to patients who are already prescribed this medication.**
- Consider Midazolam 1-2 mg IV to assist with CPAP compliance. Benzodiazepines may precipitate respiratory depression or may actually worsen compliance with CPAP in patients who are already tired, already with altered mental status, or who have recent history of alcohol or drug ingestion. All efforts at verbal coaching should be utilized prior to giving benzodiazepines for patients in respiratory distress.

Adult Allergic Reaction/Anaphylaxis

History	Signs and Symptoms	Differential
• Onset and location • Insect sting or bite • Food allergy / exposure • Medication allergy / exposure • New clothing, soap, detergent • Past history of reactions • Past medical history • Medication history	• Itching or hives • Coughing / wheezing or respiratory distress • Chest or throat constriction • Difficulty swallowing • Hypotension or shock • Edema • N/V	• Urticarial (rash only) • Anaphylaxis (systemic effect) • Shock (vascular effect) • Angioedema (drug induced) • Aspiration / Airway obstruction • Vasovagal event • Asthma or COPD • CHF



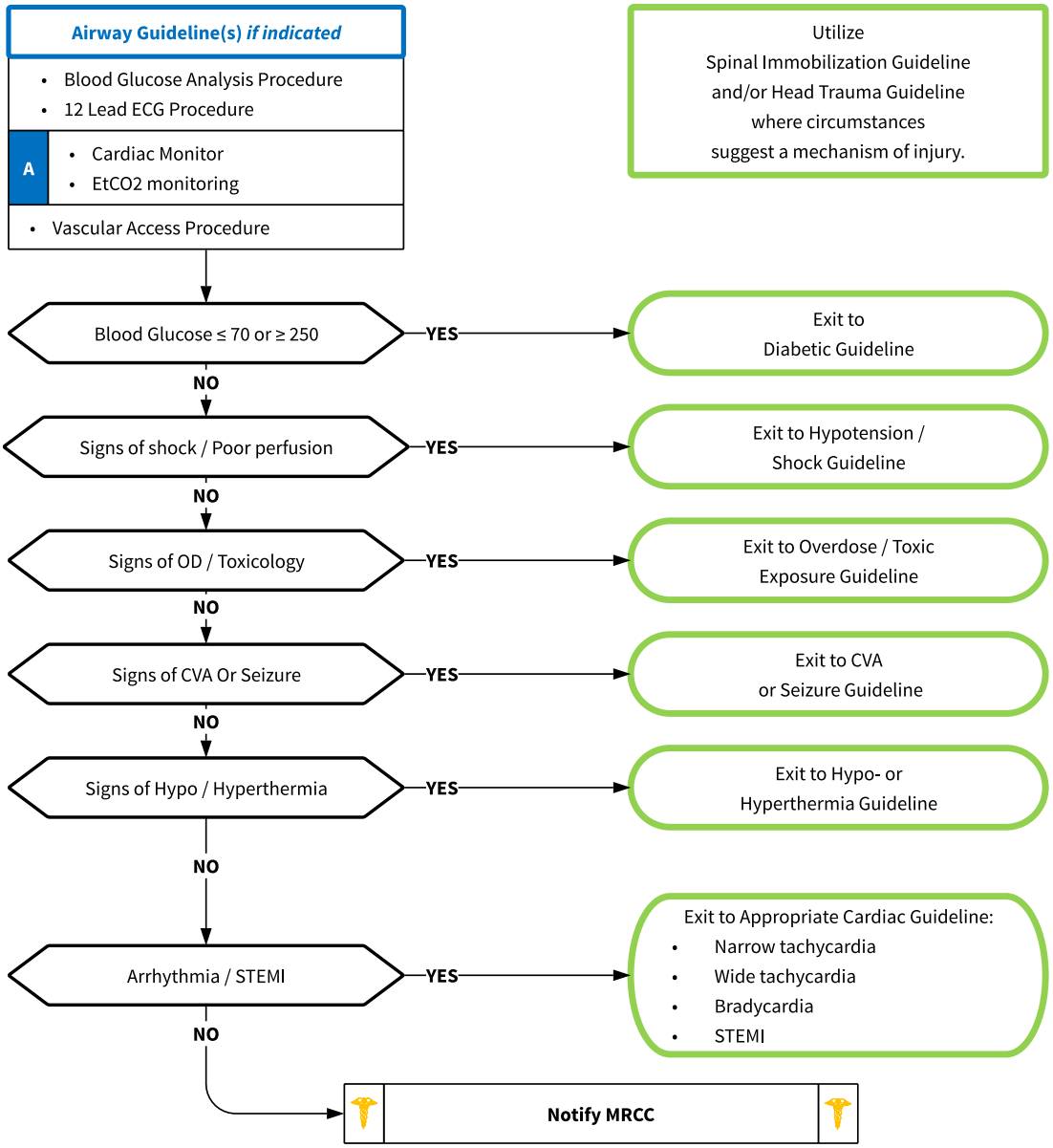
Adult Allergic Reaction/Anaphylaxis

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs**
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **Epinephrine is the drug of choice and the first drug that should be administered in acute anaphylaxis (Moderate / Severe Symptoms.) IM Epinephrine should be administered in priority before or during attempts at IV or IO access.**
- **Contact Medical Control for refractory anaphylaxis.**
- **Symptom Severity Classification:**
  - **Mild symptoms:**
    - » Flushing, hives, itching, erythema with normal blood pressure and perfusion.
  - **Moderate symptoms:**
    - » Flushing, hives, itching, erythema plus mild respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with normal blood pressure and perfusion.
  - **Severe symptoms:**
    - » Skin symptoms may or may not be present, depending on perfusion. Possible Itching, erythema plus severe respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with hypotension and poor perfusion.
- **Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash / skin involvement.**
- **Angioedema is seen in moderate to severe reactions and is swelling involving the face, lips or airway structures. This can also be seen in patients taking ACE-inhibitor blood pressure medications like Prinivil / Zestril (lisinopril)-typically end in -il.**
- **Patients who are ≥ 50 years of age, have a history of cardiac disease, take Beta-Blockers / Digoxin or patients who have heart rates ≥ 150; consider giving one-half the dose of epinephrine (0.15 mg of 1:1000) for the initial dose and any repeated doses. Epinephrine may precipitate cardiac ischemia. These patients should receive a 12 lead ECG at some point in their care, but this should NOT delay administration of epinephrine.**
- **EMT-B may administer Albuterol inhaler if patient already prescribed, or nebulized if appropriately trained.**
- Any patient with respiratory symptoms or extensive reaction should receive IV or IM diphenhydramine.
- The shorter the onset from symptoms to contact, the more severe the reaction.

Adult Altered Mental Status

History	Signs and Symptoms	Differential
• Known diabetic, medic alert tag • Drugs, drug paraphernalia • Report of illicit drug use or toxic ingestion • Past medical history • Medications • History of head trauma • Change in condition • Changes in feeding or sleep habits	• Decreased mental status or lethargy • Change in baseline mental status • Bizarre behavior • Hypoglycemia (cool, diaphoretic skin) • Hyperglycemia (warm, dry skin; fruity breath; Kussmaul respirations; signs of dehydration) • Irritability	• Head trauma • CNS (stroke, tumor, seizure, infection) • Cardiac (MI, CHF) • Hypothermia • Infection (CNS and other) • Thyroid (hyper / hypo) • Shock (septic, metabolic, traumatic) • Diabetes (hyper / hypoglycemia) • Toxicological or Ingestion • Acidosis / Alkalosis • Environmental exposure • Pulmonary (Hypoxia) • Electrolyte abnormality • Psychiatric disorder



Adult Altered Mental Status

Pearls

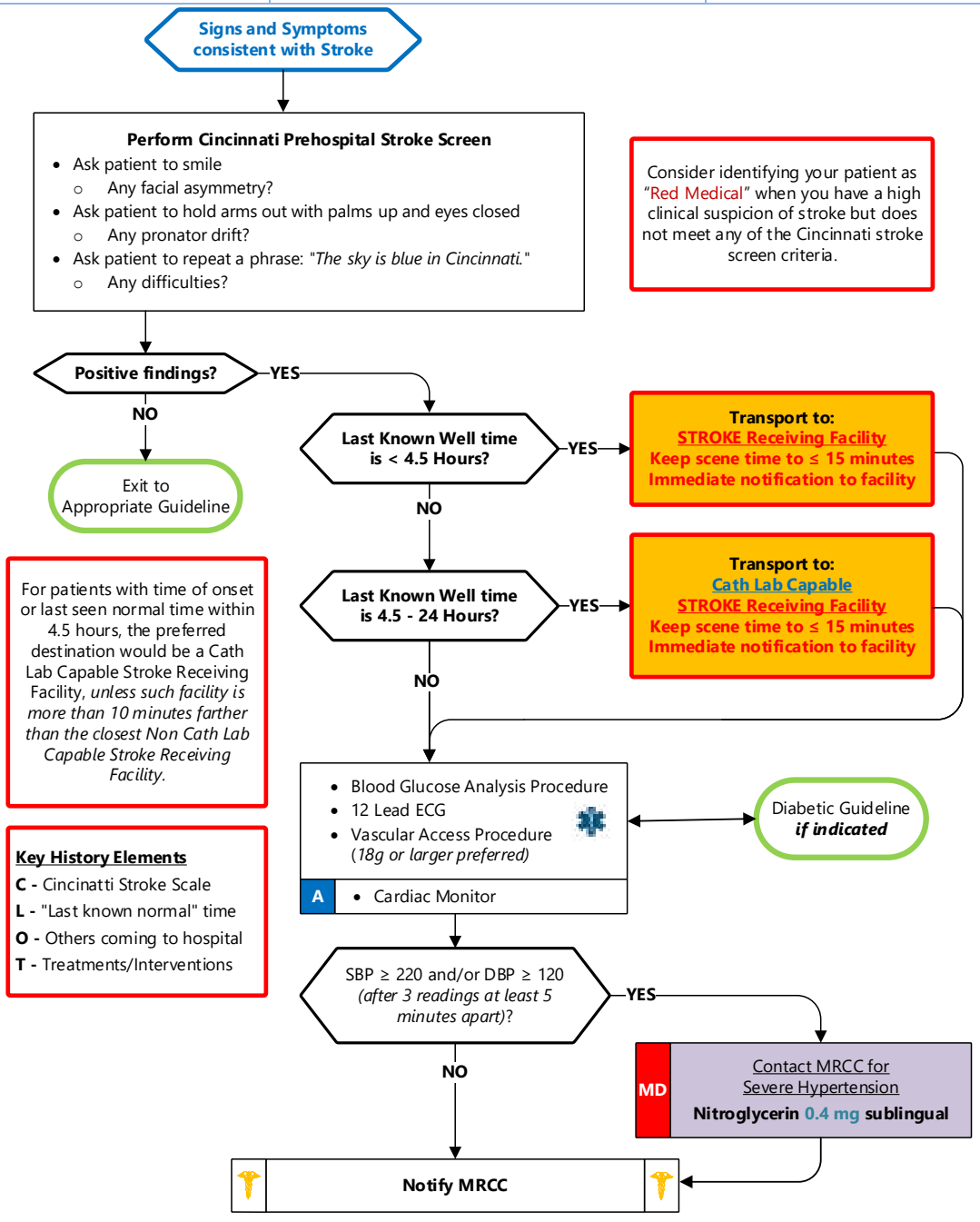
- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.**
- **Pay careful attention to the head exam for signs of bruising or other injury.**
- Be aware of AMS as presenting sign of an environmental toxin or Haz-Mat exposure and protect personal safety and that of other responders who may already be exposed.
- It is safer to assume hypoglycemia than hyperglycemia if doubt exists. Recheck blood glucose after Dextrose or Glucagon.
- Do not let alcohol confuse the clinical picture. Alcoholics frequently develop hypoglycemia (or elevated ammonia levels in the setting of chronic liver disease) and may have unrecognized injuries.
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.

Adult CVA/Suspected Stroke

History
- Previous CVA, TIAs
- Previous cardiac / vascular surgery
- Associated diseases: diabetes, hyper-tension, CAD
- Atrial fibrillation
- Medications (blood thinners)
- History of trauma

Signs and Symptoms
- Altered mental status
- Weakness / Paralysis
- Blindness or other sensory loss
- Aphasia / Dysarthria
- Syncope
- Vertigo / Dizziness
- Vomiting
- Headache
- Seizures
- Respiratory pattern change
- Hypertension / hypotension

Differential
- See Altered Mental Status
- TIA (Transient ischemic attack)
- Seizure
- Todd's Paralysis
- Hypoglycemia
- Stroke
  - Thrombotic or Embolic (~85%)
  - Hemorrhagic (~15%)
- Tumor
- Trauma
- Dialysis / Renal Failure



Adult CVA/Suspected Stroke

For further information on current recommendations regarding stroke care, including the rationale to treat or not treat hypertension in the setting of possible stroke, see the current version of:

"Guidelines for the Early Management of Patients With Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association"

Available at: http://stroke.ahajournals.org/content/early/2013/01/31/STR.0b013e318284056a

Cincinnati Pre-hospital Stroke Scale

1. FACIAL DROOP: *Have patient show teeth or smile.*

Normal: both sides of the face move equally

Abnormal: one side of face does not move as well as the other side

2. ARM DRIFT: *Patient closes eyes & holds both arms out for 10 sec.*

Normal: both arms move the same or both arms do not move at all

Abnormal: one arm does not move or drifts down compared to the other

3. ABNORMAL SPEECH: *Have the patient say "you can't teach an old dog new tricks."*

Normal: patient uses correct words with no slurring **Abnormal**: patient slurs words, uses the wrong words, or is unable to speak

INTERPRETATION: If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%.

Cath Lab Capable Stroke Receiving Facilities

- Regions Hospital
- United Hospital
- M Health St. Johns Hospital
- M Health Fairview-University Medical Center
- Hennepin County Medical Center
- Abbott Northwestern Hospital
- North Memorial Medical Center
- Methodist Hospital
- M Health Fairview Southdale Hospital

Metro area Stroke Receiving Facilities

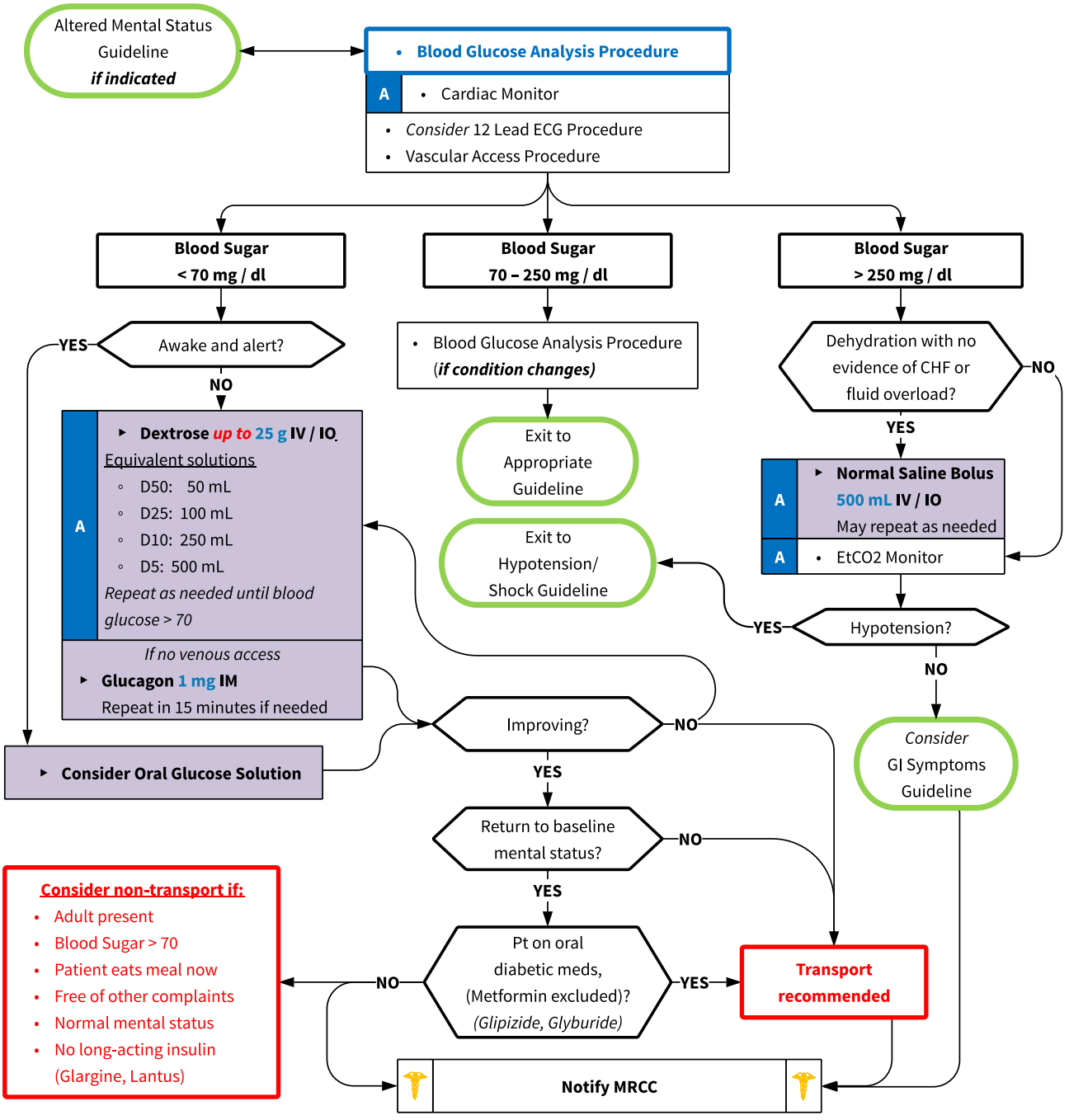
- Lakeview Hospital
- Hudson Hospital
- Woodwinds Hospital
- Regina Hospital
- M Health Fairview Ridges Hospital

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Acute Stroke care is evolving rapidly. Time of onset / last seen normal parameters may be changed at any time depending on the capabilities and resources of the Stroke Receiving Hospital.**
- **Time of Onset or Last Seen Normal: One of the most important items the pre-hospital provider can obtain, on which all treatment decisions are based. Be very precise in gathering data to establish the time of onset and report as an actual time (i.e. 13:47 NOT "about 45 minutes ago.") Without this information patient may not be able to receive thrombolytics at facility. For patients with "Woke up and noticed stroke," Time starts when patient went to sleep or was last seen awake.**
- **With a duration of symptoms of less than EIGHT (8) HOURS, scene times should be limited to ≤ 15 minutes, early notification of receiving facility should be performed and transport times should be minimized.**
- The differential listed on the Altered Mental Status Protocol should also be considered.
- Be alert for airway problems (swallowing difficulty, vomiting/aspiration).
- Hypoglycemia can present as a LOCALIZED neurologic deficit, especially in the elderly.
- Document the Cincinnati Prehospital Stroke Screen results in the PCR.

Adult Diabetic Emergency

History	Signs and Symptoms	Differential
• Past medical history • Medications • Recent blood glucose check • Last meal	• Altered mental status • Combative / irritable • Diaphoresis • Seizures • Abdominal pain • Nausea / vomiting • Weakness • Dehydration • Deep / rapid breathing	• Alcohol / drug use • Toxic ingestion • Trauma; head injury • Seizure • CVA • Altered baseline mental status.



Adult Diabetic Emergency

Pearls

- **Recommended exam: Mental Status, Skin, Respirations and effort, Neuro.**
- **Ensure vascular access is patent before administering D50.**
- Patients with prolonged hypoglycemia or severe liver disease may not respond to glucagon.
- Response to Glucagon can take 15-20 minutes. Consider the entire clinical picture when treating hypoglycemia, including a patient's overall clinical condition and other vital signs. It may be safe to wait for some time for Glucagon to work, instead of pursuing the more aggressive course of performing IO access to give faster acting IV/IO Dextrose solution. On the other hand, consider IO access to give Dextrose early in patients who are critically ill (seizing) or peri-arrest and hypoglycemic.
- DKA is a serious condition resulting from a lack of insulin production and uncontrolled blood sugars. Patients are typically severely dehydrated and display signs of hypovolemic shock (tachycardia, hypotension, dry membranes, poor skin turgor, increased respiratory rate, and decreased EtCO2 levels). In addition to aggressive IV fluid resuscitation (some patients will require > 5 liters of saline in the ED) providers should consider other medical conditions that triggered the episode, such as infections or cardiac events. Have a low threshold to obtain an EKG on a diabetic patient with abnormal vital signs.
- Consider EtCO2 monitoring when glucose levels are > 250 to screen for DKA.
- Do not administer oral glucose to patients that are not able to swallow or protect their airway.
- Quality control checks should be maintained per manufacturers recommendation for all glucometers.
- Patients refusing transport to medical facility after treatment of hypoglycemia:
- **Oral Agents**: Patients taking oral diabetic medications should be strongly encouraged to allow transportation to a medical facility. They are at risk of recurrent hypoglycemia that can be delayed for hours and require close monitoring even after normal blood glucose is established. Not all oral agents have prolonged action so Contact Medical Control for advice. Patients who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal with complex carbohydrates and protein.
- **Insulin Agents**: Many forms of insulin now exist. Longer acting insulin (i.e. Glargine, Lantus) places the patient at risk of recurrent hypoglycemia even after a normal blood glucose is established. Patients who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal with complex carbohydrates and protein.

Adult Gastrointestinal Emergency

History

- Age
- Past medical / surgical history
- Medications
- Onset
- Palliation / Provocation
- Quality (crampy, constant, sharp, dull, etc.)
- Region / Radiation / Referred
- Severity (1-10)
- Time (duration / repetition)
- Fever
- Last meal eaten
- Last bowel movement / emesis
- Menstrual history (pregnancy)
- Other sick contacts
- Travel history
- Bloody emesis / diarrhea

Signs and Symptoms

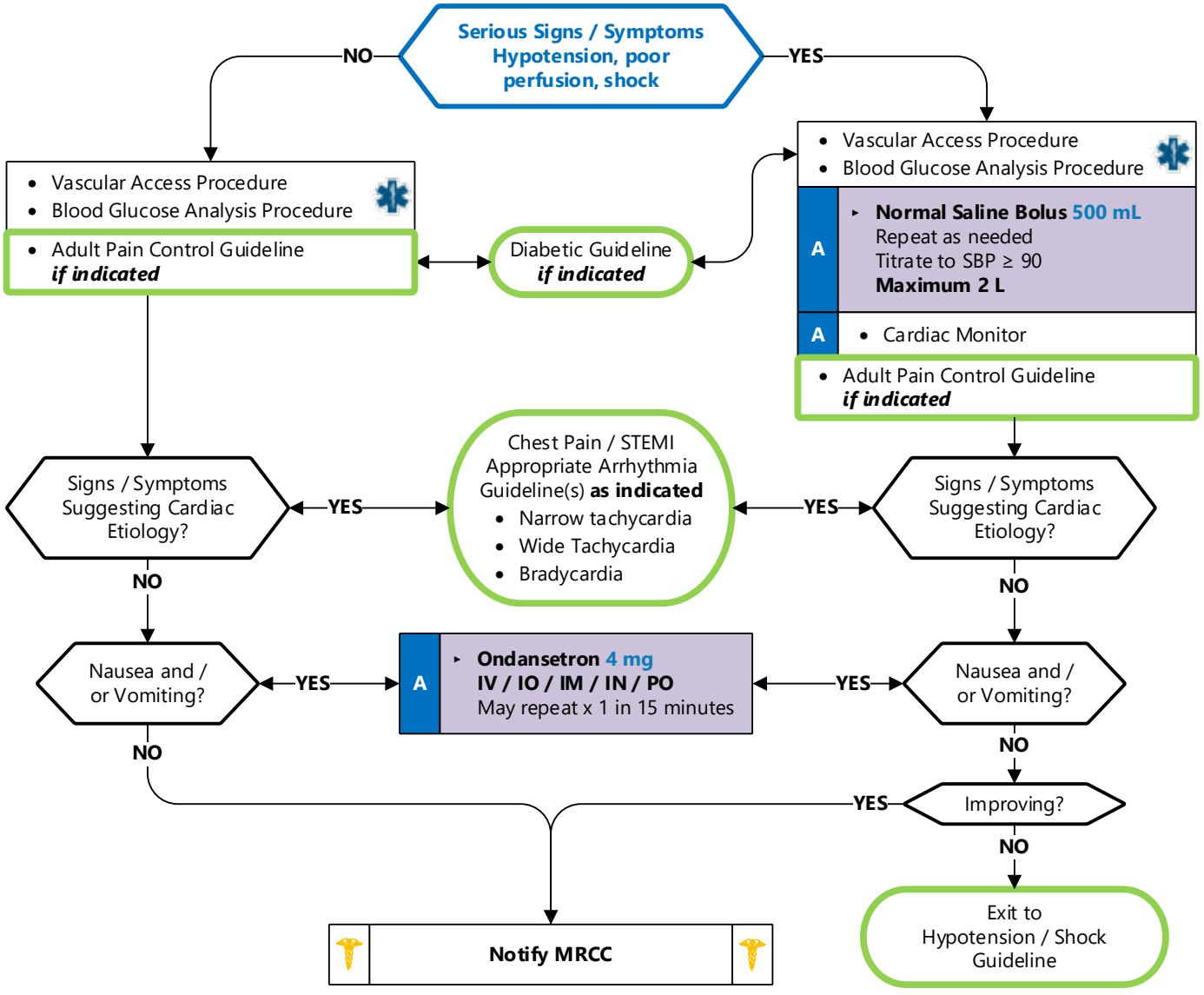
- Pain (location / migration)
- Tenderness
- Nausea
- Vomiting
- Diarrhea
- Dysuria
- Constipation
- Vaginal bleeding / discharge
- Pregnancy

Associated symptoms: (Helpful to localize source)

Fever, headache, weakness, malaise, myalgias, cough, headache, mental status changes, rash

Differential

- Pneumonia or Pulmonary embolus
- Liver, pancreas, gallbladder
- Peptic ulcer disease / Gastritis
- Myocardial infarction
- Kidney stone
- Abdominal aneurysm
- Appendicitis, diverticulitis
- Bladder / Prostate disorder
- Pelvic (PID, Ectopic pregnancy, Ovarian cyst)
- Spleen enlargement
- Bowel obstruction
- Gastroenteritis (infectious)
- CNS (increased pressure, headache, trauma)
- Diabetic ketoacidosis
- Medication or substance abuse



Adult Gastrointestinal Emergency

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lung, Abdomen, Back, Extremities, Neuro**
- Document the mental status and vital signs prior to administration of anti-emetics
- Abdominal pain in women of childbearing age should be treated as pregnancy related until proven otherwise.
- The diagnosis of abdominal aneurysm should be considered with abdominal pain or back pain especially in patients over 50, elderly males complaining of testicular pain, and / or patients with shock/ poor perfusion.
- Repeat vital signs after each fluid bolus.
- Consider cardiac etiology in patients > 50, diabetics and / or women especially with upper abdominal complaints. Have a low threshold to perform a 12-lead EKG on these patients.
- Isolated vomiting may be caused by pyloric stenosis (in pediatrics), bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures).
- IV Ondansetron (Zofran) solution may be given by any route. When giving orally, mix with juice.
- There is a risk of QT interval prolongation with many anti-emetic medications, including ondansetron. Although not required, providers should consider cardiac monitoring and obtaining a 12-lead ECG prior to administration of these medications, especially in patients who are also taking anti-psychotic, antibiotic, cardiac, or neurologic medications. If the QTc interval is close to or greater than 500ms, medical control authorization should be obtained prior to administration of medications.

Adult Hypertension

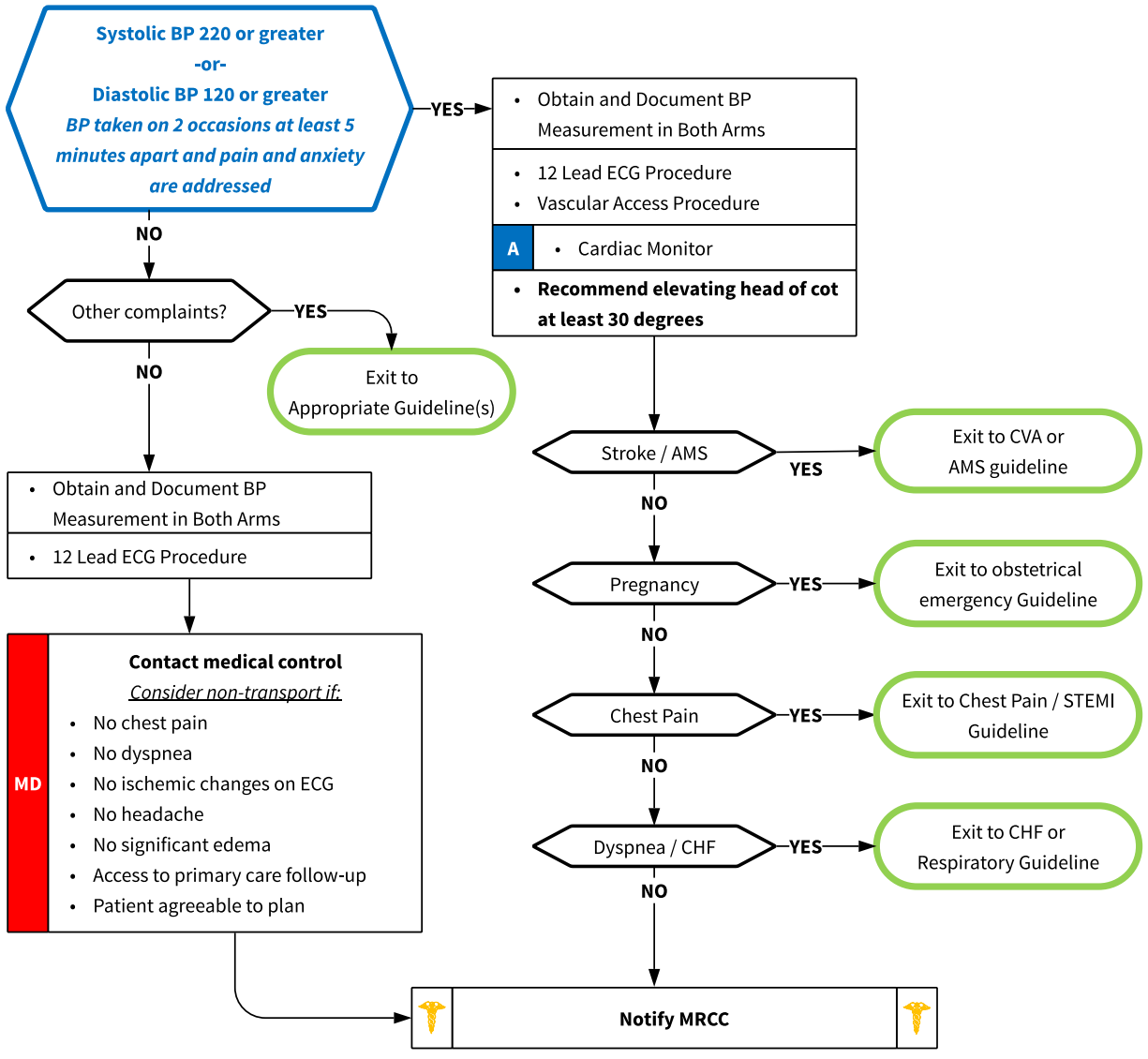
History
- Documented Hypertension
- Related diseases: Diabetes; CVA; Renal Failure; Cardiac Problems
- Medications for Hypertension
- Compliance with Hypertensive Medications
- Erectile Dysfunction medications
- Pregnancy

Signs and Symptoms
One of these:
- Systolic BP 220 or greater
- Diastolic BP 120 or greater

AND at least one of these:
- Severe Headache
- Chest Pain
- Dyspnea
- Altered Mental Status
- Seizure

Differential
- Hypertensive encephalopathy
- Primary CNS Injury (Cushing's Response with Bradycardia and Hypertension)
- Myocardial Infarction
- Aortic Dissection / Aneurysm
- Pre-eclampsia / Eclampsia

Hypertension is not uncommon especially in an emergency setting. Hypertension is usually transient and in response to stress and / or pain. A hypertensive emergency is based on blood pressure along with symptoms which suggest an organ is suffering damage such as MI, CVA or renal failure. This is very difficult to determine in the pre-hospital setting in most cases. Aggressive treatment of hypertension can result in harm. Most patients, even with significant elevation in blood pressure, need only supportive care. Specific complaints such as chest pain, dyspnea, pulmonary edema or altered mental status should be treated based on those specific protocols.



Adult Hypertension

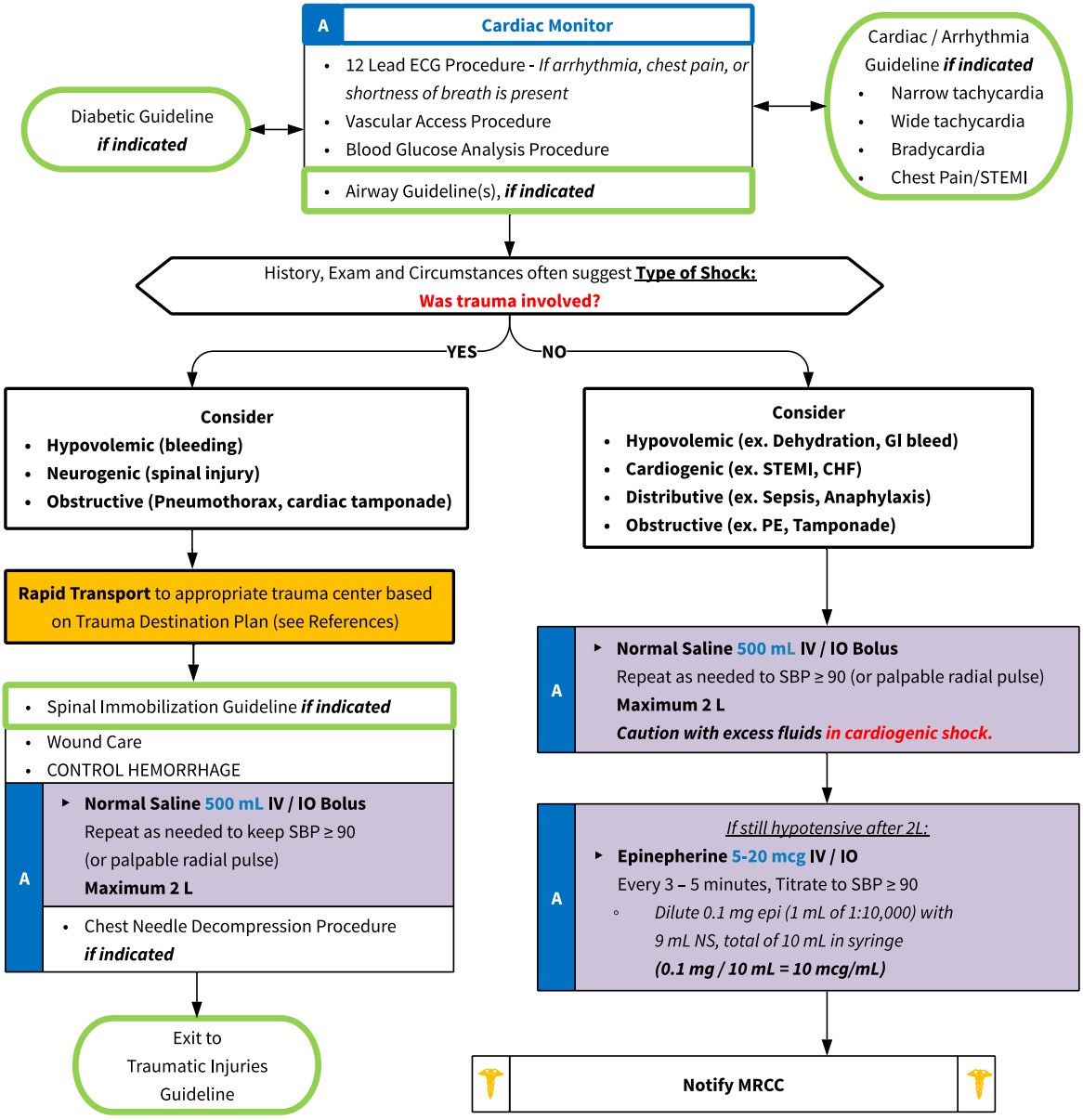
Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- Elevated blood pressure is based on at least two sets of vital signs, each several minutes apart.
- Defined as systolic > 140 or diastolic > 90.
- If patient is pregnant and in third trimester, consider pre-eclampsia and follow Obstetrical Emergencies Protocol.
- Symptomatic hypertension is typically revealed through end organ dysfunction to the cardiac, CNS or renal systems.
- All symptomatic patients with hypertension should be transported with their head elevated at 30 degrees.
- Ensure appropriate size blood pressure cuff utilized for body habitus.
- Reassure asymptomatic patients that high blood pressure is not an emergent problem, but rather a risk to health over a long period of time (months to years). This is a condition that can be safely managed in an outpatient setting.

Adult Hypotension/Shock

History	Signs and Symptoms	Differential

• Blood loss - vaginal or gastrointestinal bleeding, AAA, ectopic
• Fluid loss - vomiting, diarrhea, fever
• Infection
• Cardiac ischemia (MI, CHF)
• Medications
• Allergic reaction
• Pregnancy
• History of poor oral intake
	• Restlessness, confusion
	• Weakness, dizziness
	• Weak, rapid pulse
	• Pale, cool, clammy skin
	• Delayed capillary refill
	• Hypotension
	• Coffee-ground emesis
	• Tarry stools
		• Shock
		  ◦ Hypovolemic
		  ◦ Cardiogenic
		  ◦ Septic
		  ◦ Neurogenic
		  ◦ Anaphylactic
		• Ectopic pregnancy
		• Dysrhythmias
		• Pulmonary embolus
		• Tension pneumothorax
		• Medication effect / overdose
		• Vasovagal
		• Physiologic (pregnancy)



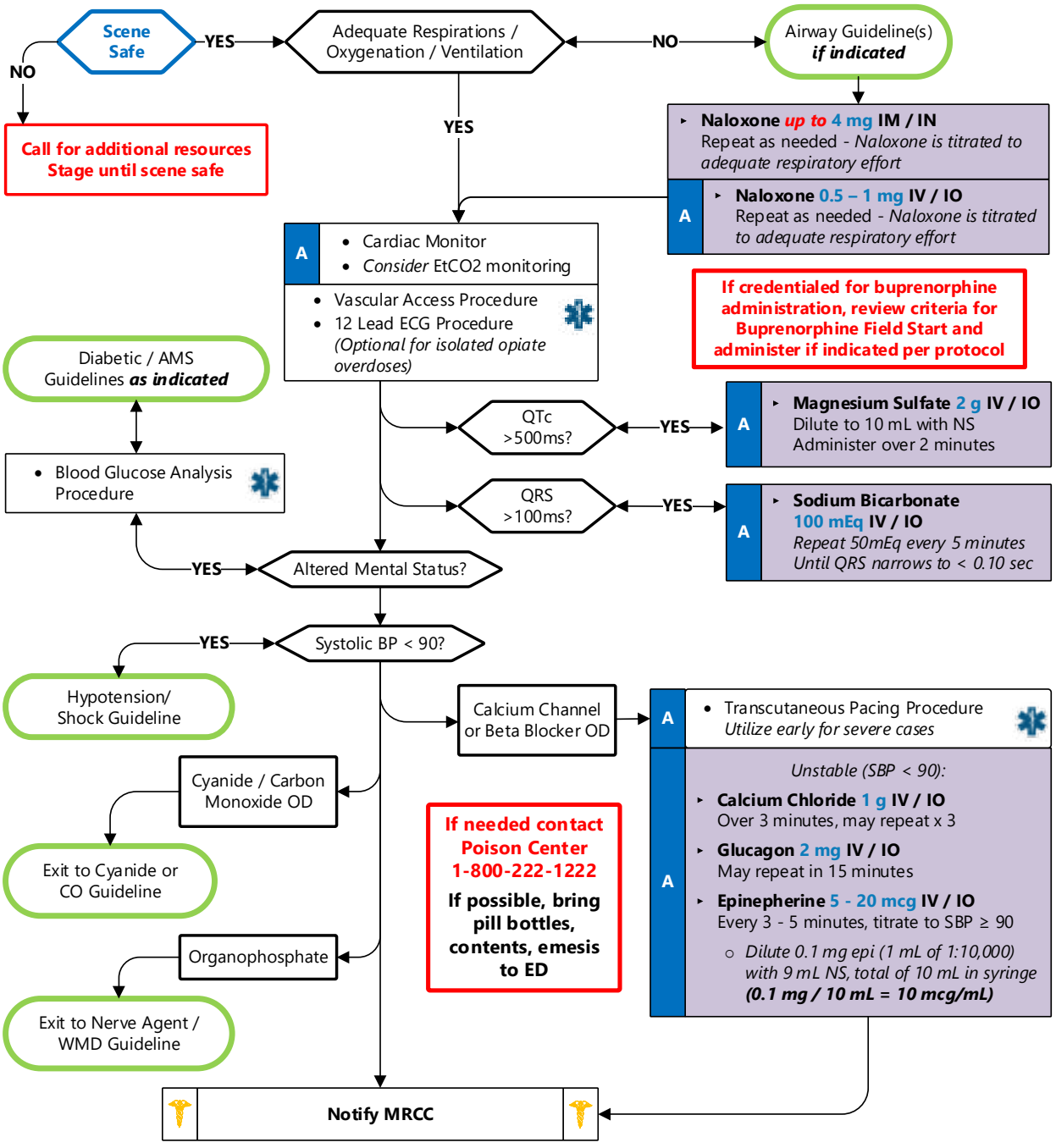
Adult Hypotension/Shock

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Hypotension is often defined as a systolic blood pressure of less than 90. This is not always reliable and should be interpreted in context and patient's typical BP if known. Shock may be present with a normal blood pressure initially. Fundamentally, shock is inadequate perfusion of body tissues.**
- **Shock often is present with normal vital signs and may develop insidiously. Tachycardia or tachypnea may be the only manifestation.**
- **Patients on beta-blocker medications may not demonstrate tachycardia. Conversely, tachycardia in a patient who is on beta-blockers should warrant aggressive shock management.**
- **Consider all possible causes of shock and treat per appropriate protocol.**
- **Hypovolemic Shock:**
  - Hemorrhage, trauma, GI bleeding, ruptured aortic aneurysm or pregnancy-related bleeding.
- **Cardiogenic Shock:**
  - Heart failure: MI, Cardiomyopathy, Myocardial contusion, Ruptured ventrical / septum / valve / toxins.
- **Distributive Shock:**
  - Sepsis (systemic infection)
  - Anaphylactic
  - Neurogenic: Hallmark is warm, dry, pink skin with normal capillary refill time and typically alert. Toxins
- **Obstructive Shock:**
  - Pericardial tamponade. Pulmonary embolus. Tension pneumothorax.
  - Signs may include hypotension with distended neck veins, tachycardia, unilateral decreased breath sounds or
  - muffled heart sounds.
- For non-cardiac hypotension, Pressors should only be started after 2 liters of NS have been given.

Adult Overdose/Ingestion

History	Signs and Symptoms	Differential
• Ingestion or suspected ingestion of a potentially toxic substance • Substance ingested, route, quantity • Time of ingestion • Reason (suicidal, accidental, criminal) • Available medications in home • Past medical history, medications	• Mental status changes • Hypotension / hypertension • Decreased respiratory rate • Tachycardia, dysrhythmias • Seizures • S.L.U.D.G.E. (see Pearls) • D.U.M.B.B.E.L.S (see Pearls)	• Tricyclic antidepressants (TCAs) • Acetaminophen (Tylenol) • Aspirin • Depressants • Stimulants • Anticholinergic • Cardiac medications • Solvents, Alcohols, Cleaning agents • Insecticides (organophosphates)



Adult Overdose/Ingestion

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- Overdose or Toxin patients with significant ingestions/exposures should be monitored very closely and aggressively treated as indicated. Do not hesitate to contact medical control for advice as certain critically ill overdose patients may quickly overwhelm medication supplies. For example, patients with a tricyclic overdose with a wide QRS and altered mental status should receive multiple sodium bicarbonate boluses until QRS narrowing and clinical improvement; patients with organophosphate toxicity with SLUDGE syndrome may require more atropine than is usually carried on the ambulance.
- For patients with Beta-blocker and Calcium Channel blocker overdoses and hemodynamic instability, high-dose insulin is an effective treatment which should be started early. Ensure adequate pre-notification is given for such patients as it takes time to obtain and prepare medications and equipment at the receiving hospital.
- Consider the need for law enforcement to assist with involuntary transport if suicidal intent is suspected or if patient does not appear to be in a state of mind conducive to making appropriate decisions for personal safety.
- **Do not rely on patient history of ingestion, especially in suicide attempts. Make sure patient is not carrying other medications or weapons.**
- **S.L.U.D.G.E: Salivation, Lacrimation, Urination, Defecation, GI distress, Emesis**
- **D.U.M.B.B.E.L.S: Diarrhea, Urination, Miosis, Bradycardia, Bronchorrhea, Emesis, Lacrimation, Salivation.**
- **Tricyclic**: 4 major areas of toxicity: decreased mental status, dysrhythmias, seizures, hypotension, then coma and death. There may be a rapid progression from alert mental status to death.
- **Acetaminophen**: initially normal or nausea/vomiting. If not detected and treated, causes irreversible liver failure
- **Aspirin**: Early signs consist of abdominal pain and vomiting. Tachypnea and altered mental status may occur later. Renal dysfunction, liver failure, and or cerebral edema among other things can take place later.
- **Depressants**: decreased HR, decreased BP, decreased temperature, decreased respirations, non-specific pupils
- **Stimulants**: increased HR, increased BP, increased temperature, dilated pupils, seizures
- **Anticholinergic**: increased HR, increased temperature, dilated pupils, mental status changes
- **Cardiac Medications**: dysrhythmias and mental status changes
- **Solvents**: nausea, coughing, vomiting, and mental status changes
- **Insecticides**: increased or decreased HR, increased secretions, nausea, vomiting, diarrhea, pinpoint pupils
- Consider restraints if necessary for patient's and/or personnel's protection per the Restraint Procedure.
- Nerve Agent Antidote kits contain 2 mg of Atropine and 600 mg of pralidoxime in an autoinjector for self administration or patient care. These are available in larger quantities as part of the CHEMPACK program. Deployment is coordinated through MRCC.
- Consider contacting the Regional Poison Center for guidance, either directly (1-800-222-1222) or through MRCC.

Adult Respiratory Emergency

History

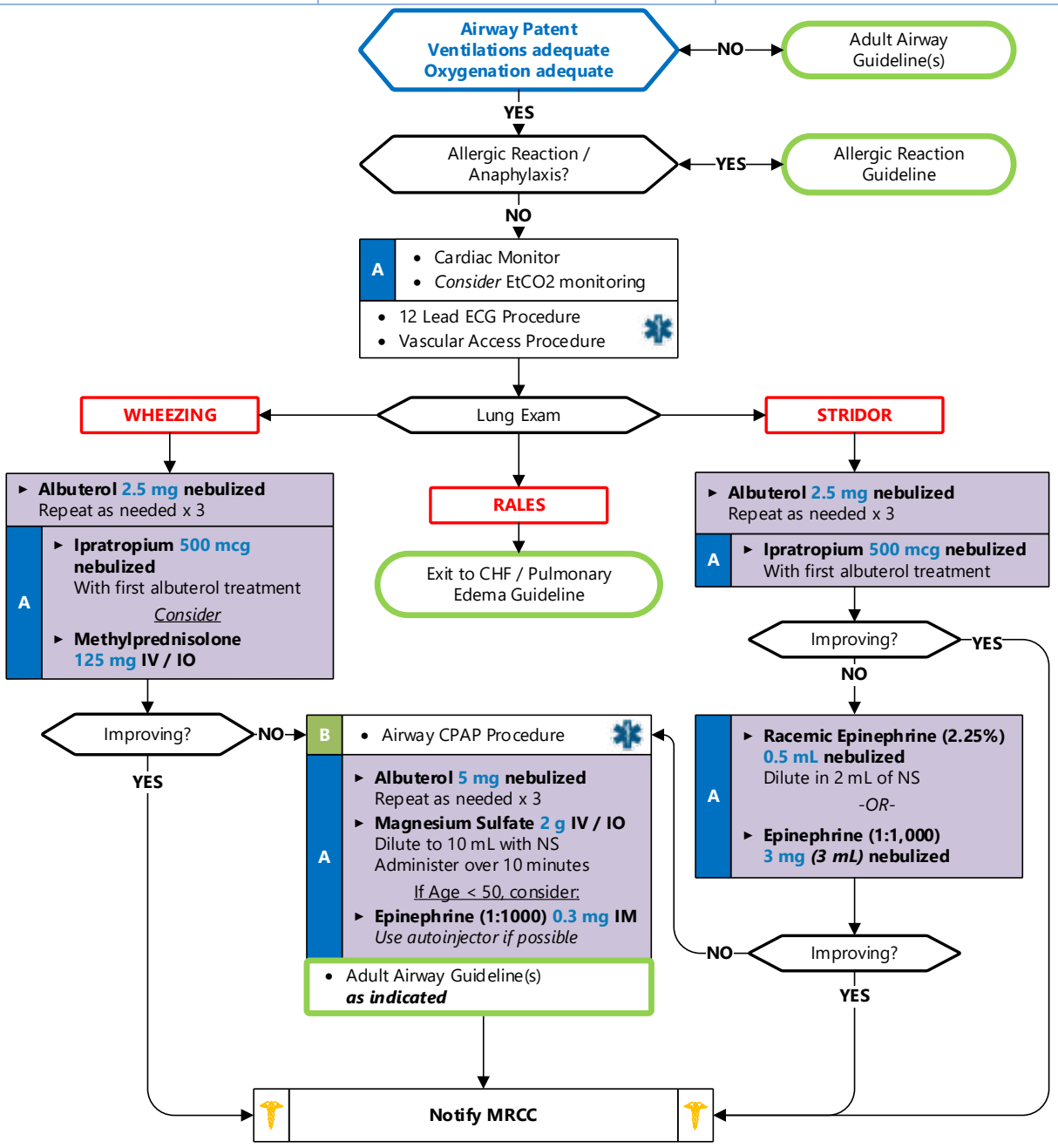
- Asthma; COPD -- chronic bronchitis, emphysema, congestive heart failure
- Home treatment (oxygen, nebulizer)
- Medications (theophylline, steroids, inhalers)
- Toxic exposure, smoke inhalation

Signs and Symptoms

- Shortness of breath
- Pursed lip breathing
- Decreased ability to speak
- Increased respiratory rate and effort
- Wheezing, rhonchi
- Use of accessory muscles
- Fever, cough
- Tachycardia

Differential

- Asthma
- Anaphylaxis
- Aspiration
- COPD (Emphysema, Bronchitis)
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pneumothorax
- Cardiac (MI or CHF)
- Pericardial tamponade
- Hyperventilation
- Inhaled toxin (Carbon monoxide, etc.)



Adult Respiratory Emergency

Factors	Asthma	COPD
Age when it starts	• Typically in childhood • Does not generally worsen with age	• Usually in later adulthood (but as soon as the early 40s) • Worsens over time
Triggers/Causes	• Allergens (dust, plants, animals, etc.) • Weather • Heredity	• Directly linked to smoking • Less commonly caused by inhaled fumes, pollution, dust, and chemicals
Symptoms	• Patient is often symptom free between attacks	• Chronic (occur almost all the time)
Airflow	• Usually treatment can quickly and fully restore airflow	• Can be partly restored by quitting smoking and taking prescribed medicines

Key Points:

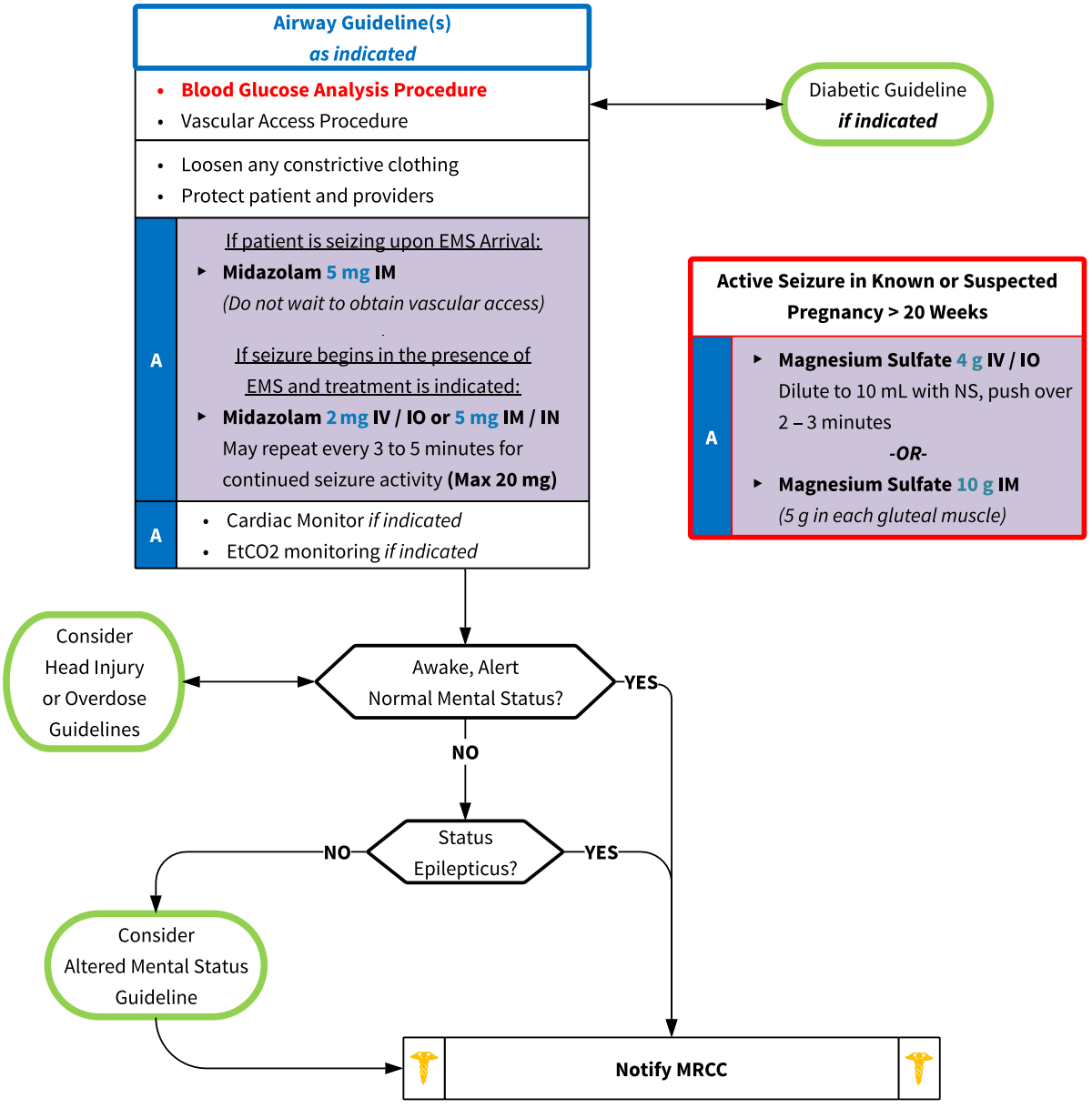
- Asthma is reversible and typically responds well to medications (albuterol, steroids, epinephrine for severe symptoms), as the underlying problem is inflammation and smooth muscle constriction.
- COPD is generally not reversible and responds poorly to medications, as the underlying problem is chronic inflammation leading to destruction of the airway supportive tissues. This results in less elasticity which leads to decreased effectiveness of bronchodilator medications.

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Pulse oximetry and End-Tidal Waveform Capnography should be monitored continuously for patients in persistent distress.**
- ETCO2 should be used when Respiratory Distress is significant and does not respond to initial Beta-Agonist dose.
- A silent chest in respiratory distress is a pre-respiratory arrest sign.
- **EMT-B may administer Albuterol inhaler if patient already prescribed, or nebulized if appropriately trained.**
- Consider Midazolam 1-2 mg IV to assist with CPAP compliance. Benzodiazepines may precipitate respiratory depression or may actually worsen compliance with CPAP in patients who are already tired, already with altered mental status, or who have recent history of alcohol or drug ingestion. All efforts at verbal coaching should be utilized prior to giving benzodiazepines for patients in respiratory distress.

Adult Seizure

History	Signs and Symptoms	Differential
• Reported / witnessed seizure activity • Previous seizure history • Medical alert tag information • Seizure medications • History of trauma • History of diabetes • History of pregnancy • Time of seizure onset • Document number of seizures • Alcohol use, abuse or abrupt cessation • Fever	• Decreased mental status • Sleepiness • Incontinence • Observed seizure activity • Evidence of trauma • Unconscious	• CNS (Head) trauma • Tumor • Metabolic, Hepatic, or Renal failure • Hypoxia • Electrolyte abnormality (Na, Ca, Mg) • Drugs, Medications, Non-compliance • Infection / Fever • Alcohol withdrawal • Eclampsia • Stroke • Hyperthermia • Hypoglycemia



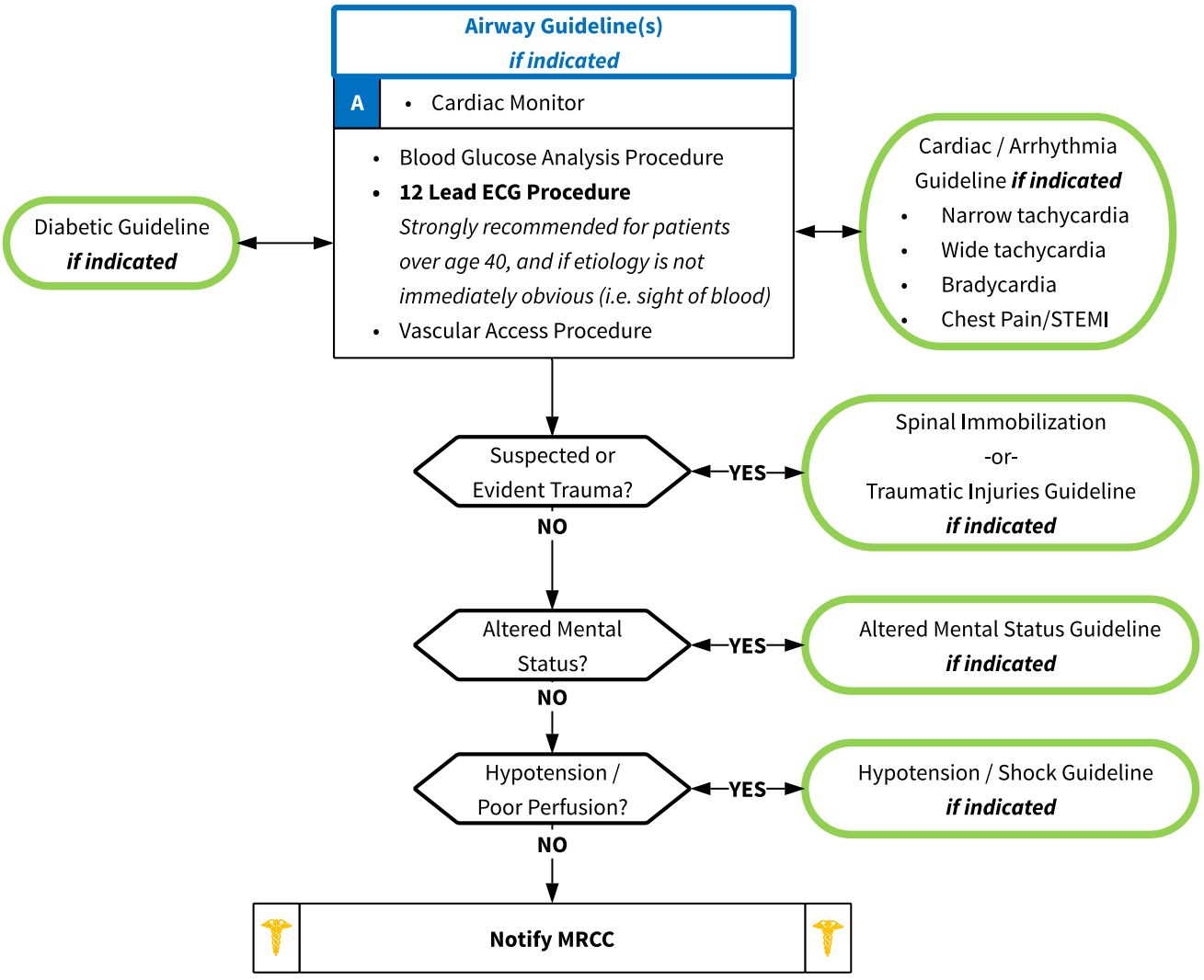
Adult Seizure

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Extremities, Neuro**
- **Midazolam 5 mg IM is effective in termination of seizures. Do not delay IM administration to obtain IV or IO access in an actively seizing patient.**
- **For a seizure that begins in the presence of EMS, if the patient was previously conscious, alert, and oriented, take time to assess and protect the patient and providers and consider the cause. The seizure may stop, especially in patients who have prior history of self-limiting seizures. However, do not hesitate to treat recurrent or prolonged (> 1 minute) seizure activity.**
- For the purposes of this protocol, **status epilepticus** is defined as two or more successive seizures without a period of consciousness or recovery, or one prolonged seizure lasting longer than 5 minutes. This is a true emergency requiring rapid airway control, treatment, and transport. The true definition of status epilepticus requires 30 minutes of uninterrupted seizure activity, or multiple seizures without return to baseline in between.
- **Grand mal seizures (generalized)** are associated with loss of consciousness. Often incontinence and/or tongue trauma is also present.
- **Focal seizures (petit mal)** affect only a part of the body and are not usually associated with a loss of consciousness
- Be prepared for airway problems and continued seizures.
- Assess for the possibility of occult trauma or substance abuse.
- Be prepared to assist ventilations and/or manage the airway especially if lorazepam or midazolam is used.
- For any seizure in a pregnant patient, follow the OB Emergencies Protocol.

Adult Syncope/Near-Syncope

History	Signs and Symptoms	Differential
• Cardiac history, stroke, seizure • Occult blood loss (GI, ectopic) • Females: LMP, vaginal bleeding • Fluid loss: nausea, vomiting, diarrhea • Past medical history • Medications	• Loss of consciousness with recovery • Lightheadedness, dizziness • Palpitations, slow or rapid pulse • Pulse irregularity • Decreased blood pressure	• Vasovagal • Orthostatic hypotension • Cardiac syncope • Micturition / Defecation syncope • Psychiatric • Stroke • Hypoglycemia • Seizure • Shock (see Shock Protocol) • Toxicological (Alcohol) • Medication effect (hypertension) • PE • AAA



San Francisco Syncope Rule

Can be used to predict patients having a high-risk for serious outcome (defined as death, myocardial infarction, arrhythmia, pulmonary embolism, stroke, subarachnoid hemorrhage, significant hemorrhage, or return visit to the hospital).

- History of CHF
- Hematocrit < 30% (not usually known to EMS providers)
- Any ECG abnormality
- Any shortness of breath
- SBP < 90 mm Hg on initial evaluation

Patients with 1 or more of the above findings should be evaluated in an emergency department.

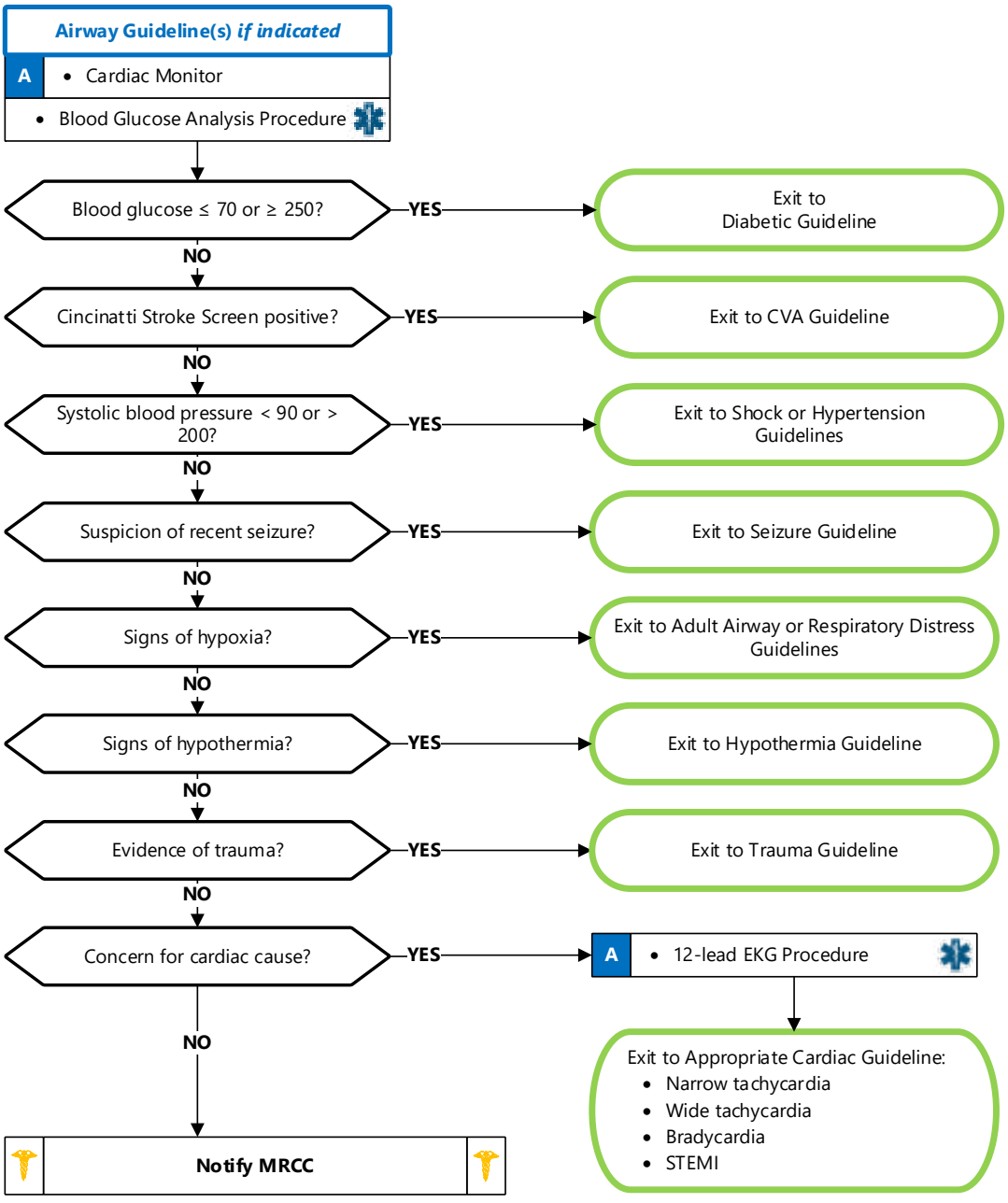
For patients under the age of 30 with none of the above findings and no other concerning symptoms or preexisting medical conditions, non-transport may be a reasonable consideration.

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Assess for signs and symptoms of trauma and/or head injury if associated with fall or if it's questionable whether the patient fell due to syncope.
- Consider dysrhythmias, GI bleed, ectopic pregnancy, and seizure as possible causes of syncope.
- Syncope patients should be transported as there is often a treatable etiology.
- Near-syncope is equivalent to syncope from a medical perspective.
- **More than 25% of geriatric syncope is cardiac dysrhythmia based.**

Adult Weakness

History	Signs and Symptoms	Differential
• Known diabetic • Known seizure disorder • Medical alert tag • Recent illnesses • Past medical history • Medications • Recent trauma • Prior CVA	• Decreased mental status or lethargy • Generalized lack of strength • Generalized lack of energy • Signs of acute coronary syndrome (chest pain, diaphoresis, shortness of breath, nausea)	• Trauma • CVA • Cardiac (MI) • Infection • Endocrine (hypothyroid, hypoglycemia) • Toxicologic • Hypoxia • Hypotension • Electrolyte abnormality • Conversion disorder



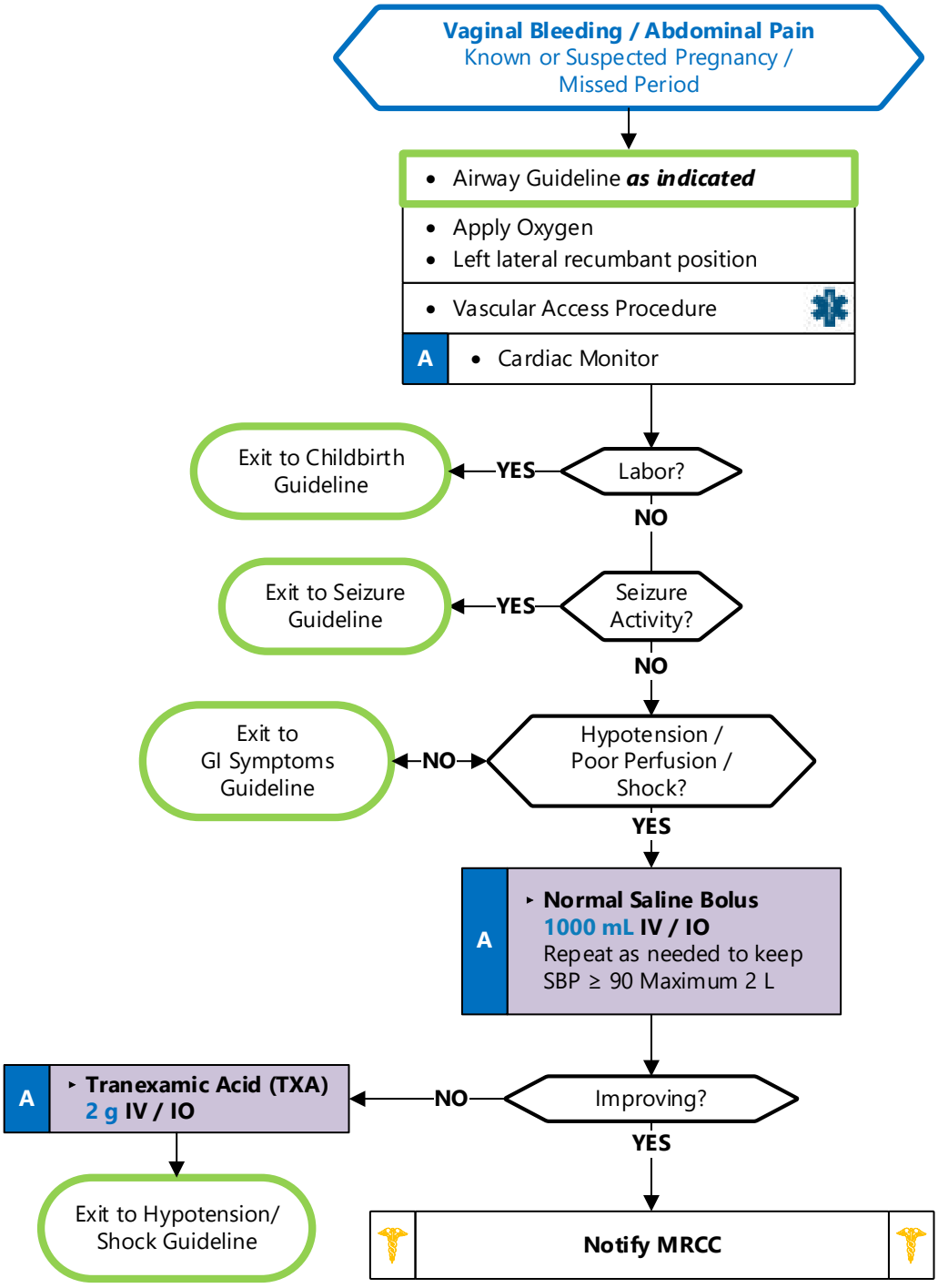
Adult Weakness

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Extremities, Neuro**
- Weakness is considered an anginal equivalent and can be the only sign of acute coronary syndrome or myocardial infarction particularly in those with cardiac history and the elderly.
- Be very deliberate in differentiating focal weakness suggestive of a stroke compared to generalized weakness which would be much less consistent with stroke.
- Isolated weakness has a broad differential and acquiring further history is essential to determine appropriate treatment plan.
- Medications are a common cause of weakness and attention should be given to patient's medication list
- Use caution ambulating patients that are weak due to concern for subsequent fall
- Patients with weakness rendering them unable to move around safely are likely unable to meet their basic needs and should be transported to the hospital; recommend consultation with medical control for refusals.

Obstetrical/Gynecologic Emergencies

History	Signs and Symptoms	Differential
• Past medical history • Hypertension meds • Prenatal care • Prior pregnancies / births • Gravida / Para	• Vaginal bleeding • Abdominal pain • Seizures • Hypertension • Severe headache • Visual changes • Edema of hands and face	• Pre-eclampsia / Eclampsia • Placenta previa • Placenta abruptio • Spontaneous abortion



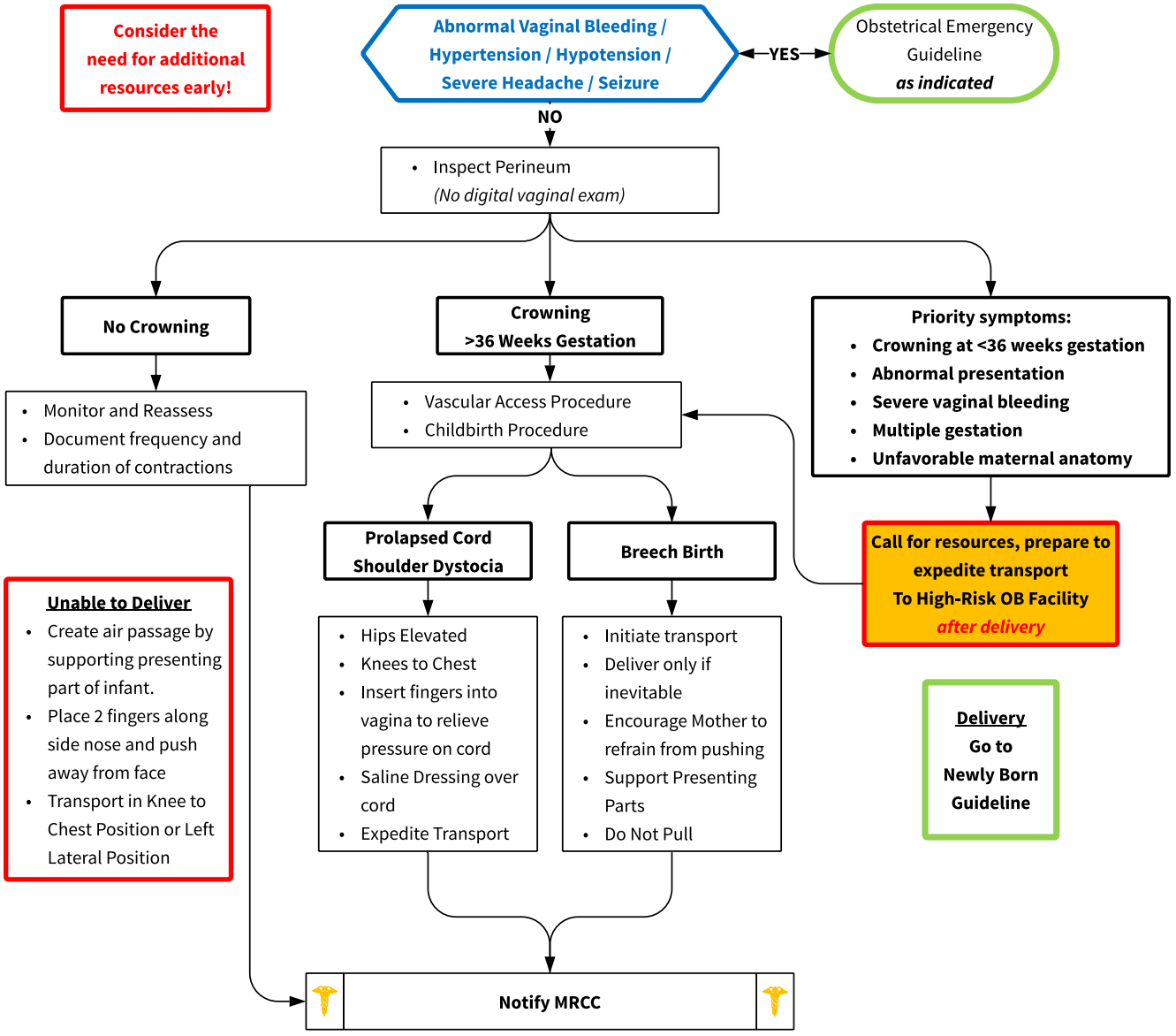
Pearls

- **Recommended Exam: Mental Status, Abdomen, Heart, Lungs, Neuro**
- Severe headache, vision changes, or RUQ pain may indicate preeclampsia.
- In the setting of pregnancy, hypertension is defined as a BP greater than 140 systolic or greater than 90 diastolic, or a relative increase of 30 systolic and 20 diastolic from the patient's normal (pre-pregnancy) blood pressure.
- Maintain patient in a left lateral position to minimize risk of supine hypotensive syndrome, which may occur as the fetus gets large enough to compress the vena cava.
- Oxygen should be provided regardless of O2 sats, as the baby is dependent on the mom's oxygen content.
- Ask patient to quantify bleeding - number of pads used per hour.
- **Any pregnant patient involved in a MVC should be seen immediately by a physician for evaluation. Greater than 20 weeks generally require several hours of fetal monitoring. DO NOT suggest that the patient needs an ultrasound.**
- A patient who is pregnant and seizing should be presumed to have eclampsia, a true medical emergency. **Refer to the Seizure Guideline for management.** Magnesium administration should be a priority in these patients. However, IM benzodiazepines may be given first due to rapidity of IM administration. For crews with two ALS providers, one provider should administer IM benzodiazepine while the other provider establishes IV access for Magnesium.

Childbirth and Complications

History	Signs and Symptoms	Differential

• Due date
• Onset and frequency of contractions
• Rupture of membranes
• Time / amount of vaginal bleeding
• Sensation of fetal activity
• Past medical and delivery history
• Medications
• Gravida / Para Status
• High Risk pregnancy
	• Spasmodic pain
	• Vaginal discharge or bleeding
	• Crowning or urge to push
	• Meconium
		• Abnormal presentation
		  ◦ Buttock
		  ◦ Foot
		  ◦ Hand
		• Prolapsed cord
		• Placenta previa
		• Abruptio placenta



APGAR SCORING

INDICATOR	0	1	2
HR	Absent	<100	>100
RR	Absent	Slow, irregular weak cry	Good vigorous cry
MUSCLE TONE	Flaccid, limp	Some flexion of extremities	Good flexion, active motion
REFLEX IRRITABILITY	NR	Weak cry and grimace	Vigorous cry, cough, sneeze
SKIN COLOR	Blue	Acrocyanosis	Pink

High Risk OB Receiving Facilities

- 20 – 32 weeks: United Hospital
- 28 – 32 weeks: St. John's Hospital (with approval)
- > 32 weeks: Closest appropriate facility

Pre-term Gestational Age Estimation

- Fingers/Toes fused together < 22 weeks
- Skin is gelatinous/red/translucent < 24 weeks
- Eyes fused shut < 26 weeks

Occassionally the fingers and toes will unfuse as early as 12 weeks gestation. If the other two findings are present, it is still possible the fetus is under 22 weeks gestational age.

Pearls

- **Recommended Exam (of Mother): Mental Status, Heart, Lungs, Abdomen, Neuro**
- Document all times (delivery, contraction frequency, and length).
- If maternal seizures occur, refer to the Obstetrical Emergencies Protocol.
- After delivery, massaging the uterus (lower abdomen) will promote uterine contraction and help to control post-partum bleeding.
- Some perineal bleeding is normal with any childbirth. Large quantities of blood or free bleeding are abnormal.
- Record APGAR at 1 minute and 5 minutes after birth.

Newborn Care and Resuscitation

History	Signs and Symptoms	Differential

• Due date and gestational age
• Multiple gestation (twins etc.)
• Meconium
• Delivery difficulties
• Congenital disease
• Medications (maternal)
• Maternal risk factors
  ◦ Substance abuse
  ◦ Smoking
	• Respiratory distress
	• Peripheral cyanosis or mottling (normal)
	• Central cyanosis (abnormal)
	• Altered level of responsiveness
	• Bradycardia
		• Airway failure
		• Hypovolemia / hemorrhage
		• Secretions
		• Respiratory drive
		• Infection
		• Maternal medication effect
		• Hypoglycemia
		• Congenital heart disease
		• Hypothermia

Airway Suctioning

- Routine suctioning of the newborn is no longer recommended

Clear amniotic fluid:

- Suction only when obstruction is present and / or if BVM is needed.

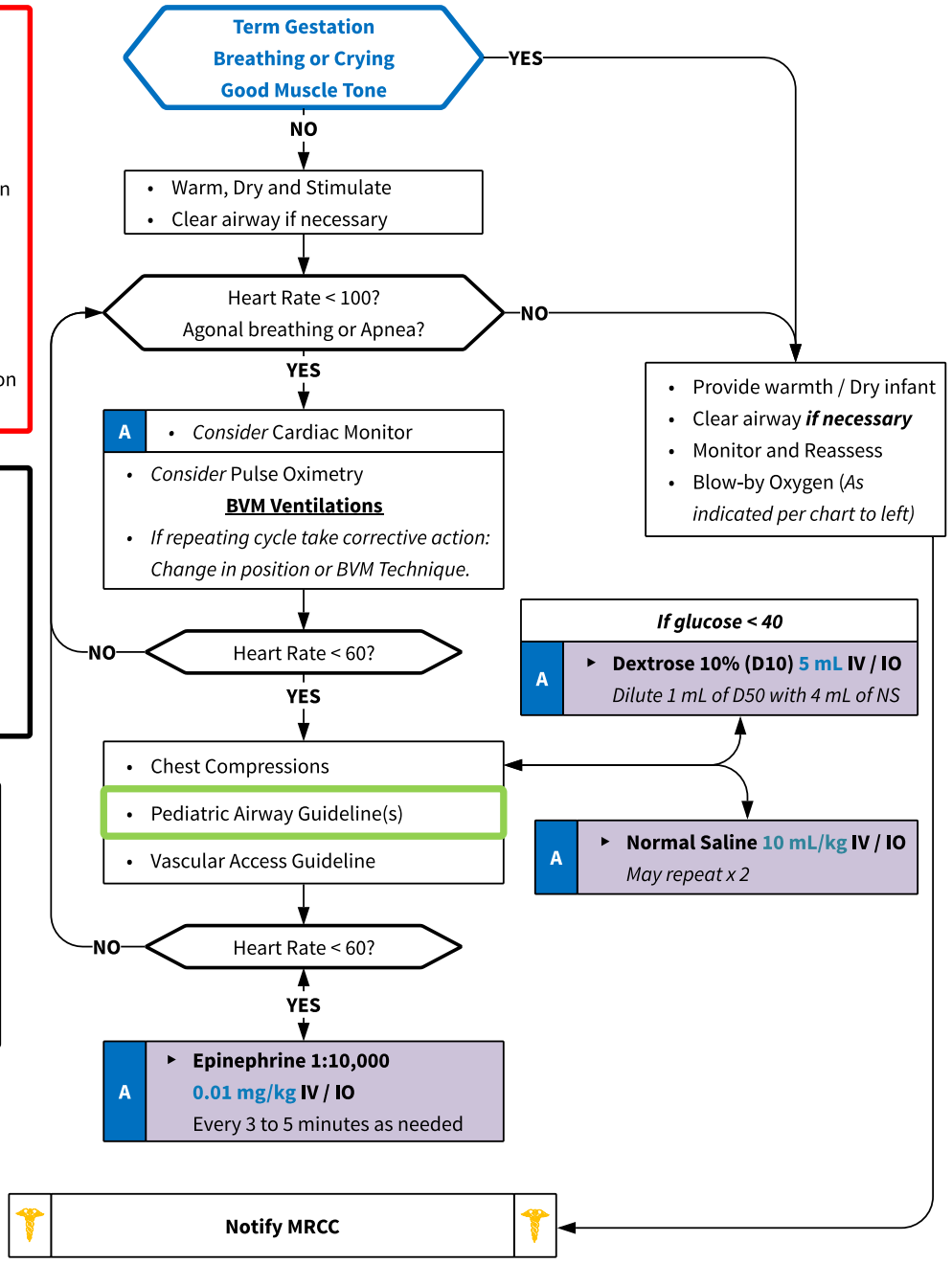
Meconium present:

- Non-vigorous newborns may require deep suction if no response to initial resuscitation efforts

- Most newborns requiring resuscitation will respond to ventilations / BVM, compressions and / or epinephrine.
- If not responding, consider hypovolemia and / or hypoglycemia (< 40).

Target SpO_2

1 min	60 – 65%
2 min	65 – 70%
3 min	70 – 75%
4 min	75 – 80%
5 min	80 – 85%
10 min	85 – 95%



APGAR SCORING

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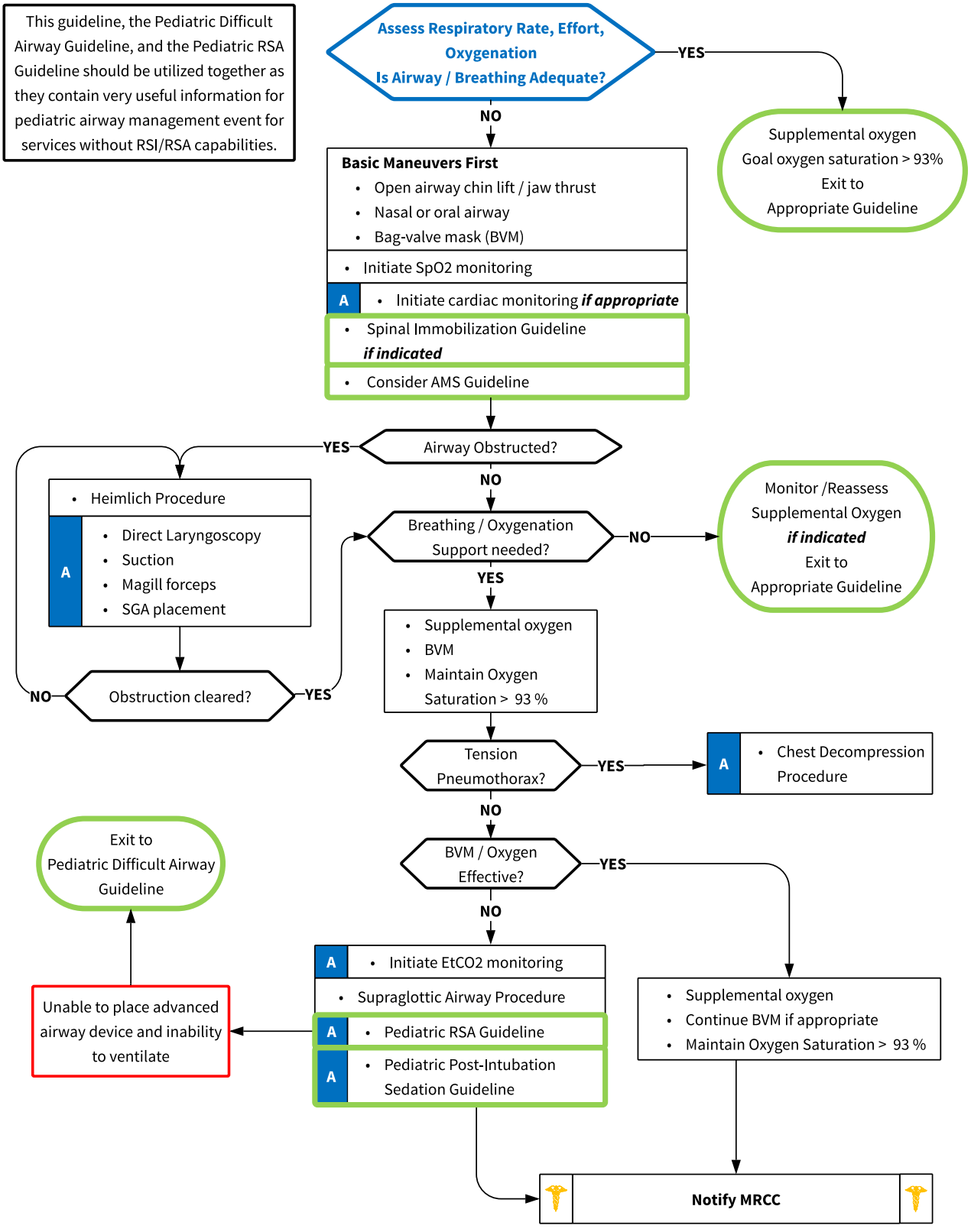
REFLEX IRRITABILITY	NR	Weak cry and grimace	Vigorous cry, cough, sneeze
SKIN COLOR	Blue	Acrocyanosis	Pink

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Chest, Heart, Abdomen, Extremities, Neuro**
- **Transport mother WITH infant when at all possible.**
- **Term gestation, strong cry / breathing and with good muscle tone generally will need no resuscitation.**
- **Most important vital signs in the newly born are respirations / respiratory effort and heart rate.**
- Heart rate best assessed by auscultation of the precordial pulse followed palpation of the umbilical pulse.
- Pulse oximetry should be applied to the right side of the body.
- **Expected pulse oximetry readings following birth:**
  - 1 minute = 60 - 65 %
  - 2 minutes = 65 – 70%
  - 3 minutes = 70 – 75 %
  - 4 minutes = 75 – 80 %
  - 5 minutes = 80 – 85 %
  - 10 minutes = 85 – 95%.
- CPR in newborns is 120 compressions/minute with a 3:1 compression to ventilation ratio.
- It is extremely important to keep infant warm
- Maternal sedation or narcotics will sedate infant (Naloxone NO LONGER recommended - supportive care only).
- Consider hypoglycemia in infant (Heel stick < 40).
- D10 = D50 diluted (1 ml of D50 with 4 ml of Normal Saline)
- Document 1 and 5 minute APGARs in PCR

This guideline, the Pediatric Difficult Airway Guideline, and the Pediatric RSA Guideline should be utilized together as they contain very useful information for pediatric airway management event for services without RSI/RSA capabilities.

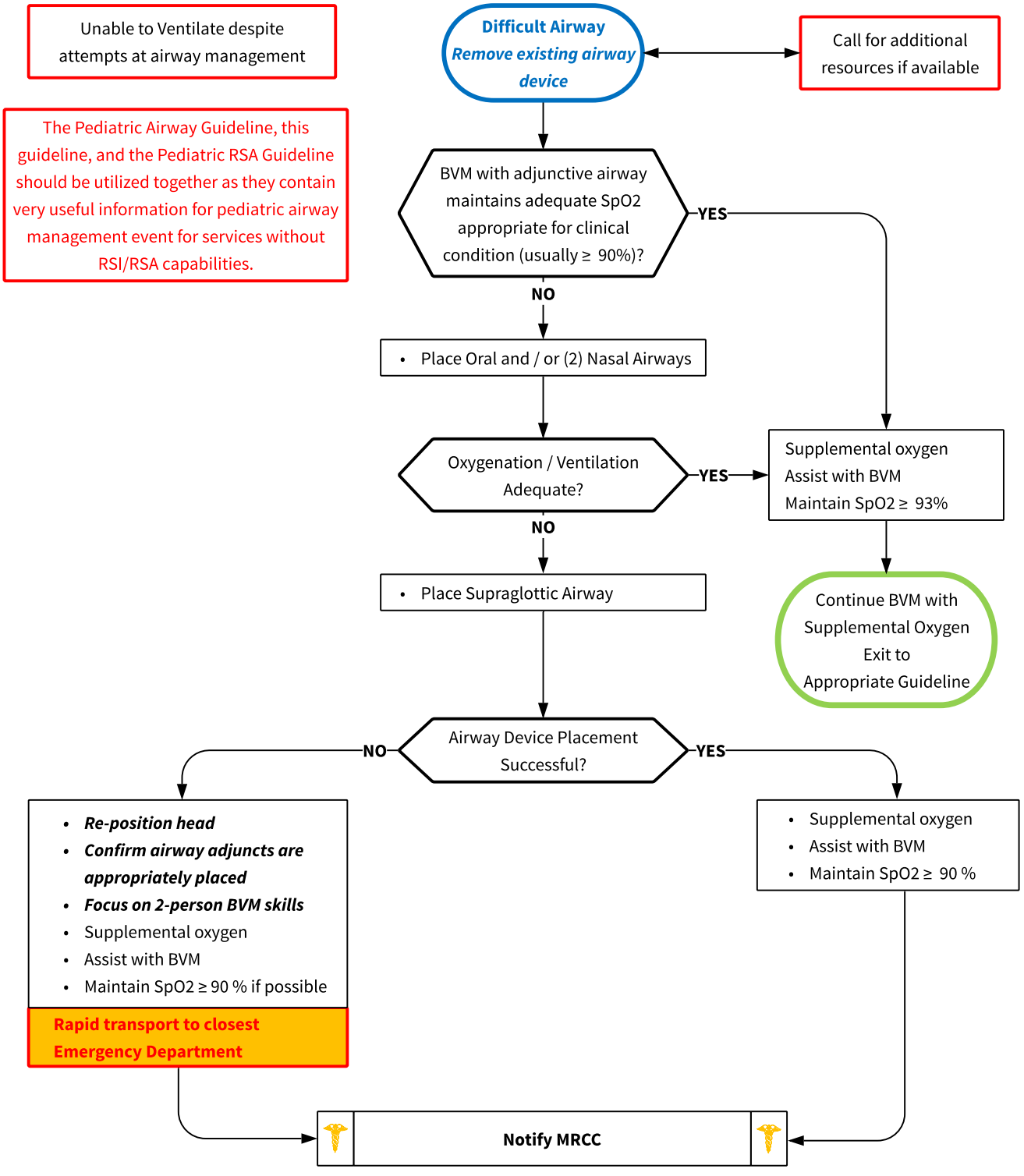


Pediatric Airway Management

Pearls

- **For this guideline, pediatric is defined as < 12 years of age, < 40 kg in weight, lack of signs of puberty, or any patient who can be measured within the Broselow-Luten tape.**
- **Continuous waveform capnography (EtCO2) is mandatory with all advanced airway placements. Document results.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of > 93% or stable/improving values consistent with clinical condition (e.g. pulse oximetry in the mid 80s post-drowning), it would be most appropriate to continue with basic airway measures instead of placing a supraglottic airway.**
- **For the purposes of this guideline, a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **Ventilatory rate should generally be 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 8-12 per minute. Goal ventilation rate should maintain EtCO2 between 35 and 45; AVOID HYPERVENTILATION.**
- **Hyperventilation in deteriorating head trauma should only be done to maintain an EtCO2 of 30-35.**
- Do not attempt advanced airway placement in patients who maintain a gag reflex.
- A gastric tube should be placed in all patients with a supraglottic airway, if time permits.
- It is important to secure the airway device well and consider c-collar (even in absence of trauma) to better maintain airway placement. Manual stabilization of the airway device should be used during all patient moves / transfers.

Pediatric Difficult Airway

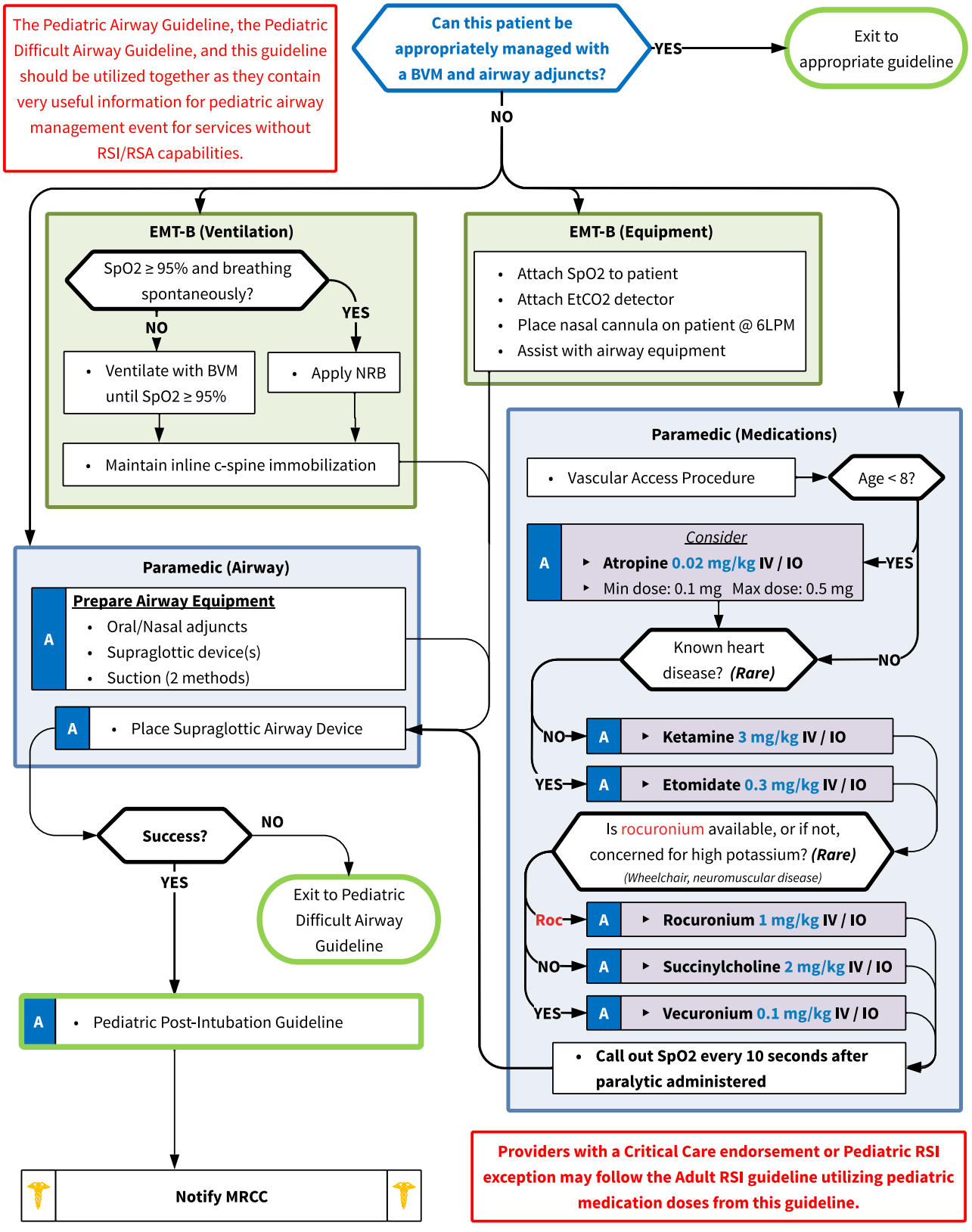


Pediatric Difficult Airway

Pearls

- **For this guideline, pediatric is defined as less than 12 years of age, < 40 kg in weight, lack of signs of puberty, or any patient which can be measured within the Broselow-Luten tape.**
- **Continuous waveform capnography (EtCO2) is mandatory with all advanced airway devices. Document results.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of ≥ 93% or stable/improving values appropriate to clinical condition (e.g. values in the mid 80s with a post-drowning patient), it would be most appropriate to continue with basic airway measures instead of using a King or LMA airway device.**
- **For the purposes of this guideline a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **Ventilatory rate should generally be 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 8-12 per minute. The goal rate maintains an EtCO2 between 35 and 45 and avoid hyperventilation.**
- **Hyperventilation in deteriorating head trauma should only be done to maintain an EtCO2 of 30-35.**
- A gastric tube placement should be placed in all patients with a supraglottic airway device, if time permits.
- It is important to secure the airway device well and consider c-collar (even in absence of trauma) to better maintain device placement. Manual stabilization of the airway device should be used during all patient moves / transfers.

Pediatric Rapid Sequence Airway



Pediatric Rapid Sequence Airway

Always weigh the risks and benefits of advanced airway management in the field against transport. All prehospital RSI/RSA interventions are considered high risk. If ventilation / oxygenation is adequate, transport may be the best option. The most important airway device and the most difficult to use correctly and effectively is the Bag Valve Mask. Few prehospital airway emergencies cannot be temporized or managed with proper BVM techniques.

Difficult Airway Assessment

Difficult King / SGA - RODS:

- **R**estricted mouth opening
- **O**bstruction / Obese or late pregnancy
- **D**istorted or disrupted airway
- **S**tiff or increased airway pressures (Asthma, COPD, Obese, Pregnant)

Trauma: Utilize in-line cervical stabilization during King/SGA or BVM use. During airway placement the cervical collar front should be open or removed to facilitate translation of the mandible / mouth opening.

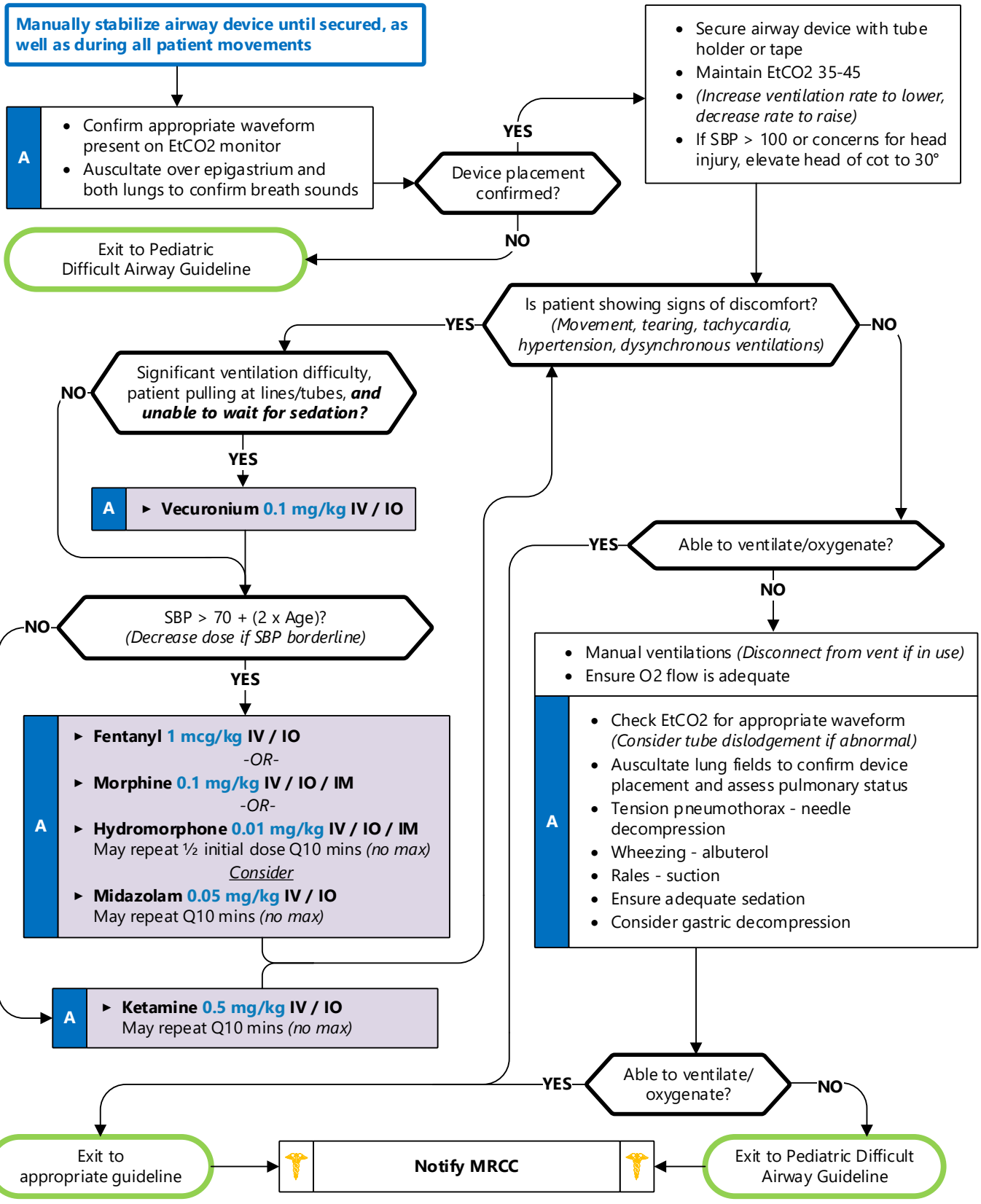
Indications for RSA

- Failure to protect the airway
- Inability to oxygenate Inability to ventilate
- Unstable hemodynamics/shock GSC < 9 in trauma
- Impending airway compromise

Pearls

- **This procedure requires at least 2 EMT-Paramedics**
- **Divide the workload – ventilate, suction, drugs, airway device placement**
- **Once a patient has been given a paralytic drug, YOU ARE RESPONSIBLE FOR VENTILATIONS if desaturation occurs**
- **Continuous Waveform Capnography and Pulse Oximetry are required for airway device verification and ongoing patient monitoring**
- **An airway is considered secure when the patient is receiving appropriate oxygenation and ventilation.**
- **An appropriate ventilatory rate is one that maintains an EtCO2 of 35-45. Avoid hyperventilation.**
- Protect the patient from self extubation when the drugs wear off. Longer acting paralytics may be needed post-airway placement.
- A gastric tube should be placed with all supraglottic airway devices to limit aspiration and decompress stomach, if time permits.
- Hyperventilation in deteriorating head trauma should only be done to maintain a EtCO2 of 30-35.
- It is important to secure the airway device well and consider c-collar (in absence of trauma) to better maintain airway device placement. Manual stabilization of the airway device should be used during all patient moves / transfers.

Pediatric Post-Intubation Management



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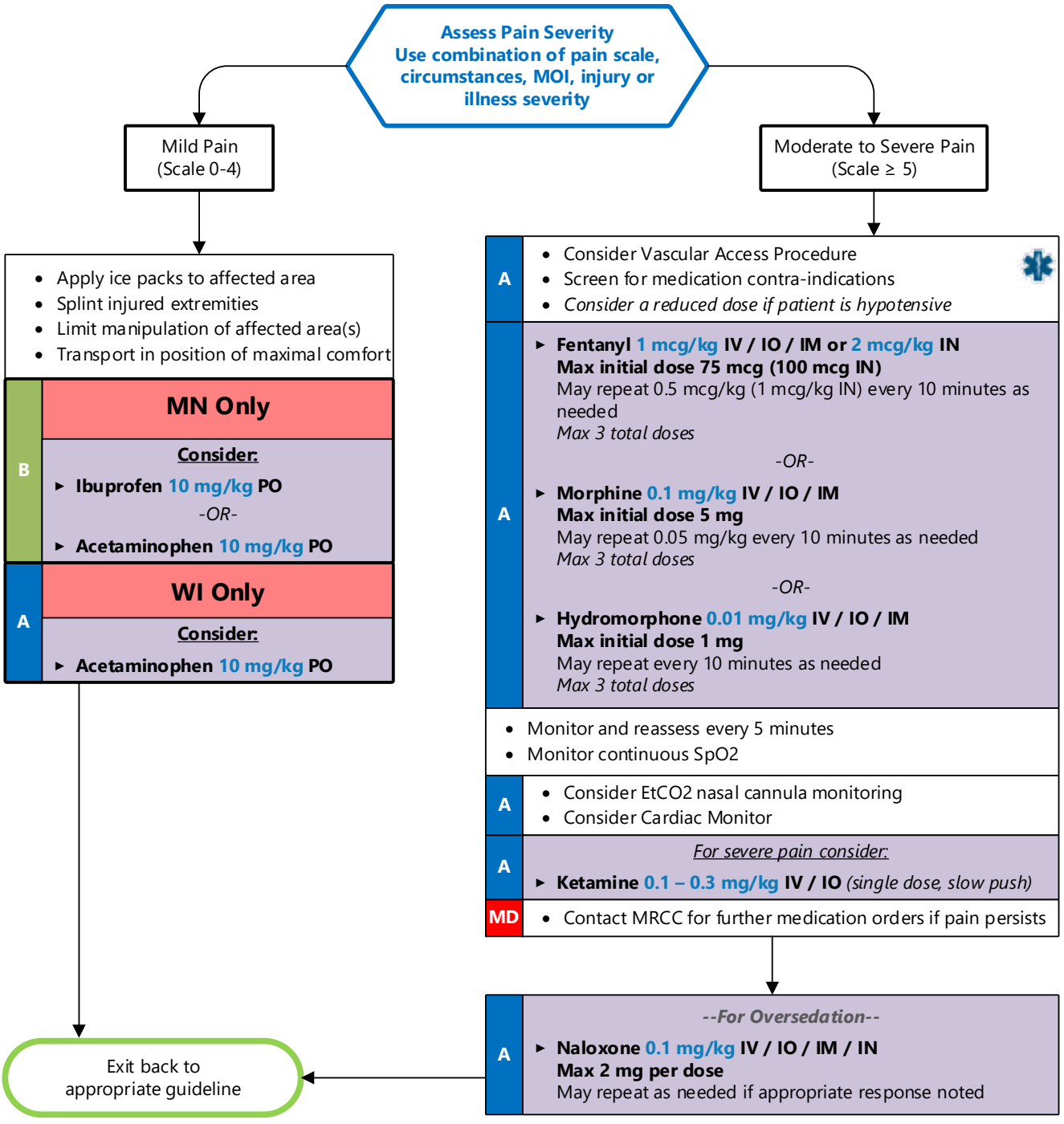
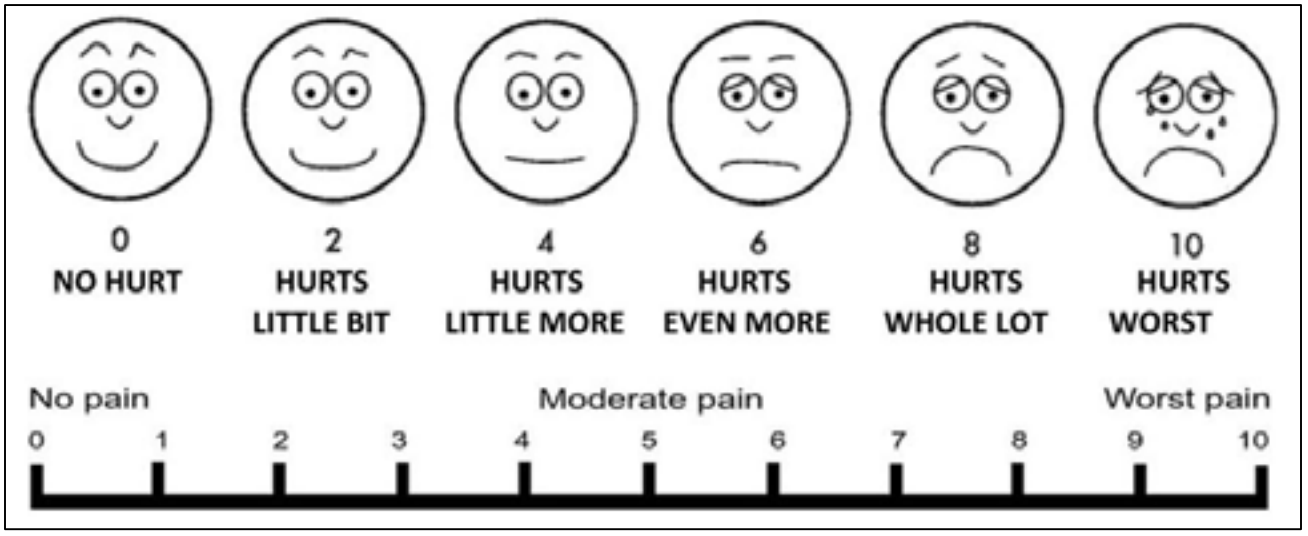
- Protect the patient from self extubation when the drugs wear off. Longer acting paralytics may be needed post-airway placement.
- A gastric tube should be placed with all supraglottic airway devices to limit aspiration and decompress stomach
- Hyperventilation should be avoided even with signs of deteriorating head trauma.
- It is important to secure the airway device well and consider c-collar (in absence of trauma) to better maintain airway device placement. Manual stabilization of the airway device should be used during all patient moves / transfers.

Pediatric Pain Management

History	Signs and Symptoms	Differential
• Age • Location • Duration • Severity (1 - 10) • If child use Wong-Baker faces scale • Past medical history • Medications • Drug allergies	• Severity (pain scale) • Quality (sharp, dull, etc.) • Radiation • Relation to movement, respiration • Increased with palpation of area	• Per the specific protocol • Musculoskeletal • Visceral (abdominal) • Cardiac • Pleural / Respiratory • Neurogenic • Renal (colic)



Wong-Baker Faces Scale



FLACC Pain Assessment Score

Parameter	0	1	2
Face	No expression	Occasional grimace	Frequent to constant quivering chin
Legs	Normal position or relaxed	Uneasy restless, tense	Kicking or legs drawn up
Activity	Lying quiet	Squirming, shifting back and forth,tense	Arched, rigid or jerking
Cry	No cry	Moans or whimpers	Crying steadily
Consolability	Content, relaxed	Reassurance, hugging	Difficult to console

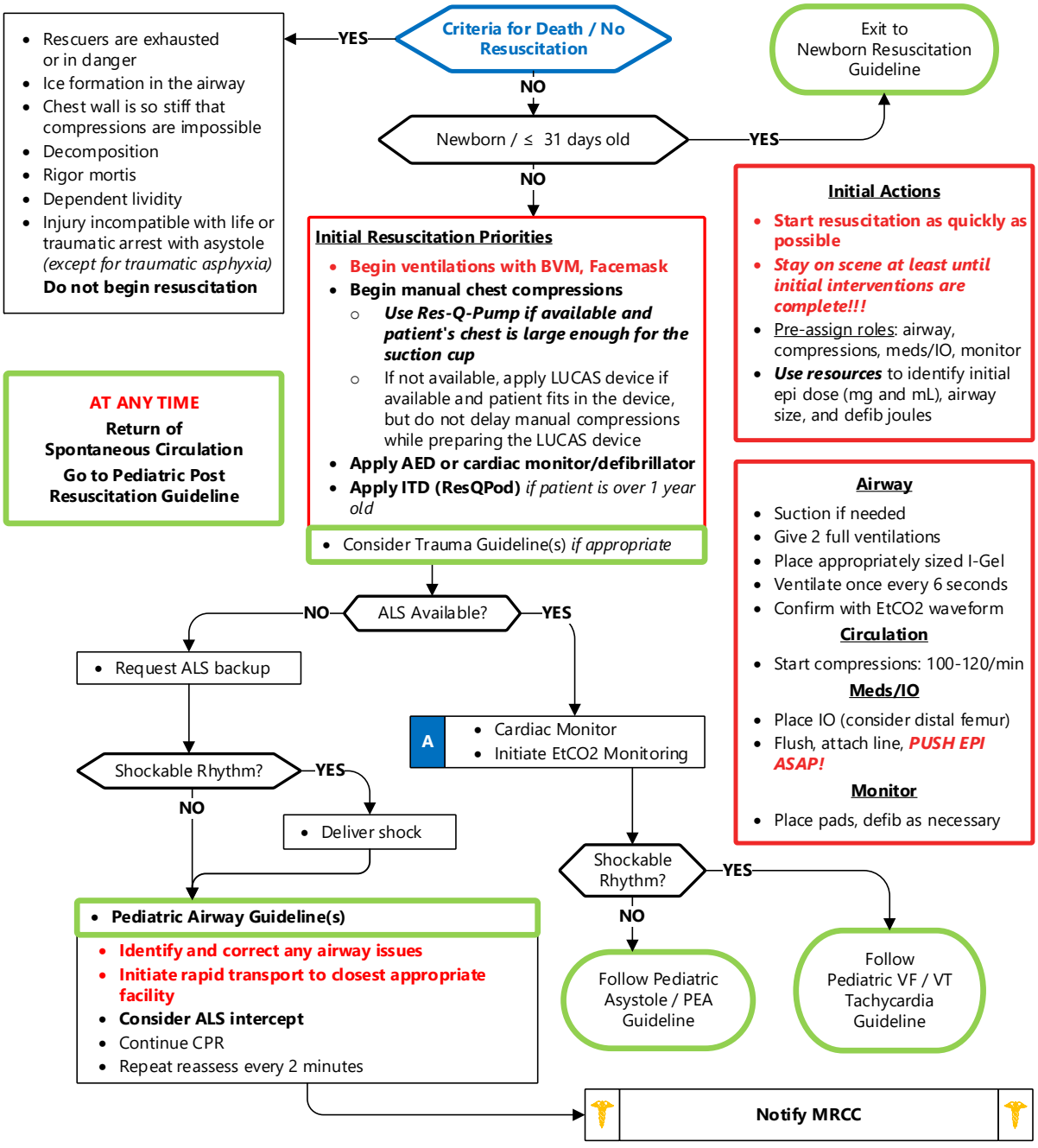
Score: 0, no pain; 1–3, mild pain; 4–7, moderate pain; 8–10, severe pain,
FLACC: Face, legs, activity, cry, consolability

Pearls

- **Recommended Exam: Mental Status, Area of Pain, Neuro**
- **USE EXTREME CAUTION in administering opioids to patients less than 10kg**
- **This guideline applies to patients less than 12 years of age, weight < 40 kg, lack of signs of puberty, or who can be measured on the Broselow-Luten tape. If a patient is larger than the Broselow-Luten tape, you may use the adult pain control guideline, realizing that the adult pain control guideline is also weight-based.**
- **Pain severity (0-10) is a vital sign to be recorded pre and post IV or IM medication delivery and at disposition.**
- **For children use Wong-Baker faces scale or the FLACC score**
- **Vital signs should be obtained pre, 5 minutes post, and at disposition with all pain medications.**
- **Contraindications to opioid use include hypotension, altered mental status, or respiratory distress.**
- All patients who receive IM or IV medications must be observed 15 minutes for drug reaction.
- Use Numeric (> 9 yrs), Wong-Baker faces (4-16yrs) or FLACC scale (0-7 yrs) as needed to assess pain

Pediatric Cardiac Arrest

History	Signs and Symptoms	Differential
• Time of arrest • Medical history • Medications • Possibility of foreign body • Hypothermia	• Unresponsive • Cardiac arrest	• Respiratory failure • Foreign body, Secretions, Infection • Hypovolemia (dehydration) • Congenital heart disease • Trauma • Tension pneumothorax, cardiac tamponade, pulmonary embolism • Hypothermia • Toxin or medication • Electrolyte abnormalities • Acidosis



Pediatric Cardiac Arrest

If pediatric defibrillation patches are not available, adult patches may be used.

Cardiac Arrest Code Commander Checklist

- Code Commander is identified
- Time Keeper is identified
- Monitor is visible and a dedicated provider is viewing the rhythm with all leads attached
- Confirm that quality compressions are ongoing at 100-120 beats per minute at a 15:2 ratio with ventilations. If an ET tube has been placed compressions should be continuous with ventilations every 2-3 seconds.
- ITD device in use (ResQPod) *only if patient is older than 1 year*
- Defibrillations are occurring at 2 minute intervals for shockable rhythms
- O2 cylinder with adequate oxygen is attached to *an appropriately sized* BVM
- EtCO2 waveform is present and value is being monitored
- Vascular access has been obtained (IV or IO) with IV fluids being administered *(consider distal femur as preferred IO site)*
- Underlying causes have been considered and treated early in arrest
- Gastric distention is not a factor
- Family is receiving care and is at the patient's side if desired

Post ROSC Cardiac Arrest Checklist

- **Airway**
  - ITD has been removed, ASSESS EtCO2 (should be >20 with good waveform)
  - Evaluate for post-resuscitation airway placement
  - Mask is available for BVM in case advanced airway fails
- **Breathing**
  - Check O2 supply and SpO2 to TITRATE to 94-99%
  - Do not try to obtain a "normal" EtCO2 by increasing respiratory rate
  - Avoid hyperventilation
- **Circulation**
  - Assign a provider to maintain FINGER on pulse during all patient movements
  - Continuous visualization of cardiac monitor rhythm
  - Evaluate cardiac rhythm
  - Assess for & TREAT bradycardias < 60 bpm. Resume chest compressions if pulse drops below 60 bpm.
  - Obtain Blood Pressure - Consider pressor agent(s) for SBP < 70 + 2 x Age
  - When patient is moved, perform CONTINUOUS PULSE CHECKS and monitoring of cardiac rhythm
- **Other**
  - Once in ambulance, confirm pulse, breath sounds, SpO2, EtCO2, and cardiac rhythm
  - Appropriate personnel present in the back of the ambulance for transport

Pearls

- **Recommended Exam: Mental Status**
- **Efforts should be directed at high quality compressions with limited interruptions and early defibrillation when indicated. Compress ≥ 1/3 anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches. Consider early IO placement if available and / or difficult IV access anticipated.**
- **DO NOT HYPERVENTILATE: Ventilate at a 15:2 compressions-to-ventilations ratio. If an ET tube has been placed, ventilate every 2-3 seconds.**
- **Do not interrupt compressions to place airway device.**
- Airway is the most important intervention in pediatric arrests. This should be accomplished quickly with BVM or supraglottic device. Patient survival is often dependent on proper ventilation and oxygenation / airway interventions.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work. Utilize Team Focused "Code Commander" Approach assigning responders to predetermined tasks.
- Team Focused Approach / Pit-Crew Approach.
- Reassess and document airway device and EtCO2 frequently, after every move, and at transfer of care.
- In order to be successful in pediatric arrests, a cause must be identified and corrected.

Pediatric V-Fib/Pulseless V-Tach

History
- Events leading to arrest
- Estimated downtime
- Past medical history
- Medications
- Existence of terminal illness
- Airway obstruction
- Hypothermia

Signs and Symptoms
- Unresponsive
- Cardiac Arrest

Differential
- Respiratory failure / Airway obstruction
- Hyper / hypokalemia
- Hypovolemia
- Hypothermia
- Hypoglycemia
- Acidosis
- Tension pneumothorax
- Tamponade
- Toxin or medication
- Thrombosis: Coronary / Pulmonary Embolism
- Congenital heart disease

Every 10 minutes

A
- **Sodium Bicarbonate 1 mEq/kg IV / IO**
  (May cause an artificial increase in $EtCO_2$ readings)

Torsades de pointes

A
- **Magnesium Sulfate 40 mg/kg IV / IO**
  May repeat every 5 minutes
  Maximum 2 g

Charge AED, deliver shock

A
- **Defibrillation Procedure 2 Joules/kg**

- **Begin Chest Compressions**
  - Push Hard (1.5 inches Infant / 2 inches in children)
  - Push Fast (≥ 100 min)
- *Pediatric Airway Guideline(s)*
- Vascular Access Guideline

AT ANY TIME

Return of Spontaneous Circulation

Go to Pediatric Post Resuscitation Guideline

- **Begin Chest Compressions**
  - Push Hard (1.5 inches Infant / 2 inches in children)
  - Push Fast (≥ 100 min)

A
- **Epinephrine (1:10,000) 0.01 mg/kg IV / IO**
  Max 1 mg each dose
  Repeat every 5 CPR cycles (10 minutes)
- **Normal Saline Bolus 20 mL/kg IV / IO**
  May repeat as needed **Maximum 60 mL/kg**
- **Amiodarone 5 mg/kg IV / IO**
  Maximum initial dose 300 mg
  Repeat every 5 minutes, max dose 150 mg
  Maximum total dose 15 mg/kg

  -- OR if amiodarone is not available --
- **Lidocaine 1 mg/kg IV / IO**
  May repeat **0.5 mg/kg** x4 every 10 minutes

- **Pulse and rhythm check every 2 minutes**
- Ultrasound Procedure *(if available)*

Shockable rhythm? **NO** → Pulse present? **NO** → Exit to Asystole / PEA Guideline

Shockable rhythm? **YES**

Pulse present? **YES** → Exit to Post Resuscitation Guideline

- **Charge AED, deliver shock**

A
- **Defibrillation Procedure 4 Joules/kg**

Consider early transport in all pediatric arrests

Notify MRCC

Pediatric Shockable Rhythm Timeline
V-Fib / V-Tach

	BLS Provider Compressions	BLS Provider Ventilations	ALS Provider Monitor/Airway	ALS Provider Medications
Arrival	Start CPR Prepare LUCAS device if appropriate size for patient	BVM + ITD (ResQPod)	Shock 2 J/kg Apply cardiac monitor	Vascular Access Infuse normal saline
2 minutes	Restart CPR immediately after pulse/rhythm check	Monitor EtCO2	Shock 4 J/kg Prepare airway equipment	Epinephrine 0.01 mg/kg (1:10,000) Max 1 mg
4 minutes	Restart CPR immediately after pulse/rhythm check	Assist with airway management	Shock 4 J/kg Airway management	Amiodarone 5 mg/kg -or- Lidocaine 1 mg/kg (repeat x1 in 10 minutes)
6 minutes	Restart CPR immediately after pulse/rhythm check	Ongoing ventilations at an appropriate rate	Shock 4 J/kg	
8 minutes	Restart CPR immediately after pulse/rhythm check		Shock 4 J/kg	Amiodarone 5 mg/kg -or- Lidocaine 1 mg/kg
10 minutes	Restart CPR immediately after pulse/rhythm check		Shock 4 J/kg	Sodium Bicarbonate 1 mEq/kg Repeat every 10 minutes
12 minutes	Restart CPR immediately after pulse/rhythm check		Shock 4 J/kg	Epinephrine 0.01 mg/kg (1:10,000) Max 1 mg Repeat every 10 minnutes

H's/T's

- **Hypovolemia**
- **Hypoxia**
- Hydrogen ion (acidosis)
- Hypothermia
- Hypo / Hyperkalemia
- Hypoglycemia
- Tension pneumothorax
- Tamponade; cardiac
- **Toxins**
- Thrombosis; pulmonary (PE)
- Thrombosis; coronary (MI)

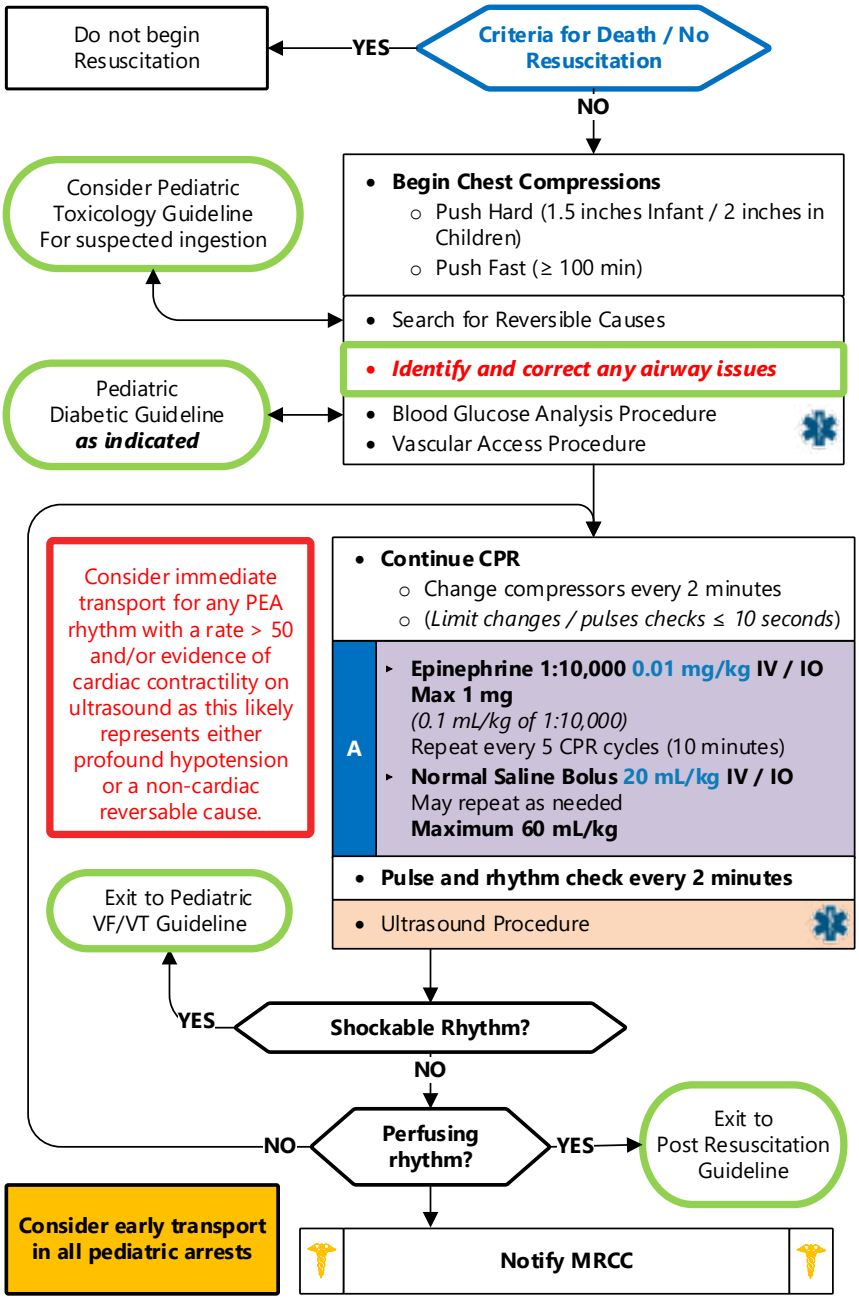
It is always important to perform a thorough physical exam and obtain a SAMPLE history to identify any reversible causes of cardiac arrest.

Pearls

- **Efforts should be directed at high quality compressions with limited interruptions and early defibrillation when indicated. Compress ≥ 1/3 anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches. Consider early IO placement if available and / or difficult IV access anticipated.**
- **DO NOT HYPERVENTILATE: Ventilations should be at a 15:2 compressions-to-ventilations ratio. If an ET tube has been placed ventilate every 2-3 seconds.**
- **Limit chest compression interruptions when placing airway device.**
- Airway is a more important intervention in pediatric arrests. This should be accomplished quickly with BVM or supraglottic device. Patient survival is often dependent on proper ventilation and oxygenation / airway interventions
- In order to be successful in pediatric arrests, a cause must be identified and corrected.
- Respiratory arrest is a common cause of cardiac arrest. Unlike adults early airway intervention is critical.
- In most cases pediatric airways can be managed by basic interventions and/or BVM.
- Reassess and document airway device placement and EtCO2 frequently, after every move, and at transfer of care.

Pediatric Asystole/PEA

History	Signs and Symptoms	Differential
• Events leading to arrest • Estimated downtime • Past medical history • Medications • Existence of terminal illness • Airway obstruction • Hypothermia • Suspected abuse; shaken baby syndrome, pattern of injuries • SIDS	• Unresponsive • Cardiac Arrest • Signs of lividity or rigor	• Respiratory failure • Foreign body • Hyperkalemia • Infection (croup, epiglotitis) • Hypovolemia (dehydration) • Congenital heart disease • Trauma • Tension pneumothorax • Hypothermia • Toxin or medication • Hypoglycemia • Acidosis



AT ANY TIME

Return of Spontaneous Circulation

Go to Pediatric Post Resuscitation Guideline

Reversible Causes

- **Hypovolemia**
- **Hypoxia**
- Hydrogen ion (acidosis)
- Hypothermia
- Hypo / Hyperkalemia
- Hypoglycemia
- Tension pneumothorax
- Tamponade (cardiac)
- **Toxins**
- Thrombosis (pulmonary - PE)
- Thrombosis (coronary - MI)

Consider Early for PEA

- Normal Saline boluses
- Dextrose 1 g/kg IV / IO
- Toxicology guideline for suspected beta blocker or calcium channel blocker overdose
- Calcium Chloride 20 mg/kg IV / IO for suspected hyperkalemia or hypocalcemia
- Sodium Bicarbonate 1 mEq/kg IV / IO for possible overdose, hyperkalemia, renal failure
- Chest Decompression

Pediatric Non-shockable Rhythm Timeline
Asystole / PEA

	BLS Provider Compressions	BLS Provider Ventilations	ALS Provider Monitor/Airway	ALS Provider Medications
Arrival	Start CPR Prepare LUCAS device if appropriate size for patient	BVM + ITD (ResQPod)	Apply cardiac monitor	Vascular Access Infuse normal saline
2 minutes	Restart CPR immediately after pulse/rhythm check	Monitor EtCO2	Check monitor Prepare airway equipment	Epinephrine 0.01 mg/kg (1:10,000) Max 1 mg
4 minutes	Restart CPR immediately after pulse/rhythm check	Assist with airway management	Check monitor Airway management	Review H's/T's Interventions as indicated
6 minutes	Restart CPR immediately after pulse/rhythm check	Ongoing ventilations at an appropriate rate	Check monitor	Sodium Bicarbonate 1 mEq/kg Repeat every 10 minutes
8 minutes	Restart CPR immediately after pulse/rhythm check		Check monitor	
10 minutes	Restart CPR immediately after pulse/rhythm check		Check monitor	
12 minutes	Restart CPR immediately after pulse/rhythm check		Check monitor	Epinephrine 0.01 mg/kg (1:10,000) Max 1 mg Repeat every 10 minnutes

H's/T's

- **Hypovolemia**
- **Hypoxia**
- Hydrogen ion (acidosis)
- Hypothermia
- Hypo / Hyperkalemia
- Hypoglycemia
- Tension pneumothorax
- Tamponade; cardiac
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- In most cases pediatric airways can be managed by basic interventions and/or BVM.
- Reassess and document airway device placement and EtCO2 frequently, after every move, and at transfer of care.

Pediatric Post-Resuscitation Management

History	Signs and Symptoms	Differential
• Respiratory arrest • Cardiac arrest	• Return of pulse	• Continue to address specific differentials associated with the original dysrhythmia

Arrhythmias are common and usually self limiting after ROSC. If arrhythmia persists, follow appropriate guideline:
- Tachycardia
- Bradycardia

Repeat Primary Assessment

- **Optimize Ventilation and Oxygenation**
  - Remove ITD (ResQPod)
  - Goal SpO2 ≥ 94%, ETCO2 35 – 45 mm Hg
  - DO NOT HYPERVENTILATE

A
- Cardiac Monitor
- Airway Guideline ***if indicated***
- Vascular Access Procedure ***if indicated***
- 12 Lead ECG Procedure
- Monitor Vital Signs / Reassess

Hypotension Age-Based

0 – 28 Days
< 60 mmHg

1 Month to 1 Year
< 70 mmHg

1 to 11 Years
< 70 + (2 x age) mmHg

12 Years and older
< 90 mmHg

A
- **Normal Saline Bolus 20 mL/kg IV / IO**
  May repeat to **60 mL/kg** if lungs remain clear
- **Epinepherine 1 mcg/kg (0.1 mL/kg) IV / IO**
  Max 20 mcg (2 mL) per dose
  Every 3 – 5 minutes
  Titrate to SBP ≥ (70 + 2 x Age)
  - *Dilute 0.1 mg epi (1 mL of 1:10,000) with 9 mL NS, total of 10 mL in syringe* ***(0.1 mg / 10 mL = 10 mcg/mL)***

Hypotension Age-based? — **YES** → A
NO

Blood Glucose ≤ 69 or ≥ 250? — **YES** → Pediatric Diabetic Guideline
NO

Symptomatic Bradycardia? — **YES** → Pediatric Bradycardia Guideline
NO

Symptomatic Tachycardia? — **YES** → Pediatric Tachycardia Guideline
NO

Post-Intubation Sedation Guideline ***If indicated***

Notify MRCC

Pediatric Post-Resuscitation Management

Post ROSC Cardiac Arrest Checklist

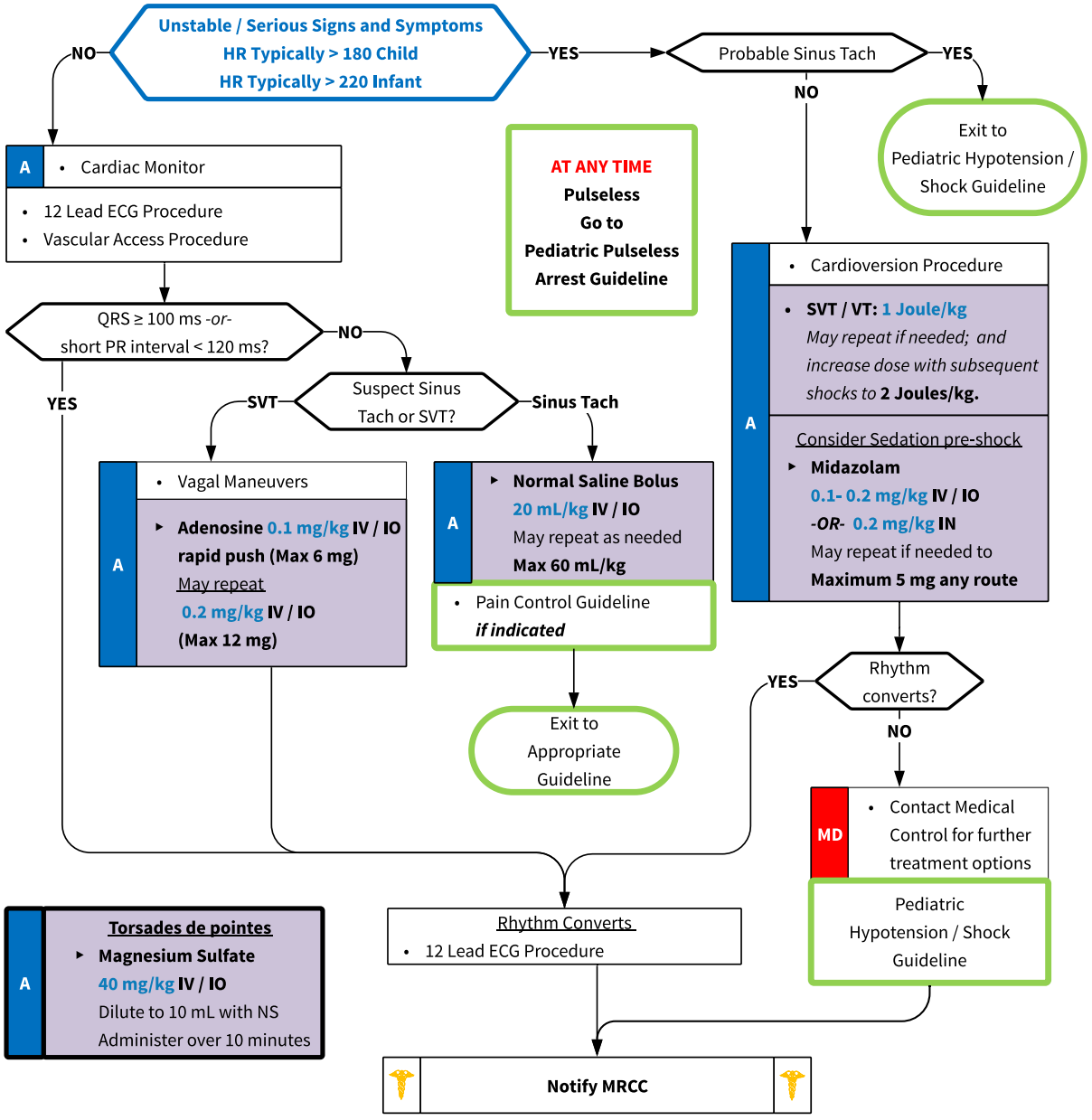
- **Airway**
  - ITD has been removed, ASSESS EtCO2 (should be >20 with good waveform)
  - Evaluate for post-resuscitation airway placement
  - Mask is available for BVM in case advanced airway fails
- **Breathing**
  - Check O2 supply and SpO2 to TITRATE to 94-99%
  - Do not try to obtain a "normal" EtCO2 by increasing respiratory rate
  - Avoid hyperventilation
- **Circulation**
  - Assign a provider to maintain FINGER on pulse during all patient movements
  - Continuous visualization of cardiac monitor rhythm
  - Obtain 12 lead EKG
  - Assess for & TREAT bradycardias < 60 bpm. Resume chest compressions if pulse drops below 60 bpm.
  - Obtain Blood Pressure - Consider pressor agent(s) for SBP < 70 + 2 x Age
  - When patient is moved, perform CONTINUOUS PULSE CHECKS and monitoring of cardiac rhythm
- **Other**
  - Once in ambulance, confirm pulse, breath sounds, SpO2, EtCO2, and cardiac rhythm
  - Appropriate personnel present in the back of the ambulance for transport

Pearls

- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro**
- **Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided at all costs.**
- **Initial EtCO2 may be elevated immediately post-resuscitation but will usually normalize. While goal is 35 – 45 mm Hg, avoid hyperventilation.**
- **Transport to regional Children's Hospital if appropriate. Under 1 year of age consider transport to Level 1 Pediatric Trauma Center due to high incidence of child abuse and concurrent injuries.**
- Most patients immediately post resuscitation will require ventilatory assistance.
- The condition of post-resuscitation patients fluctuates rapidly and continuously and they require close monitoring.
- Appropriate post-resuscitation management may require consultation with medical control.
- Common causes of post-resuscitation hypotension include hyperventilation, hypovolemia, pneumothorax, and medication reaction to ALS drugs.
- If utilized, titrate epinephrine to maintain age-appropriate SBP. Ensure adequate fluid resuscitation is ongoing.

Pediatric Tachycardia

History	Signs and Symptoms	Differential
• Past medical history • Medications or Toxic Ingestion (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin) • Drugs (nicotine, cocaine) • Congenital Heart Disease • Respiratory Distress • Syncope or Near Syncope	• Heart Rate: ◦ Child > 180/bpm ◦ Infant > 220/bpm • Pale or Cyanosis • Diaphoresis • Tachypnea • Vomiting • Hypotension • Altered Level of Consciousness • Pulmonary Congestion • Syncope	• Heart disease (Congenital) • Hypo / Hyperthermia • Hypovolemia or Anemia • Electrolyte imbalance • Anxiety / Pain / Emotional stress • Fever / Infection / Sepsis • Hypoxia • Hypoglycemia • Medication / Toxin / Drugs • Pulmonary embolus • Trauma • Tension Pneumothorax



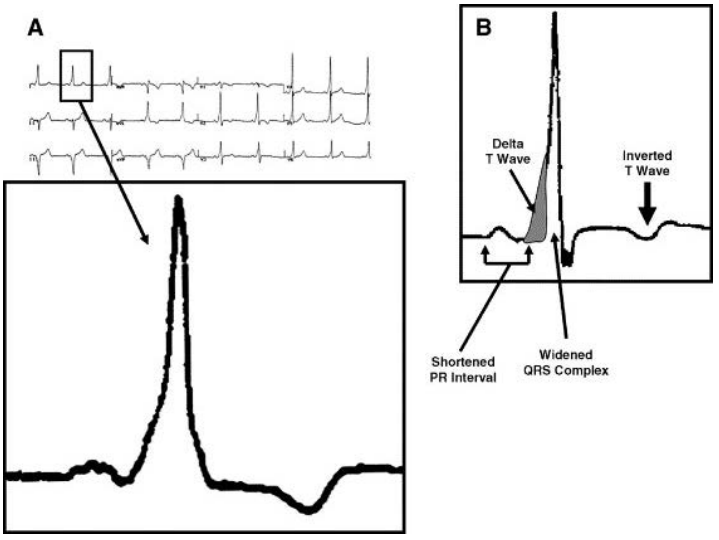
Pediatric Tachycardia

Wolf-Parkinson-White Syndrome

Wolf-Parkinson-White syndrome indicates the presence of an accessory conduction pathway between the atria and ventricles of the heart. This is identified through the presence of "delta" waves on an EKG: a gradual upsloping of the QRS segment which is often interpreted as a short PR interval, and/or wide QRS complex.

This is important to be aware of, as in the setting of tachycardia with underlying Wolf-Parkinson-White if adenosine or other AV nodal blocking agent is given (calcium-channel blockers or beta-blockers), the disorganized atrial electrical impulses can then travel unrestricted through the accessory pathway, resulting in over-stimulation of the ventricles. This causes a paradoxical increase in heart rate, which quickly degrades into ventricular fibrillation or ventricular tachycardia.

For tachycardia with concern for Wolf-Parkinson-White, electrical cardioversion is the appropriate treatment for any signs of hemodynamic instability. Contact medical control for any orders prior to administering medications.



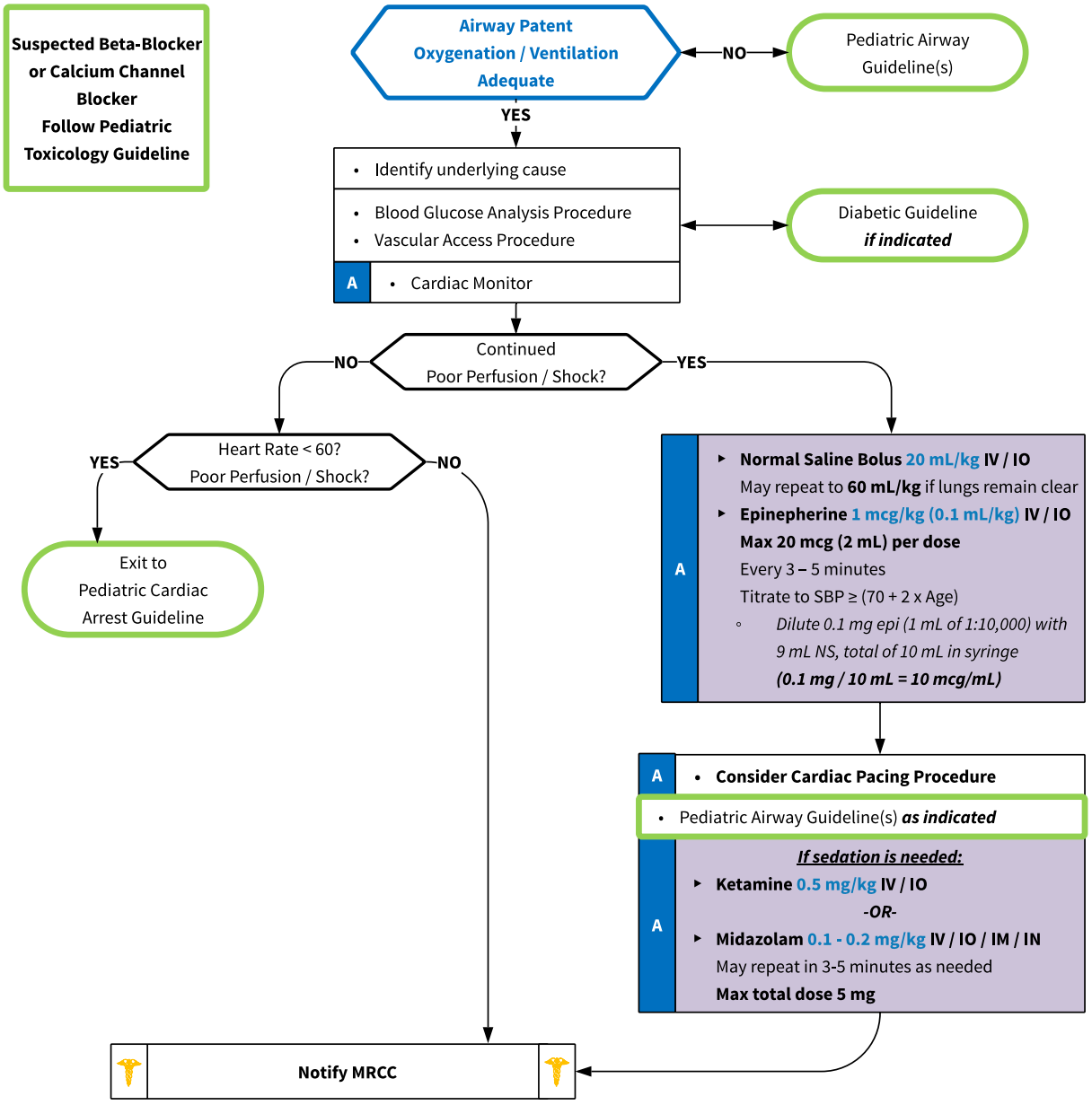
Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Serious Signs and Symptoms:**
  - Respiratory distress / failure.
  - Signs of shock / poor perfusion with or without hypotension.
  - Altered Mental Status
  - Sudden collapse with rapid, weak pulse
- **Narrow Complex Tachycardia (≤100 ms):**
  - Sinus tachycardia: P waves present. Variable R-R waves. Infants usually < 220 beats / minute. Children usually < 180 beats / minute.
  - SVT: > 90 % of children with SVT will have a narrow QRS (≤0.09 seconds.) P waves absent or abnormal. R-R waves not variable. Usually abrupt onset. Infants usually > 220 beats / minute. Children usually > 180 beats / min.
  - Atrial Flutter / Fibrillation
- **Wide Complex Tachycardia (≥ 0.09 seconds):**
  - SVT with aberrancy.
  - VT: Uncommon in children. Rates may vary from near normal to > 200 / minute. Most children with VT have underlying heart disease / cardiac surgery / long QT syndrome / cardiomyopathy.
- **Torsades de Pointes / Polymorphic (multiple shaped) Tachycardia:**
  - Rate is typically 150 to 250 beats / minute.
  - Associated with long QT syndrome, hypomagnesaemia, hypokalemia, many cardiac drugs.
  - May quickly deteriorate to VT.
- **Vagal Maneuvers:**
  - Breath holding. Blowing a glove into a balloon. Have child blow out "birthday candles" or through an obstructed straw. Infants: May put a bag of ice water over the upper half of the face careful not to occlude the airway.
- Separating the child from the caregiver may worsen the child's clinical condition.
- Pediatric pads should be used in children < 10 kg or Broselow-Luten color Purple if available.
- Monitor for respiratory depression and hypotension if Midazolam is used.
- Continuous pulse oximetry is required for all SVT Patients if available.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- Generally, the maximum sinus tachycardia rate is 220 – the patient's age in years.

Pediatric Bradycardia

History	Signs and Symptoms	Differential

• Past medical history
• Foreign body exposure
• Respiratory distress or arrest
• Apnea
• Possible toxic or poison exposure
• Congenital disease
• Medication (maternal or infant)
	• Decreased heart rate
	• Delayed capillary refill or cyanosis
	• Mottled, cool skin
	• Hypotension or arrest
	• Altered level of consciousness
		• Respiratory failure
		  ◦ Foreign body
		  ◦ Secretions
		  ◦ Infection (croup, epiglotitis)
		• Hypovolemia (dehydration)
		• Congenital heart disease
		• Trauma
		• Tension pneumothorax
		• Hypothermia
		• Toxin or medication
		• Hypoglycemia
		• Acidosis



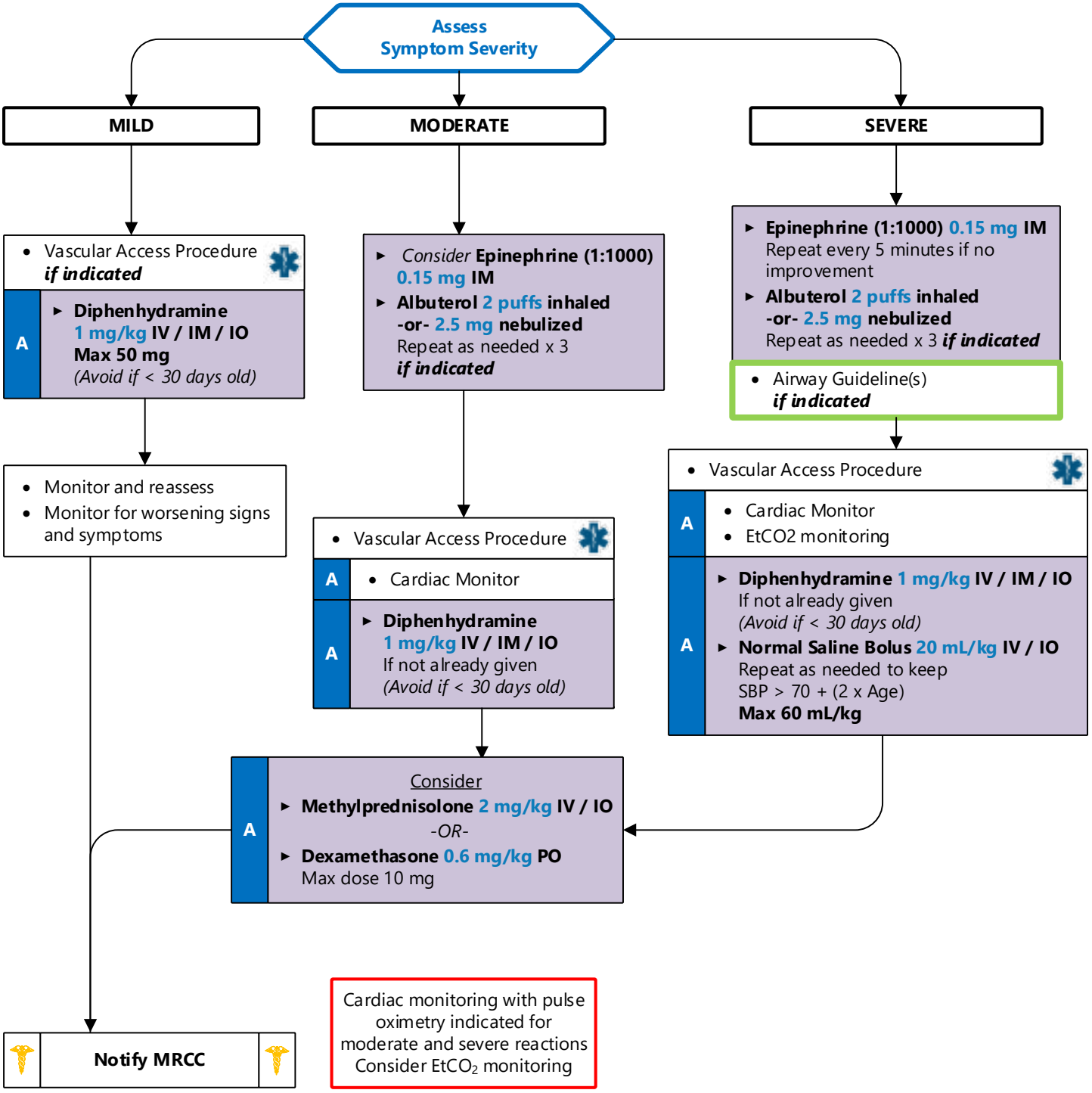
Pediatric Bradycardia

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Use pre-made Drug dosage reference for drug dosages if applicable.**
- The majority of pediatric arrests are due to airway problems.
- Most maternal medications pass through breast milk to the infant, consider narcotic overdose.
- Hypoglycemia, severe dehydration and narcotic effects may produce bradycardia.
- Pediatric patients requiring transcutaneous pacing require the use of pads appropriate for pediatric patients when available
- Transcutaneous pacing should be considered early in bradycardic patients with shock.

Pediatric Allergic Reaction/Anaphylaxis

History	Signs and Symptoms	Differential
• Onset and location • Insect sting or bite • Food allergy / exposure • Medication allergy / exposure • New clothing, soap, detergent • Past medical history / reactions • Medication history	• Itching or hives • Coughing / wheezing or respiratory distress • Chest or throat constriction • Difficulty swallowing • Hypotension or shock • Edema	• Urticaria (rash only) • Anaphylaxis (systemic effect) • Shock (vascular effect) • Angioedema (drug induced) • Aspiration / Airway obstruction • Vasovagal event • Asthma / COPD / CHF



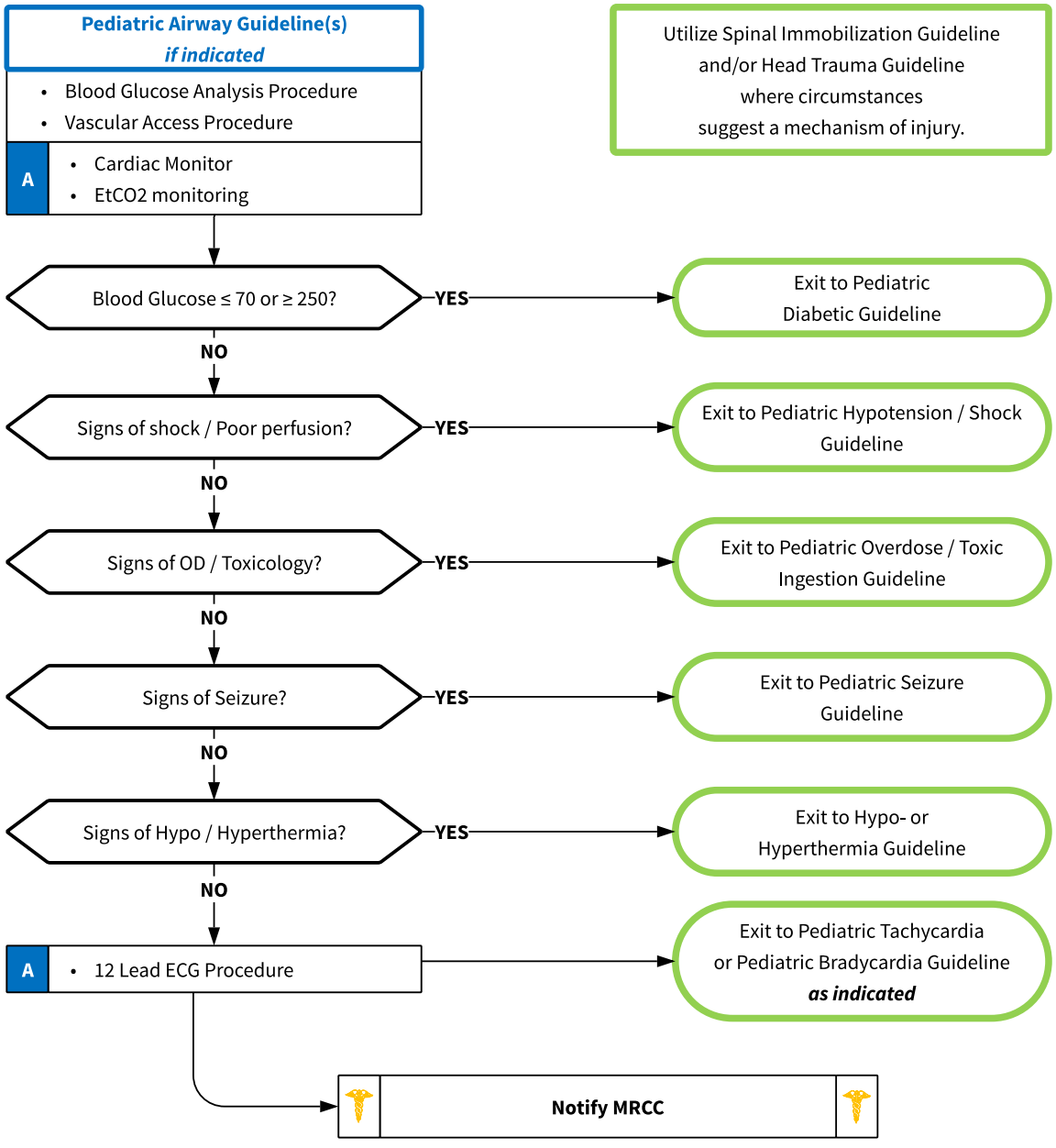
Pediatric Allergic Reaction/Anaphylaxis

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs**
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **Epinephrine is the drug of choice and the first drug that should be administered in acute anaphylaxis (Moderate / Severe Symptoms – airway involvement and/or hypotension.) IM Epinephrine should be administered in priority before or during attempts at IV or IO access.**
- **To increase patient safety, Use an autoinjector if available to deliver epinephrine. For pediatric patients, either the 0.15mg dose ("epi-pen jr") or 0.3mg dose ("epi-pen") may be used. Either may be repeated for severe symptoms that have not improved or are worsening 5 minutes after the first dose.**
- **Contact MRCC for medical control orders for anaphylaxis unresponsive to repeat doses of IM epinephrine.**
- **Symptom Severity Classification:**
  - **Mild symptoms:**
    - » Flushing, hives, itching, erythema with normal blood pressure and perfusion.
  - **Moderate symptoms:**
    - » Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with normal blood pressure and perfusion.
  - **Severe symptoms:**
    - » Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with hypotension and poor perfusion. Skin symptoms may not be present due to poor perfusion.
- **Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash / skin involvement.**
- **Angioedema is seen in moderate to severe reactions and is defined as swelling involving the face, lips or airway structures. This can also be seen in patients taking blood pressure medications like Prinivil, Zestril, or lisinopril (typically end in -il).**
- **Fluids and Medication should be titrated to maintain a SBP >70 + (age in years x 2) mmHg.**
- **EMT-B may administer Albuterol if patient already prescribed, or nebulized if appropriately trained.**
- **Patients with moderate and severe reactions should receive a 12 lead ECG and should be continually monitored, but** this should NOT delay administration of epinephrine.
- The shorter the onset from exposure to symptoms the more severe the reaction.

Pediatric Altered Mental Status

History	Signs and Symptoms	Differential
• Past medical history • Medications • Recent illness • Irritability • Lethargy • Changes in feeding / sleeping • Diabetes • Potential ingestion • Trauma	• Decrease in mentation • Change in baseline mentation • Decrease in Blood sugar • Cool, diaphoretic skin • Increase in Blood sugar • Warm, dry, skin, fruity breath, kussmaul respirations, signs of dehydration	• Hypoxia • CNS (trauma, stroke, seizure, infection) • Thyroid (hyper / hypo) • Shock (septic-infection, metabolic, traumatic) • Diabetes (hyper / hypoglycemia) • Toxicological • Acidosis / Alkalosis • Environmental exposure • Electrolyte abnormatilities • Psychiatric disorder



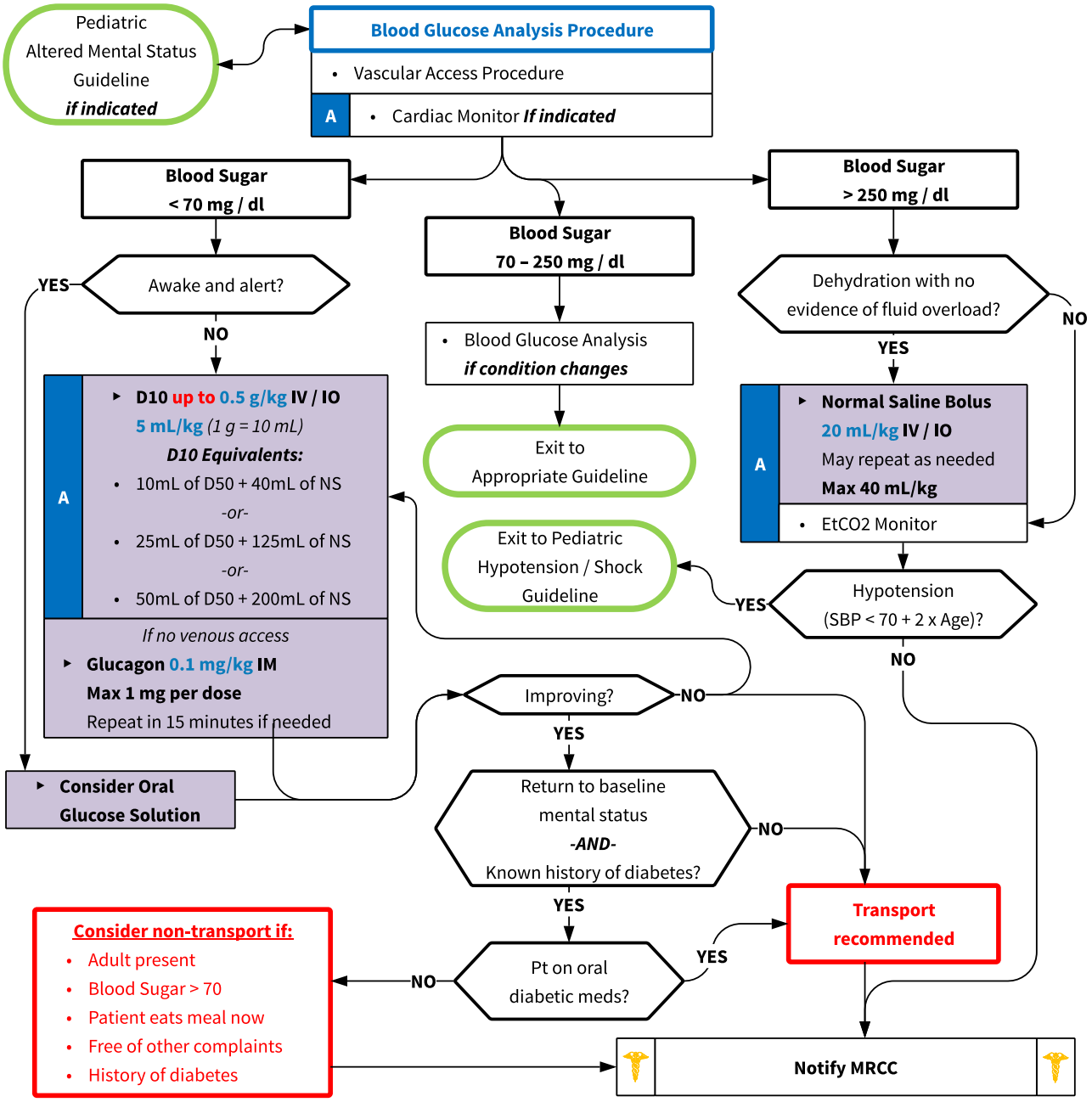
Pediatric Altered Mental Status

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Pay careful attention to the head exam for signs of bruising or other injury.**
- Be aware of AMS as presenting sign of an environmental toxin or Haz-Mat exposure and protect personal safety.
- It is safer to assume hypoglycemia than hyperglycemia if doubt exists. Recheck blood glucose after Dextrose or Glucagon
- Consider alcohol, prescription drugs, illicit drugs and Over the Counter preparations as a potential etiology.
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.

Pediatric Diabetic Emergency

History	Signs and Symptoms	Differential
• Past medical history • Medications • Recent blood glucose check • Last meal	• Altered mental status • Combative / irritable • Diaphoresis • Seizures • Abdominal pain • Nausea / vomiting • Weakness • Dehydration • Deep / rapid breathing	• Alcohol / drug use • Toxic ingestion • Trauma; head injury • Seizure • CVA • Altered baseline mental status.



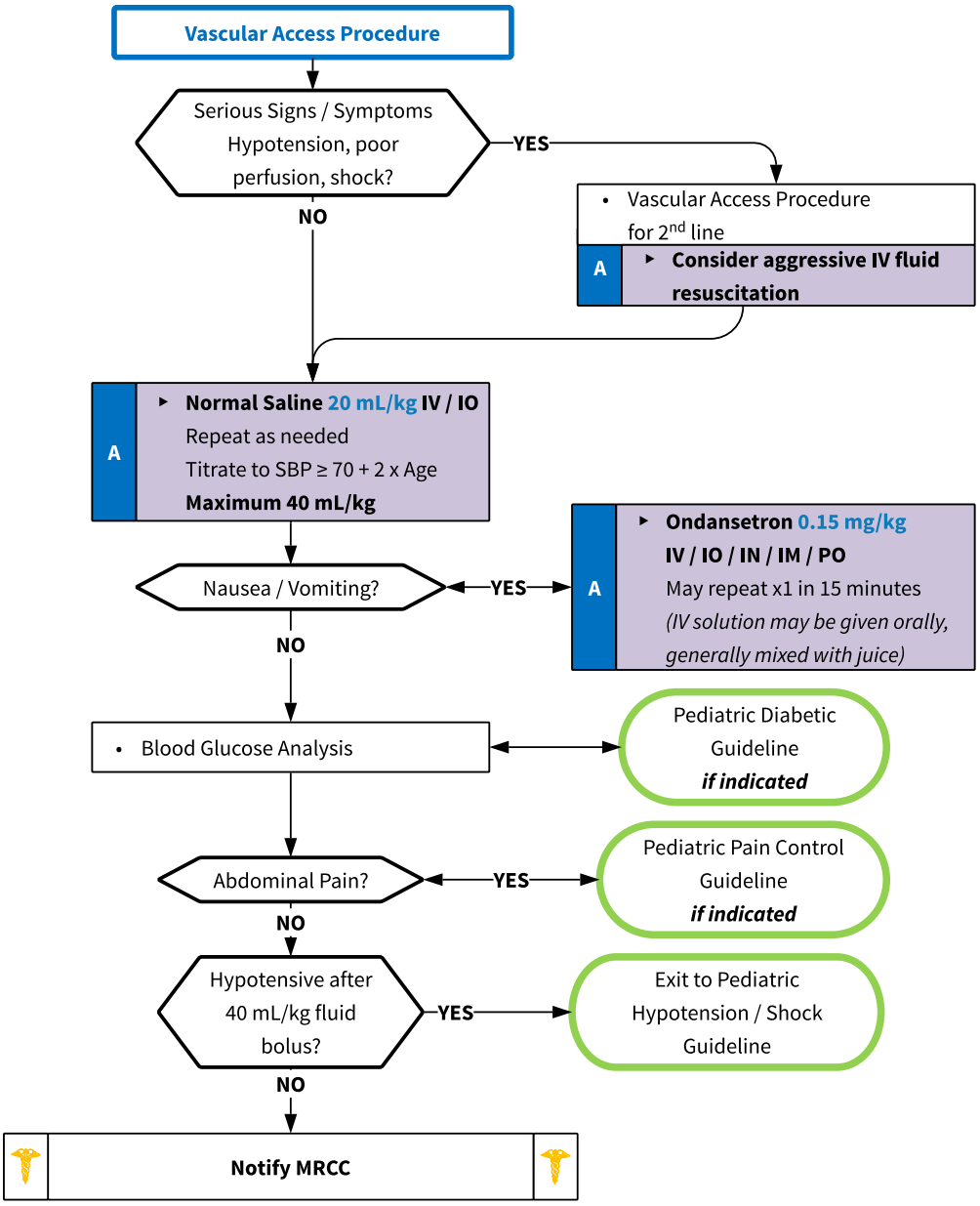
Pediatric Diabetic Emergency

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Patients with prolonged hypoglycemia my not respond to glucagon.
- Do not administer oral glucose to patients that are not able to swallow or protect their airway.
- **It may be necessary to utilize different concentrations of dextrose in clinical practice. Make D10 by drawing up 10 mL**
- **of D50 in a 60 mL syringe and dilute with 40 mL of NS. You now have 50mL of D10. Make D25 by drawing up 25 mL of D50 in a 60 mL syringe and dilute with 25 mL of NS. You now have 50mL of D25.**
- Quality control checks should be maintained per manufacturers recommendation for all glucometers.
- Patient Refusal:
  - Adult caregiver must be present with pediatric patient. Blood sugar must be 70 or greater and patient has ability to eat and availability of food with responders on scene. Patient must have a known history of diabetes and not be taking any oral diabetic agents (i.e. insulin only). Otherwise contact MRCC for medical control advice.

Pediatric Gastrointestinal Emergency

History	Signs and Symptoms	Differential
• Age • Time of last meal • Last bowel movement / emesis • Improvement or worsening with food or activity • Other sick contacts • Past Medical History • Past Surgical History • Medications • Travel history • Bloody Emesis or diarrhea	• Pain • Distension • Constipation • Diarrhea • Anorexia • Fever • Cough • Dysuria	• CNS (Increased pressure, headache, tumor, trauma or hemorrhage) • Drugs • Appendicitis • Gastroenteritis • GI or Renal disorders • Diabetic Ketoacidosis • Infections (pneumonia, influenza) • Electrolyte abnormalities



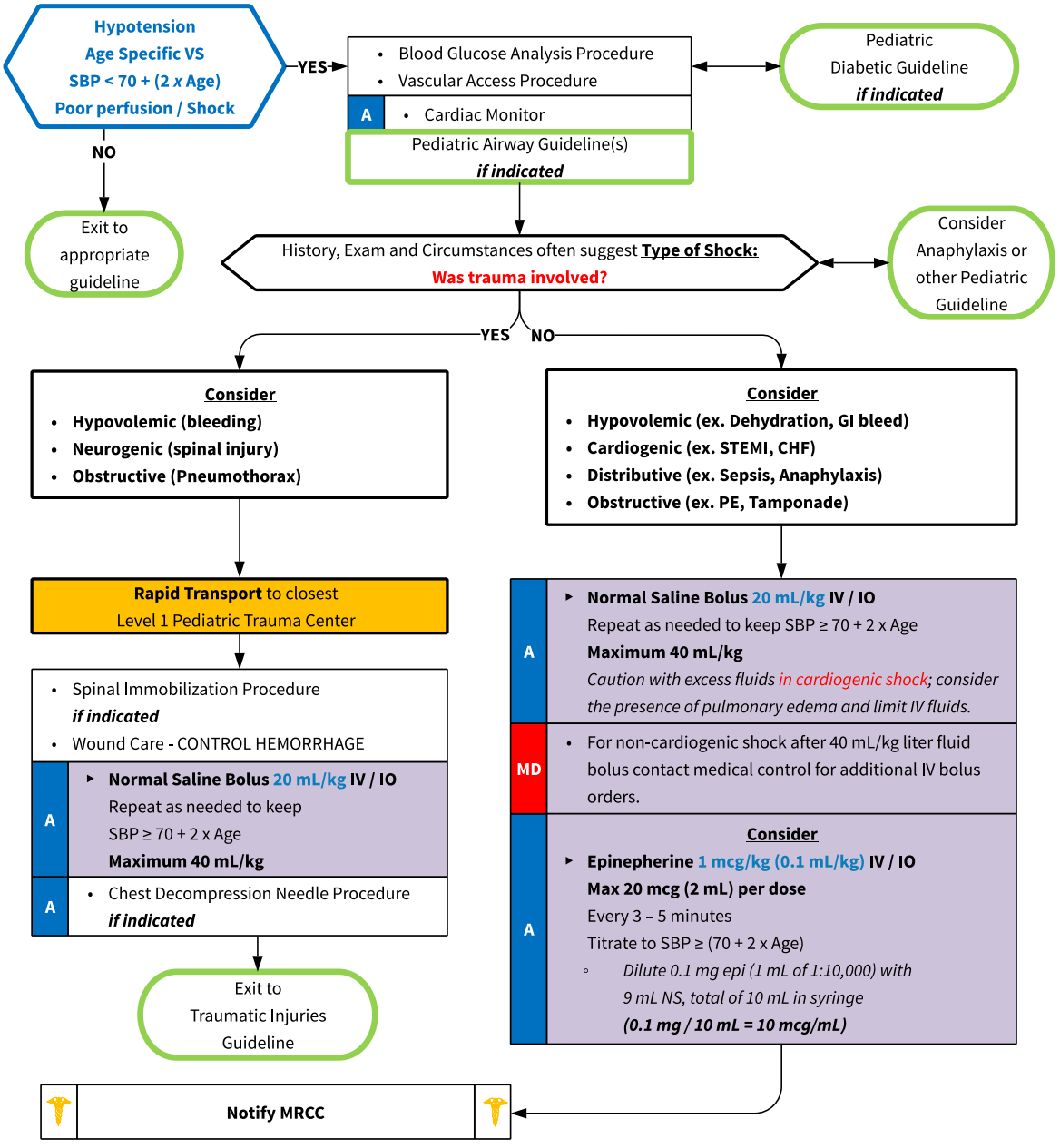
Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Heart Rate: One of the first clinical signs of dehydration is almost always increased heart rate. Tachycardia increases as dehydration becomes more severe, very unlikely to be significantly dehydrated if heart rate is close to normal.**
- **Age specific blood pressure 0 – 28 days > 60 mmHg, 1 month - 1 year > 70 mmHg, 1 - 11 years > 70 + (2 x age) mmHg and 12 years and older > 90 mmHg.**
- Beware of only vomiting (i.e. no diarrhea) in children. Pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures) all often present with isolated vomiting.

Pediatric Hypotension/Shock

History	Signs and Symptoms	Differential

• Blood loss
• Fluid loss
• Vomiting
• Diarrhea
• Fever
• Infection
	• Restlessness, confusion, weakness
	• Dizziness
	• Tachycardia
	• Hypotension (Late sign)
	• Pale, cool, clammy skin
	• Delayed capillary refill
	• Dark-tarry stools
		• Shock
		  ◦ Hypovolemic
		  ◦ Cardiogenic
		  ◦ Septic
		  ◦ Neurogenic
		  ◦ Anaphylactic
		• Trauma
		• Infection
		• Dehydration
		• Congenital heart disease
		• Medication or Toxin



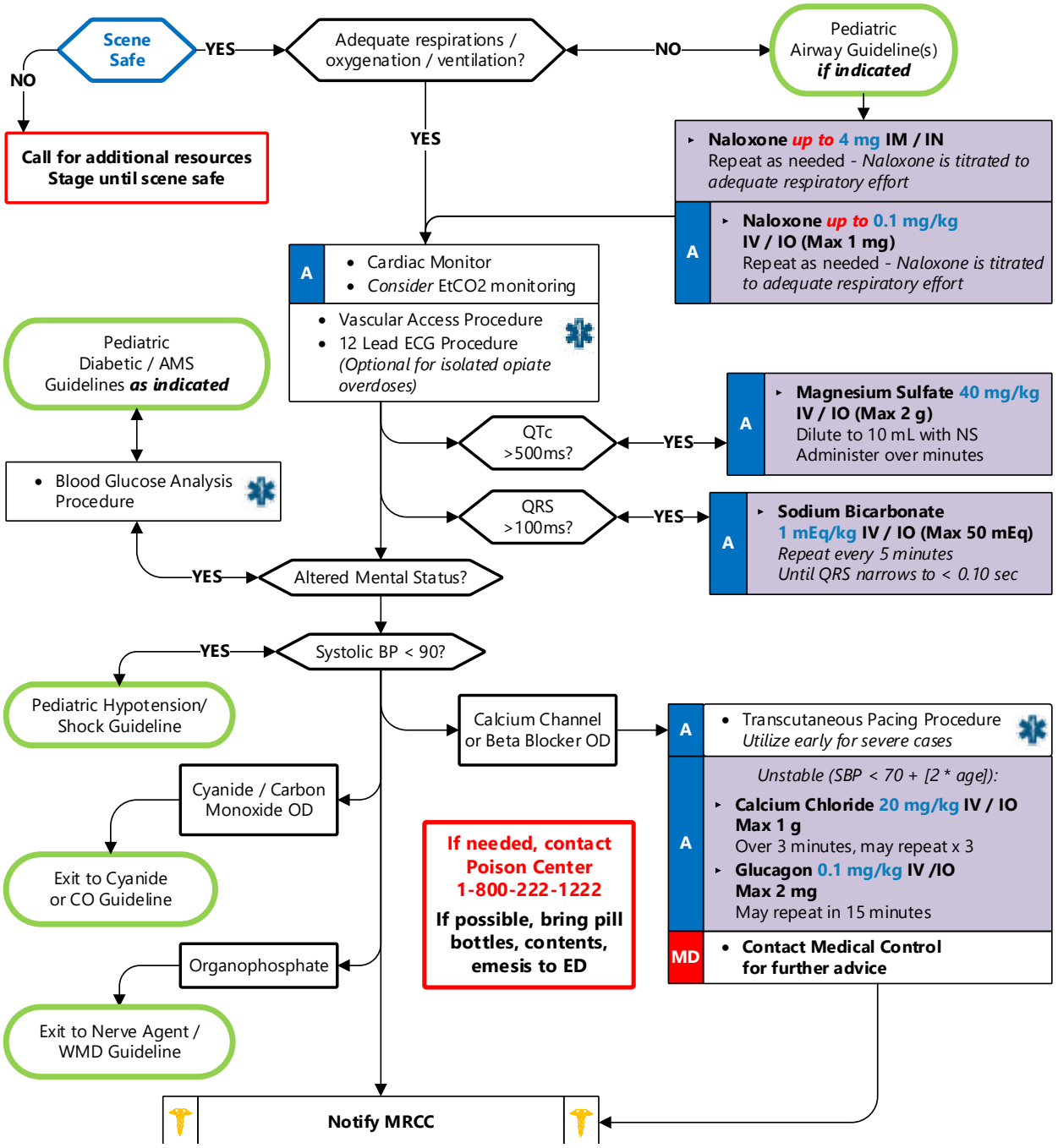
Pediatric Hypotension/Shock

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Lowest normal blood pressure by age: < 31 days: > 60 mmHg. 31 days to 1 year: > 70 mmHg. Greater than 1 year: 70 + 2 x age in years.**
- **Consider all possible causes of shock and treat per appropriate guideline. Majority of decompensation in pediatrics is airway related.**
- **Decreasing heart rate and hypotension occur late in children and are signs of imminent cardiac arrest.**
- **Shock may be present with a normal blood pressure initially.**
- **Shock often is present with normal vital signs and may develop insidiously. Tachycardia may be the only manifestation.**
- **Consider all possible causes of shock and treat per appropriate guideline.**
- **Hypovolemic Shock:**
  - Hemorrhage, trauma, dehydration, excessive vomiting or diarrhea.
- **Cardiogenic Shock:**
  - Heart failure: Congenital heart disease, Cardiomyopathy, Myocardial contusion, Ruptured ventrical / septum / valve / toxins.
- **Distributive Shock:**
  - Sepsis
  - Anaphylactic
  - Neurogenic: Hallmark is warm, dry, pink skin with normal capillary refill time and typically alert. Toxins
- **Obstructive Shock:**
  - Pericardial tamponade. Pulmonary embolus. Tension pneumothorax.
  - Signs may include hypotension with distended neck veins, tachycardia, unilateral decreased breath sounds or muffled heart sounds.

Pediatric Overdose/Ingestion

History	Signs and Symptoms	Differential
• Ingestion or suspected ingestion of potentially toxic substance • Substance ingested, route, quantity • Time of Ingestion is important • Reason (suicidal, accidental, criminal) • Available medications in home • Past medical history, medications, past psychiatric history	• Mental status changes • Hypotension / hypertension • Decreased respiratory rate • Tachycardia, dysrhythmias • Seizures • Salivation, Lacrimation, Urination; increased, loss of control, Defecation / Diarrhea, GI Upset; Abdominal pain / cramping, Emesis, Muscle Twitching	• Tricyclic antidepressants • Acetaminophen • Depressants • Stimulants • Anticholinergic • Cardiac medications • Solvents, Alcohols, Cleaning agents • Insecticides (organophosphates)



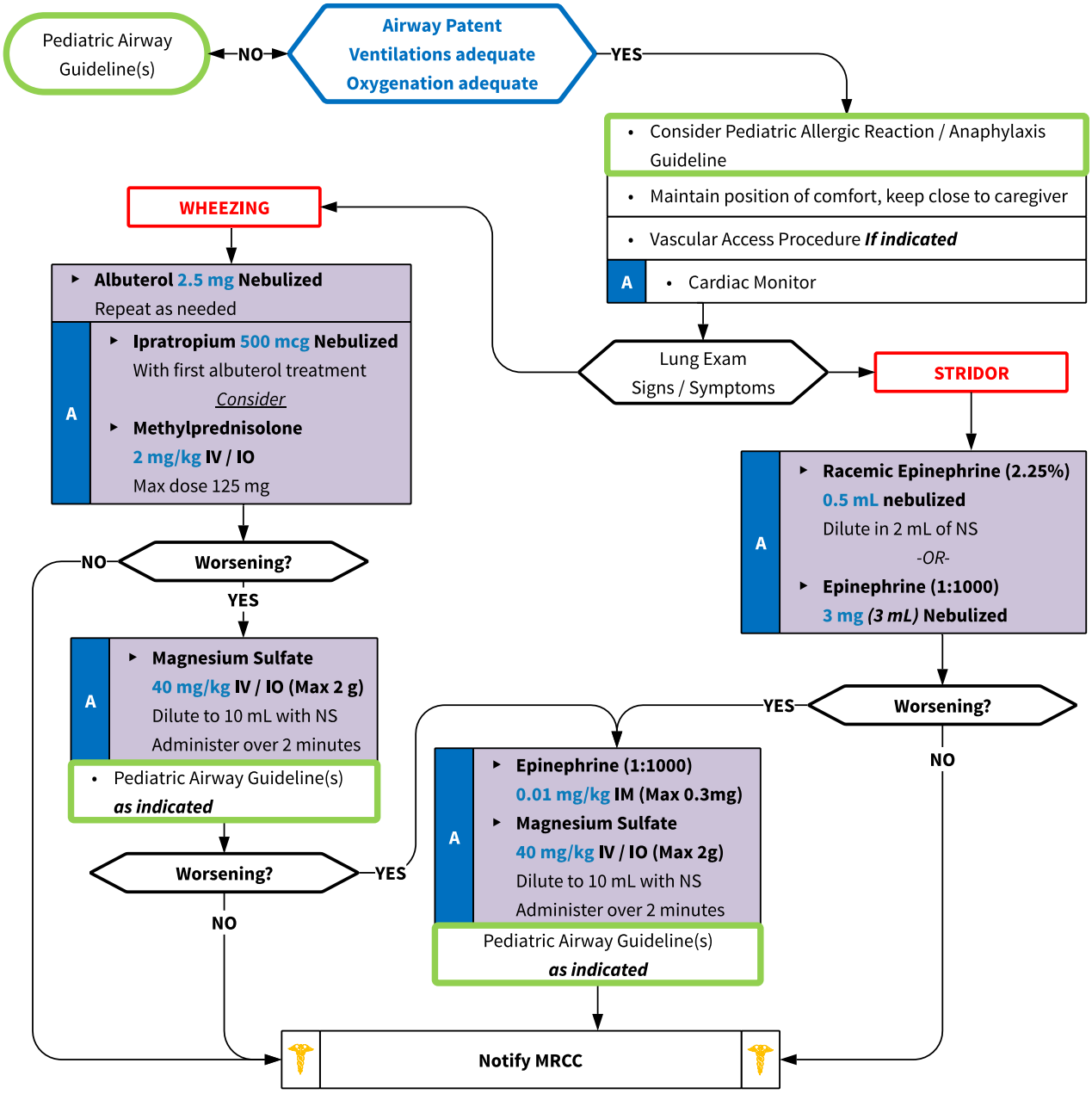
Pediatric Overdose/Ingestion

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Do not rely on patient history of ingestion, especially in suicide attempts. Make sure patient is still not carrying other medications or has any weapons. Bring bottles, contents, emesis to ED.**
- **Age specific blood pressure 0 – 28 days > 60 mmHg, 1 month - 1 year > 70 mmHg, 1 - 10 years > 70 + (2 x age)mmHg and 11 years and older > 90 mmHg.**
- **Tricyclic**: 4 major areas of toxicity: seizures, dysrhythmias, hypotension, decreased mental status or coma; rapid progression from alert mental status to death.
- **Acetaminophen**: initially normal or nausea/vomiting. If not detected and treated, causes irreversible liver failure
- **Aspirin**: Early signs consist of abdominal pain and vomiting. Tachypnea and altered mental status may occur later. Renal dysfunction, liver failure, and or cerebral edema among other things can take place later.
- **Depressants**: decreased HR, decreased BP, decreased temperature, decreased respirations, non-specific pupils
- **Stimulants**: increased HR, increased BP, increased temperature, dilated pupils, seizures
- **Anticholinergic**: increased HR, increased temperature, dilated pupils, mental status changes
- **Cardiac Medications**: dysrhythmias and mental status changes
- **Solvents**: nausea, coughing, vomiting, and mental status changes
- **Insecticides**: increased or decreased HR, increased secretions, nausea, vomiting, diarrhea, pinpoint pupils
- Consider restraints if necessary for patient's and/or personnel's protection per the Restraint Procedure.
- **Nerve Agent Antidote kits** contain 2 mg of Atropine and 600 mg of pralidoxime in an autoinjector for self administration or patient care. These kits may be available as part of the domestic preparedness for Weapons of Mass Destruction.
- Consider contacting the Regional Poison Control Center (1-800-222-1222) for guidance. Any advice given should be relayed to Medical Control for definitive orders.

Pediatric Respiratory Emergency

History	Signs and Symptoms	Differential
• Time of onset • Possibility of foreign body • Past Medical History • Medications • Fever / Illness • Sick Contacts • History of trauma • History / possibility of choking • Ingestion / OD • Congenital heart disease	• Wheezing / Stridor / Crackles / Rales • Nasal Flaring / Retractions / Grunting • Increased Heart Rate • AMS • Anxiety • Attentiveness / Distractability • Cyanosis • Poor feeding • JVD / Frothy Sputum • Hypotension	• Asthma / Reactive Airway Disease • Aspiration • Foreign body • Upper or lower airway infection • Congenital heart disease • OD / Toxic ingestion / CHF • Anaphylaxis • Trauma



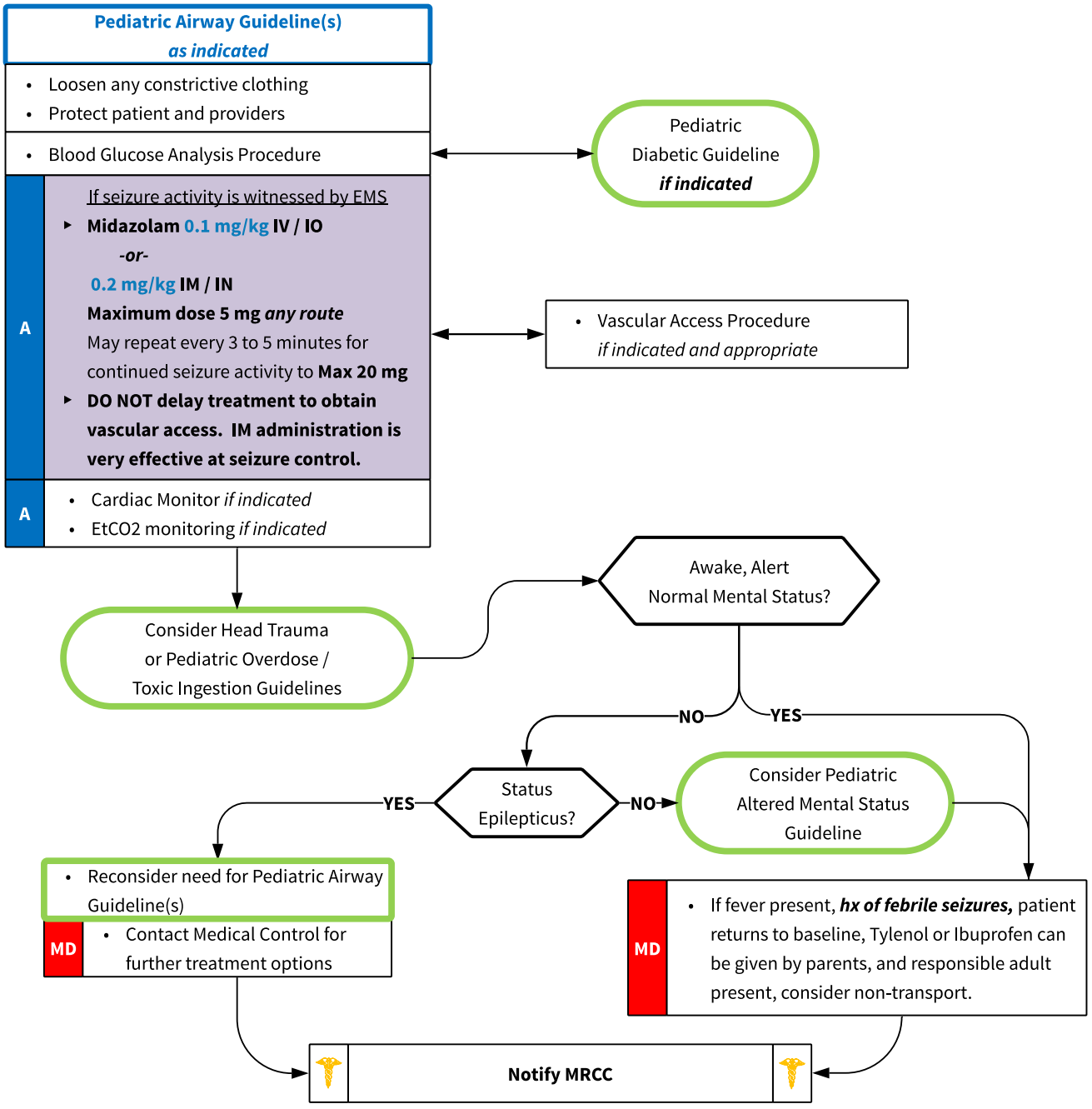
Pediatric Respiratory Emergency

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Pulse oximetry should be monitored continuously in the patient with respiratory distress.**
- **EMT-B may administer Albuterol if patient appropriately trained.**
- **Consider IV access when Pulse oximetry remains ≤ 92 % after first beta agonist treatment. Also consider saline bolus of 20 mL/kg in pediatric patients in respiratory distress; these patients are often dehydrated.**
- Do not force a child into a position, allow them to assume position of comfort. They will protect their airway by their body position.
- The most important component of respiratory distress is airway control.
- Bronchiolitis is a viral infection typically affecting infants which results in wheezing which may not respond to beta-agonists.
- Consider Epinephrine if patient < 18 months and not responding to initial beta-agonist treatment.
- Croup typically affects children < 2 years of age. It is a viral infection with possible fever, gradual onset, and no drooling is noted.
- Epiglottitis typically affects children > 2 years of age. It is a bacterial infection with fever, rapid onset, and often stridor. The patient typically wants to sit up to keep airway open, drooling is common. ***Airway manipulation may worsen the condition. Avoid airway device insertion in patients with suspected epiglottitis.***
- In patients using levalbuterol (Xopenex) you may use substitute the patient's levalbuterol for Albuterol in the protocol.

Pediatric Seizure

History	Signs and Symptoms	Differential
• Fever, Sick contacts • Prior history of seizures • Medication compliance • Recent head trauma • Whole body vs unilateral seizure activity • Duration, Single/multiple • Congenital Abnormality	• Fever; hot, dry skin • Seizure activity • Incontinence • Tongue trauma • Rash • Nuchal rigidity • Altered mental status	• Simple Febrile seizure • Infection • Head trauma, Medication or Toxin • Hypoxia or Respiratory failure • Hypoglycemia • Metabolic abnormality / acidosis • Tumor



Pediatric Seizure

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Extremities, Neuro**
- Simple Febrile Seizures are most common in ages 6mos – 5 years. They are by definition generalized seizures with no seizure history in the setting of any grade of fever, with an otherwise normal neurologic and physical exam and recent history. It may be reasonable to observe these seizures, while treating fever with acetaminophen or ibuprofen and passive cooling measures (i.e. undressing), for up to five minutes. Any seizure confirmed to last for more than five minutes should be treated with medication.
- All first time seizures should be transported for evaluation at a hospital. Consult with Medical Control if any questions arise.
- **Midazolam 0.2 mg/kg IM is effective in termination of seizures. Do not delay IM administration with difficult IV or IO access. IM Preferred over IO.**
- Addressing the ABCs and verifying blood glucose is as important as stopping the seizure.
- Be prepared to assist ventilations especially if a benzodiazepine is used. Avoiding hypoxemia is extremely important.
- In an infant, a seizure may be the only evidence of a closed head injury.
- Status epilepticus is defined as two or more successive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid airway control, treatment, and transport.
- Assess for possibility of occult trauma and substance abuse, overdose or ingestion / toxins.

Traumatic Injuries

History	Signs and Symptoms	Differential (Life threatening)

• Time and mechanism of injury
• Damage to structure or vehicle
• Location in structure or vehicle
• Others injured or dead
• Speed and details of MVC
• Restraints / protective equipment
• Past medical history
• Medications
	• Pain, swelling
	• Deformity, lesions, bleeding
	• Altered mental status or unconscious
	• Hypotension or shock
	• Arrest
		• Chest:
		  ◦ Tension pneumothorax
		  ◦ Flail chest
		  ◦ Pericardial tamponade
		  ◦ Open chest wound
		  ◦ Hemothorax
		• Intra-abdominal bleeding
		• Pelvis / Femur fracture
		• Spine fracture / Cord injury
		• Head injury (see Head Trauma)
		• Extremity fracture / Dislocation
		• HEENT (Airway obstruction)
		• Hypothermia

Patients in cardiac arrest due to trauma do not require resuscitation attempts if any of the following criteria are met:
- Blunt with asystole (after chest needle decompression)
- Penetrating trauma with no signs life and asystole, after decompression procedures have been considered
- Obviously fatal injuries (decapitation, etc.)
- Transport time to an ED or trauma center would be more than 15 minutes

Assessment of Serious Signs / Symptoms (ABC and LOC)

- Airway Guideline(s) ***if indicated*** Adult / Pediatric
- ***Spinal Motion Restriction Guideline***
- **Occlude any open chest wounds**

Do not delay transport for multi-trauma patients, but time spent on-scene addressing ABC's is always time well spent.

Do not delay transport to accomodate chest compressions for penetrating trauma without source control of hemorrhage .

Vitals / Perfusion / GCS

ABNORMAL

A
- Chest Needle Decompression Procedure ***if indicated***

- Control major external hemorrhage
- **Rapid Transport** according to Trauma Triage and Destination Plan
- **Limit Scene Time ≤ 10 minutes**
- **Provide Early Notification**
- Vascular Access Procedure
  2 large-bore access points

A
- **Normal Saline Bolus IV / IO**
  Peds: 20 mL/kg
  Adults: 500 mL
  Repeat to keep SBP ≥ 90, 70 + (2 x Age), or palpable radial pulse
  Maximum 60 mL/kg *or* **2 L**

A
Hemorrhage with signs of shock:
- **Tranexamic Acid (TXA) IV / IO**
  Peds: 15 mg/kg (max 1 g)
  Adults: 2 g

A
--If Available--
Hemorrhage with signs of shock:
- **Blood product transfusion**

A
- Cardiac Monitor

- **Head Trauma Guideline *if indicated***
- Remove clothing, fully expose
- **Splint Suspected Fractures**
- **Place Pelvic Binder if pelvic fractures are suspected**
- **Soft Tissue Injury Management**

NORMAL

Consider Crush Injury Guideline for entrapped victims, request additional medical resources early.

- Vascular Access Procedure
- Splint Suspected Fractures
- Consider Pelvic Binding if patient becomes unstable
- Control External Hemorrhage

A
- Cardiac Monitor

- **Transport** according to Trauma Triage and Destination Plan

Hypotension / Shock Guideline Adult / Pediatric

Pain Control Guideline ***if appropriate*** Adult / Pediatric

Wound care considerations:
- Direct pressure
- Pressure dressing
- Tourniquet(s)
- Wound packing

- Ultrasound Procedure *(if available and other interventions have been performed)*

A
- **If stable, consider tourniquet conversion**

- **Apply warm blankets, prevent hypothermia**

Notify MRCC

TRAUMA CENTER CRITERIA

A Trauma Team Activation ("TTA") may be requested by an ALS provider if any of the following criteria are met:

- Traumatic cardiac arrest
- Airway compromise related to trauma
- Sustained systolic blood pressure below 90mmHg (pediatrics < 70 + 2 x age)
- GCS < 14
- Transfer from another facility with blood transfusion in progress (related to trauma)
- Flail chest or other major chest injury
- Depressed skull fracture
- Focal neurologic deficits related to trauma (pupils, sensorimotor)
- Abnormal abdominal exam
- Major extremity vascular injury
- 2 or more proximal long bone fractures (femur, humerus)
- Amputation proximal to wrist or ankle
- Major penetrating trauma to the face or head
- Penetrating trauma to the torso (neck to groin) such as gunshot wound or stabbing
- Burns > 20% 2nd or 3rd degree, high voltage burns, significant burns with trauma, inhalation burn requiring airway support
- Pediatric hanging
- Physician judgement
- EMS judgement

TTAs are called based on the anatomic and physiologic criteria listed above. They are not called based on mechanism of injury. Mechanism of injury may mandate that the patient be transported to a Trauma Center but mechanism alone does not warrant a TTA. There may be times when patients have significant mechanisms of injury but appear to be stable. If the provider feels that a patient is a candidate for evaluation at a trauma center, the EMS provider should bring the patient to the Trauma Center even if the patient does not meet TTA criteria.

MRCC Operators are authorized to upgrade a TTA and may suggest to the EMS provider if appropriate. MRCC Operators are able to enforce the transportation of trauma patients who have a significant mechanism of injury to an appropriately designated Trauma Center. Please report a complete set of vital signs to MRCC when requesting a TTA (whenever possible), as this is helpful for the surgical team in preparing for possible interventions.

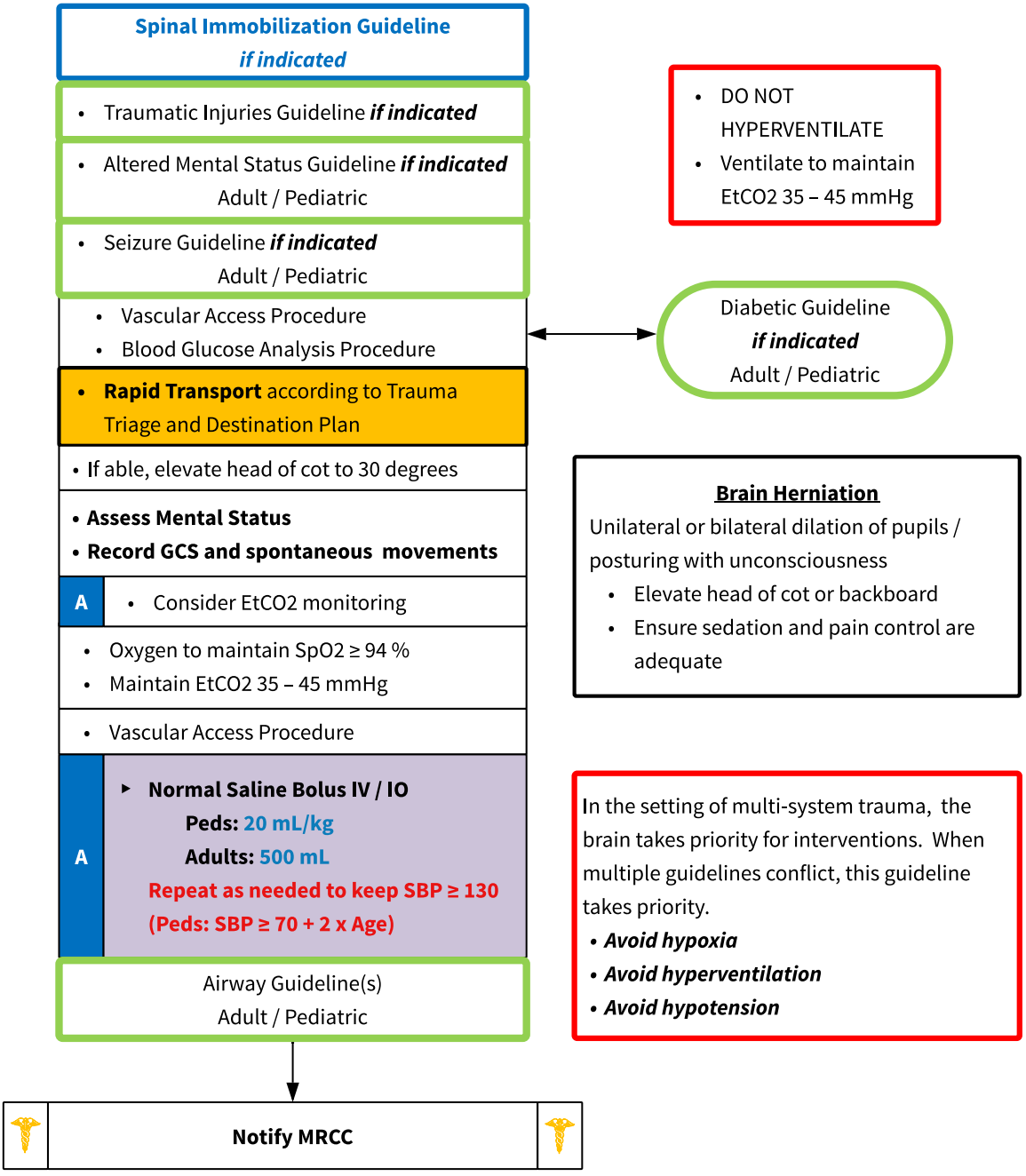
The Trauma Triage and Destination Plan in the Reference section should be used to assist in determining an appropriate destination for a patient suffering from traumatic injuries.

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro**
- **Scene times should not be delayed for procedures. These should be performed en route when possible.**
- **Rapid transport of the unstable trauma patient to the appropriate facility IS the goal.**
- **If ongoing hemorrhage is suspected, target fluid resuscitation to a lower systolic blood pressure (80s or 90s) to minimize further blood loss.**
- **Bag valve mask is an acceptable method of managing the airway if pulse oximetry can be maintained ≥ 93%**
- Geriatric patients should be evaluated with a high index of suspicion. Often occult injuries are more difficult to recognize and patients can decompensate unexpectedly with little warning.
- Mechanism is the most reliable indicator of serious injury.
- Do not overlook the possibility of associated domestic violence or abuse.
- Sucking chest wounds should be managed with an occlusive dressing. Monitor the patient for signs of a developing tension pneumothorax and treat as indicated.
- Abdominal eviscerations should be treated by covering the exposed abdominal contents with moistened gauze.

Head Trauma

History	Signs and Symptoms	Differential
• Time of injury • Mechanism (blunt vs. penetrating) • Loss of consciousness • Bleeding • Past medical history • Medications • Evidence for multi-trauma	• Pain, swelling, bleeding • Altered mental status • Unconscious • Respiratory distress / failure • Vomiting • Major traumatic mechanism of injury • Seizure	• Skull fracture • Brain injury (Concussion, Contusion, Hemorrhage or Laceration) • Epidural hematoma • Subdural hematoma • Subarachnoid hemorrhage • Spinal injury • Abuse



Head Trauma

Secondary brain injury is an indirect result of the injury. It results from processes initiated by the initial trauma. It occurs in the hours and days following the primary injury and plays a large role in the brain damage and death that result from TBI.

- Ischemia (insufficient blood flow)
- Cerebral hypoxia (insufficient oxygen in the brain)
- Hypotension (low blood pressure)
- Cerebral edema (swelling of the brain)
- Raised intracranial pressure (the pressure within the skull).
- Hypercapnia (excessive carbon dioxide levels in the blood)
- Acidosis (excessively acidic blood)
- Infection (generally delayed)

If intracranial pressure gets too high, it can lead to deadly brain herniation, in which parts of the brain are squeezed past structures in the skull.

Maintain SpO2 >= 94%

Maintain SBP > 130 (or 70 + 2 x age)

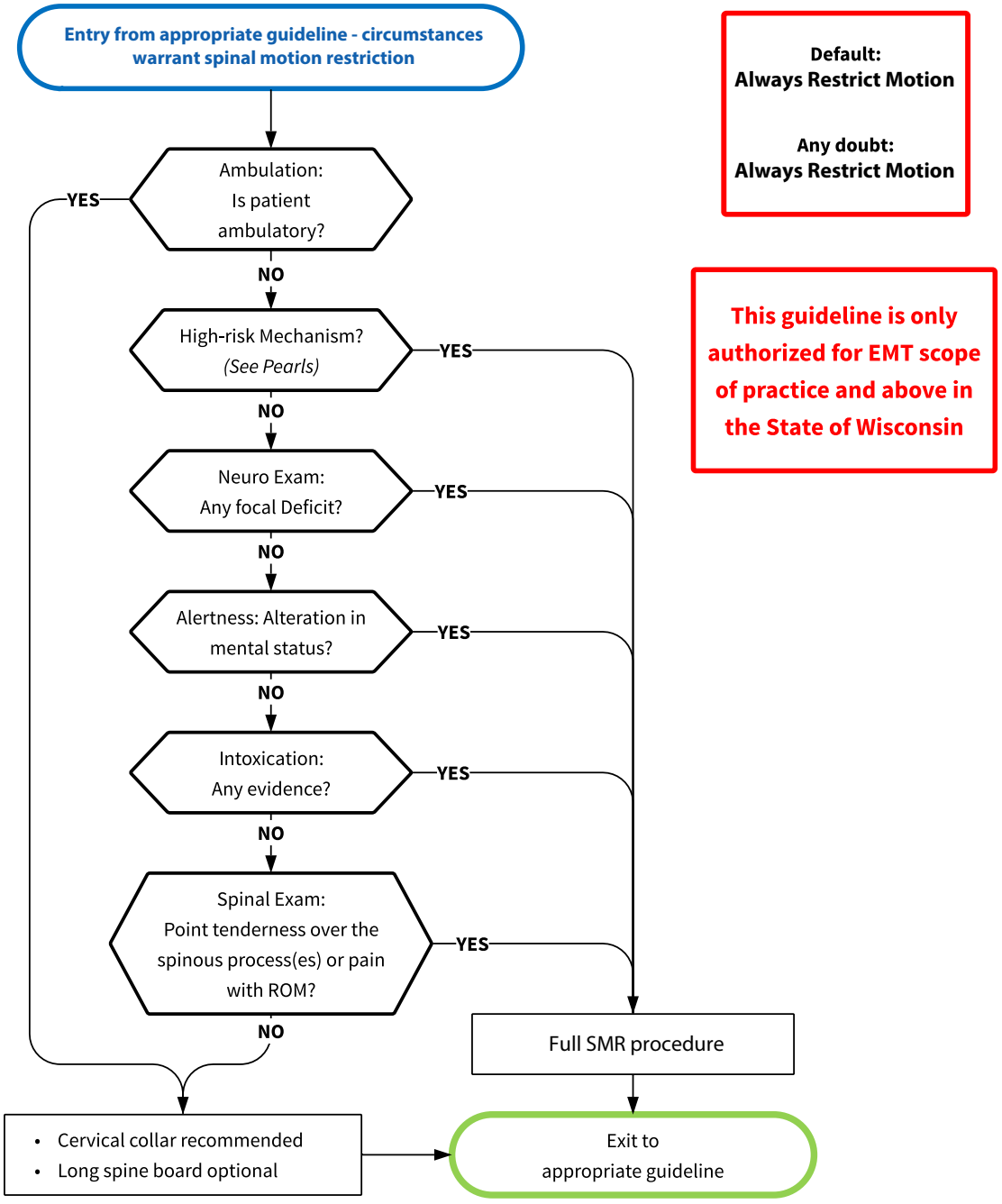
Maintain EtCO2 between 35 - 45

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro**
- Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Response).
- Hypotension usually indicates injury or shock unrelated to the head injury and should be aggressively treated.
- An important item to monitor and document is a change in the level of consciousness by serial examination.
- Consider Restraints if necessary for patient's and/or personnel's protection per the Restraint Procedure.
- Concussions are traumatic brain injuries involving any of a number of symptoms including confusion, LOC, vomiting, or headache. Any prolonged confusion or mental status abnormality which does not return to normal within 15 minutes or any documented loss of consciousness should be evaluated by a physician ASAP.

Spinal Motion Restriction (SMR)

History	Signs and Symptoms	Differential
• Type of injury • Mechanism: blunt / fall / penetrating • Time of injury • LOC • Medical history • Medications	• Pain, swelling • Deformity / step-off • Altered sensation / motor function • Bradycardia • Hypotension • Paralysis • Headache • Shooting pain	• Fracture • Spinal cord injury • Muscle strain • Muscle spasm • Ligamentous injury



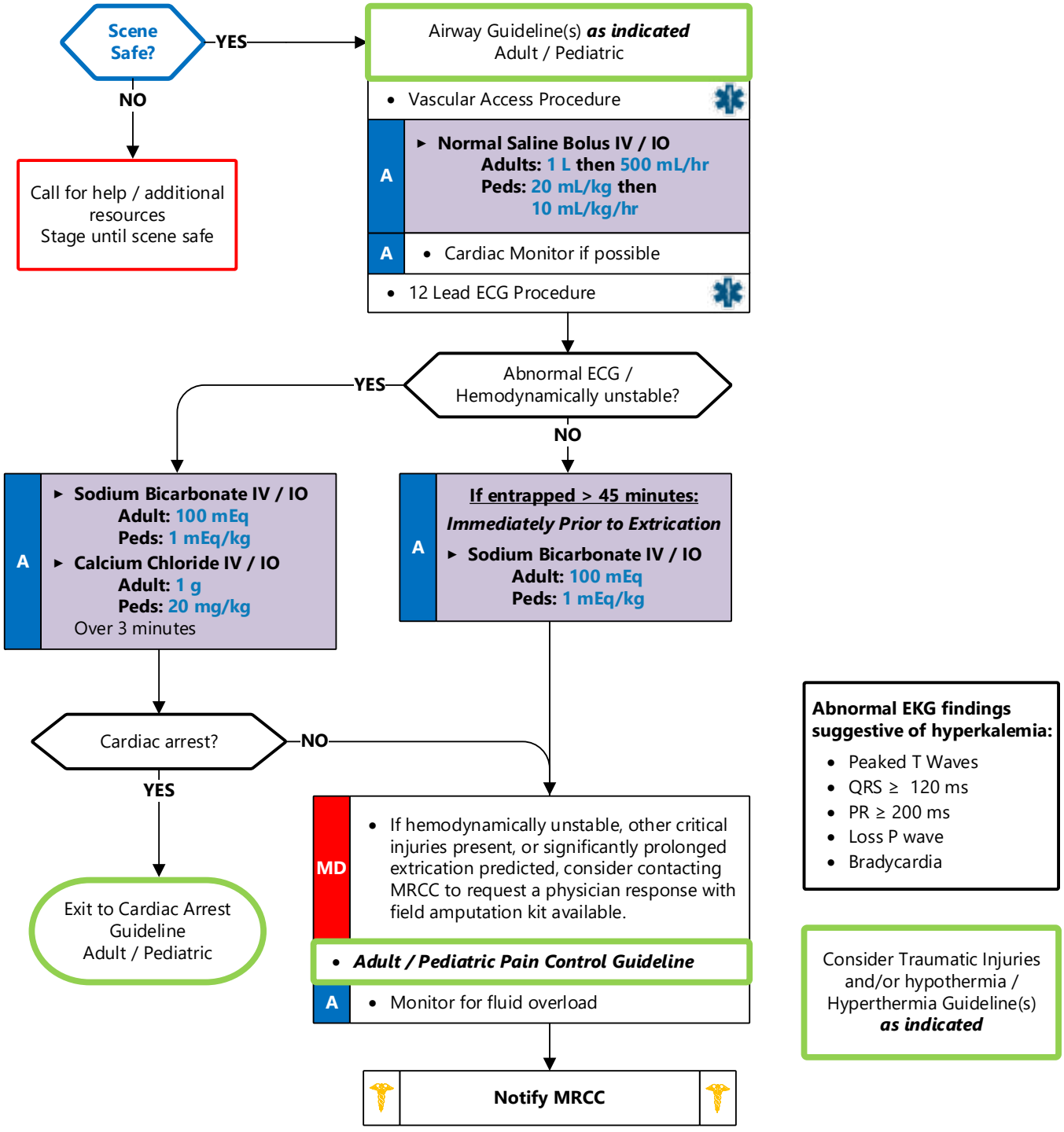
Spinal Motion Restriction (SMR)

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Consider spinal motion restriction in any patient with arthritis, cancer, dialysis or other underlying spinal or bone disease.**
- **The decision to NOT implement spinal motion restriction in a patient is the responsibility of the paramedic solely.**
- **In very old and very young, a normal exam may not be sufficient to rule out spinal injury.**
- Significant mechanism includes high-energy events such as ejection, high falls, and abrupt deceleration crashes and may indicate the need for full spinal motion restriction.
- Range of motion should NOT be assessed if there is any concern for a neck or back injury. Patient's range of motion should not be assisted.
- While backboards have historically been used to attempt spinal motion restriction, SMR may also be achieved by using a scoop stretcher, vacuum splint, ambulance cot, or other similar device to which a patient is safely secured.
- **Spinal Motion Restriction Guidelines:**
  - Spinal motion restriction should occur in consideration of the individual patient's benefit vs. risk.
  - SMR, when indicated, should apply to the entire spine due to the risk of noncontiguous injuries
  - SMR patients include: Patients with blunt trauma and distracting injury, intoxication, altered mental status, or neurologic complaint (e.g. numbness or weakness), and non-ambulatory blunt trauma patients with spinal pain, tenderness, or spinal deformity.
  - If elevation of the head is required, the device used to stabilize the spine should be elevated at the head while maintaining alignment of the neck and torso. SMR cannot be properly performed with a patient in a sitting position.
  - Patients with penetrating trauma and no evidence of spinal injury do not require spinal motion restriction. Patients who are ambulatory at the scene of blunt trauma in general do not require spinal motion restriction, but may require cervical collar and spinal precautions.
  - Whether or not a backboard is utilized, spinal precautions are STILL VERY IMPORTANT in patients at risk for spinal injury. Adequate spinal precautions may be achieved by placement of a hard cervical collar and ensuring that the patient is secured tightly to the stretcher, ensuring minimal movement and patient transfers, and manual in-line stabilization during any transfers.

Crush Syndrome

History	Signs and Symptoms	Differential
• Entrapped and crushed under heavy load > 30 minutes • Extremity / body crushed • Building collapse, trench collapse, industrial accident, pinned under heavy equipment	• Hypotension • Hypothermia • Abnormal ECG findings • Pain • Anxiety	• Entrapment without crush syndrome • Entrapment without significant crush • Altered mental status



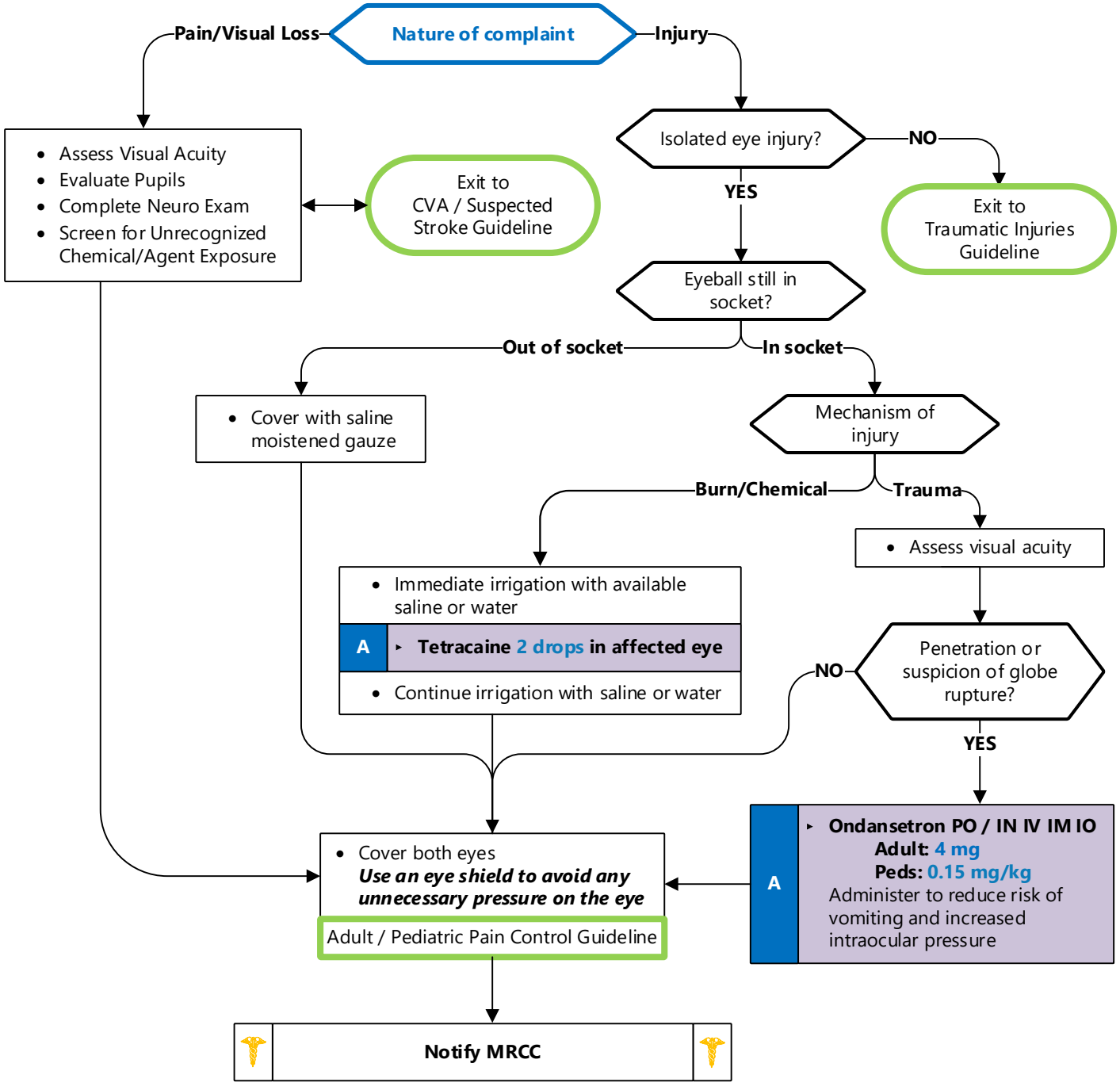
Crush Syndrome

Pearls

- **Recommended exam: Mental Status, Musculoskeletal, Neuro**
- **Scene safety is of paramount importance as typical scenes pose hazards to rescuers. Call for appropriate resources.**
- For entrapment greater than 45 minutes, significant fluid shifts can occur after extrication resulting in hemodynamic instability.
- Hyperkalemia from crush syndrome can produce ECG changes described in protocol, but may also cause a bizarre, wide complex rhythm. Wide complex rhythms should also be treated using the VF/Pulseless VT Protocol.
- Patients may become hypothermic even in warm environments.
- For prolonged extrication situations or patients with hemodynamic instability or other life-threatening injuries, consider requesting a physician field response with amputation kit via MRCC.

Eye Trauma

History:	Signs and Symptoms:	Differential:
• Time of injury/onset • Blunt/penetrating/chemical • Open vs. closed injury • Involved chemicals/MSDS • Wound Contamination • Medical History • Tetanus status • Normal visual acuity • Medications	• Pain, swelling, blood • Deformity, contusion • Visual deficit • Leaking aqueous/vitreous humor • Upwardly fixed eye • "Shooting" or "streaking" light • Visible contaminants • Rust ring • Lacrimation	• Abrasion/Laceration • Globe rupture • Retinal nerve damage/detachment • Chemical/thermal burn/agent of terror • Orbital fracture • Orbital compartment symdrome • Neurological event • Acute glaucoma • Retinal artery occlusion



Visual Acuity Testing

- Have the patient read normal-sized text at arm's length
- Have the patient count fingers held in front of their face
- Assess for recognition of motion (hand waving)
- Assess for light perception

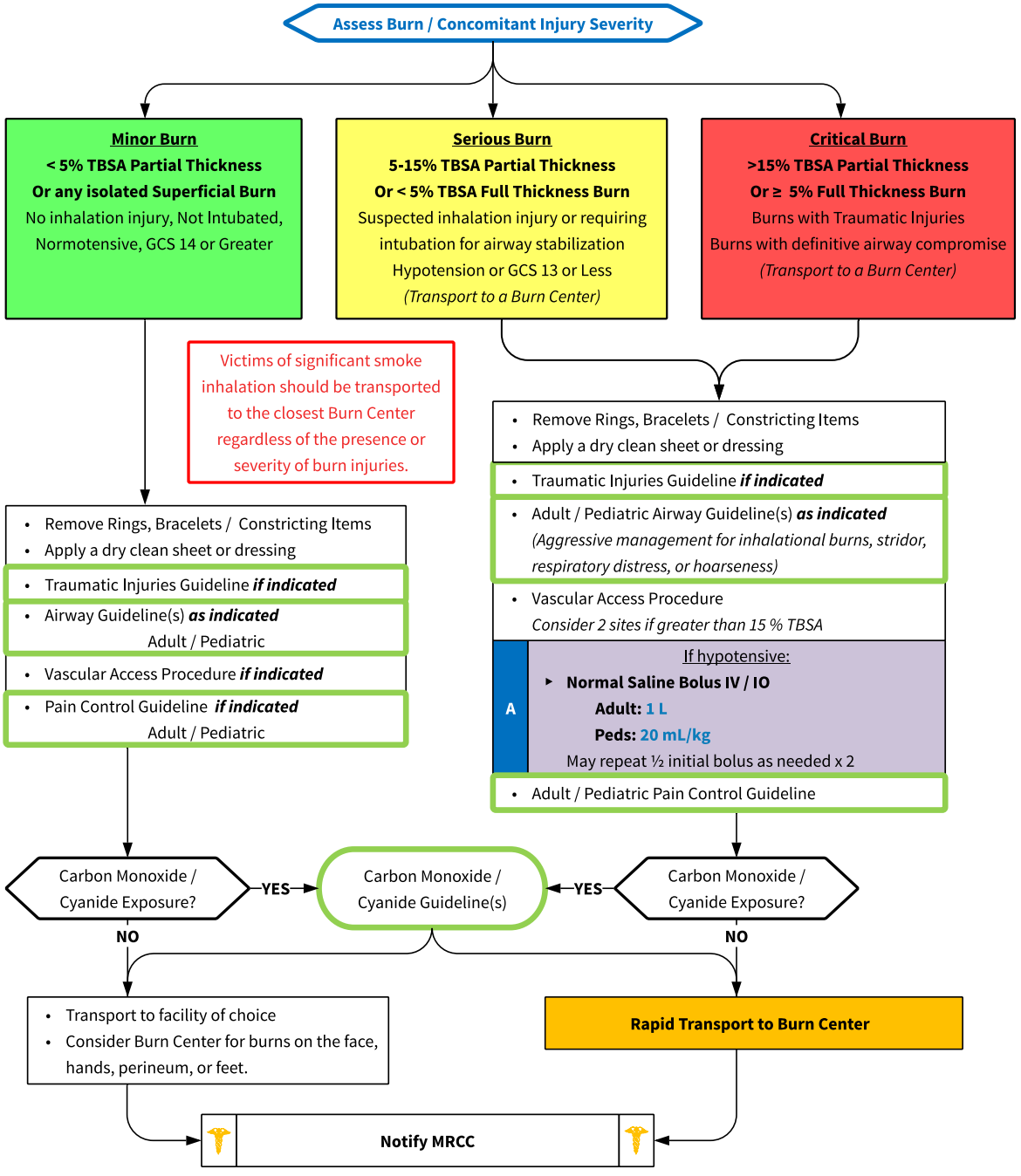
Visual acuity should be tested in each eye individually, then both eyes together. Allow patient to wear glasses (if available) if they normally would wear them, and document whether or not vision was tested with corrective eyewear (including contacts).

Pearls

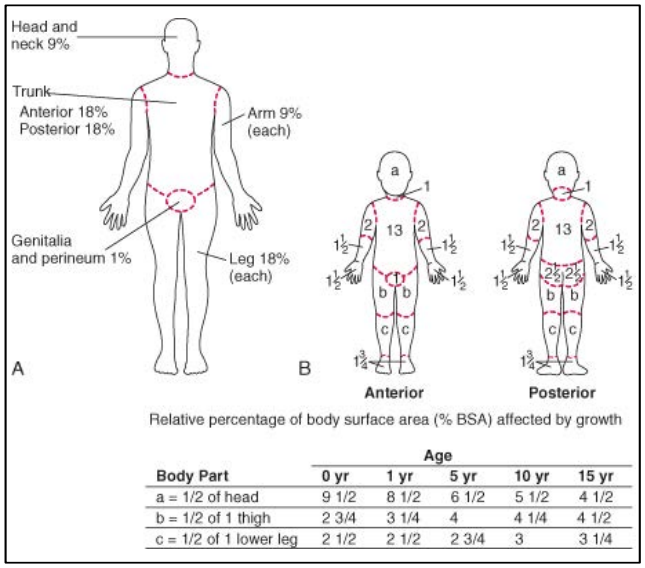
- **Remove contact lens whenever possible.**
- Normal visual acuity can be present even with severe eye injury
- Any chemical or thermal burn to the face/eyes should raise suspicion of respiratory insult
- Orbital fractures raise concern of globe or nerve injury and need repeated assessments of visual status
- Always cover both eyes to prevent further injury due to coordinated eye movements.
- Use shields, not pads, for physical trauma to eyes. Pads can be used for the unaffected eye.
- Do not remove impaled objects
- Suspected globe rupture or compartment syndrome requires emergent hospital intervention.

Thermal Burns

History	Signs and Symptoms	Differential
• Type of exposure (heat, gas, chemical) • Inhalation injury • Time of Injury • Past medical history and Medications • Other trauma • Loss of Consciousness • Tetanus/Immunization status	• Burns, pain, swelling • Dizziness • Loss of consciousness • Hypotension/shock • Airway compromise/distress could be indicated by hoarseness/ wheezing	• Superficial (1st Degree) red - painful (Don't include in TBSA) • Partial Thickness (2nd Degree) blistering • Full Thickness (3rd Degree) painless/ charred or leathery skin • Thermal injury • Chemical – Electrical injury • Radiation injury • Blast injury

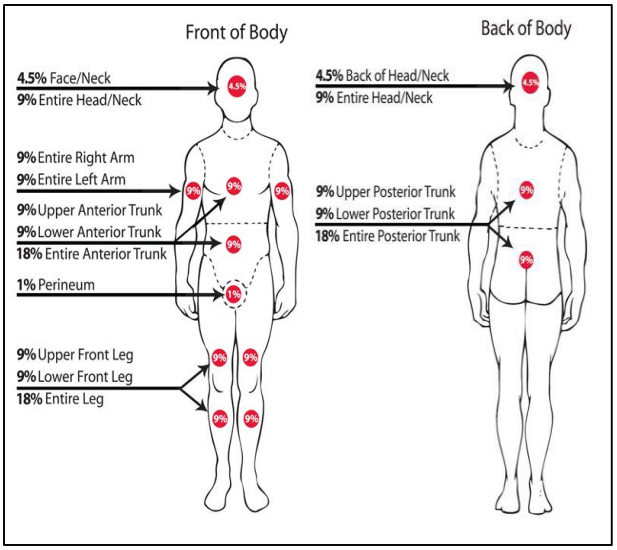


Thermal Burns



Relative percentage of body surface area (% BSA) affected by growth

	Age				
Body Part	0 yr	1 yr	5 yr	10 yr	15 yr
a = 1/2 of head	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2
b = 1/2 of 1 thigh	2 3/4	3 1/4	4	4 1/4	4 1/2
c = 1/2 of 1 lower leg	2 1/2	2 1/2	2 3/4	3	3 1/4



Estimate spotty areas of burn by using the size of the patient's palm as 1 %

Rule of Nines

- Seldom do you find a complete isolated body part that is injured as described in the Rule of Nines.
- More likely, it will be portions of one area, portions of another, and an approximation will be needed.
- For the purpose of determining the extent of serious injury, differentiate the area with minimal or superficial (1st) burn from those of partial (2nd) or full (3rd) thickness burns.
- For the purpose of determining Total Body Surface Area (TBSA) of burn, include only Partial and Full Thickness burns. Report the observation of other superficial (1st degree) burns but do not include those burns in your TBSA estimate.

Pearls

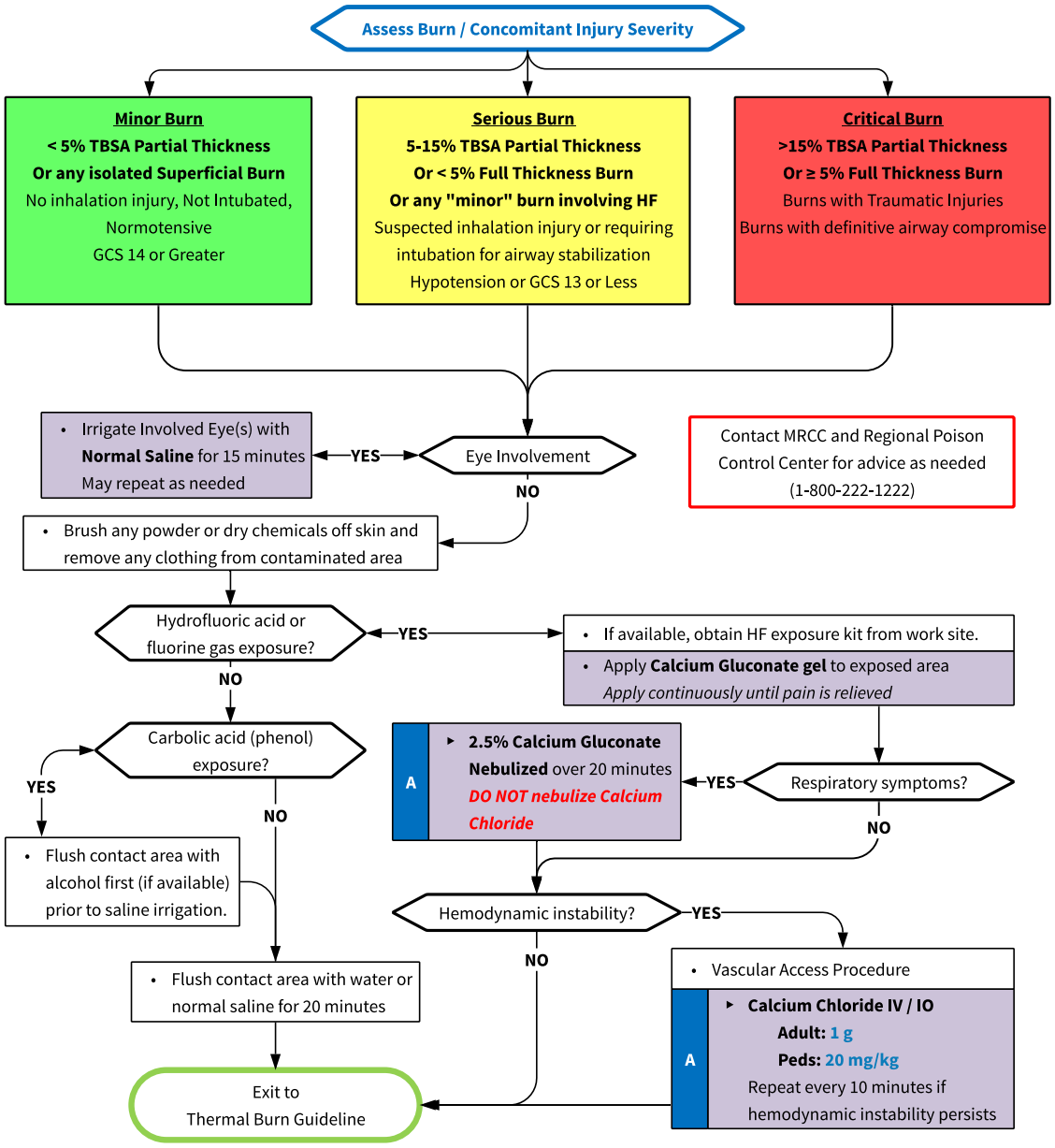
- **Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- **Critical or Serious Burns** *(These patients require direct transport to a Burn Center. Local facility should be utilized only if critical interventions such as airway management are not possible in the field)*:
  - ***> 5-15% total body surface area (TBSA) partial or full thickness burns***
  - ***Full thickness burns > 5% TBSA for any age group***
  - ***Circumferential burns of extremities***
  - ***Electrical or lightning injuries***
  - ***Suspicion of abuse or neglect***
  - ***Inhalation injury***
  - ***Chemical burns***
  - ***Burns of face, hands, perineum, or feet***
- Burn patients are often trauma patients, evaluate for multisystem trauma.
- Assure whatever has caused the burn is no longer contacting the injury. (Stop the burning process!)
- **Early intubation is required** when the patient experiences significant inhalation injuries. If appropriate airway management cannot be achieved in the field, go to the nearest emergency department for stabilization prior to transfer to the Burn Center.
- Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
- ***Burn patients are prone to hypothermia*** - never apply ice or cool the burn, must maintain normal body temperature.
- Evaluate the possibility of child abuse with children and burn injuries.
- Never administer IM pain injections to a burn patient.
- IO access through burns is allowed if no other vascular access site is available
- Always consider the possibility of child abuse in children with burn injuries

Chemical Burns

History	Signs and Symptoms	Differential
• Type of exposure (heat, gas, chemical) • Inhalation injury • Time of Injury • Past medical history /Medications • Other trauma • Loss of Consciousness • Tetanus/Immunization status	• Burns, pain, swelling • Dizziness • Loss of consciousness • Hypotension/shock • Airway compromise/distress could be indicated by hoarseness/ wheezing / Hypotension	• Superficial (1st Degree) red - painful (Don't include in TBSA) • Partial Thickness (2nd Degree) blistering • Full Thickness (3rd Degree) painless/ charred or leathery skin • Thermal injury • Chemical injury • Radiation injury • Blast injury

Assure Chemical Source is NOT Hazardous to Responders. Follow departmental Decontamination Procedures.

All chemical burns should be transported to a Burn Center. Provide pre-notification if decon was performed.



Chemical Burns

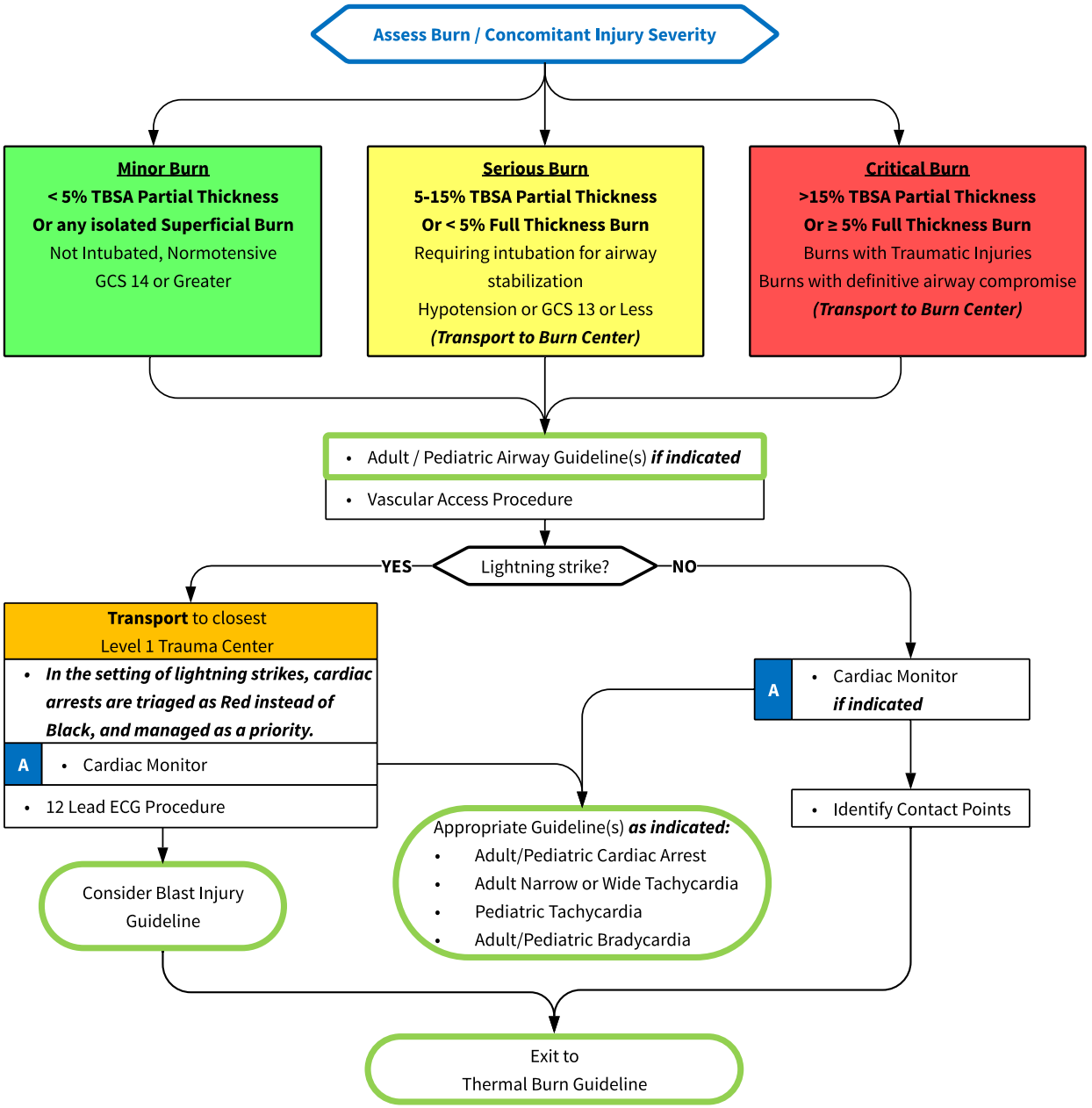
Pearls

- **Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- **Refer to Rule of Nines to estimate total body surface area affected by exposure**
- **Chemical Burns:**
  - Refer to Decontamination Procedure.
  - Normal Saline or Sterile Water is preferred, however if not available, do not delay irrigation using tap water. Other water sources may be used based on availability. Flush the area as soon as possible with the cleanest readily available water or saline solution using copious amounts of fluids.
- **Carbolic Acid (phenol)** – This chemical is hydrophobic, therefore will not be efficiently decontaminated by water/saline irrigation alone. Alcohol (any form) should be used as the initial flush if available, however do not unnecessarily delay copious irrigation with water or saline.
- **Hydrofluoric acid / fluorine gas** – These substances cause extensive tissue destruction due to their ability to penetrate tissues more easily than other substances. All exposures to these chemicals should be considered serious or critical and transported to a burn center for evaluation due to potential delayed toxicity. Calcium ions are readily bound by the fluoride ions, which contributes to pain and possible hemodynamic instability (even cardiac arrest). Calcium chloride should be given intravascularly for any signs of hemodynamic instability. Pain is an indication of ongoing tissue destruction, for which the most effective treatment is calcium gluconate gel. Even small areas of exposure can be incredibly painful. Ideally, narcotics should be withheld in preference to calcium gluconate gel which should be repeatedly applied to the affected area until the pain subsides. DO NOT nebulize calcium chloride as this can cause further tissue damage. Calcium gluconate should be given via nebulizer if available for respiratory symptoms.

Electrical Burns/Electrocution

History	Signs and Symptoms	Differential
• Type of exposure (lightning, residential power, high-voltage) • Voltage exposure • Time of Injury • Past medical history / Medications • Other trauma • Loss of Consciousness • Tetanus/Immunization status	• Burns, pain, swelling • Dizziness • Loss of consciousness • Hypotension/shock • Airway compromise/distress could be indicated by hoarseness / wheezing / Hypotension	• Superficial (1st Degree) red - painful (Don't include in TBSA) • Partial Thickness (2nd Degree) blistering • Full Thickness (3rd Degree) painless/ charred or leathery skin • Thermal injury • Internal electrical injury • Blast injury

Ensure electrical source is NO longer in contact with patient before touching patient.



Electrical Burns/Electrocution

Pearls

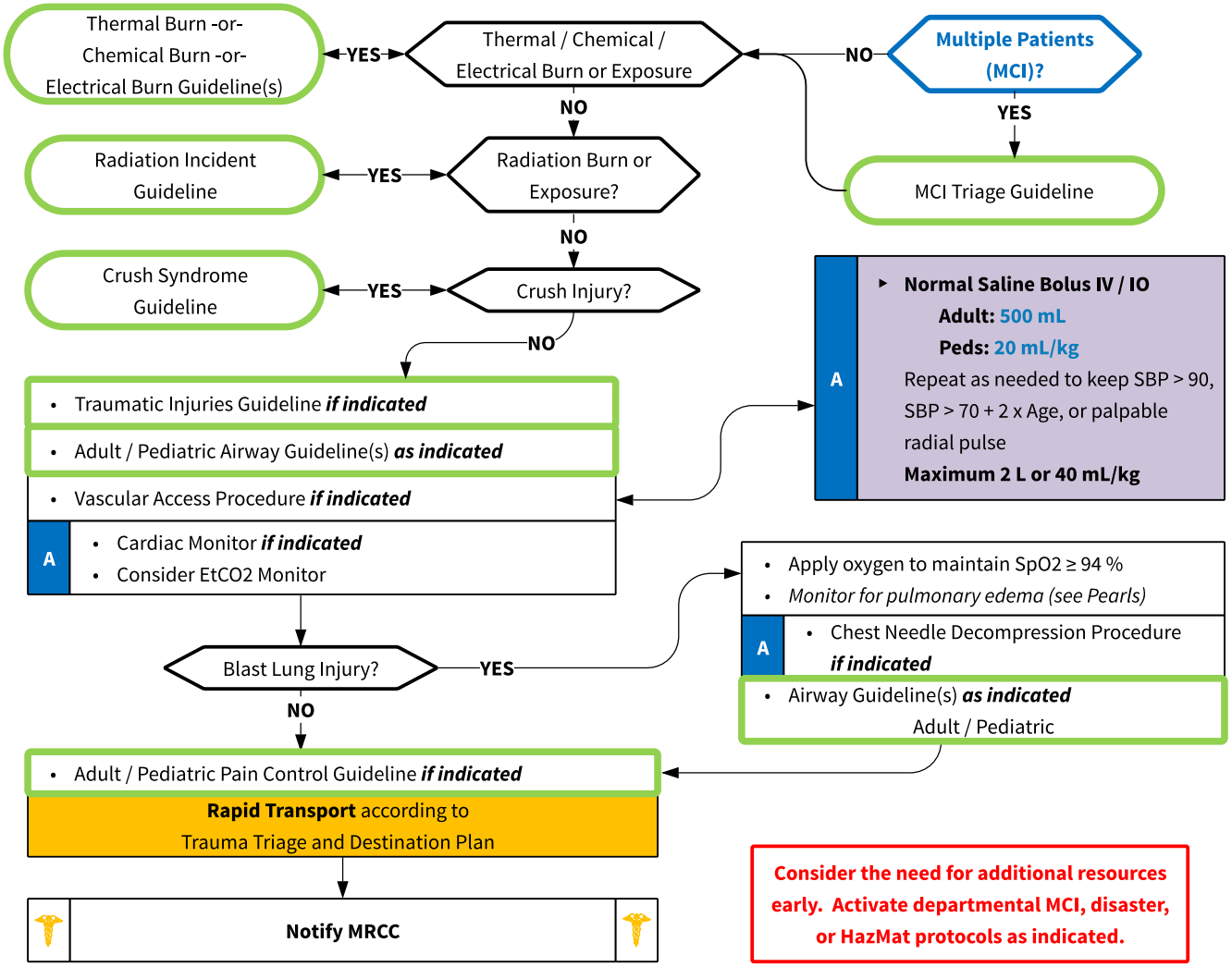
- **Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- **Refer to Rule of Nines: Remember the extent of the obvious external burn from an electrical source, does not always reflect more extensive internal damage not seen.**
- **Lightning Strikes:**
  - Lightning strikes should be treated as electrical burns, blast injuries, and multiple trauma due to the extreme forces produced. Cardiac arrests are often easily resuscitated with defibrillation attempts with resultant good neurologic outcomes, therefore should be triaged as Red in the setting of a mass casualty incident.
- **Electrical Burns:**
  - DO NOT contact patient until you are certain the source of the electrical shock is disconnected.
  - Attempt to locate contact points (generally there will be two or more.) A point where the patient contacted the source and a point(s) where the patient is grounded. Sites will generally be full thickness. ***Do not refer to as entry and exit sites or wounds.***
- **Cardiac Monitor:**
  - Anticipate ventricular or atrial irregularity including VT, VF, atrial fibrillation and / or heart blocks.
  - Attempt to identify the nature of the electrical source (AC / DC), the amount of voltage, and the amperage the patient may have been exposed to during the electrical shock.

Blast Injuries/Explosions

History	Signs and Symptoms	Differential
• Type of exposure (heat, gas, chemical) • Inhalation injury • Time of Injury • Past medical history /Medications • Other trauma • Loss of Consciousness • Tetanus/Immunization status	• Burns, pain, swelling • Dizziness • Loss of consciousness • Hypotension/shock • Airway compromise/distress could be indicated by hoarseness/ wheezing / Hypotension	• Superficial (1st Degree) red - painful (Don't include in TBSA) • Partial Thickness (2nd Degree) blistering • Full Thickness (3rd Degree) painless/ charred or leathery skin • Thermal injury • Chemical – Electrical injury • Radiation injury • Blast injury

- **Nature of Device**: Agent / Amount. Industrial Explosion. Terrorist Incident. Improvised Explosive Device.
- **Method of Delivery**: Incendiary / Explosive
- **Nature of Environment**: Open / Closed.
- **Distance from Device**: Intervening protective barrier. Other environmental hazards,
- **Evaluate for**: Blunt Trauma / Crush Injury / Compartment Syndrome / Traumatic Brain Injury / Concussion / Tympanic Membrane Rupture / Abdominal hemorrhage or Evisceration, Blast Lung Injury and Penetrating Trauma.

Scene Safety / Quantify and Triage Patients / Load and Go with Assessment & Treatment Enroute



Blast Injuries/Explosions

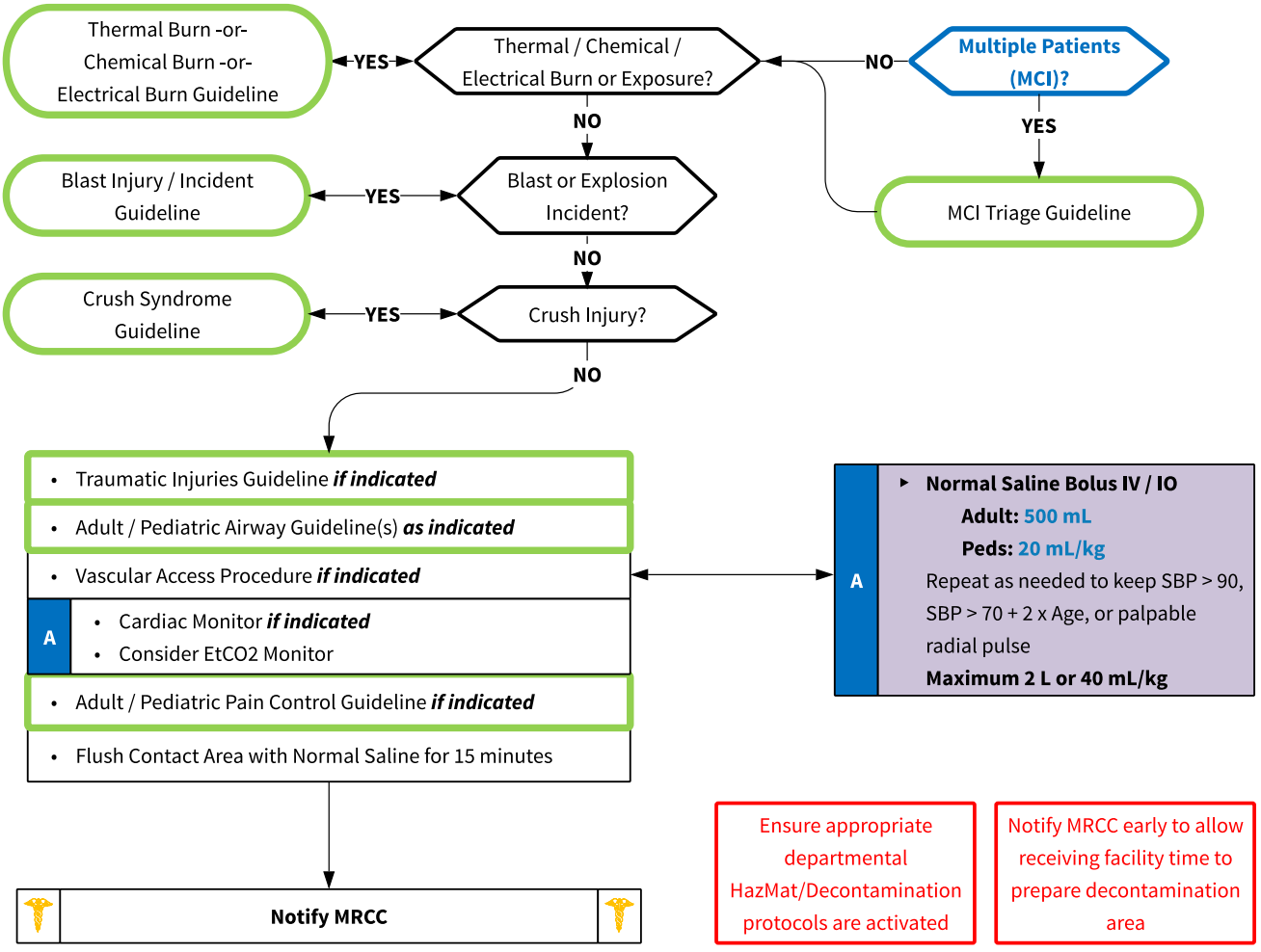
Pearls

- **Types of Blast Injury:**
  - Primary Blast Injury: From pressure wave.
  - Secondary Blast Injury: Impaled objects. Debris which becomes missiles / shrapnel.
  - Tertiary Blast Injury: Patient falling or being thrown / pinned by debris.
  - Most Common Cause of Death: Secondary Blast Injuries.
- **Triage of Blast Injury patients:**
  - Blast Injury Patients with Burn Injuries Must be Triaged using the Thermal / Chemical / Electrical Burn Destination Guidelines for Critical / Serious / Minor Trauma and Burns
- **Blast Lung Injury:**
  - Blast Lung Injury is characterized by respiratory difficulty and hypoxia. Can occur (rarely) in patients without external thoracic trauma. More likely in enclosed space or in close proximity to explosion.
  - Symptoms: Dyspnea, hemoptysis cough, chest pain, wheezing and hemodynamic instability.
  - Signs: Apnea, tachypnea, hypopnea, hypoxia, cyanosis and diminished breath sounds.
  - Blast Lung Injury patients may require early intubation but positive pressure ventilation may exacerbate the injury, avoid hyper-ventilation.
  - Air transport may worsen lung injury as well and close observation is mandated. Tension pneumothorax may occur requiring chest decompression. Be judicious with fluids as volume overload may worsen lung injury.
- **Safety Considerations:**
  - Attempt to determine source of the blast to include any potential threat for particalization of hazardous materials.· Evaluate scene safety to include the source of the blast that may continue to spill explosive liquids or gases. Conditions that led to the initial explosion may be returning and lead to a second explosion.
  - Patients who can, typically will attempt to move as far away from the explosive source as they safely can.
  - If concern exists for intentional explosion, consider potential threat for a secondary device.
  - Evaluate surroundings for suspicious items; unattended back packs or packages, or unattended vehicles.
  - Protect the airway and cervical spine, however, beyond the primary survey, care and a more detailed assessment should be de-ferred until the patient is in the ambulance.
  - If there are signs the patient was carrying the source of the blast, notify law enforcement immediately and most likely, a law en-forcement officer will accompany your patient to the hospital.
  - Consider the threat of structural collapse, contaminated particles and / or fire hazards.

Radiation Incidents

History	Signs and Symptoms	Differential
• Type of exposure (heat, gas, chemical) • Inhalation injury • Time of Injury • Past medical history /Medications • Other trauma • Loss of Consciousness • Tetanus/Immunization status	• Burns, pain, swelling • Dizziness • Loss of consciousness • Hypotension/shock • Airway compromise/distress could be indicated by hoarseness/ wheezing / Hypotension	• Superficial (1st Degree) red - painful (Don't include in TBSA) • Partial Thickness (2nd Degree) blistering • Full Thickness (3rd Degree) painless/ charred or leathery skin • Thermal injury • Chemical – Electrical injury • Radiation injury • Blast injury

- **Radiation Exposure does not change the acute treatment of patients.**
- **Evaluate and treat traumatic and medical complaints per appropriate guidelines.**
- **Scene Safety / Quantify and Triage Patients / Load and Go with Assessment & Treatment Enroute**

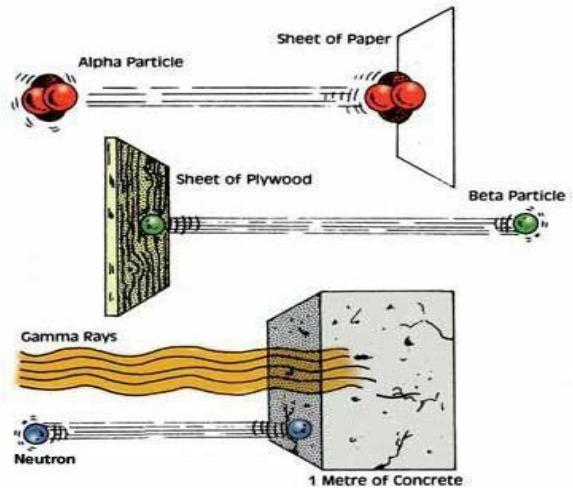


Collateral Injury: Most all injuries immediately seen will be a result of collateral injury, such as heat from the blast, trauma from concussion, treat collateral injury based on typical care for the type of injury displayed.·

Qualify: Determine exposure type; external irradiation, external contamination with radioactive material, internal contamination with radioactive material.·

Quantify: Determine exposure (generally measured in Grays/Gy). Information may be available from those on site who have monitoring equipment, do not delay transport to acquire this information.

Radiation Incidents



Time Phases of Radiation Injury
(Exposure Dose vs Clinical Outcome)

Exposure Dose (Gy)	Prodrome Severity	Manifest Illness - Symptom Severity			Prognosis
		Hematologic	Gastrointestinal	Neurologic	
0.5 to 1.0	+	+	0	0	Survival almost certain
1.0 to 2.0	+/++	+	0	0	Survival >90 percent
2.0 to 3.5	++	++	0	0	Probable survival
3.5 to 5.5	+++	+++	+	0	Death in 50% at 3.5 to 6 wks
5.5 to 7.5	+++	+++	++	0	Death probable in 2-3 wks
7.5 to 10	+++	+++	+++	0*	Death probable in 1-2.5 wks
10 to 20	+++	+++	+++	+++	Death certain in 5-12 days
> 20	+++	+++	+++	+++**	Death certain in 2-5 days

Abbreviations: Gy: dose in Grey;
0: no effects; +: mild; ++: moderate; +++: severe or marked

* Hypotension
** Also cardiovascular collapse, fever, shock

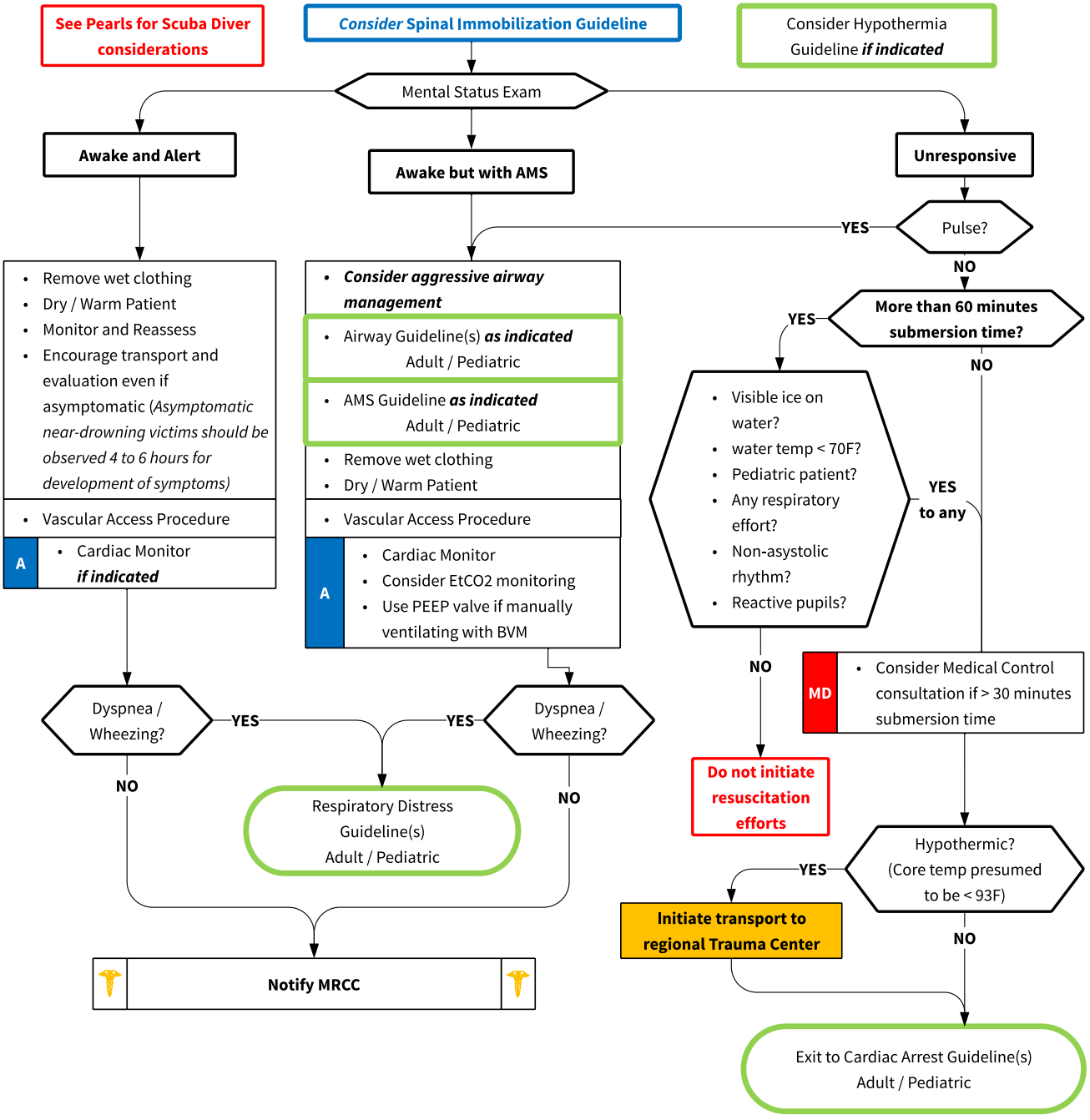
Modified from : Waselenko, JK, MacVittie, TJ, Blakely, WF, et al. Medical management of the acute radiation syndrome: Recommendations of the strategic national stockpile radiation working group. Ann Int Med 2004; 140:1039.

Pearls

- **If appropriate, life-saving interventions may be performed in the Hot or Warm zones, but should be restricted to critical interventions such as King airway placement, chest needle decompression, and tourniquet application.**
- Dealing with a patient with a radiation exposure can be a frightening experience. Do not ignore the ABC's, a dead but decontaminated patient is not a good outcome.
- Normal Saline or Sterile Water is preferred, however if not available, do not delay irrigation using tap water. Other water sources may be used based on availability. Flush the area as soon as possible with the cleanest readily available water or saline solution using copious amounts of fluids.
- **Three methods of exposure:**
  - External irradiation
  - External contamination
  - Internal contamination
- **Two classes of radiation:**
  - Ionizing radiation (greater energy) is the most dangerous and is generally in one of three states: Alpha Particles,
  - Beta Particles and Gamma Rays.
  - Non-ionizing (lower energy) examples include microwaves, radios, lasers and visible light.
- Radiation burns with early presentation are unlikely, it is more likely this is a combination event with either thermal or chemical burn being presented as well as a radiation exposure. Where the burn is from a radiation source, it indicates the patient has been exposed to a significant source, (> 250 rem).
- Patients experiencing radiation poisoning are not contagious. Cross contamination is only a threat with external and internal contamination.
- Typical ionizing radiation sources in the civilian setting include soil density probes used with roadway builders and medical uses such as x-ray sources as well as radiation therapy. Sources used in the production of nuclear energy and spent fuel are rarely exposure threats as are military sources used in weaponry. Nevertheless, these sources are generally highly radioactive and in the unlikely event they are the source, consequences could be significant and the patient's outcome could be grave.
- **The three primary methods of protection from radiation sources:**
  - Limiting time of exposure
  - Distance from
  - Shielding from the source
- Dirty bombs ingredients generally include previously used radioactive material and combined with a conventional explosive device to spread and distribute the contaminated material.
- Refer to WMD / Nerve Agent Guideline for dirty contamination events.
- If there is a time lag between the time of exposure and the encounter with EMS, key clinical symptom evaluation includes: Nausea/ Vomiting, hypothermia/hyperthermia, diarrhea, neurological/cognitive deficits, headache and hypotension.
- **Inform MRCC early to mobilize hospital resources at receiving facilities**

Drowning/Submersion Incidents

History	Signs and Symptoms	Differential
• Submersion in water regardless of depth • Possible history of trauma ie: diving board • Duration of immersion • Temperature of water or possibility of hypothermia • Degree of water contamination	• Unresponsive • Mental status changes • Decreased or absent vital signs • Vomiting • Coughing, Wheezing, Rales, Rhonci, Stridor • Apnea	• Trauma • Pre-existing medical problem • Pressure injury (diving) • Barotrauma • Decompression sickness • Post-immersion syndrome



Drowning/Submersion Incidents

Diver's Alert Network
(919)-684-9111
24-hour emergency medical consultation

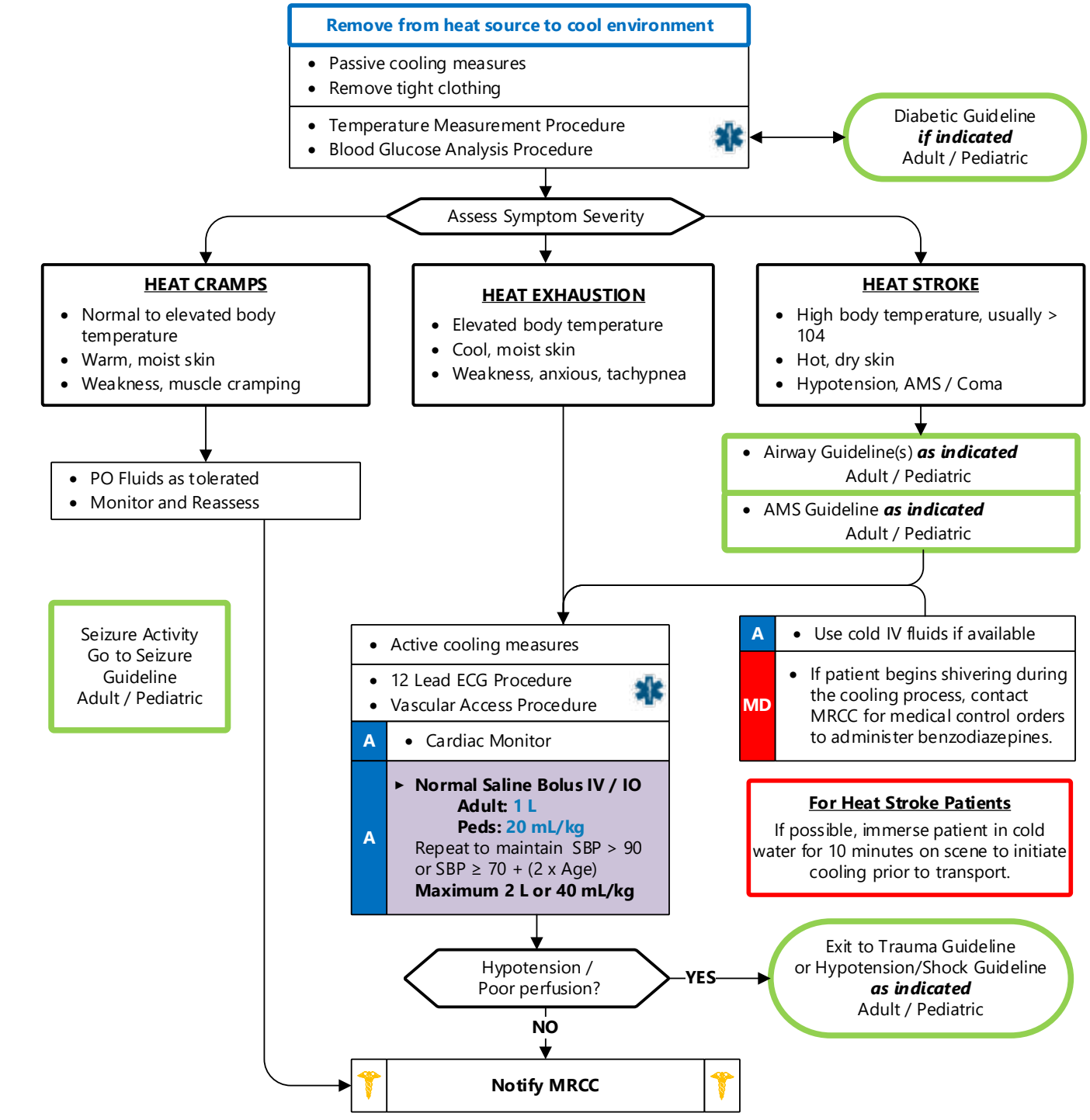
- Decompression injuries (i.e. "The Bends", nitrogen narcosis, air emboli) can occur after an ascent from any depth when using SCUBA equipment. Typical symptoms include severe joint pain, chest pain, breathing difficulty, or altered mental status. *These patients should be transported to the nearest hyperbaric facility unless other confounding injuries are present (burns, major trauma).* **Avoid air transport** (unless low altitudes can be maintained) as this will exacerbate the decompression injury further. Consider Diver's Alert Network and medical control consultation to assist with the management of these patients.
- After 60 minutes of submersion the likelihood of successful resuscitation approaches zero, and the risk to rescuers increases. Unless special circumstances are present (i.e. visible ice on water, pediatric victim) consider transitioning efforts from rescue to recovery after 60 minutes. Utilize MRCC for medical control consultation as appropriate.
- Positive pressure ventilation should be considered for any drowning victim with respiratory difficulty or unresponsiveness. CPAP would be appropriate for the awake patient, and a PEEP valve should be used in conjunction with a BVM for any patient requiring ventilatory assistance following a submersion/drowning injury.

Pearls

- **Recommended Exam: Trauma Survey, Head, Neck, Chest, Abdomen, Pelvis, Back, Extremities, Skin, Neuro**
- **Ensure scene safety. Drowning is a leading cause of death among would-be rescuers.**
- **Allow appropriately trained and certified rescuers to remove victims from areas of danger.**
- **With cold water submersion there is an increased chance of survival even with cardiac arrest and prolonged submersion. Have a low threshold to initiate resuscitation, consider medical control consultation early.**
- Have a high index of suspicion for possible spinal injuries
- Hypothermia is often associated with drowning and submersion injuries.
- All victims should be transported, even if asymptomatic, for evaluation due to potential for worsening over the next several hours.
- With pressure injuries (decompression / barotrauma), consider transport to or availability of a hyperbaric chamber.
- Post-drowning patients who are awake and cooperative but with respiratory distress may benefit from CPAP.

Hyperthermia

History	Signs and Symptoms	Differential
• Age, very young and old • Exposure to increased temperatures and / or humidity • Past medical history / Medications • Time and duration of exposure • Poor PO intake, extreme exertion • Fatigue and / or muscle cramping	• Altered mental status / coma • Hot, dry or sweaty skin • Hypotension or shock • Seizures • Nausea	• Fever (Infection) • Dehydration • Medications • Hyperthyroidism (Storm) • Delirium tremens (DT's) • Heat cramps, exhaustion, stroke • CNS lesions or tumors



Hyperthermia

Passive Cooling

- **Extricate to cooler environment**
- **Remove all clothing**
- **Limit physical activity**

Active Cooling

- **Ice packs to axilla, groin, and neck**
- **Cold IV fluids**
- **Fan with cold air**
- **Mist with water**
- **Immersion in cold water**
- **Cold oral fluids if alert**

- Most cases of heat exhaustion do not require intensive treatment.
- Consider using the Scene Rehabilitation protocol for mild cases of heat exhaustion without confounding medical issues.

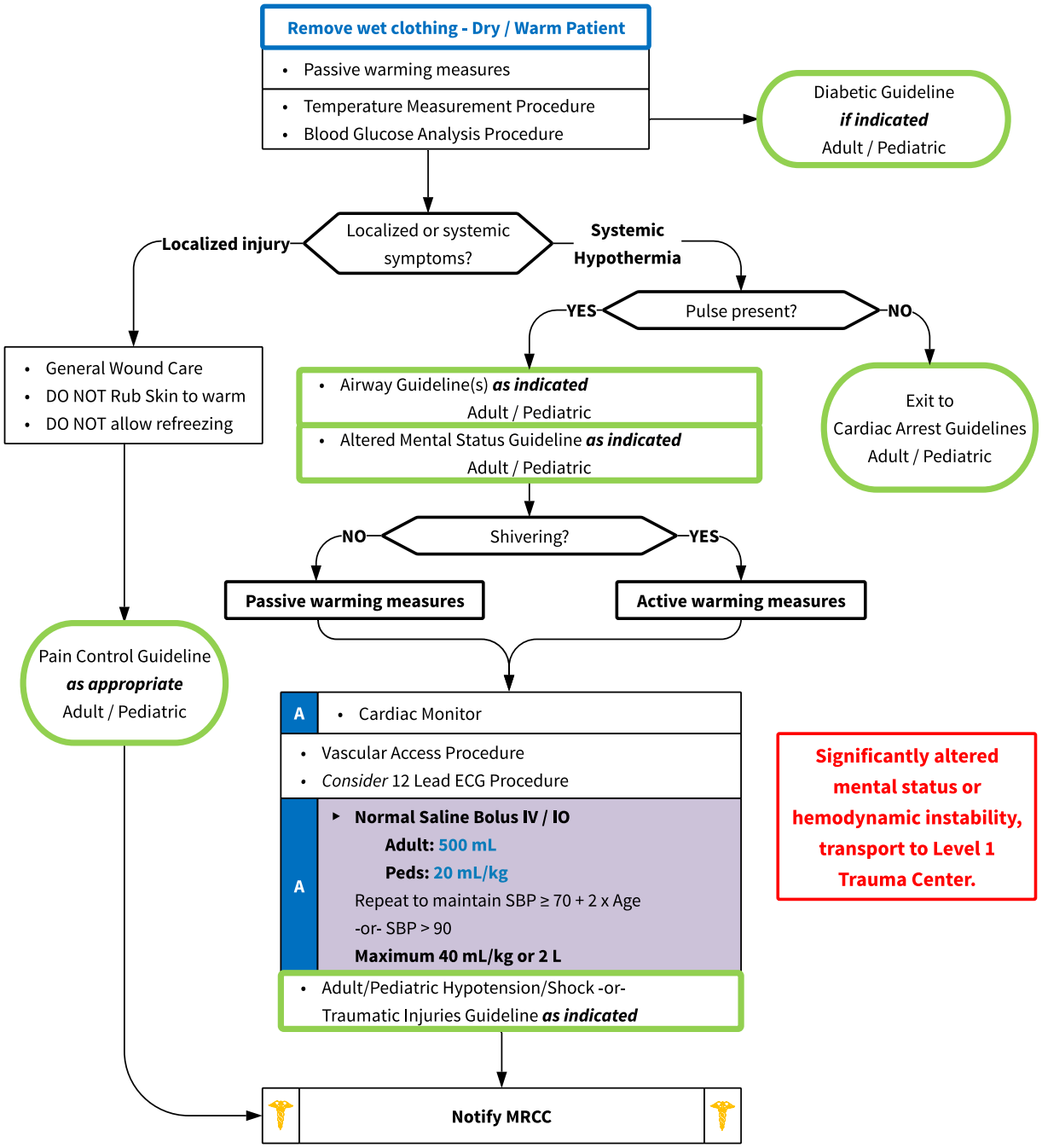
Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Neuro**
- Extremes of age are more prone to heat emergencies (i.e. young and old). Obtain and document patient temperature if able.
- Predisposed by use of: tricyclic antidepressants, phenothiazines, anticholinergic medications, and alcohol.
- Cocaine, Amphetamines, and Salicylates may elevate body temperatures.
- Sweating generally disappears as body temperature rises above 104° F (40° C).
- Intense shivering may occur as patient is cooled. Treat with benzos per guidelines.
- **Heat Cramps** consists of benign muscle cramping 2° to dehydration and is not associated with an elevated temperature.
- **Heat Exhaustion** consists of dehydration, salt depletion, dizziness, fever, mental status changes, headache, cramping, nausea and vomiting. Vital signs usually consist of tachycardia, hypotension, and an elevated temperature.
- **Heat Stroke** consists of dehydration, tachycardia, hypotension, temperature >104° F (40° C), and an altered mental status.

Hypothermia/Frostbite

History	Signs and Symptoms	Differential

• Age, very young and old
• Exposure to decreased temperatures but may occur in normal temperatures
• Past medical history / Medications
• Drug use: Alcohol, barbituates
• Infections / Sepsis
• Length of exposure / Wetness / Wind chill
	• Altered mental status / coma
	• Cold, clammy
	• Shivering
	• Extremity pain or sensory abnormality
	• Bradycardia
	• Hypotension or shock
		• Sepsis
		• Environmental exposure
		• Hypoglycemia
		• CNS dysfunction
		  ◦ Stroke
		  ◦ Head injury
		  ◦ Spinal cord injury



Hypothermia/Frostbite

Passive Rewarming

- **Extricate from cold environment**
- **Remove wet clothing**

Active Rewarming

- **Increase ambient temperature**
- **Apply blankets**
- **Administer warm IV fluids**
- **Heating packs to axilla and groin**
- **Warm humidified oxygen**

Hypothermic cardiac arrests should be transported to a regional Trauma Center with active CPR if core temperature is < 93 degrees F (32 degrees C). After the first round of ACLS meds, delay any further cardiac medications or defibrillation attempts until the patient's temperature is at least 86 degrees F (30 degrees C).

After Drop

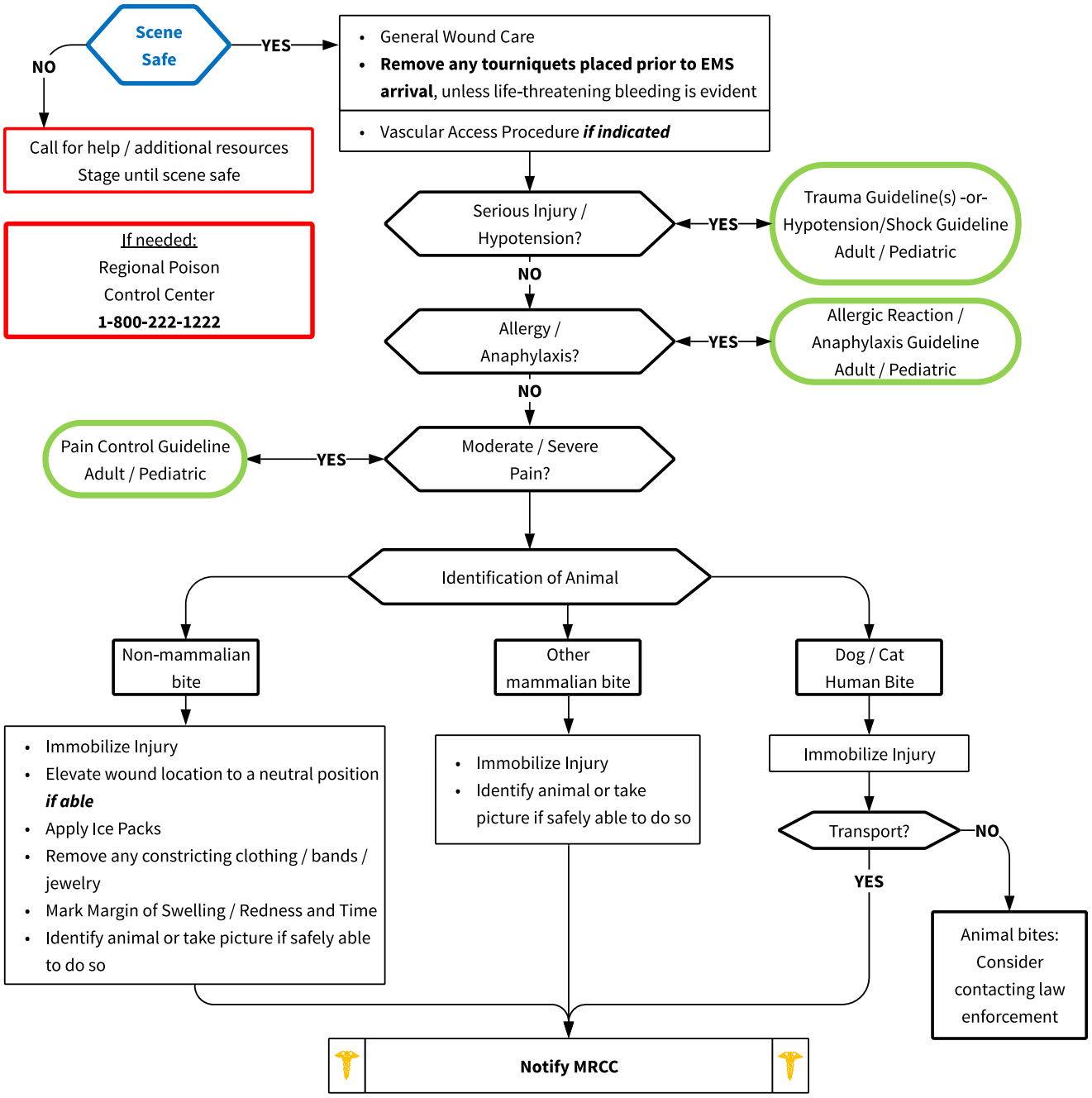
After drop, otherwise known as rewarming collapse (or rewarming shock) is a sudden drop in blood pressure in combination with a low cardiac output which may occur during active treatment of a severely hypothermic person. This occurs when vasodilation (in response to warming) forces cold blood from the extremities to be recirculated back to the core, resulting in a further drop in the core body temperature. This can result in ventricular fibrillation or sudden cardiovascular collapse. There is theoretical concern that external rewarming rather than internal rewarming may increase the risk. Since internal rewarming is logistically challenging in the pre-hospital environment, active rewarming should not be performed by pre-hospital personnel if the patient has cooled beyond the point of shivering.

Pearls

- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Hypothermia categories:**
  - Mild 90 – 95 degrees F (32 – 35 degrees C)
  - Moderate 82 – 90 degrees F (28 – 32 degrees C)
  - Severe < 82 degrees F (< 28 degrees C)
- **Mechanisms of hypothermia:**
  - Radiation: Heat loss to surrounding objects via infrared energy (60 % of most heat loss.)
  - Convection: Direct transfer of heat to the surrounding air.
  - Conduction: Direct transfer of heat to direct contact with cooler objects (important in submersion.)
  - Evaporation: Vaporization of water from sweat or other body water losses.
- Contributing factors of hypothermia: Extremes of age, malnutrition, alcohol or other drug use.
- If the temperature is unable to be measured, treat the patient based on the suspected temperature.
- **CPR:**
  - **Severe hypothermia may cause cardiac instability. Rough handling of the patient theoretically could cause ventricular fibrillation. This is controversial and not clearly supported in research studies. Intubation and CPR techniques should not be withheld due to this concern, but in severe hypothermia airway management should be performed by the most experienced provider.**
  - **Below 86 degrees F (30 degrees C) ACLS medications may not be effective. One initial round of medications may be administered, however further treatments (other than chest compressions and airway management) should be deferred until the patient has been warmed to at least 86 degrees F (30 degrees C). Contact medical control for direction.**
  - **If the patient's temperature is below 86 degrees F (30 degrees C) then defibrillate 1 time if indicated. Further defibrillation attempts should be deferred until the patient has been warmed to at least 86 degrees F (30 degrees C). Contact medical control for direction.**
  - **Hypothermia may produce severe bradycardia so take at least 45 seconds to palpate for a pulse.**
- Hot packs can be activated and placed in the armpit and groin area if available. Care should be taken not to place the packs directly against the patient's skin.

Bites/Stings/Envenomations

History	Signs and Symptoms	Differential
• Type of bite / sting • Description or bring creature / photo with patient for identification • Time, location, size of bite / sting • Previous reaction to bite / sting • Domestic vs. Wild • Tetanus and Rabies risk • Immunocompromised patient	• Rash, skin break, wound • Pain, soft tissue swelling, redness • Blood oozing from the bite wound • Evidence of infection • Shortness of breath, wheezing • Allergic reaction, hives, itching • Hypotension or shock	• Animal bite • Human bite • Snake bite (poisonous) • Spider bite (poisonous) • Insect sting / bite (bee, wasp, ant, tick) • Infection risk • Rabies risk • Tetanus risk



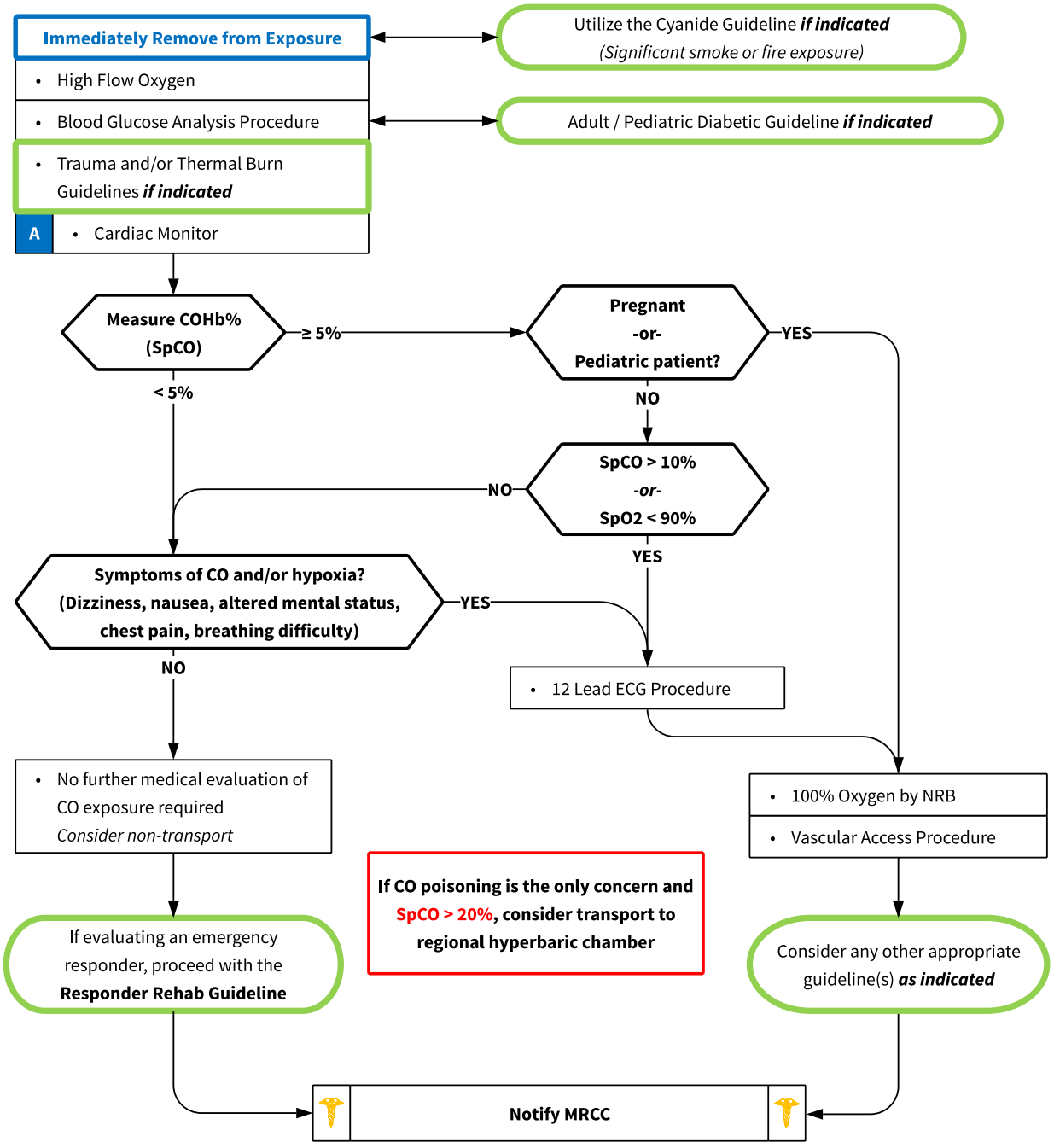
Bites/Stings/Envenomations

Pearls

- **Recommended Exam: Mental Status, Skin, Extremities (Location of injury), and a complete Neck, Lung, Heart, Abdomen, Back, and Neuro exam if systemic effects are noted**
- Human bites have higher infection rates than animal bites due to normal mouth bacteria.
- Carnivore bites are much more likely to become infected and all have risk of Rabies exposure.
- Cat bites may progress to infection rapidly due to a specific bacteria (Pasteurella multicoda).
- Poisonous snakes in this area are generally of the pit viper family (rattlesnake). Other poisonous exotic species may be found at zoos, pet stores, or in rare cases at private residences (legally or illegally).
- Coral snake bites are rare: Very little pain but very toxic. "Red on yellow - kill a fellow, red on black - venom lack."
- If no pain or swelling, envenomation is unlikely. About 25 % of snake bites are "dry" bites.
- Black Widow spider bites tend to be minimally painful, but over a few hours, muscular pain and severe abdominal pain may develop (spider is black with red hourglass on belly).
- Brown Recluse spider bites are minimally painful to painless. Little reaction is noted initially but tissue necrosis at the site of the bite develops over the next few days (brown spider with fiddle shape on back).
- Evidence of infection: swelling, redness, drainage, fever, red streaks proximal to wound.
- Immunocompromised patients are at an increased risk for infection: diabetes, chemotherapy, transplant patients.
- Consider contacting the Regional Poison Control Center or MRCC for guidance (1-800-222-1222).

Carbon Monoxide Exposure

History	Signs and Symptoms	Differential
• Firefighter/Structure Fire victim • Suspected CO exposure • Suspected source/duration exposure • Age, possible pregnancy • Reason (accidental, suicidal) • Measured atmospheric levels • Past medical history, meds	• Altered mental status/dizziness • Headache, Nausea/Vomiting • Chest Pain/Respiratory distress • Neurological impairments • Vision problems/reddened eyes • Tachycardia/tachypnea • Arrhythmias, seizures, coma	• Effects of other toxic fire byproduct • Acute cardiac event • Acute neurological event • Flu/GI illness • Acute intoxication • Diabetic Ketoacidosis • Headache of non-toxic origin



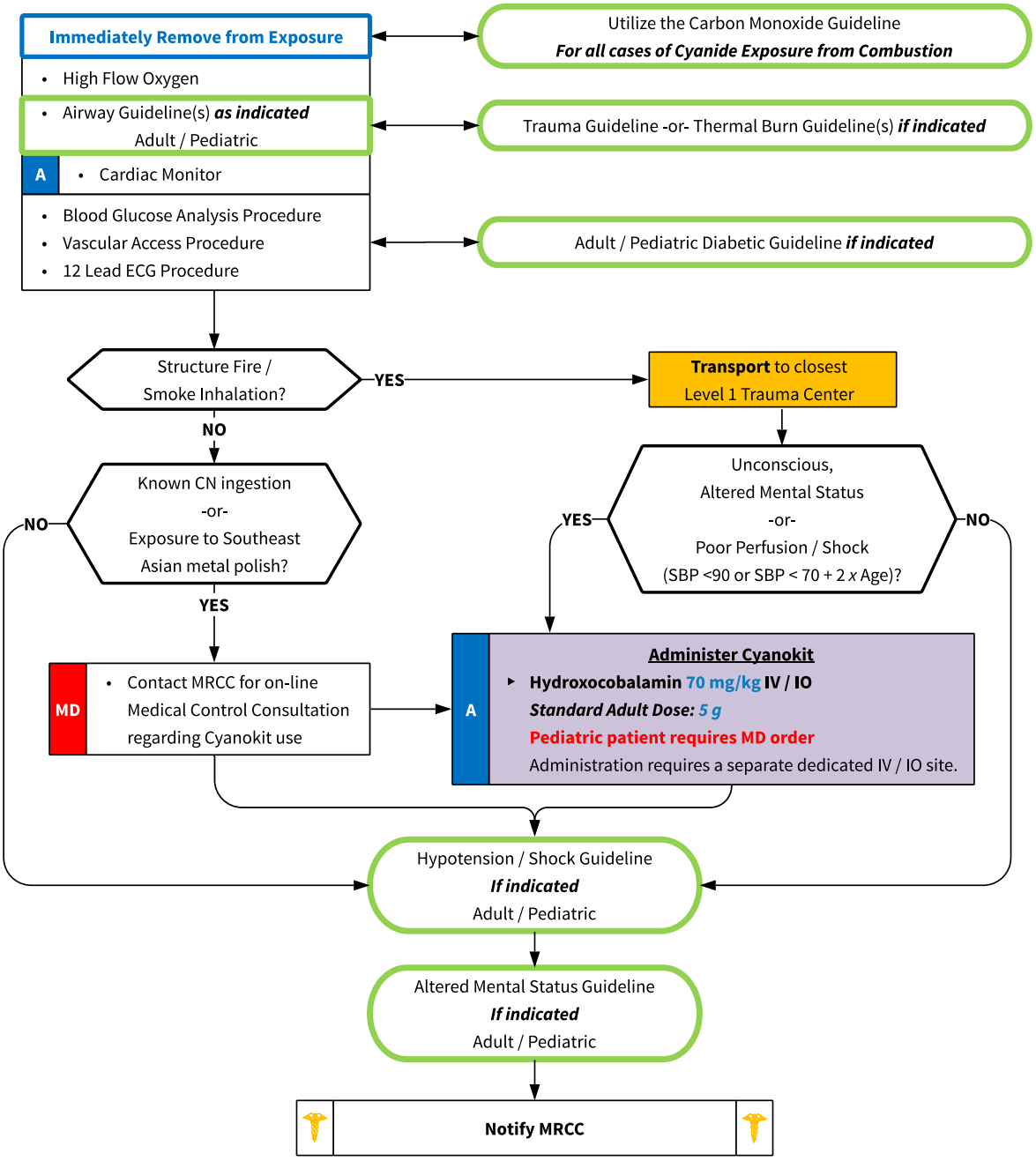
Carbon Monoxide Exposure

Pearls

- **Recommended exam: Neuro, Skin, Heart, Lungs, Abdomen, Extremities**
- **Scene safety is priority.**
- Consider CO and Cyanide with any product of combustion
- Normal environmental CO level does not exclude CO poisoning.
- **Fetal hemoglobin has a greater attraction for CO than maternal hemoglobin. Females who are known to be or possibly pregnant should be advised that EMS-measured SpCO levels reflect the adult's level, and that fetal COHb levels may be higher. Recommend Hospital eval for any CO exposed pregnant person.**
- The absence (or low detected levels of) of COHb is not a reliable predictor of firefighter or victim exposure to other toxic byproducts of fire
- In obtunded fire victims, consider Cyanide treatment protocol
- The differential list for CO Toxicity is extensive. Attempt to evaluate other correctable causes when possible
- Chronic CO exposure is clinically significant; therefore advice on smoking cessation is important medical instruction

Cyanide Exposure

History	Signs and Symptoms	Differential
• Smoke inhalation • Ingestion of cyanide • Eating large quantity of fruit pits • Industrial exposure • Trauma • Reason: Suicide, criminal, accidental • Past Medical History • Time / Duration of exposure	• AMS • Malaise, weakness, flu like illness • Dyspnea • GI Symptoms; N/V; cramping • Dizziness • Seizures • Syncope • Reddened skin • Chest pain	• Diabetic related • Infection • MI • Anaphylaxis • Renal failure / dialysis problem • Head injury / trauma • Co-ingestant or exposures



Cyanide Exposure

Cyanokit® Administration

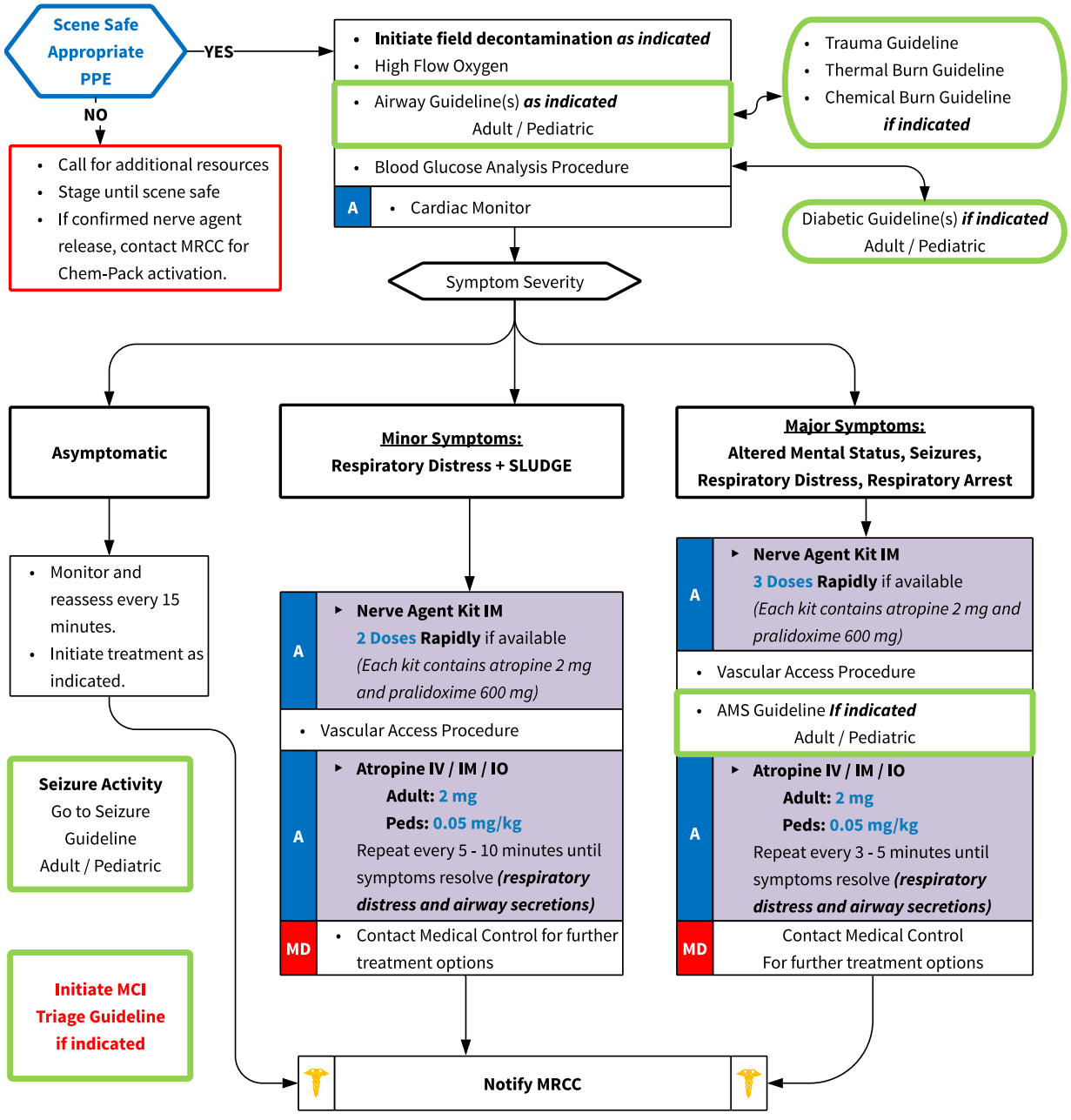
- **Reconstitute**: Add 200 mL of 0.9% Sodium Chloride to the vial using the transfer spike. Fill to the line.
- **Mix**: The vial should be repeatedly inverted or rocked, not shaken, for at least 60 seconds prior to infusion.
- **Infuse**: Use vented intravenous tubing, hang and infuse over 15 minutes.

Pearls

- **Recommended exam: Neuro, Skin, Heart, Lungs, Abdomen, Extremities**
- **Scene safety is priority. Do not enter a suspected cyanide ingestion scene without proper SCBA equipment.**
- Consider CO and Cyanide with any product of combustion.
- Continue high flow oxygen regardless of pulse ox readings.
- MRCC can facilitate toxicology consultation to assist with treatment recommendations.
- Hydroxocobalamin is not compatible with most medications. A separate dedicated vascular access point is required for administration.

Nerve Agent Exposure

History	Signs and Symptoms	Differential
• Exposure to chemical, biologic, radiologic, or nuclear hazard • Potential exposure to unknown substance/hazard • **Farmer with exposure to pesticide**	• **S**alivation • **L**acrimation • **U**rination; increased, loss of control • **D**efecation / Diarrhea • **GI** Upset; Abdominal pain / cramping • **E**mesis • Muscle Twitching • Seizure Activity • Respiratory Arrest	• Nerve agent exposure (e.g., VX, Sarin, Soman, etc.) • **Organophosphate exposure (pesticide)** • Vesicant exposure (e.g., Mustard Gas, etc.) • Respiratory Irritant Exposure (e.g., Hydrogen Sulfide, Ammonia, Chlorine, etc.)



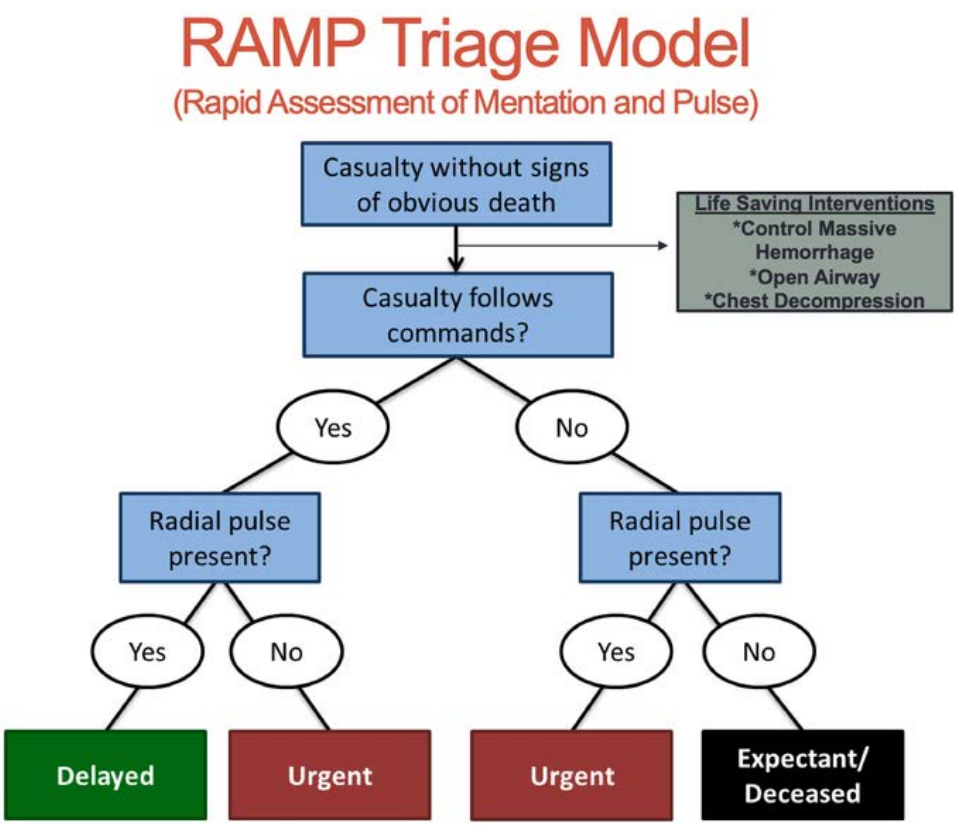
Nerve Agent Exposure

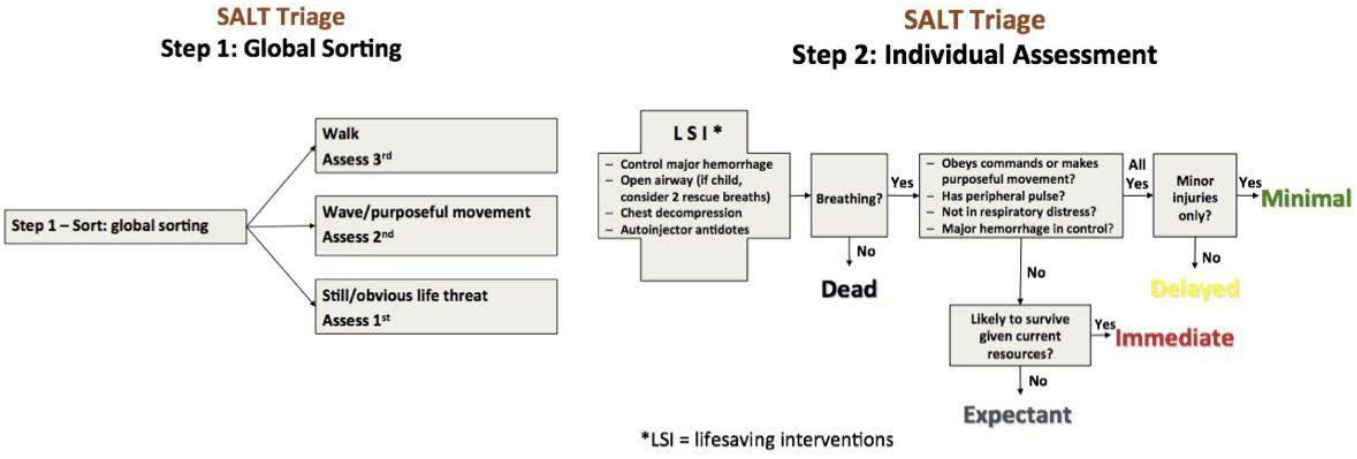
Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Gastrointestinal, Neuro**
- **Follow local HAZMAT protocols for decontamination and use of personal protective equipment.**
- **Nerve Agent Kits should only be administered for symptomatic treatment. DO NOT administer Nerve Agent Kits for prophylaxis even in asymptomatic patients with a known nerve agent exposure.**
- **In the face of a bona fide attack, begin with 1 Nerve Agent Kit for patients less than 7 years of age, 2 Nerve Agent Kits from 8 to 14 years of age, and 3 Nerve Agent Kits for patients 15 years of age and over.**
- **Contact Medical Control early for treatment advice**
- **Each Nerve Agent Kit contains 600 mg of Pralidoxime (2-PAM) and 2 mg of Atropine. Also known as Mark I kits.**
- **Seizure Activity: Any benzodiazepine by any route is acceptable.**
- For patients with major symptoms, there is no limit for atropine dosing.
- Carefully evaluate patients to ensure they not from exposure to another agent (e.g., narcotics, vesicants, etc.)
- The main symptom that the atropine addresses is excessive secretions so atropine should be given until salivation improves.
- EMS personnel, public safety officers and Medical Responders / EMT-B may carry, self-administer or administer a Mark I autoinjector kit to themselves or a fellow responder per protocol.

MCI Triage

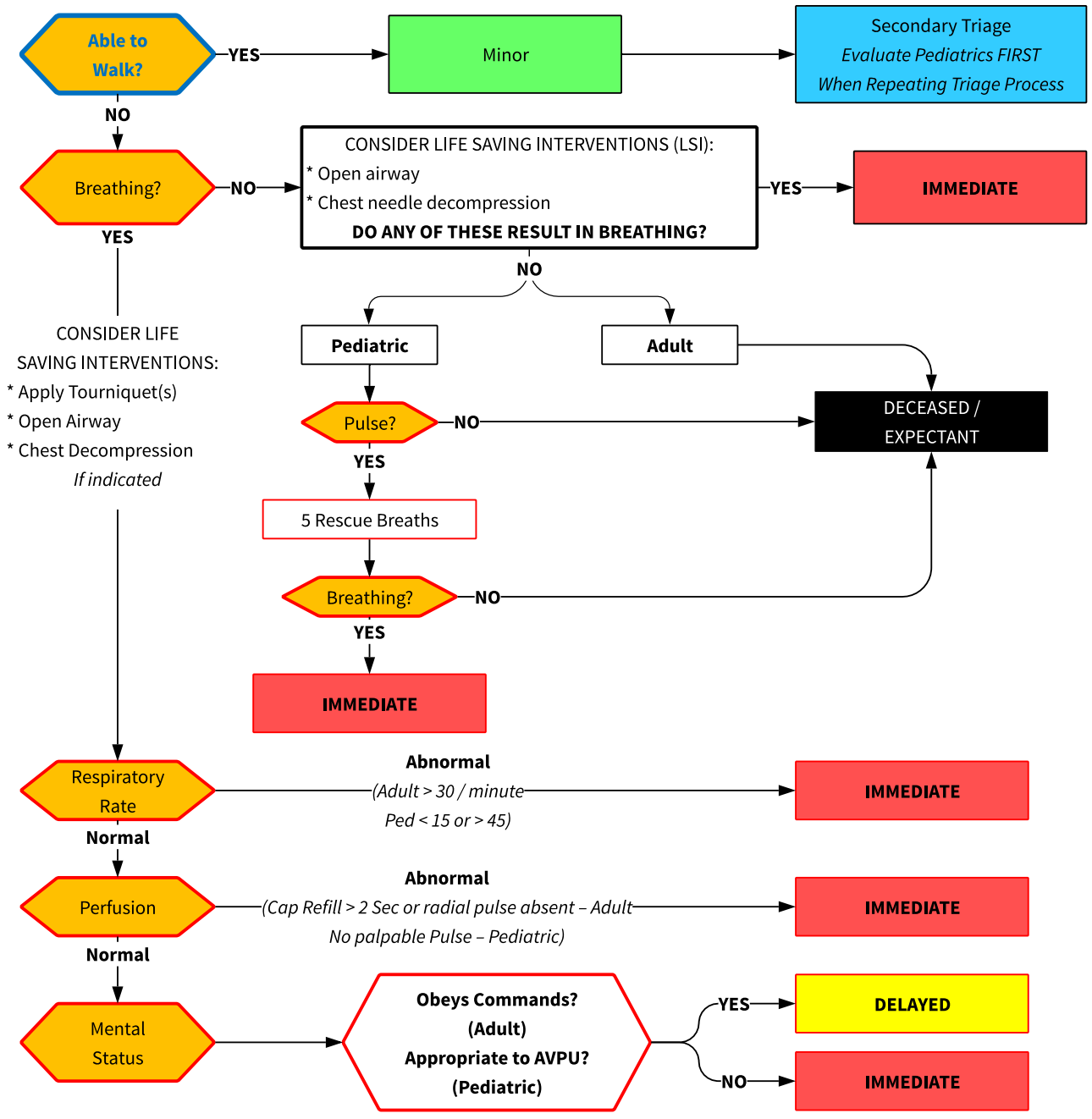
- RAMP Triage is a simple, intuitive, easy to remember model
- Preferred rapid triage method when resources are overwhelmed by patients
- SALT and START are included for interoperability with other agencies as needed





START / JumpSTART Triage Algorithm

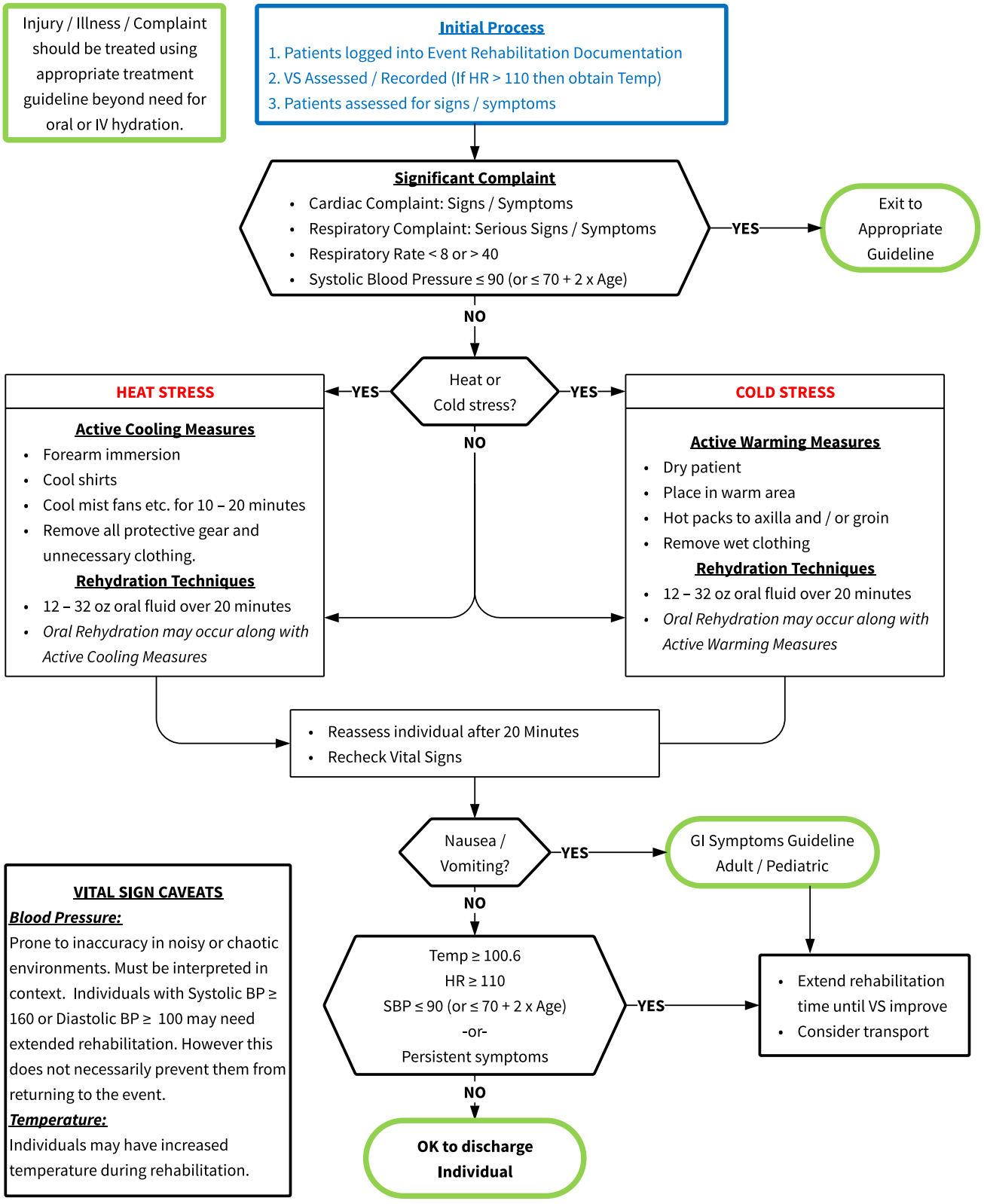
*** All infants with signs of life are automatically triaged as "IMMEDIATE" or "RED"**



Pearls

- **Follow local HAZMAT protocols for decontamination and use of personal protective equipment.**
- **Notify MRCC as soon as possible to activate hospital resources and to assist with distribution and tracking of patients.**
- **Begin triage with the patient closest to you.**
- **Be aware of safety hazards and request additional resources early.**
- All infants with signs of life should be triaged category RED.

Special Event Rehabilitation



Special Event Rehabilitation

General Principles of event rehabilitation:

- Remove patient to a controlled environment
- Warm/Cool as appropriate
- Rest, limit physical exertion
- Encourage oral hydration

Most patients will improve significantly after 15-20 minutes.

If unable to tolerate oral hydration, vital signs are significantly abnormal, or symptoms persist after 15-20 minutes in rehab, consider transport to a hospital, IV hydration, or extend time in rehab.

Utilize warming and cooling techniques from the Hyperthermia and Hypothermia protocols.

Pearls

- **This guideline should be utilized for evaluating patrons of certain special events that may or may not otherwise meet the definition of a patient.**
- **Ranking medical officer on-scene has full authority in deciding when individuals meet the definition of a patient and/or require further treatment or transport.**
- Regarding documentation under this guideline, individuals who are evaluated only at the rehabilitation center do not require a narrative-based PCR. However, if a patient receives ALS care above and beyond over-the-counter medications and/or is transported to an emergency department, the patient requires a separate run number and full PCR like any other patient.
- Those taking anti-histamines, blood pressure medication, diuretics or stimulants are at increased risk for cold and heat stress.
- Establish rehab location such that it provides shelter, privacy and freedom from smoke or other hazards.
- Event circumstances may warrant special protocols as approved by the Medical Director.

Responder Rehabilitation

This Guideline should be considered for any incident posing exertional risk or unusual danger to emergency responders. Examples would include working fires, prolonged search/rescue/recovery operations, prolonged law enforcement or EMS operations, or extreme weather conditions. Use of This guideline is optional and should be superceded by agency-specific rehabilitation protocols. It is provided as a resource for situations where an appropriate agency-specific rehabilitation policy or guideline does not exist, or at the discretion of the Rehab Sector Commander.

Remove:

- PPE
- Body Armor
- Chemical Suits
- SCBA
- Turnout Gear
- Other equipment as indicated

Continue:

- Heat and Cold Stress treatment techniques from Special Event Rehab Guideline

Specific Injury / Illness / Complaint should be treated using appropriate treatment guideline beyond need for oral or IV hydration.

Rehab Sector Commander has full authority to determine when responders may return to duty.

NFPA Age Predicted 85 % Maximum Heart Rate	
20 - 25	170
26 - 30	165
31 - 35	160
36 - 40	155
41 - 45	152
46 - 50	148
51 -55	140
55 - 60	136
61 - 65	132

Initial Process

1. Personnel logged into Responder Rehabilitation Section log
2. VS assessed and recorded
3. Pulse oximetry, respirations and SpCO (if available)
4. Personnel assessed for signs / symptoms

Rehab personnel should use this Guideline in combination with the Special Event Rehabilitation Guideline

- **20 Minute Rest Period**
  (Responders should consume at least 8 ounces of fluid)

Pulse Rate > 85% NFPA Age Predicted Maximum
-or-
SBP ≤ 90?

YES →
- Vascular Access Procedure

A
- **Normal Saline Bolus 500 mL IV / IO**
  May repeat up to 2 L
  Until Pulse Rate is 110 or less and systolic BP is 100 or greater

NO

Systolic BP ≥ 160
Or
Diastolic BP ≥ 100?

YES →

NO

Respirations < 8 or > 40?

YES →

NO

Pulse oximetry < 90 %
or SpCO > 10 %?

YES →

NO

Temperature ≥ 100.6?

YES →
- Mandatory Rest Period
- **Encourage oral hydration**

NO

Re-evaluate in 15-20 minutes.
Improvement?
Consider transport if no improvement.

NO → (back to Pulse Rate)

YES →

Discharge Responder from Rehabilitation Section

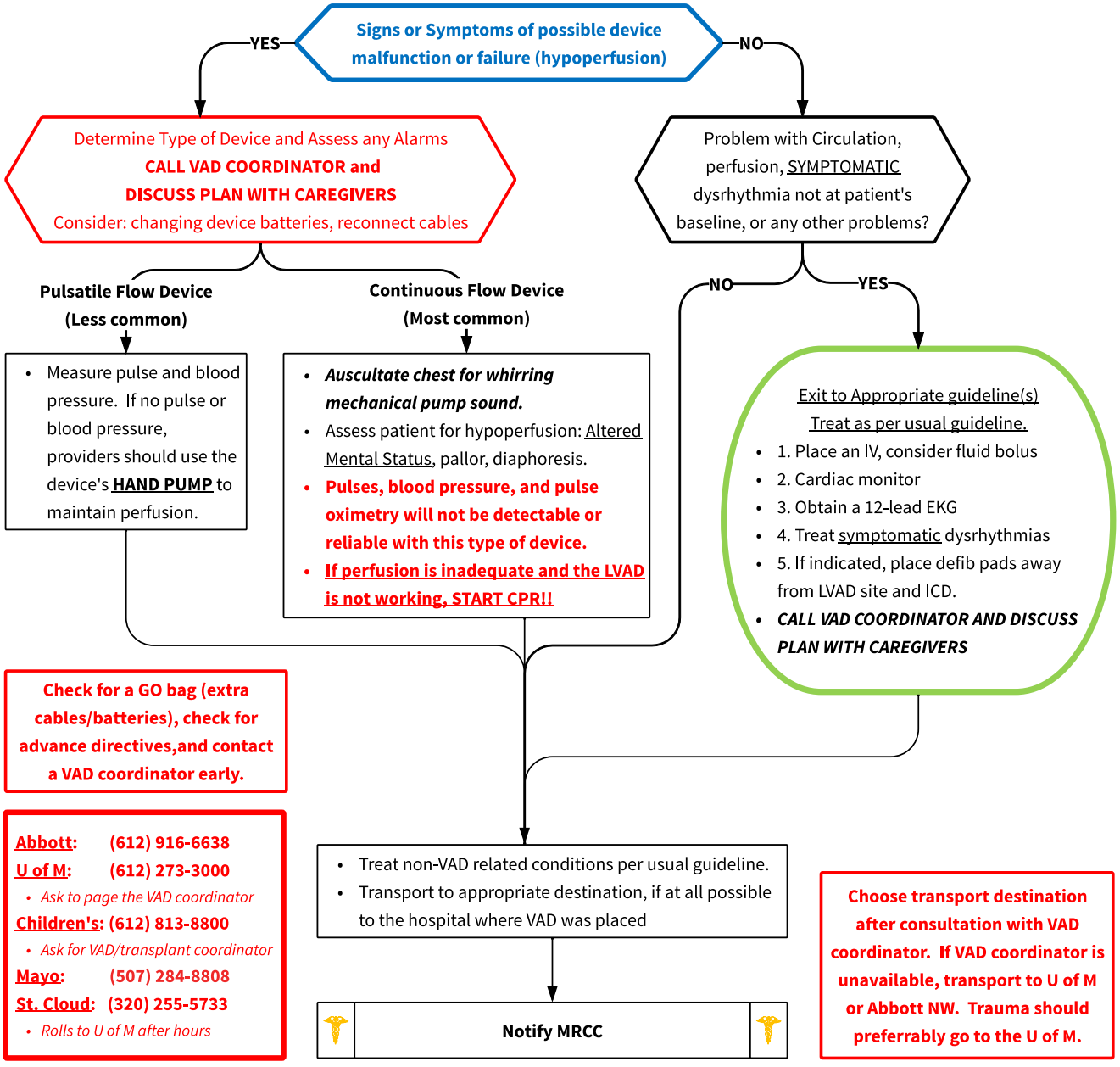
Responder Rehabilitation

Pearls

- **This guideline is to be utilized for public safety responders (usually firefighters) on the scene of an incident.**
- **Rehabilitation officer has full authority in deciding when responders may return to duty.**
- **Utilize this guideline in conjunction with the rehab steps and guidance in the Special Event Rehabilitation Guideline.**
- **May be utilized with adult responders on fire, law enforcement, rescue, EMS, and training scenes.**
- **Responders taking anti-histamines, blood pressure medication, diuretics or stimulants are at increased risk for cold and heat stress.**
- Rehabilitation Section is an integral function within the Incident Management System.
- Establish section such that it provides shelter, privacy and freedom from smoke or other hazards.

Ventricular Assist Devices

History	Signs and Symptoms	Differential
• End-Stage Heart Failure • Patient has surgically-implanted pump that assists the action of one or both ventricles. • Patient may or may not be on a list for cardiac transplantation	• The flow through many of these devices is not pulsatile, therefore THE PATIENT MAY NOT HAVE A PULSE AT BASELINE. For this reason pulse oximetry readings may also be inaccurate • Altered Mental Status may be the only indicator of a problem • Consider both VAD-related and non-VAD related problems	• Stroke • Cardiac Arrest • Dysrhythmia different from patient's baseline • Infection • Bleeding (VAD patients are anticoagulated) • Dehydration • Cardiac Tamponade • Device problem such as low battery or disconnected cable



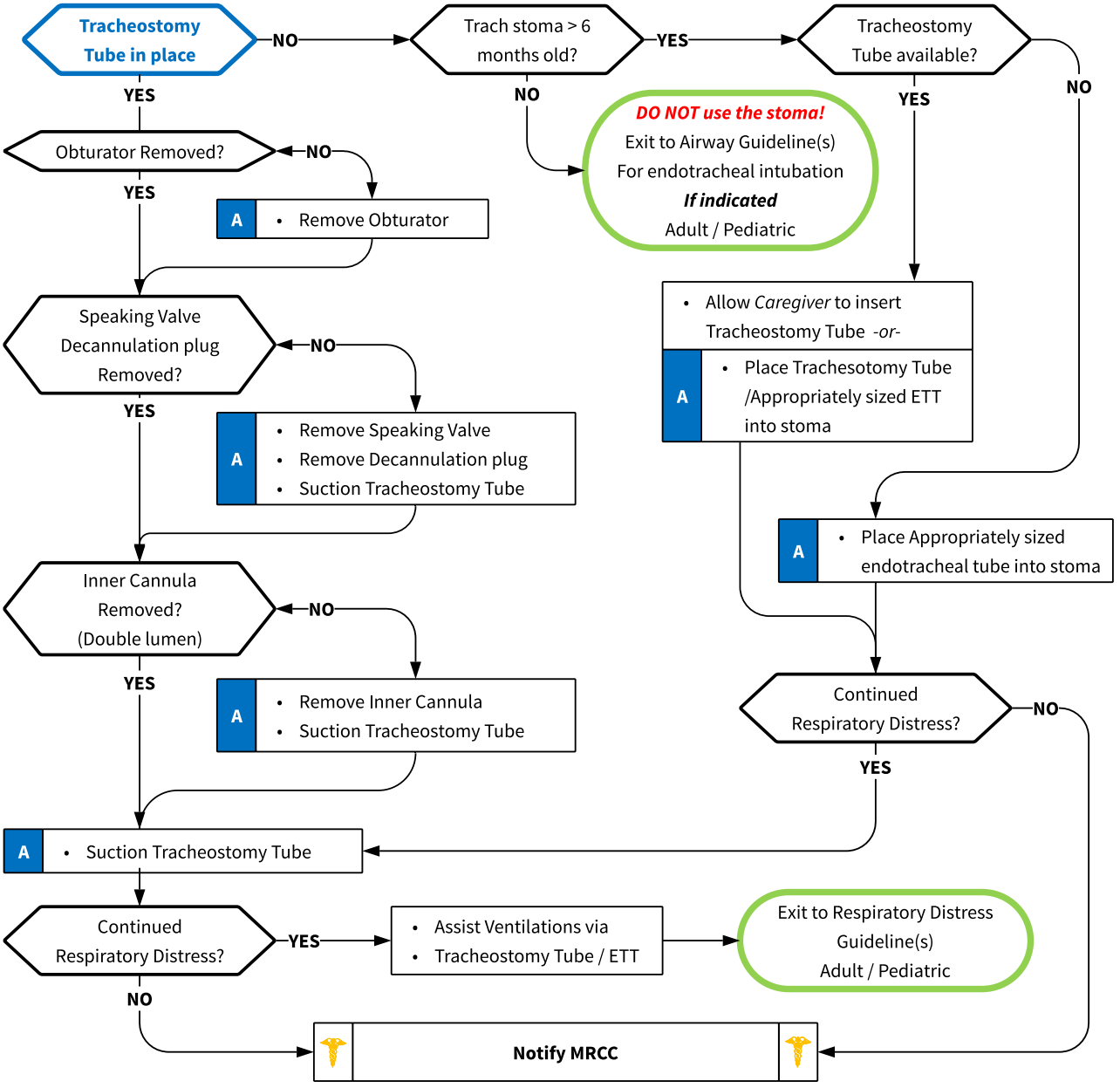
Ventricular Assist Devices

Pearls

- **ALWAYS talk to family/caregivers as they have specific knowledge and skills. CALL THE VAD COORDINATOR EARLY as per patient/family instructions or as listed on the device. They are available 24/7 and should be an integral part of the treatment plan.**
- **QUESTIONS TO ASK: DOES THE PATIENT HAVE A DNR? Can the patient be cardioverted or defibrillated if needed? Can CHEST COMPRESSIONS be performed in case of pump failure?**
- **Deciding when to initiate Chest Compressions is very difficult. Consider that chest compressions may cause death by exsanguination if the device becomes dislodged. However, if the pump has stopped the heart will not be able to maintain perfusion and the patient will likely die. Ideally, plan the decision in advance with a responsive patient and the VAD coordinator. If a VAD patient is unresponsive and pulseless with a non-functioning pump and has previously indicated a desire for resuscitative efforts, begin compressions. Contact the VAD coordinator and medical control.**
- Common complications in VAD patients include Stroke and TIA (incidence up to 25%), bleeding, dysrhythmia, and infection.
- The Cardiac Monitor and 12 lead EKG are not affected by the VAD and will provide important information.
- VAD patients are preload dependent. Consider that a FLUID BOLUS can often reverse hypoperfusion.
- Transport patients with ALL device equipment including any instructions, hand pumps, backup batteries, primary and secondary controllers, as well as any knowledgeable family members or caregivers.

Tracheostomy Emergency

History	Signs and Symptoms	Differential
• Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities) • Surgical complications (accidental damage to phrenic nerve) • Trauma (post-traumatic brain or spinal cord injury) • Medical condition (bronchial or pulmonary dysplasia, muscular dystrophy)	• Nasal flaring • Chest wall retractions (with or without abnormal breath sounds) • Attempts to cough • Copious secretions noted coming out of the tube • Faint breath sounds on both sides of chest despite significant respiratory effort • AMS • Cyanosis	• Allergic reaction • Asthma • Aspiration • Septicemia • Foreign body • Infection • Congenital heart disease • Medication or toxin • Trauma



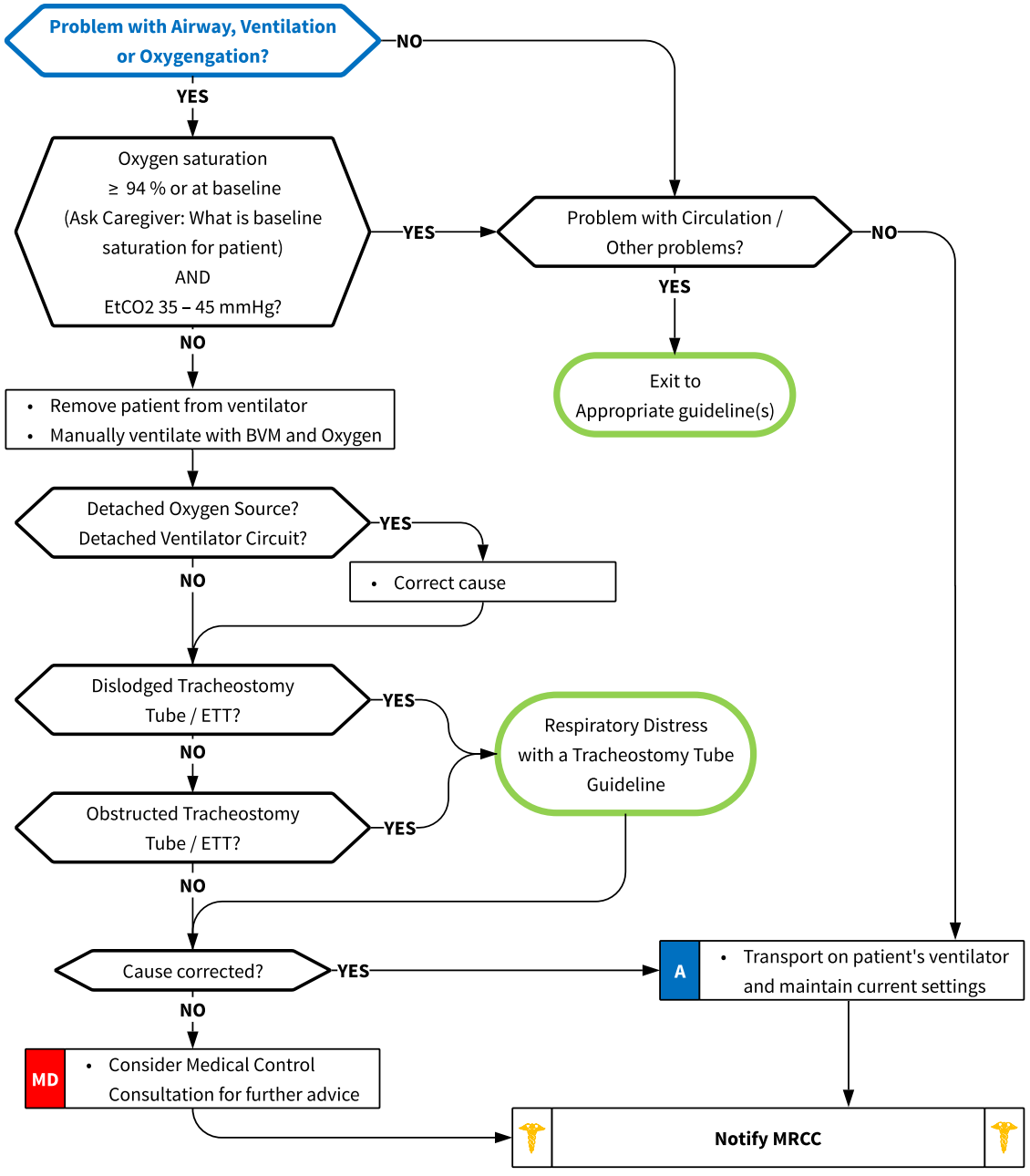
Tracheostomy Emergency

Pearls

- **Always talk to family / caregivers as they have specific knowledge and skills.**
- **A tracheostomy stoma that is less than 6 months old should not be manipulated. The stoma has not fully matured and there is an increased risk of creating a false passage outside of the trachea if attempts are made to replace a dislodged tube.**
- Use patient's equipment if available and functioning properly.
- Estimate suction catheter size by doubling the inner tracheostomy tube diameter and rounding down.
- Suction depth: Ask family/caregiver. No more than 3 to 6 cm typically. Instill 2 – 3 mL of NS before suctioning.
- Do not suction more than 10 seconds each attempt and pre-oxygenate before and between attempts.
- DO NOT force suction catheter. If unable to pass, then tracheostomy tube should be changed.
- Always deflate tracheal tube cuff before removal. Continual pulse oximetry and EtCO2 monitoring if available.
- **DOPE**: **D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.

Ventilator Emergency

History	Signs and Symptoms	Differential
• Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities) • Surgical complications (damage to phrenic nerve) • Trauma (post-traumatic brain or spinal cord injury) • Medical condition (bronchopulmonary dysplasia, muscular dystrophy)	• Transport requiring maintenance of a mechanical ventilator • Power or equipment failure at residence	• Disruption of oxygen source • Dislodged or obstructed tracheostomy tube • Detached or disrupted ventilator circuit • Cardiac arrest • Increased oxygen requirement / demand • Ventilator failure



Ventilator Emergency

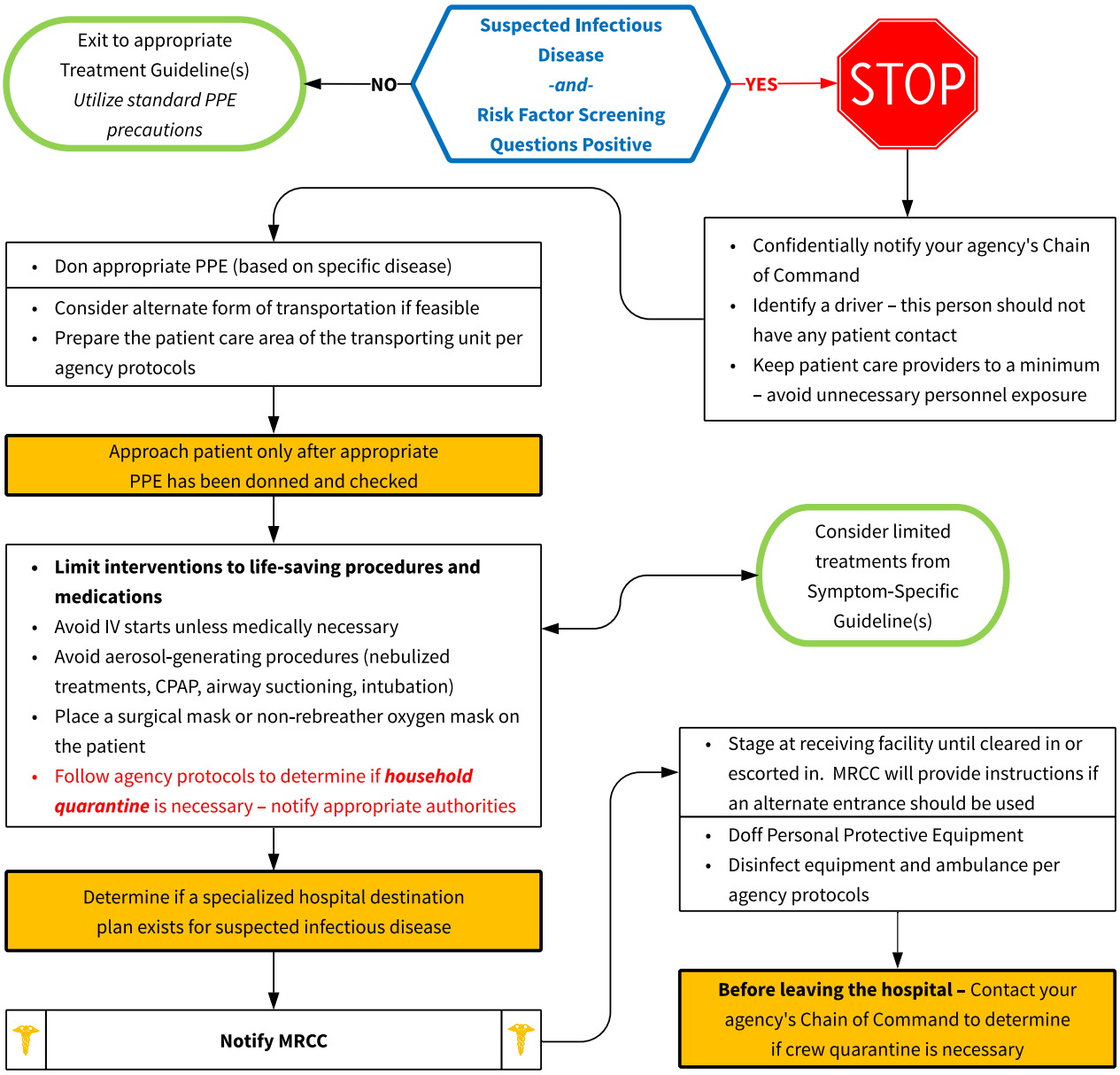
Pearls

- **Always talk to family / caregivers as they have specific knowledge and skills.**
- Always use patient's equipment if available and functioning properly.
- Continuous pulse oximetry and end tidal CO2 monitoring must be utilized during assessment and transport.
- **DOPE**: **D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.
- Unable to correct ventilator problem: Remove patient from ventilator and manually ventilate using BVM. Take patient's ventilator to hospital even if not functioning properly.
- Typical alarms:
  - Low Pressure / Apnea: Loose or disconnected circuit, leak in circuit or around tracheostomy site.
  - Low Power: Internal battery depleted.
  - High Pressure: Plugged / obstructed airway or circuit.

High Consequence Infectious Disease

History	Signs and Symptoms	Differential
• Exposure to infected persons • Recent travel to an endemic area	• Fever • Headache • Joint & Muscle aches • Weakness & Fatigue • Vomiting & Diarrhea • Stomach pain • Respiratory Symptoms • Altered Mental Status	• Ebola • Malaria • Influenza-like illness • Other common viral infections • Sepsis • Tick-borne illness • Biological warfare agent exposure • Non-infectious metabolic crisis

- **Do not rely soly on dispatchers to screen patients for biohazard exposure or infectious disease risk factors**
- **EMS Personnel must screen all potential patients for exposures, risk factors, travel history, and symptoms**



High Consequence Infectious Disease

Common Covid-19 Symptoms

- Fever
- Sore throat
- Body aches
- Cough
- Shortness of breath
- Headache
- Loss of taste or smell
- Nausea/vomiting
- Diarrhea
- Congestion or runny nose

Infectious Disease Pearls

- Each unique infection can have a variable Incubation period (up to 21 days in some cases).
- Infected patients may still be contagious even if asymptomatic.
- Avoid direct contact with body fluids (blood, urine, sweat, semen, vomit, feces, etc.)

When in doubt, SLOW DOWN! Take time to think through the situation, determine the urgency for the need for interventions and transport, and protect yourself and the general public.

Donning PPE

Remove all jewelry, valuables, and tie hair back. If time permits, change into scrubs prior to donning PPE. Depending on the infection, appropriate PPE may include:

- Gloves (double gloves, extra long cuffs)
- Fluid resistant or impermeable Tyvek-like suit
- Tyvek-like hood with apron
- Full-face splash shield
- N-95 face mask or APR/PAPR
- Shoe covers up to mid-calf or knees

Utilize the buddy system to check your PPE. PPE must be in place BEFORE approaching the patient. It should not be doffed until personnel are no longer in contact with the patient, ideally at the receiving hospital.

Doffing PPE

- PPE must be carefully removed without contaminating one's eyes, mucous membranes, or clothing with potentially infectious materials. Utilize the buddy system to ensure no cross contamination occurs.
- PPE generally should be double bagged and placed into a regulated medical waste container and disposed of in an appropriate location.
- Appropriate PPE must be worn while decontaminating / disinfecting EMS equipment or unit.
- Re-useable PPE should be cleaned and disinfected according to the manufacturer's reprocessing instructions

Patient Isolation

- If warranted, place an impermeable barrier (preferred) or blanket on stretcher to "cocoon" the patient
- If time permits, remove unnecessary equipment and secure plastic sheeting over interior of ambulance

Documentation should include the following:

- Risk factors and suspicions for infection with specific disease
- Specific precautions taken to prevent transmission
- Names of all personnel who had contact with patient
- Steps taken to decontaminate equipment and ambulance
- Department of Health notification if appropriate

Cardiac Arrests or Obvious Deaths

Many infections are still transmissible after death of the host patient. Consider that either the screening questions may not have been asked, or travel history and recent symptoms are unknown.

Pearls

- **Do NOT rely soly on dispatchers to screen patients for special infectious disease risk factors. Dispatch information is often limited and may come from third parties not familiar with the patient's exposure risks.**
- **Limit interventions to life-saving or medically indicated procedures and medications**
- **Place a fluid-resistant or impermeable barrier over stretcher before loading patient**
- Identify a driver who will not have any patient contact or enter an area with potential exposure
- Limit the number of providers necessary for patient contact
- If possible, identify a dedicated radio operator to limit equipment contamination
- When safe to do so, consider stopping the ambulance when performing invasive procedures
- Notify the receiving hospital as early as possible to allow time for preparations to receive an infectious patient
- Do not enter the receiving facility until cleared in or escorted by hospital staff
- Most infectious diseases are effectively decontaminated with bleach, chlorine, and other hospital-grade disinfectants
- Consult with local public health officials to determine how to manage exposed household contacts on scene

Universal Critical Care

Pre-Transport Checklist

- Determine stability for transfer
- Ensure airway is appropriately secured, if necessary
- Ensure adequate vascular access is available
- Ensure patient is adequately sedated prior to movement, if intubated
- Obtain history of illness or injury (including onset of symptoms, diagnostic testing results, time of treatment)
- Obtain baseline exam
- Obtain critical care medication pack from Lakeview Hospital pharmacy
- Transport vent (if needed and available)
- IV pumps (if needed)
- Discuss ongoing infusions with RN
- Verify concentrations of infusing medications with medication library in the IV pump
- Discuss medication titration orders with MD, including parameters
- Obtain extra doses of medications ordered by MD as appropriate

If at any point the patient's status should change, address any emergency medical conditions according to the standard Regions Hospital EMS patient care guidelines.

General Considerations

- If the patient is felt to be not stable for transport, coordinate with the transferring facility to stabilize the patient ***to the extent of that facility's capabilities*** prior to departure. Consider the need for definitive care vs the risk of transport in an unstable condition. If any disagreement exists, contact MRCC for recommendations.
- Obtain contact information for family members or caregivers in case the patient's status changes en route.
- Verify that the receiving facility has accepted the patient and is ready for the transfer.
- Collect all available documentation including EMS run sheets, demographics face sheet, lab/imaging results (and images on a CD if appropriate), provider/nursing notes, and if applicable any documentation provided by the patient's residential facility.
- If patient is unstable or requires time-sensitive interventions at the receiving facility, do not delay transport to collect the documentation. This should be faxed by the transferring facility directly to the receiving unit.
- Provide an update to MRCC with the patient's status and ETA prior to arrival at the receiving facility.
- In the unlikely situation when medical control is unreachable and intervention is necessary outside of the scope of standing orders, the transport team will divert to the nearest appropriate medical facility.
- If infusing medication concentrations do not match the library in the IV pump, either exchange the medication for its equivalent from the critical care medication pack (if available) or override the pump programming to match the concentration. Verify all medications with the RN prior to transfer. Contact MRCC for an IV pharmacy consult if needed for assistance with pump programming.

Additional Personnel

When the EMS provider anticipates that they will require more assistance to appropriately care for the patient during transfer, they shall request the transferring physician/health care provider to provide appropriately trained hospital staff to accompany the patient and assist. The EMS provider must contact Medical Control for medical direction in all situations where they are not comfortable with the circumstances of the transfer. The transfer will not occur unless the EMS provider and medical control are confident the personnel and equipment are appropriate for transfer.

Requirements of CCP

- Current State Paramedic Licensure
- Successful completion & maintenance of an approved Critical Care Paramedic (or equivalent) course.
- Complete annual CME and skills testing requirements as determined by the Medical Director

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Anaphylaxis

Interventions	Medications
• Frequent airway evaluation • Be prepared for advanced airway intervention • Have surgical airway kit readily available	• Diphenhydramine • Methylprednisolone • Epinephrine

Adult Medications

- The following medications are authorized on standing order:
  - **Diphenhydramine**: 25-50 mg IV or 50 mg IM. May repeat x 1 two hours after initial dose. Contact Medical Control for further authorization if needed.
  - **Methylprednisolone**: 125 mg IV x 1 dose if not given by transferring facility. (Note: Peak effect will not be seen for up to 6 hours)
  - **Epinephrine 1:1,000**: 0.3 mg IM. May repeat every 20 minutes for persistent hypotension and/or airway compromise.
  - **Epinephrine 1:10,000**: may dilute 1mL with 9mL of NS ***to a concentration of 1:100,000*** and administer 5 mcg to 20 mcg (0.5 - 2 mL) slow IV push every 5 minutes as needed for impending respiratory/cardiac arrest.
- **Medical control authorization required:**
  - **Epinephrine drip**: Mix 1 mg of epinephrine in 250 mL of normal saline (concentration will be 4 µg/mL). Titrate at 2 – 10 µg/min. Drip rate: 1 – 5 gtt/sec with micro drip set (60 gtt/mL).

Pediatric Medications

- The following medications are authorized on standing order:
  - **Diphenhydramine**: 1 mg/kg IV (max 25 mg) or 2 mg/kg IM (max 50 mg). May repeat x 1 two hours after initial dose. Contact Medical Control for further authorization if needed.
  - **Methylprednisolone**: 2 mg/kg IV (max 125 mg) x 1 dose if not given by sending facility. (Peak effect will not be seen for up to 6 hours)
  - **Epinephrine 1:1,000**: 0.01 mg/kg IM (max 0.3 mg). May repeat every 20 minutes for persistent hypotension and/or airway compromise.
- **Medical control authorization required:**
  - **Epinephrine drip**: Mix 1 mg of epinephrine in 250 mL of normal saline (concentration will be 4 µg/mL). Titrate at 0.1 – 1 µg/min. Drip rate: 1 drip every 40 secs (0.1 µg/min) to 1 drip every 4 secs (1 µg/min) with micro drip set (60 gtt/mL).

- **Epinephrine 1:1,000 should NEVER be given IV!!**
- Although the dose may be the same, epinephrine 1:1,000 is 10x more concentrated than epinephrine 1:10,000. This can cause significant cardiac ischemia, arrhythmias, or even sudden cardiac arrest if given IV.
- If patient develops chest pain following administration of epinephrine, obtain a 12-lead EKG and treat according to the standard Chest Pain treatment guideline.

Pearls

- Airway management is the most important consideration.
- Atypical anaphylaxis may present with hypotension, altered mental status, or abdominal pain with or without facial or airway edema or skin findings.
- For individuals over 50 or those with a history of coronary artery disease, epinephrine should be reserved for severe reactions or evidence of airway involvement.

Critical Care Endorsement Required
Critical Care Endorsement Required
Critical Care Endorsement Required

Aortic Emergencies

Interventions	Medications
• Treatment is generally similar to major trauma patients • Ensure adequate vascular access (2 large-bore IV's) • Emergent transport unless otherwise instructed • Blood pressure control is the primary focus.	• Labetalol • Esmolol • Nitroprusside

Aortic Rupture, Transection, or Tear

- Maintain systolic BP 90 – 110 mmHg or MAP 65 – 80 mmHg
- If systolic BP < 90 mmHg or MAP < 65 mmHg, follow the ***Hypovolemic Shock*** guideline to transfuse blood products (preferred) or infuse IV fluids.
- **If systolic BP > 110 mmHg or MAP > 80 mmHg:**
  - **Labetalol**: 5 – 10 mg slow IV push over 2 minutes. If SBP remains above target, repeat 10 – 20 mg slow IV push (over 2 minutes) every 10 minutes.
  - **Esmolol**: 500 µg/kg slow IV push over 1 minute. Then start drip at 50 µg/kg/min. Titrate up to max of 300 µg/kg/min, to keep SBP 90 – 110 mmHg, MAP 65 – 80 mmHg, or heart rate no less than 20% of initial rate.

Abdominal Aortic Aneurysm

- Maintain systolic BP 90 – 110 mmHg or MAP 65 – 80 mmHg
- If systolic BP < 90 mmHg or MAP < 65 mmHg, follow the ***Hypovolemic Shock*** guideline to transfuse blood products (preferred) or infuse IV fluids.
- **If systolic BP > 110 mmHg or MAP > 80 mmHg:**
  - **Labetalol**: 5 – 10 mg slow IV push over 2 minutes. If SBP remains above target, repeat 10 – 20 mg slow IV push (over 2 minutes) every 10 minutes.
  - **Esmolol**: 500 µg/kg slow IV push over 1 minute. Then start drip at 50 µg/kg/min. Titrate up to max of 300 µg/kg/min, to keep SBP 90 – 110 mmHg, MAP 65 – 80 mmHg, or heart rate no less than 20% of initial rate.

Thoracic Aortic Aneurysm / Dissection

- Maintain systolic BP < 110 mmHg
- **If systolic BP > 110 mmHg or MAP > 80 mmHg:**
  - **Labetalol**: 20 mg slow IV push (over 2 minutes) every 10 minutes until SBP < 110 mmHg.
  - **Esmolol**: 500 µg/kg slow IV push over 1 minute. Then start drip at 50 µg/kg/min. Titrate up to max of 300 µg/kg/min, to keep SBP 90 – 110 mmHg, MAP 65 – 80 mmHg, or heart rate no less than 20% of initial rate.

If patient becomes bradycardic (HR < 60 or drop of more than 20% from initial HR):

- Stop (or titrate down) current drip rate
- **Sodium nitroprusside drip**: Start at 0.25 µg/kg/min, increase by 0.25 – 0.5 µg/kg/min every 5 minutes until target BP goal reached (max 10 µg/kg/min).

Pearls

- An aortic rupture, transection, or tear can cause rapid life-threatening hemorrhage. Treatment includes emergent surgery or endovascular repair in a cath lab.
- An aneurysm is a weakened or bulging area of the aorta. These can leak or rupture, causing life-threatening hemorrhage. Treatment depends on the size and location of the aneurysm but may involve emergent surgery.
- A dissection is a flap between layers of the wall of the aorta. This flap can cause occlusion of branches off the aorta, leading to stroke symptoms, kidney failure, intestinal damage, or even coronary artery occlusion. Occasionally the dissection flap can extend back to the heart, causing hemorrhage into the pericardium (tamponade). Treatment depends on the location and may include surgical or non-surgical management. The primary management focus is controlling the blood pressure to reduce shearing and prevent further dissection damage.

Critical Care Endorsement Required
Critical Care Endorsement Required
Critical Care Endorsement Required

Blood Product Administration

Interventions

- Critical Care Paramedics may initiate the administration of blood products
- All blood products must be obtained from the transferring facility
- Monitor for transfusion reactions or anaphylaxis

Medications

- Packed Red Blood Cells (PRBC)
- Fresh Frozen Plasma (FFP)
- Platelets
- Cryoprecipitate

Indications

- Documented anemia with hemodynamic instability, symptoms (dyspnea, light-headedness), or indicated due to medical comorbidities
- Persistent hypotension or sustained tachycardia despite adequate IV crystalloid fluid challenge (2 L for adults, total of 40 mL/kg for pediatric patients), and concern exists for blood loss
- Suspected ongoing hemorrhage with symptoms of anemia

Preparation

- Determine the source of blood loss if possible, and perform hemorrhage control interventions (including tourniquet use if indicated)
- Ensure large bore IV access, 2 sites if possible. (Blood products can be transfused through an IO line although the rate will be limited)
- Ensure IV crystalloid fluid challenge has been given
- Document physician order for initiating blood product transfusion (referral physician or on-line medical control physician)

Monitor for transfusion reactions (acute hemolytic reactions or allergic reactions). If a reaction occurs, immediately STOP the transfusion, keep patient cool, and refer to Anaphylaxis Guideline for treatment options.

Acute Hemolytic Reaction

- Temperature increase
- Low back or flank pain
- Hypotension
- New bleeding or oozing
- Respiratory Failure

Transfusion Procedure

- Both paramedics should match the patient's name and wristband with the blood product unit's information tag (blood type, Rh factor, unit #, expiration date). This information should be documented in the PCR.
- If any inconsistencies exist in matching the patient's information to the blood product, DO NOT TRANSFUSE!
- Obtain baseline vitals (including temperature) prior to transfusion
- Transfuse via dedicated IV line using blood tubing and filter set primed with normal saline
- *Adult patients will receive the entire unit, pediatric patients should receive 10 mL/kg*
- Discuss infusion rate with transferring provider
- Reassess vital signs (including temperature) every 5 minutes during transfusion
- Monitor for acute hemolytic reactions or allergic reactions – see red box for information
- Monitor for signs of fluid overload (respiratory issues), slow transfusion rate or provide positive-pressure ventilation or CPAP as indicated
- Retain all tubing and used blood product bags for receiving facility analysis

Pearls

- Type-specific and cross-matched blood products are preferred if time permits to reduce the risk of reactions
- Universal donor O-negative (or occasionally O-positive) PRBCs (universal FFP is type AB) may be ordered by a physician in emergent situations

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Cardiac Arrythmias

Interventions	Medications
• Maintain continuous cardiac monitoring • Consider applying defib pads prophylactically • Monitor blood pressure, mental status, and symptoms suggestive of cardiac ischemia	• Metoprolol • Esmolol • Diltiazem • Amiodarone • Lidocaine • Procainamide

Bradycardia

- Follow the standard Adult Bradycardia guideline, consider toxicology-related causes
- Be prepared to pace 2nd degree type 2 and 3rd degree A-V blocks

Supraventricular Tachycardia (SVT) or Wide Complex Tachycardia

- Follow the standard Adult Tachycardia Narrow/Wide Complex guideline
- If SVT persists AND patient remains symptomatic or unstable, **contact MRCC for orders for the following**:
- **Amiodarone**: 150 mg diluted in 100 mL NS, infuse over 10 minutes. Peds: 5 mg/kg (max 150 mg).
  - Re-attempt cardioversion
  - If successful, start **amiodarone drip** at 1 mg/min *(Peds: contact MRCC)*

Atrial Fibrillation/Flutter

- Follow the standard Adult Tachycardia Narrow Complex guideline
- If at any point the patient becomes unstable (altered mental status, hypotension, respiratory distress, chest pain), attempt cardioversion
- **The following medications require physician authorization**, either by transferring facility or MRCC (target heart rate is < 100):
  - **Metoprolol**: 5 mg slow IV push over 2 minutes, may repeat every 5 minutes for 3 doses total. HOLD if SBP < 100.
  - **Esmolol**: 500 µg/kg slow IV push over 1 minute. Then start drip at 50 µg/kg/min. Titrate up to max of 300 µg/kg/min. HOLD if SBP < 90.
  - **Diltiazem**: 0.25 mg/kg (20 mg for avg adult) slow IV push over 2 minutes. After 15 minutes may repeat at 0.35 mg/kg (25 mg for avg adult) slow IV push over 2 minutes. After 15 additional minutes, may start **Diltiazem drip** at 5 – 15 mg/hour. HOLD if SBP < 90.
  - **Amiodarone**: 150 mg diluted in 100 mL NS, infuse over 10 minutes. Then start **amiodarone drip** at 1 mg/ min. HOLD if SBP < 90.

Frequent PVCs or Other Atrio-Ventricular Arrhythmias

- Typically do not require treatment. If symptomatic or unstable, **obtain orders from MRCC**:
  - **Amiodarone**: 150 mg diluted in 100 mL NS, infuse over 10 minutes. Then start **amiodarone drip** at 1 mg/ min. HOLD if SBP < 90.
  - **Procainamide**: 1 – 4 mg/min
  - **Lidocaine**: 1 – 1.5 mg/kg slow IV push over 2 minutes. May repeat 0.5 – 0.75 mg/kg every 10 minutes, max 3 mg/kg.
  - **Lidocaine drip**: 1 – 4 mg/min

If at any point the patient loses pulses, refer to the Cardiac Arrest guidelines.

Pearls

- *Treat the patient, not the number!* Asymptomatic arryhtmias do not necessarily need treatment.

Critical Care Endorsement Required

Critical Care Endorsement Required

Cardiac Emergencies

Interventions	Medications
• Aspirin is the critical intervention if not given by transferring facility • Maintain continuous cardiac monitoring • Monitor for bleeding from IV sites, catheter sites, nose, mouth, and other recent wounds or lacerations if TPA or heparin is being infused	• Aspirin • Heparin • Nitroglycerin • Ticagrelor • Clopidogrel • Eptifibatide • Alteplase

Acute Coronary Syndrome

- **Aspirin**: 324 mg chewed orally if not already given. OK to give even if patient is on warfarin – the benefits outweigh the risks for a single dose in the setting of cardiac ischemia.
- *Pain control:*
  - **Nitroglycerin**: 0.4 mg sublingual. May repeat every 5 minutes for 3 doses. If still having pain, start a **nitroglycerin drip** at 50 µg/min IV. Increase by 5 – 10 µg/min every 5 – 10 minutes to alleviate pain, hold if SBP < 90 mmHg. *Avoid if patient has used a phosphodiesterase inhibitor (Viagra, Levitra, Cialis) in the past 48 hours. Use cautiously in the setting of an inferior MI.*
  - May also use the Pain Management guideline if nitroglycerin is not effective
- ***If ordered by transferring physician:***
  - **Heparin**: 60 units/kg IV (max 4,000 units) bolus, followed by **heparin drip** at 12 units/kg/hour IV (max 1,000 units/hour). Do not give if Lovenox has been given in past 6 hours.
  - **Eptifibatide (Integrilin)**: 180 µg/kg IV bolus, followed by **eptifibatide drip** at 2 µg/kg/min IV (if renal function is impaired – creatinine clearance < 50 mL/min – dose should be reduced to 1 µg/kg/min)

STEMI

- Ensure 2 IV's are available, defibrillator pads are placed
- Ensure the following medications have been given by transferring facility:
  - **Aspirin**: 324 mg (chewed or rectal)
  - **Clopidogrel (Plavix)**: 600 mg PO -OR- **Ticagrelor (Brilinta)**: 180 mg PO
  - Treat per the "Acute Coronary Syndrome" treatment section above
- If thrombolytics were given or started by transferring facility, discuss plan with provider:
  - Thrombolytics should be infused through a dedicated line. DO NOT infuse any other medications through this line.
  - **Tenecteplase (TNKase)** is given as a single IV bolus dose.
  - **Alteplase (Activase)** is given as a bolus, followed by an IV infusion
  - Verify total dose of medication to be infused, time of administration (if completed prior to transfer), or anticipated time of completion (if still infusing)
  - If the infusion will continue during transfer, verify with sending facility that excess medication has been withdrawn from the bottle and wasted. The bottle should be labeled by the sending hospital with the total dose/volume that was in the bottle initially to be administered.
  - When pump alarms that the bottle is empty, switch the IV tubing to a fresh bag of saline to infuse the remaining medication left in the tubing. The pump will stop when the preset volume has been infused.
  - If SBP increases above 180 mmHg or DBP above 105 mmHg, follow the "Hypertensive Crisis" treatment section (on back)

Monitor for any acute change in neurologic condition (headache, acute hypertension, nausea/ vomiting, new focal deficits, or change in mental status). If noted:

- **Immediately stop the infusion if still infusing!**
- **Stop heparin and eptifibatide infusions if running.**
- Contact medical control for further instructions, including blood pressure parameters
- Continue to monitor vital signs and neurologic exam every 10 minutes

Pearls

- Emergent transport – encourage transferring facility to expedite transfer of care to your vehicle
- Be prepared for life-threatening arrhythmias in the setting of acute cardiac ischemia
- Reference "CHF/Pulmonary Edema" on back and "Cardiogenic Shock" guideline as needed

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Cardiac Emergencies

Interventions

- Maintain continuous cardiac monitoring
- Monitor respiratory status and mental status closely during transport
- A rapid decrease in blood pressure can precipitate cerebral ischemia. Target goal is generally a 20% reduction.

Medications

- Labetalol
- Metoprolol
- Hydralazine
- Esmolol
- Nicardipine
- Sodium Nitroprusside
- Nitroglycerin
- Furosemide
- Bumetanide

Hypertensive Crisis

Maintain BP within parameters given by sending facility. A reasonable target should be a 20% decrease in systolic BP from initial value. The following standing orders may be used for blood pressure control:

- Hold anti-hypertensives if SBP < 140, DBP < 80, or decrease in SBP of more than 20% from baseline.
- Restart drips if SBP > 180 or DBP > 105, decrease previous dose by 2 titration steps.
- For BP control the following medications are authorized on standing order to maintain parameters given by transferring facility (contact MRCC for further orders):
  - **Labetalol**: 10mg slow IV push over 2 minutes. May repeat x1 in 10 minutes if no response. Hold if HR < 60.
  - **Metoprolol**: 5mg IV push. May repeat every 5 mins (total max 20 mg). Hold if HR < 60.
  - **Hydralazine**: 10 mg slow IV push over 2 minutes. May repeat x 1 in 10 minutes if no response.
  - **Esmolol drip**: 500 µg/kg slow IV push over 1 minute. Then start drip at 50 µg/kg/min. Increase by 25 µg/kg/ min every 5 minutes (Max 300 µg/kg/min). Hold or titrate down if HR < 60.
  - **Nicardipine drip**: Start at 5 mg/hr. Increase by 2.5 mg/hr every 5-10 minutes (Max 15 mg/hr).
  - **Sodium Nitroprusside drip**: Start at 0.25 µg/kg/min, increase by 0.25 – 0.5 µg/kg/min every 5 minutes (max 10 µg/kg/min).

CHF / Pulmonary Edema

- If patient becomes hemodynamically unstable, include treatments from "Cardiogenic Shock" guideline.
- Treatment goal is alleviation of respiratory symptoms. Prepare for RSI and closely monitor respiratory status.
- Consider the "Pain/Sedation Management" guideline cautiously as needed
- If central venous access is available, a CVP of < 12 mmHg would argue against cardiogenic pulmonary edema
- Standing orders for respiratory distress:
  - **CPAP/BiPAP**: *Refer to the Ventilator/BiPAP/CPAP device management guideline*
  - **Mechanical Ventilation**: *Refer to Ventilator/BiPAP/CPAP device management guideline.* Patients with pulmonary edema generally need assistance with oxygenation (PEEP, FiO2) rather than ventilation (rate, tidal volume).
  - **Nitroglycerin**: 0.4 – 0.8 mg sublingual. May repeat every 5 minutes for 3 doses if able to tolerate oral medications. Then start a **nitroglycerin drip** at 50 µg/min IV. Increase by 5 – 10 µg/min every 5 – 10 minutes to alleviate respiratory distress, hold if SBP < 90 mmHg. *Use with caution if patient has used a phosphodiesterase inhibitor (Viagra, Levitra, Cialis) in the past 48 hours.*
- If ordered by transferring physician:
  - **Furosemide (Lasix) drip**: Continue infusion at rate set by transferring facility (typically 20 -160 mg/hr). No titration needed.
  - **Bumetanide (Bumex) drip**: Continue infusion at rate set by transferring facility (typically 0.1 – 1 mg/hr). No titration needed.

Pearls

- Discontinue CPAP/BiPAP and consider intubation if patient becomes hypotensive or mental status deteriorates
- CPAP/BiPAP is contraindicated in trauma and those with high risk of aspiration

Critical Care Endorsement Required

Critical Care Endorsement Required

Cardiogenic Shock

Interventions	Medications
• Support respiratory efforts if evidence of pulmonary edema • Support end-organ perfusion by maintaining adequate intra-vascular volume and cardiac output • Continuous cardiac monitoring	• Dobutamine • Dopamine • Norepinephrine

General Considerations

- Consider defibrillation pad placement in critically ill patients
- Titrate down or stop any vasodilators that may be infusing (beta-blockers, calcium channel blockers, sodium nitroprusside, nitroglycerin, sedatives)
- **Monitor for arrhythmias and treat/cardiovert as indicated**
- Follow the "Cardiac Emergencies" guideline, "CHF/Pulmonary Edema" treatment section for respiratory symptoms

Normotensive

- Follow the "Cardiac Emergencies" guideline, "CHF/Pulmonary Edema" treatment section for respiratory symptoms as needed

Hypotensive (SBP < 100) without symptoms

- Closely monitor, contact MRCC with any questions or concerns

Hypotensive (SBP < 100) with signs/symptoms of shock

- Refer to the appropriate "Cardiac Arrhythmia" guideline as indicated
- If no evidence of pulmonary edema or respiratory distress:
  - **Normal Saline**: 250 – 500 mL IV bolus. Use caution in elderly or known history of CHF.
- **Discuss the following order with the transferring physician:**
  - **Dobutamine**: Start at 10 µg/kg/min, titrate up by 2.5 µg/kg/min every 5 minutes to keep SBP > 100 mmHg (max 20 µg/kg/min).
  - If no response to dobutamine, add **Dopamine**: Start at 10 µg/kg/min, titrate up by 2.5 µg/kg/min every 5 minutes to keep SBP > 100 mmHg (max 20 µg/kg/min). Hold if new arrhythmia noted or HR > 100.

Advanced Interventions

- *Arterial lines* – May be used in place of intermittent blood pressure cuff readings for purposes of titrating medications. Verify with transferring facility that invasive pressures correlate with non-invasive pressures.
- *Swan-Ganz Catheter / Central Venous Catheter* – Discuss placement and depth with transferring provider, SwanGanz catheters can be used for CVP measurements at the appropriate depth. Refer to the "CVC Lines" guideline prior to use. Do not manipulate during transport.
- *Intra-Aortic Balloon Pump* – must have a trained technician accompany during transport.
- *Extra-Corporeal Membrane Oxygenation (ECMO)* – must have a trained perfusionist accompany during transport
- *Transvenous Pacer* – refer to the "Transvenous Pacing" guideline
- Contact MRCC for further orders as needed.

If at any point the patient loses pulses, refer to the Cardiac Arrest guidelines.

Pearls

- Cardiogenic shock is caused by poor cardiac output. This leads to low BP, venous congestion, and often pulmonary edema.
- Consider reversible causes of cardiogenic shock, such as medications which can lower blood pressure or reduce cardiac output.

Critical Care Endorsement Required

Critical Care Endorsement Required

CVA/Stroke

Interventions

- Patients should be NPO unless they have passed a bedside nursing swallow evaluation
- Maintain head of bed at 30 degrees
- Monitor and document the following every 10 minutes:
  - Vital signs
  - Neurologic exam
  - If TPA was/is infusing, evaluate for bleeding (IV sites, catheter, mouth/gums, sites of recent trauma)

Medications

- TPA
- Labetalol
- Metoprolol
- Esmolol
- Hydralazine
- Nicardipine
- Nitroprusside

Thrombolytics

- ***Alteplase (tPA)*** is given as a bolus + infusion over 60 minutes.
- ***Tenecteplase (TNKase)*** is given as a single bolus.
- Document vitals prior to departure, ensure that SBP < 180 and DBP < 105. If outside of these parameters, transferring hospital should stabilize further or stop the thrombolytic infusion.
- Document a thorough baseline neuro exam prior to departure
- Thrombolytics should be infused through a dedicated line. DO NOT administer any other medications through this line.
- Verify total dose of medication to be infused, time of administration (if completed prior to transfer), or anticipated time of completion (if still infusing at time of transfer)
- If the infusion will continue during transfer, verify with sending facility that excess medication has been withdrawn from the bottle and wasted. The bottle should be labeled by the sending hospital with the total dose/volume that was in the bottle initially to be administered.
- When pump alarms that the bottle is empty, switch the IV tubing from the bottle to a fresh bag of saline to infuse the remaining medication left in the tubing. This should remain on the IV pump, and the pump will stop when the preset volume has been infused.
- When the infusion is complete, infuse normal saline at TKO.

Monitor for any acute change in neurologic condition (headache, acute hypertension, nausea/vomiting, new focal deficits, or change in mental status). If noted:

- **Immediately stop the infusion if still infusing!**
- Contact medical control for further instructions, including blood pressure parameters, diversion to nearest hospital, or if patient is a direct admit consideration of further stabilization in the ED at the receiving facility
- Continue to monitor vital signs and neurologic exam every 10 minutes

Blood Pressure Control

Maintain BP within parameters given by sending facility, using medications ordered by sending facility. The following standing orders may be used for blood pressure control:

- Hold anti-hypertensives and/or stop anti-hypertensive drips if SBP < 140, DBP < 80, or HR < 60.
- Restart drips if SBP > 180 or DBP > 105, decrease previous dose by 2 titration steps.
- If SBP > 180 or DBP > 105, the following medications are authorized on standing order:
  - **Labetalol**: 10mg slow IV push over 2 minutes. May repeat x1 in 10 minutes if no response.
  - **Metoprolol**: 5mg IV push. May repeat every 5 mins (total max 20 mg).
  - **Hydralazine**: 10 mg slow IV push over 2 minutes. May repeat x 1 in 10 minutes if no response.
  - **Esmolol drip**: 500 µg/kg slow IV push over 1 minute. Then start drip at 50 µg/kg/min. Increase by 25 µg/kg/min every 5 minutes (Max 300 µg/kg/min). Hold or titrate down if HR < 60.
  - **Nicardipine drip**: Start at 5 mg/hr. Increase by 2.5 mg/hr every 5-10 minutes (Max 15 mg/hr).
  - **Sodium Nitroprusside drip**: Start at 0.25 µg/kg/min, increase by 0.25 – 0.5 µg/kg/min every 5 minutes (max 10 µg/kg/ min).

Pearls

- Blood pressure control is important with neurologic emergencies, as the brain loses its ability to auto-regulate.
- Cerebral hemorrhage patients may require tight blood pressure control to prevent further bleeding.
- Ischemic stroke patients, however, should be allowed to run hypertensive which helps to maintain perfusion throughout the brain.
- Thrombolytics have the potential to cause life-threatening bleeding at any time during and following the infusion.

Critical Care Endorsement Required

Critical Care Endorsement Required

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Diabetic Emergencies

Interventions	Medications
• Ensure adequate hydration • Ensure potassium levels are adequate • Administer insulin to prevent further ketone production • Consider an acute medical event as the underlying cause (infection, cardiac ischemia, insulin non-compliance)	• Dextrose • Insulin • Potassium chloride • 0.45% NS • D5 0.45% NS

Hypoglycemia

- Follow the standard Diabetic treatment guideline for symptomatic patients
- Dextrose as a continuous infusion (any concentration) may be continued and titrated per transferring provider's orders.
- Continuous infusions at concentrations of 20% or higher should be given through a central line

Diabetic Ketoacidosis (DKA)

- ***Verify pediatric orders with transferring provider, or contact MRCC***
- Patient should remain NPO
- Ensure home insulin pump is stopped, if present
- Document amount of fluid infused prior to transfer (typically 2,000 mL of 0.9% NS, or 20 mL/kg for peds)
- Obtain and review current lab values (glucose, sodium, potassium, serum bicarbonate, pH, creatinine)
- If iStat is available, recheck serum electrolytes every hour
- Recheck finger-stick glucose every 30 minutes during transport
- **The following adult orders should be verified by the transferring provider:**
  - **IV Fluids** (after initial 2,000 mL bolus of 0.9% NS)
    - Switch to 0.45% NS unless otherwise specified
    - Infuse at 500 mL/hr for 2 hours, then maintain at 200 mL/hr
    - When glucose drops below 250 mg/dL, switch to D5 0.45% NS at current rate.
  - **Potassium Chloride**
    - If serum potassium is < 3.0, HOLD insulin and administer potassium chloride 10 mEq over 1 hour with IV fluids
    - If serum potassium is between 3.5 – 5.0, administer insulin infusion as below and add potassium chloride 10 mEq over 1 hour x 2 doses
    - If serum potassium is > 5.0, administer insulin infusion as below and HOLD potassium chloride
  - **Insulin**
    - Regular insulin (1 U/mL in 0.9% NS) – infuse at 0.1 U/kg/hr (typically between 6 – 10 U/hr), titrate per table below every 30 minutes per finger-stick glucose readings:

Glucose	*Change in glucose from previous*	*Actions*
≥ 250 mg/dL	Increase by ≥ 50 mg/dL	Verify insulin infusion is infusing appropriately
≥ 250 mg/dL	Increase by < 50 mg/dL or decrease by any amount	No change
< 250 mg/dL	Decrease by < 100 mg/dL or increase by any amount	Change IV fluid to D5 0.45% NS No change in insulin
< 200 mg/dL	Decrease by ≥ 60 mg/dL over prior 2 hours	Change IV fluid to D5 0.45% NS Decrease insulin infusion rate by 50%, call MRCC
< 200 mg/dL	Decrease by < 60 mg/dL over prior 2 hours or increase by any amount	Change IV fluid to D5 0.45% NS No change in insulin
< 100 mg/dL		Decrease insulin infusion rate by 50%, call MRCC

Pearls

- Insulin should not be started until potassium is > 3.5
- Patients are often profoundly dehydrated when in DKA
- Kussmaul breathing (deep rapid breathing) is a normal response to severe acidosis, such as with DKA

Critical Care Endorsement Required

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Diabetic Emergencies

Interventions

- Ensure adequate hydration
- Ensure potassium levels are adequate
- Administer insulin to prevent further ketone production
- Consider an acute medical event as the underlying cause (infection, cardiac ischemia, insulin non-compliance)

Medications

- Dextrose
- Insulin
- Potassium chloride
- 0.45% NS
- D5 0.45% NS

	DKA			HHS
	Mild	Moderate	Severe	
Plasma glucose (mg/dL)	>250	>250	>250	>600
Arterial pH	7.25-7.30	7.00-7.24	<7.00	>7.30
Serum bicarbonate (mEq/L)	15-18	10 to <15	<10	>18
Urine ketones*	Positive	Positive	Positive	Small
Serum ketones*	Positive	Positive	Positive	Small
Effective serum osmolality (mOsm/kg)•	Variable	Variable	Variable	>320
Anion gapΔ	>10	>12	>12	Variable
Alteration in sensoria or mental obtundation	Alert	Alert/drowsy	Stupor/coma	Stupor/coma

Pearls

- DKA is caused by lack of insulin in the body, which is uncommon in type 2 diabetics
- HHS, or Hyperosmolar Hyperglycemic State, can happen with either type of diabetes and is characterized by altered mental status, remarkably high glucose levels (often > 1,000 mg/dL), and lack of concomitant acidosis.

Critical Care Endorsement Required

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Electrolyte Abnormalities

Interventions	Medications
• Maintain continuous cardiac monitoring • Obtain lab values, ensure treatment decisions are based on recent values	• Potassium • Calcium • Magnesium • Hypertonic saline

Hypokalemia

- Monitor for cardiac rhythm changes, treat per appropriate guideline
- Assess for low magnesium levels and treat accordingly, as potassium levels cannot be restored if magnesium levels are also low.
- **The following orders should be verified by transferring provider:**
  - **Potassium Chloride** - concentrations no greater than 20mEq/50ml D5W (or NS) for central lines and 10mEq/100ml D5W (or NS) for peripheral lines
    - Central Lines:

Serum K+	*Dose*	*Total Dose*
< 2.5	20mEq KCL q1hr x 5	100mEq
2.6 – 3.0	20mEq KCL q1hr x 4	80mEq
3.1 – 3.5	20mEq KCL q1hr x 3	60mEq

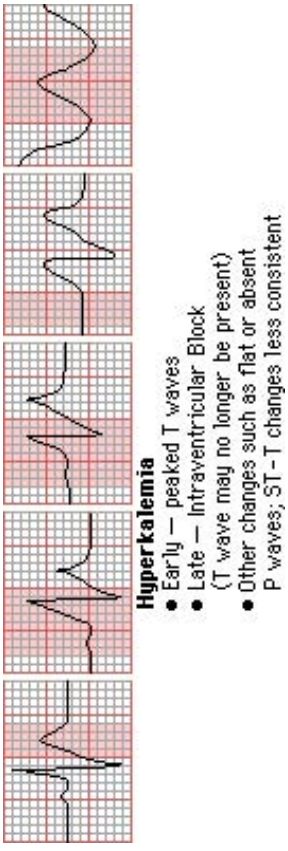
    - Peripheral Lines:

Serum K+	*Dose*	*Total Dose*
< 2.5	10mEq KCL q1hr x 10	100mEq
2.6- 3.0	10mEq KCL q1hr x 8	80mEq
3.1 – 3.5	10mEq KCL q1hr x 6	60mEq

    - If patient's creatinine is > 1.4, discuss with transferring provider or contact MRCC before administering potassium chloride.

Hyperkalemia

- Confirm any potassium level > 5.5 prior to treatment unless patient is hemodynamically unstable.
- If iStat is available, recheck serum potassium every 30 minutes after treatment.
- Monitor for cardiac rhythm changes, treat per appropriate guideline
- **The following orders should be verified by transferring provider:**
  - *Moderate (6.0-7.0) without EKG changes:*
    - Sodium bicarbonate: 1 mEq/kg IV (max 100 mEq)
    - Insulin: 10 U IV (Peds: 0.1 U/kg, max 10 U)
    - Dextrose: 25 g IV (Peds: 0.5 - 1 g/kg, max 25 g)
  - *Severe (>7.0) or Moderate (6.0-7.0) with EKG changes - same as above plus:*
    - Calcium gluconate: 1 g IV over 10 minutes (Peds: 100 mg/kg, max 1,000 mg) Calcium chloride may be given if diluted.
    - Albuterol: 10 mg nebulized over 15 minutes (Peds: 2.5 mg if < 25 kg; 5.0 mg if > 25 kg)
  - *Severe (>7.0) with EKG changes & instability or cardiac arrest - same as above plus:*
    - Immediately give calcium chloride



Pearls

- Electrolyte imbalances can cause life-threatening arrhythmias
- **Never administer potassium as IV push!** It can cause life-threatening arrhythmias.
- Hyperkalemia in the setting of acute renal failure often requires emergent dialysis

Critical Care Endorsement Required

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Electrolyte Abnormalities

Interventions	Medications
• Maintain continuous cardiac monitoring • Obtain lab values, ensure treatment decisions are based on recent values	• Potassium • Calcium • Magnesium • Hypertonic saline

Hyponatremia

- Rapidly raising the serum sodium levels can be dangerous. Treatment should be gradual (over days), or more aggressive only if significant symptoms are present.
- Brain tissue can swell with severely low or acutely low sodium levels, with the risk of stroke-like symptoms, altered mental status, brain herniation, or seizures.
- In most cases, the only treatment needed is to restrict the patient's water intake.
- ***Verify pediatric orders with transferring physician.***
- **Confirm with the transferring provider if treatment is indicated and obtain orders for medications.** The following adult treatments are commonly used:
  - **3% Saline** – 50-100 mL over 10 minutes. Central line preferred, may give through a reliable peripheral IV
  - **3% Saline continuous infusion** – Confirm infusion rate and pump settings with transferring provider

Hypomagnesemia

- *If patient's creatinine is > 1.4, discuss with transferring provider or contact MRCC before administering magnesium.*
- ***Verify pediatric orders with transferring physician.***
- **The following adult orders should be verified by transferring provider:**
  - **Magnesium Sulfate** – dilute to 2g in 50mL of 5% dextrose (D5), sterile water, or normal saline

Serum Mg2+	*Dose*	*Total Dose*
< 1.0 mEq/L	2g over 1 hour x 2	4g
1.0 – 1.5 mEq/L	2g over 1 hour x 1	2g

Hypocalcemia

- Verify with the provider that treatment is indicated. Total serum calcium levels (reported as part of a standard basic metabolic panel) should not be used as indications for replacement. The actual active ion is in the form of ionized calcium which is a separate lab test, and should be used as the basis for calcium replacement.
- Patients receiving transfusions of multiple units of blood products may also need calcium replacement, as preservatives in the blood products may bind to free calcium ions.
- ***Verify pediatric orders with transferring physician.***
- **The following adult orders should be verified by transferring provider:**
  - **Calcium Chloride** – administer via central line only, or dilute and slow push via peripheral line
  - **Calcium Gluconate** – central line preferred, may administer through a reliable peripheral line

Ionized Ca2+	*Dose*
< 1 mmol/L	2g over 1 hour
1 – 1.1 mmol/L	1g over 1 hour

Pearls

- **Avoid calcium if digoxin toxicity is suspected. Magnesium Sulfate** (2gm over 5 min) may be used instead.

Critical Care Endorsement Required

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Gastrointestinal Bleeding

Interventions	Medications
• Monitor airway status • Treat nausea and pain as needed • Utilize Hypovolemic Shock guideline as indicated	• Octreotide • Pantoprazole • Esomeprazole • Vasopressin • Antibiotics

Lower GI Bleeding

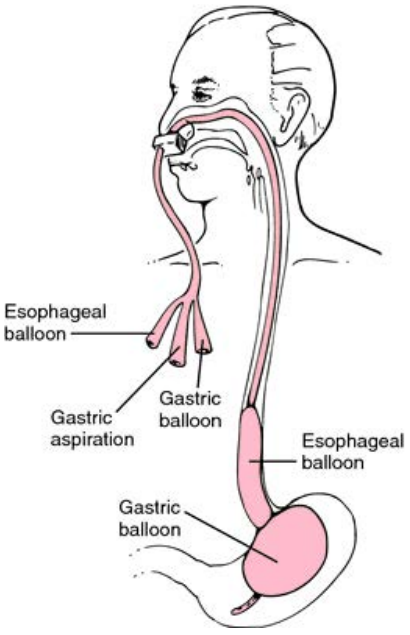
- Treat pain and nausea per the Pain Management guideline
- If hemodynamically unstable, treat per the Hypovolemic Shock guideline

Upper GI Bleeding

- Closely monitor airway, consider advanced intervention as indicated
- Treat pain and nausea per the Pain Management guideline
- If hemodynamically unstable, treat per the Hypovolemic Shock guideline
- Obtain current labs and review (Hgb, INR)
- **If INR is elevated (> 1.4), discuss the following interventions with transferring provider** *(Patients may not receive all of these, some may not be appropriate such as those who are hemodynamically stable, liver failure, or who have had a heart valve replaced):*
  - **Vitamin K** – 10mg IV slow push/infusion over 20 minutes
  - **Kcentra Prothrombin Complex Concentrate** – should be administered by transferring facility
  - **Recombinant Factor VIIa** – should be administered by transferring facility
  - **Fresh Frozen Plasma (FFP)** transfusion – 20 mL/kg
- **Regardless of INR, discuss the following interventions with transferring provider:**
  - **Octreotide** – 50 µg IV bolus, then infuse at 25-50 µg/hr
    --OR--
  - **Vasopressin** – 0.2 - 0.8 U/min IV infusion
  - **Pantoprazole** – 80 mg IV bolus over 5 minutes, then infuse at 8 mg/hr
    --OR--
  - **Esomeprazole** – 80 mg IV bolus over 30 minutes, then infuse at 8 mg/hr
  - **Antibiotics** – in the setting of cirrhosis, antibiotics may be indicated due to the high incidence of infection

Sengstaken-Blakemore Tube (Minnesota Tube)

- If indicated, will be placed by the transferring provider
- Patient should be intubated while device is in place
- Ensure you have appropriate syringes to deflate the balloons if necessary, should complications arise during transport
- Maintain 1kg traction on the end of the tube to keep the gastric balloon compressing the gastro-esophageal junction. This should be established at the transferring facility following device placement.
- Contact MRCC with any changes or concerns



Pearls

- Upper GI bleeding can be life-threatening and may require emergent intervention
- Patients with liver failure or those on blood thinners are higher risk for life-threatening bleeding
- Consider obtaining additional blood products for longer transports

Critical Care Endorsement Required

Critical Care Endorsement Required

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Head Trauma

Interventions	Medications
• Prevent secondary brain injury ◦ Maintain SBP > 90 ◦ Maintain SpO2 > 93% ◦ Elevate head ◦ Maintain adequate sedation and pain control	• Hypertonic saline (3%) • Mannitol

Head Trauma

- **Airway**
  - Ensure airway is patent, secure if needed
  - Apply oxygen to maintain SpO2 > 93%, avoid hypoxia
- **Breathing**
  - Ventilate to maintain EtCO2 at 35-40 mmHg
  - Hyperventilation to EtCO2 < 35 mmHg is no longer recommended even if signs of imminent herniation develop
- **Circulation**
  - Control any obvious external hemorrhage
  - Infuse normal saline to maintain SBP > 90 mmHg
  - Treat per the Hypovolemic Shock guideline if bleeding concerns exist
- **Disability**
  - Monitor pupils and neurologic status throughout transport
  - Avoid long-acting paralytics (vecuronium) unless absolutely necessary for patient safety or compliance with ventilator
  - Whenever possible, keep head of cot or backboard elevated 15-20 degrees
  - Monitor for signs of imminent herniation:
    - Unilateral pupillary dilation (with altered LOC)
    - Rapidly decreasing LOC
    - Decorticate/decerebrate posturing
    - Cushing's Triad (hypertension, bradycardia, irregular breathing pattern)
  - Consider neuroprotective interventions if signs of herniation develop:
    - Ensure patient is adequately sedated and pain is well controlled
    - Raise head of cot to 30 degrees if possible
    - Consider 3% Hypertonic Saline – 150 mL IV bolus over 15 minutes
    - Alternatively, if isolated head trauma, may consider Mannitol 20% – 0.25-1.0 g/kg IV bolus over 20 minutes
  - **If INR is elevated (> 1.4) and intracranial hemorrhage is identified on imaging, discuss the following interventions with transferring provider** *(may not be appropriate for all patients)*:
    - Vitamin K – 10mg IV slow push/infusion over 20 minutes
    - Kcentra Prothrombin Complex Concentrate – should be administered by transferring facility
    - Recombinant Factor VIIa – should be administered by transferring facility
    - Fresh Frozen Plasma (FFP) transfusion – 20 mL/kg

Pearls

- Maintain EtCO2 as close to 35 mmHg as possible. This will maximize fluid extraction from brain tissue (reducing swelling) while minimizing arterial vasoconstriction and decreased cerebral perfusion due to low blood CO2 levels.
- Mannitol is a diuretic and will enhance the urinary output. This should be avoided in patients with hypovolemic or hemorrhagic shock, thus hypertonic saline is preferred if imminent herniation is identified.

Critical Care Endorsement Required

Critical Care Endorsement Required

Hypovolemic Shock

Interventions	Medications
• Control the source of blood/fluid loss if possible • Replace lost fluid volume with equivalent type of fluid (blood products vs crystalloids) if possible • Consider vasopressors if signs of shock persist despite adequate fluid infusion	• Normal Saline • Blood Products • Norepinephrine

Hypovolemic Shock

- Control the source of volume loss
- Perform hemorrhage control measures, use tourniquets if indicated
- Treat symptoms of nausea and vomiting
- Initiate fluid replacement initially with **0.9% Normal Saline**, up to 2,000 mL *(30 mL/kg for peds)*
- Obtain orders from transferring provider for fluid resuscitation. Generally, hemodynamic goals would include SBP > 90 and/or MAP 60-65 mmHg.
- If the underlying cause is blood loss:
  - Refer to the Blood Product Transfusion guideline
  - Transfuse **packed red blood cells** as indicated and ordered by transferring provider. Type-specific is preferred, although in emergency situations O-negative blood can be given to anyone (males may also receive O-positive blood).
  - *For massive transfusions, transfuse 2 units of FFP after the first 4 units of packed RBC's. Following that, the ration of FFP to packed RBC units transfused should be 1:1.*
- If the underlying cause is excessive fluid loss or inadequate fluid intake (dehydration):
  - Bolus **0.9% Normal Saline** – 500 mL (10 mL/kg for peds) per dose. Repeat as needed to achieve hemodynamic goals, HOLD if signs of volume overload develop (respiratory distress, increasing oxygen requirements, wet lung sounds).
- If patient remains inadequately perfused despite attempts to replace volume:
  - Consider **norepinephrine** – start at 0.1 µg/kg/min, titrate up by 0.05 – 0.2 µg/kg/min every 5 minutes as needed (Max: 1 µg/kg/min)
  - Contact MRCC for further orders

Pearls

- Vasopressors will not be effective until adequate volume has been restored.
- Use caution with excessive fluid boluses in patients with CHF or renal failure. Infusions would still be indicated, but monitor very closely for signs of fluid overload.

Critical Care Endorsement Required

Critical Care Endorsement Required

Obstetric/Gynecologic Emergencies

Interventions	Medications
• Ensure patient is not in active labor and is stable for transport • Ensure adequate medications are available during transport • Identify an appropriate diversion facility should the need arise during transport	• Magnesium Sulfate • Lorazepam • Terbutaline • Labetalol • Calcium Gluconate

General Considerations

- Request that transferring provider check the patient's cervix **within 30 minutes** of transport to estimate likelihood of imminent delivery.
- Request that the transferring provider document whether or not patient is in active labor.
- If fetal monitoring is necessary during transport, qualified staff must accompany the patient to interpret and manage the monitoring devices.
- If the patient is in active labor, it may be more appropriate to request a NICU transport team and plan to deliver the patient or perform an emergent C-section at the transferring facility.

Pre-Eclampsia / Eclampsia

- The only definitive treatment is delivery of the fetus. Risks/benefits of premature delivery must be considered and may require delaying delivery until fetal lungs have matured.
- **Verify the following orders with the transferring provider:**
  - **Magnesium Sulfate** – Mix 4g in 50mL of NS, administer over 20 minutes. Then infuse at 2 g/hr (4g in 100mL of NS – 50 mL/hr). ***Monitor for magnesium toxicity!!***
- *If patient seizes:*
  - **Magnesium Sulfate** – 2g bolus over 10 minutes
  - If seizure activity persists, give **Lorazepam** – 1-2 mg slow IV push, repeat every 5 minutes as needed (Max: 20mg)
- For severe hypertension (SBP > 160mmHg, DBP > 110mmHg):
  - **Labetalol** – 10-20mg slow IV push over 2 minutes, may repeat every 10 minutes as needed. HOLD if maternal HR < 60.

It is against federal law (EMTALA) for a facility to transfer a patient in active labor until that facility has provided stabilization to the full extent of their capabilities.

No matter how sick the mother or baby may be, it is always better to deliver in a hospital rather than the back of an ambulance, especially when complications are anticipated.

If you feel uncomfortable with the situation, REJECT the transfer, contact the on-call medical director via MRCC IMMEDIATELY, and have the transferring provider discuss the situation with the EMS medical director.

Pre-Term Labor

- Continue antibiotic infusions if initiated by transferring facility
- Keep patient in comfortable left lateral recumbent position
- Apply oxygen to maintain SpO2 > 95% (higher due to fetal needs)
- **Verify the following orders with the transferring provider:**
  - **0.9% Normal Saline** – infuse at 125 mL/hr
  - **Terbutaline** – Start at 2.5 – 5 µg/min, titrate by 2.5 µg/min every 20 – 30 minutes if persistent contractions remain (max 20 µg/min).
  - **Magnesium Sulfate** – Mix 4g in 50mL of NS, administer over 20 minutes. Then infuse at 2 g/hr (4g in 100mL of NS – 50 mL/hr). Increase by 1 g/hr every 60 minutes if persistent contractions remain. ***Monitor for magnesium toxicity!!***

Pearls

- Pre-eclampsia is defined as BP greater than 140/90, or a 30mmHg rise in SBP or 15mmHg rise in DBP from baseline, after the 20th week of pregnancy.
- Any changes in condition should be closely communicated to receiving facility, in case the need arises for emergent C-section upon arrival.

Critical Care Endorsement Required

Critical Care Endorsement Required

Obstetric/Gynecologic Emergencies

Interventions	Medications
• Monitor for magnesium toxicity	• Magnesium Sulfate • Lorazepam • Terbutaline • Labetalol • Calcium Gluconate

Other Ob/Gyn Emergencies

- *Vaginal bleeding, placental emergencies, ruptured ectopic pregnancies, post-partum hemorrhage, trauma*
- Follow the Hypovolemic Shock guideline as indicated
- Continue treatments initiated by transferring facility
- **For post-partum hemorrhage, discuss the following order with the transferring provider:**
  - **Oxytocin** – 10-40 U in 1,000mL NS, start at 125 mL/hr, titrate to maintain uterine contraction

Magnesium Toxicity

- Magnesium can rise to toxic levels when infused continuously
- Signs/symptoms include:
  - Loss of deep tendon reflexes (patellar reflexes)
  - Altered mental status
  - Respiratory depression
  - Cardiac depression (hypotension, bradycardia)
- Providers should check deep tendon reflexes and monitor for changes every 30 minutes while receiving continuous magnesium infusions.
- If toxicity develops, perform the following interventions:
  - STOP magnesium sulfate infusion
  - If cardiac or respiratory depression is present, give **Calcium Gluconate** – 1g slow IV push over 10 minutes
  - Contact MRCC for further orders

Indications for medical control consultation prior to transport

- Coagulopathy (disseminated intravascular coagulation)
- Fetal distress (as evidenced by fetal heart rhythm strips or ultrasound findings)
- Excessive maternal hemorrhage
- Regular contractions < 5 minutes apart (active labor)
- Hemodynamic instability
- Severe abdominal pain
- Seizures or other abnormal neurologic findings
- Pulmonary edema
- Severe hypertension (SBP > 160 mmHg), not present prior to pregnancy
- Cervical dilation > 4 cm

Pearls

- Magnesium Sulfate is the treatment of choice to prevent seizures due to eclampsia.
- The diagnosis of eclampsia is an indication for an emergent C-section, and the patient would not be considered stable for transfer.

Critical Care Endorsement Required

Critical Care Endorsement Required

Overdose/Toxicology Emergencies

Interventions	Medications
• Monitor airway • Obtain information about the ingestion (time, amount, drug) • Discuss antidotes and treatment plan with transferring provider	• N-Acetylcysteine • Naloxone • Flumazenil • Sodium Bicarbonate • Magnesium Sulfate • Insulin • 20% Fat Emulsion

Overdose Management

- Monitor airway and be prepared to intervene as needed
- Acetaminophen overdose:
  - If initiated by the transferring facility, maintain the following continuous IV infusion of **N-Acetyl Cysteine (NAC)**:
    - 150 mg/kg over 60 minutes
    - Then 50 mg/kg over 4 hours
    - Then 100 mg/kg over 16 hours
- Sedative overdose:
  - Narcotic/Opiate overdose:
    - Naloxone (Narcan): 0.4 – 2 mg IV (Peds 0.1mg/kg, max 2 mg) every 30 minutes as needed to maintain adequate respiratory drive. May also maintain a continuous naloxone infusion if initiated by transferring facility.
  - Benzodiazepine overdose:
    - Flumazenil: 0.2 mg slow IV push over 1 – 2 minutes (Peds 5 µg/kg over 1 – 2 minutes, max 200 µg) every 1 minute for total of 4 doses to maintain adequate respiratory drive. Use caution in patients who have been on long-term benzodiazepine therapy as this may precipitate seizures.
- Cardiovascular agent overdose (beta-blocker, calcium-channel blocker):
  - Discuss management strategy with transferring provider. Consider involving a Toxicology consultant, either via MRCC (1-888-588-9855) or Poison Control (1-800-222-1222).
  - **The following infusions may be maintained if ordered by transferring provider:**
    - High-dose Insulin infusion: start at 1 unit/kg/hr, titrate up to 10 units/kg/hr to maintain hemodynamic parameters (SBP > 90 mmHg or MAP > 65 mmHg). This will also require a simultaneous dextrose infusion (D5 or D10). Obtain detailed management and titration parameters from transferring facility. This requires a second ALS provider (Paramedic, CCP, or RN) to accompany the patient in the ambulance.
    - 20% Fat Emulsion infusion (Intralipid): 1.5 mL/kg IV bolus, then 0.25 mL/kg/min for 60 minutes. Most patients treated with this therapy are critically ill and often too unstable for transport.
- Other considerations:
  - *Refer to the "Overdose/Toxic Ingestion" guideline, the "Cyanide Exposure" guideline, and the "WMD – Nerve Agent Exposure" guideline from the standard patient care guidelines for additional reference.*
  - If EKG shows QRS width > 120 ms (without previously diagnosed bundle branch block):
    - Administer Sodium Bicarbonate: 100 mEq IV (Peds 1 mEq/kg, max 100 mEq) every 15 minutes until QRS < 120 ms.
    - May maintain Sodium Bicarbonate infusion – 150 mEq in 1,000 mL D5W, rate per transferring provider's order (typical starting dose is around 25 mL/hr)
  - If EKG shows corrected QT interval > 500 ms:
    - Administer Magnesium Sulfate: 2 g slow IV push over 2 minutes (Peds 40 mg/kg, max 2,000 mg)

Pearls

- Most ingestions can be grouped into toxidromes, or clusters of symptoms. The common toxidromes involve respiratory depression, cardiovascular depression or stimulation, cardiac conduction abnormalities, and neurologic sedation or excitability (agitation, psychosis, seizures).

Critical Care Endorsement Required

Critical Care Endorsement Required

Pain Management/Sedation

Interventions	Medications
• Assess pre-intervention pain/anxiety • Re-assess post-intervention pain/anxiety • Monitor respiratory status and blood pressure closely • Consider EtCO2 monitoring for high-risk patients or those requiring multiple doses • Be aware of non-verbal signs of pain in non-communicative patients, such as tachycardia, hypertension, watering of the eyes, restlessness, or facial grimacing	• Fentanyl • Hydromorphone • Ketamine • Midazolam • Lorazepam • Propofol • Dexmedetomidine

Pain Management / Anxiety

- *This guideline should supplement the Pain Control guideline from the standard patient care guidelines*
- Attempt non-pharmacologic interventions such as verbal de-escalation, positioning, ice packs, distraction
- A patient with a patient-controlled analgesia pump (PCA) may be transported with the pump, however no changes should be made to the pump during transport
- If medications are indicated, the following standing orders may be utilized for treatment of moderate to severe pain:
  - **Fentanyl** – 0.5-1 µg/kg IV every 15 minutes as needed, or 1-2 µg/kg IN every 20 minutes as needed *(Peds same dose)*
  - **Hydromorphone** – 0.2-1 mg IV every 30 minutes as needed *(Peds 0.01 mg/kg)*
  - Consider EtCO2 monitoring if multiple doses are required or patient's mental status is abnormal
  - Consider lower doses if SBP < 100 mmHg
- If medications are indicated, the following standing orders may be utilized for treatment of significant anxiety:
  - **Midazolam** – 1-2 mg IV every 30 minutes as needed *(Peds 6 months to 5 years: 0.05 mg/kg IV, over age 6: 0.025 mg/kg IV)*, or 2-4 mg IN every 30 minutes as needed *(Peds 0.1 mg/kg IN)*
  - **Lorazepam** – 0.5-1 mg IV every 30 minutes as needed *(Peds 0.02 mg/kg, max 1 mg)*
  - Avoid or consider lower doses if SBP < 100 mmHg

Overdose

- If the patient's respiratory drive decreases after administration of analgesics or anxiolytics, consider the following standing orders:
  - For narcotic-induced symptoms, consider **naloxone** 0.4 - 4 mg IV/IM/IN *(Peds 0.1 mg/kg, max 2 mg)*, repeat every 5-10 minutes as needed

Pearls

- Intranasal midazolam should be given undiluted to minimize volume
- Do not hesitate to err on the lower side of dosing and titrate to effect, especially with elderly patients or those with a tenuous airway status

Critical Care Endorsement Required

Critical Care Endorsement Required

Pain Management/Sedation

Interventions	Medications
• Monitor respiratory status and blood pressure closely • Be aware of non-verbal signs of pain in non-communicative patients, such as tachycardia, hypertension, watering of the eyes, restlessness, or facial grimacing	• Fentanyl • Hydromorphone • Ketamine • Midazolam • Lorazepam • Propofol

Adult Sedation

- For behavioral sedation, refer to the Adult Behavioral guideline from the standard patient care guidelines
- For intubated patients, the following standing orders may be utilized:
  - May continue any infusions at rate determined by transferring facility. Obtain titration and holding parameters from provider before transport.
  - **Propofol infusion** – 5 - 80 µg/kg/minute, titrate by 5-10 µg/kg/minute every 5 minutes to maintain adequate sedation. HOLD if SBP < 90 mmHg or HR < 60.
  - **Midazolam** – 1 - 5 mg IV every 10 minutes as needed. Avoid or consider lower doses if SBP < 100 mmHg.
  - **Lorazepam** – 1 – 4 mg IV every 10 minutes as needed.
  - **Fentanyl** – 0.5 – 2.0 µg/kg IV every 10 minutes as needed.
  - **Hydromorphone** – 0.5 – 2.0 mg IV every 20 minutes as needed. Avoid or consider lower doses if SBP < 100 mmHg.
  - **Ketamine** – 0.5 – 1.0 mg/kg IV every 20 minutes as needed.

Pediatric Sedation

- For intubated patients, the following standing orders may be utilized:
  - May continue any infusions at rate determined by transferring facility. Obtain titration and holding parameters from provider before transport.
  - **Propofol infusion** – 5 - 150 µg/kg/minute, titrate by 5-10 µg/kg/minute every 5 minutes to maintain adequate sedation. HOLD if SBP < (70 + (Age x 2)).
  - **Midazolam** – 0.1 mg/kg (max 10 mg) IV every 30 minutes as needed. Avoid or consider lower doses if SBP < (70 + (Age x 2)).
  - **Lorazepam** – 0.15 mg/kg (max 4 mg) IV every 30 minutes as needed.
  - **Fentanyl** – 0.5 –2 µg/kg every 10 minutes as needed.
  - **Hydromorphone** – 0.01 – 0.02 mg/kg every 20 minutes as needed. Avoid or consider lower doses if SBP < (70 + (Age x 2)).
  - **Ketamine** – 0.5 mg/kg IV every 20 minutes as needed.

Pearls

- Intranasal midazolam should be given undiluted to minimize volume
- Do not hesitate to err on the lower side of dosing and titrate to effect, especially with elderly patients or those with a tenuous airway status or borderline blood pressure

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Respiratory Emergencies

Interventions	Medications
• Closely monitor airway status • Do not hesitate to utilize CPAP or Bi-PAP early for significant symptoms	• Methylprednisolone • Nitroglycerin • Furosemide • Bumetanide • Low-molecular weight heparin • Heparin • Alteplase • Tenecteplase

Bronchospasm

- Possible etiologies include COPD, asthma, anaphylaxis, angioedema, toxic fume exposure.
- Treat per the "Respiratory Distress" guideline (Adult or Peds) from the standard patient care guidelines.
- Consider treating for severe allergic reaction per the "Anaphylaxis" guideline as indicated.
- If not given by the transferring facility, give **Methylprednisolone** – 125 mg IV (Peds 2 mg/kg, max 125 mg) x 1 dose
- Transport in a position of comfort, typically sitting upright.
- For adult patients, consider a trial of Bi-PAP if respiratory distress or work of breathing remains elevated.

Pulmonary Edema

- Treatments should be titrated to relieve respiratory symptoms.
- Positive-pressure ventilation (invasive or non-invasive) is the preferred initial treatment to relieve respiratory symptoms.
- Consider trial of CPAP or Bi-PAP early. Prepare for intubation if mental status or respiratory status continues to decline.
- **Confirm the following orders with the transferring provider:**
  - **Nitroglycerin** – 0.4 – 0.8 mg SL every 5 minutes as needed, or start continuous infusion at 50 µg/min. Titrate up by 5 - 10 µg/min every 5 minutes as needed to relieve respiratory symptoms. HOLD if SBP < 90 mmHg.
  - **Furosemide (Lasix)** – 20 – 40 mg IV x one dose (should be given by transferring facility). May maintain any continuous infusion started by the transferring facility, titrate per orders from transferring provider.
  - **Bumetanide (Bumex)** – 0.5 – 1 mg IV x one dose (should be given by transferring facility). May maintain any continuous infusion started by the transferring facility, titrate per orders from transferring provider.

Pulmonary Embolism

- Treatment is dependent on hemodynamic stability vs instability (submassive vs massive PE).
- Diagnostic findings may or may not include right-sided heart enlargement, troponin elevation, BNP elevation (evidence of heart failure), tachycardia, hypoxia, and hypotension.
- Stable (not hypotensive), or submassive, PEs are generally treated with anticoagulation, whereas massive PEs (hypotensive) often require thrombolytic treatment.
- **Confirm with the transferring provider the following orders:**
  - **Low-molecular weight heparin (Lovenox)** – 1 mg/kg SC x 1 dose (should be given by transferring facility)
  - **Heparin** – 80 units/kg (Max 5,000 units) IV bolus (should be given by transferring facility), then 18 units/kg/hr (Max 1,300 units/hr) continuous infusion

Pearls

- Prior to anticoagulation or thrombolytic therapy (see back), providers should review the checklist on back for any bleeding risks and discuss with the transferring provider if any concerns exist.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Respiratory Emergencies

Interventions	Medications
• Closely monitor airway status • Do not hesitate to utilize CPAP or Bi-PAP early for significant symptoms	• Methylprednisolone • Nitroglycerin • Furosemide • Bumetanide • Low-molecular weight heparin • Heparin • Alteplase • Tenecteplase

Thrombolytics (for Pulmonary Embolism)

- ***Alteplase (tPA)*** and ***tenecteplase (TNKase)*** are the most common thrombolytics.
- Document vitals prior to departure, discuss blood pressure parameters and management orders with transferring provider.
- Document a thorough baseline neuro exam prior to departure
- Thrombolytics should be infused through a dedicated line. DO NOT administer any other medications through this line.
- Verify total dose of medication to be infused, time of administration (if completed prior to transfer), or anticipated time of completion (if still infusing at time of transfer)
- If the infusion will continue during transfer, verify with sending facility that excess medication has been withdrawn from the bottle and wasted. The bottle should be labeled by the sending hospital with the total dose/volume that was in the bottle initially to be administered.
- When pump alarms that the bottle is empty, switch the IV tubing from the bottle to a fresh bag of saline to infuse the remaining medication left in the tubing. This should remain on the IV pump, and the pump will stop when the preset volume has been infused.
- When TPA infusion is complete, infuse normal saline at TKO.

Monitor for any acute change in neurologic condition (headache, acute hypertension, nausea/vomiting, new focal deficits, or change in mental status). If noted:

- **Immediately stop the infusion if still infusing!**
- Contact medical control for further instructions, including blood pressure parameters, diversion to nearest hospital, or if patient is a direct admit consideration of further stabilization in the ED at the receiving facility
- Continue to monitor vital signs and neurologic exam every 10 minutes during infusion

Contraindications to thrombolytics

- Intracranial diseases
- Previous hemorrhagic stroke, ever
- Stroke within past 6 months
- Intracranial neoplasm
- Recent surgery (10-14 days)
- GI hemorrhage (3-6 mo)
- Cranial/spinal surgery/trauma (2 mo)
- Recent trauma
- Bleeding diathesis
- Post-infarction pericarditis
- Possibility of aortic dissection
- Severe uncontrolled hypertension >180/110 mmHg
- Traumatic or sustained (>10 min) CPR
- Major surgery within 3-4 wks
- Noncompressible vascular punctures
- Diabetic retinopathy
- Pregnancy

Pearls

- Prior to anticoagulation or thrombolytic therapy, providers should review the checklist for any bleeding risks and discuss with the transferring provider if any concerns exist.

Critical Care Endorsement Required

Critical Care Endorsement Required

Seizure Emergencies

Interventions	Medications
• Ensure glucose level has been checked • Benzodiazepines are the first-line treatment choice • Fosphenytoin or Keppra is usually the second-line choice • If still seizing, patients should be intubated and sedated with propofol	• Dextrose • Lorazepam • Midazolam • Fosphenytoin • Phenytoin • Keppra

Status Epilepticus

- Refer to the standard Seizure patient care guideline (adult and peds) as indicated
- Most seizures are self-limited, however for the purposes of this guideline it is likely the patient has already manifested prolonged or multiple seizure episodes, thus any seizure activity in the presence of EMS should warrant treatment.
- May maintain any infusion initiated by the transferring facility
- **Confirm the following orders with the transferring provider:**
  - *Benzodiazepine – first line, choose one*
    - Lorazepam – 1-2 mg IV (Peds: 0.05 mg/kg IV, max 2 mg per dose), may repeat in 5 minutes for 3 doses total if needed
    - Midazolam – 2 mg IV (Peds: 0.1 mg/kg IV, max 2 mg) or 5 mg IM (Peds: 0.2 mg/kg, max 5 mg), may repeat every 5 minutes as needed, max 15 mg total
  - *Anti-epileptic – second line, discuss with transferring provider or MRCC*
    - Fosphenytoin – 20 mg PE/kg (Max 1,500 PE), infuse no faster than 150 PE/min
    - Phenytoin – 20 mg/kg IV (Max 1,500 mg), infuse no faster than 50 mg/min
    - Levetiracetam (Keppra) – 20 mg/kg IV over 15 minutes (Max 1,000 mg)
    - Valproic Acid (Depakote) – 20-40 mg/kg IV (Adults: infusion rate 3-6 mg/kg/min, Peds: infusion rate 1.5-3 mg/kg/min).
- As a second-line drug, fosphenytoin is preferred due to significantly lower cost, higher infusion rate, and lower risk of hypotension and other cardiovascular complications.

Pearls

- Prolonged seizure activity can cause permanent neurological damage
- **Chemical paralysis does NOT stop seizure activity** – it merely masks the external evidence of seizure activity
- Do not hesitate to contact Medical Control if seizure activity is not controlled
- If patient is pregnant and in 3rd trimester, consider the diagnosis of eclampsia and treat per the OB/Gyn Emergencies guideline. Magnesium Sulfate would be the initial treatment of choice.

Critical Care Endorsement Required

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Sepsis

Interventions	Medications
• Ensure blood cultures and urine have been collected • Ensure antibiotics are initiated prior to transfer • Determine duration of infusion and total dose to be given • Maintain adequate end-organ perfusion with IV fluids and pressors if needed	• Normal Saline • Antibiotics • Norepinephrine • Epinephrine • Vasopressin • Dopamine • Phenylephrine • Dobutamine

Sepsis

- Defined as 2 or more of the following, PLUS a suspected or confirmed source of infection:
  - Temperature > 100.4°F or < 96.8°F
  - Heart rate > 90
  - Respiratory Rate > 20
  - WBCC > 12 or < 4
- Severe sepsis would be diagnosed by the presence of any of the following:
  - Elevated lactate
  - SBP < 90 mmHg, or a drop ≥ 40 mmHg from normal
  - Evidence of organ systems failing
- ***Ensure that antibiotics are initiated prior to transfer***
- Blood cultures should be obtained prior to initiation of antibiotics by the transferring facility

Interventions – discuss with transferring provider:

- May maintain or initiate any antibiotic infusions as ordered by transferring facility.
- Monitor for signs/symptoms of allergic reactions as indicated
- *For elevated lactate or hypotension:*
  - **Normal Saline** – 30 ml/kg (Max 2,000 mL) IV bolus
  - If patient remains persistently hypotensive (mean arterial pressure < 65 mmHg):
    - Monitor respiratory status and lung exam for signs of fluid overload with repeated boluses
    - If central venous access is available, monitor CVP and administer additional IV fluid boluses to maintain CVP 8-12 mmHg: Normal Saline – 500 mL (Peds: 10 mL/kg) IV bolus
    - If CVP is adequate (or unavailable) and patient remains persistently hypotensive, discuss the following with transferring provider or contact MRCC for orders to maintain MAP > 65 mmHg:
      - Norepinephrine – start at 0.1 µg/kg/min, titrate by 0.05-0.2 µg/kg/min every 5 minutes as needed (Max: 1 µg/ kg/min). Hold or reduce if patient becomes tachycardic.
      - Epinephrine – same dosing as norepinephrine.
      - Vasopressin – 0.03 units/min, no titration (Peds: not indicated, contact MRCC)
      - Dopamine – start at 10 µg/kg/min, titrate by 2.5 µg/kg/min every 5 minutes as needed (Max: 20 µg/kg/min). Hold or reduce if patient becomes tachycardic or develops a tachyarrhythmia.
      - Phenylephrine – last choice if other pressors are not adequate – start 0.5 µg/kg/min, titrate by 0.1-0.2 µg/kg/ min every 10 minutes as needed (Max: 5 µg/kg/min). Peds: 0.1-0.5 µg/kg/min. Hold or reduce if heart rate < 60.
- Some patients with normal blood pressures but evidence of low cardiac output may benefit from infusion of Dobutamine – start at 10 µg/kg/min, titrate by 2.5 µg/kg/min every 5 minutes as needed (Max: 20 µg/kg/min).

Pearls

- Source control is the critical intervention – this could include surgery to remove infected organs or tissue, abscess drainage, or most commonly, antibiotics

Critical Care Endorsement Required

Critical Care Endorsement Required

Shock

Interventions	Medications
• Use history and exam findings to determine the type of shock • Control source of volume loss, if appropriate • Fluid administration • Pressor administration	• Normal Saline • Norepinephrine • Vasopressin • Dopamine

Shock of Indeterminate Etiology

- Attempt to assess volume status – peripheral edema, JVD, pulmonary edema, skin turgor, mucous membranes
- Assess for evidence of hemorrhage – abdominal pain, dark/tarry stools
- If evidence of hypovolemia or hemorrhage, refer to the Hypovolemic Shock guideline
- If suspicion for infection, refer to the Sepsis guideline
- If concern exists for cardiac dysfunction, refer to the Cardiogenic Shock guideline
- Consider any exposure to medications that may cause poor perfusion – antihypertensives, some antidepressants, pain medication, antiseizure medications. Discuss with transferring provider or MRCC.
- **For shock without clear etiology, confirm the following orders with the transferring provider:**
  - **Normal Saline** – 10 mL/kg IV bolus (Max 1,000 mL per dose), repeat as needed x 2
  - **Norepinephrine** – start at 0.1 µg/kg/min, titrate by 0.05-0.2 µg/kg/min every 5 minutes as needed (Max: 1 µg/kg/min). Hold or reduce if patient becomes tachycardic.
  - **Vasopressin** – 0.03 units/min, no titration (Peds: not indicated, contact MRCC)
  - **Dopamine** – start at 10 µg/kg/min, titrate by 2.5 µg/kg/min every 5 minutes as needed (Max: 20 µg/kg/min). Hold or reduce if patient becomes tachycardic or develops a tachyarrhythmia.

Types of Shock		
Type	Physiology	Examples
Hypovolemic	Decreased circulatory volume	Hemorrhage or fluid loss
Cardiogenic	Impaired heart pump function	Acute coronary syndrome, valve failure, dysrhythmias
Distributive	Peripheral blood vessel vasodilation	Sepsis, anaphylaxis, neurogenic
Obstructive	Non-cardiac obstruction to blood flow	Pulmonary embolus, tension pneumothorax, tamponade

Pearls

- Hypovolemic shock is the most common type of shock
- If there is no obvious evidence of hemorrhage (i.e. normal hemoglobin level), the most likely etiology is sepsis

Critical Care Endorsement Required

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Spinal Cord Injuries

Interventions	Medications
• Protect spine from further injury • Monitor and manage airway and breathing • Monitor for neurogenic shock and treat accordingly	• Phenylephrine • Dopamine

Spinal Injury

- Cervical spinal cord injury patients often have compromised respiratory function and may deteriorate during transport. Consider pre-transport intubation in a controlled environment with the most skilled/experienced provider.
- Complete primary assessment to evaluation for critical injuries affecting airway, breathing and circulation.
- Note and document any gross neurologic deficits prior to immobilization.
- Document levels of sensory and motor function, including sensation at various levels on the torso.
- Remove patient from long backboard prior to transport
- Consider Foley catheter at referring institution if spinal cord injury is evident
- If patient develops neurogenic shock:
  - **Normal Saline** – 10 mL/kg IV bolus (Max 1,000 mL per dose), repeat as needed x 2
  - If HR < 100, consider **Dopamine** – start at 5 µg/kg/min, titrate by 2.5 µg/kg/min every 5 minutes as needed (Max: 20 µg/kg/min). Hold or reduce if patient becomes tachycardic or develops a tachyarrhythmia.
  - If HR > 60, consider **Phenylephrine** - start 0.5 µg/kg/min, titrate by 0.1-0.2 µg/kg/min every 5 minutes as needed (Max: 5 µg/kg/min). Peds: 0.1-0.5 µg/kg/min. Hold or reduce if heart rate < 60.

Role of Backboards

While generally speaking we are attempting to limit the use of backboards, pre-hospital and hospital providers should recognize there remain circumstances in which use of a backboard is appropriate. Backboards should be utilized to extricate patients from vehicles or other situations when they are unable to extricate themselves (critical patients, patients with lower extremity injuries, severe head injuries, etc.). In most instances, once on the EMS cot, the backboard is redundant and can be removed. However, in some settings, it may be appropriate for the backboard to remain. Those settings include, but are not limited to the following:

- Cases in which the backboard is being utilized as an element of the splinting strategy (such as multiple long bone fractures).
- Cases in which the patient is at risk for vomiting but unable to protect their own airway (such as intoxication, head injury, etc.) and may need to be turned to the side for airway protection during transport.
- Cases in which the patient is unresponsive or agitated (i.e. head injury).
- Cases in which removal of the backboard would otherwise delay transport to definitive care in a critical patient.

Pearls

Inter-Facility Transport – Long backboards do not have a role in the transport of patients between hospitals EVEN IF A SPINE INJURY IS DIAGNOSED. Use of long boards during interfacility transport is associated with increased pain, respiratory compromise, and potential for pressure sores and ulcers. Patients should instead be managed with a cervical collar (if appropriate) and firmly secured to the EMS stretcher. If a sending facility has placed the patient on a long board or requests use of a long board, EMS providers should discuss the option of forgoing backboard use with the transferring provider. If a backboard ultimately is used, it MUST be padded adequately to maximize patient comfort.

Critical Care Endorsement Required

Critical Care Endorsement Required

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Approved Medications

Generic Name	Brand Name	Indication
Acetaminophen	Tylenol; Ofirmev	Mild to moderate pain
Adenosine	Adenocard	Conversion of PSVT to normal sinus rhythm
Albuterol	Proventil; Ventolin	For relief of acute bronchospasm
Amiodarone	Coradarone	VF/VT WPW or PSVT with MD order
Aspirin	Bayer	Suspected cardiac ischemia
Atropine	N/A	Symptomatic bradycardia Organophosphate overdose
Buprenorphine	Belbuca; Subutex	Opioid withdrawal syndrome
Calcium Chloride	N/A	Suspected hyperkalemia in cardiac arrest Beta blocker or calcium channel blocker OD/toxicity Hemodynamic instability following HF acid exposure
Dexamethasone	Decadron	Allergic reactions, bronchospasm
Dextrose Intravenous (D10, D50)	N/A	Suspected or known hypoglycemia
Dextrose Oral	Glutose	Suspected or known hypoglycemia
Diphenhydramine	Benadryl	Allergic reaction Anaphylaxis Agitation
Droperidol	Inapsine	Agitation
Epinephrine 1:1,000	Adrenaline	Allergic reactions/anaphylaxis
Epinephrine 1:10,000	Adrenaline	VF/VT, asystole, and PEA Severe anaphylaxis or asthma
Epinephrine Auto-Injector	EpiPen	Severe allergic reaction
Epinephrine, Racemic 2.5%	N/A	Moderate to severe croup Bronchial asthma Laryngeal edema
Etomidate	Amidate	Induction of anesthesia for RSI
Fentanyl	Sublimaze	Pain control
Glucagon	N/A	Hypoglycemia Beta blocker or calcium channel OD/toxicity
Haloperidol	Haldol	Acute psychotic disorders
Hydromorphone	Dilaudid	Pain control
Hydroxocobalamin	CyanoKit	Known or suspected cyanide poisoning
Ibuprofen	Advil, Motrin	Mild to moderate pain
Ipratropium	Atrovent	Relief of acute bronchospasm
Ketamine	Ketalar	Induction of anesthesia for RSI Pain control Control of the aggressive or violent patient

Generic Name	Brand Name	Indication
Lidocaine	N/A	Anaesthesia for IO infusion
		VF/VT
Magnesium sulfate	N/A	Torsades de pointes
		Severe asthma
		Seizures associated with eclampsia
		Prolonged QT interval
Methylprednisolone	Solu-Medrol	Allergic reaction, bronchospasm
Midazolam	Versed	Agitation/discomfort of external pacing and cardioversion
		Agitation
		Status seizures
		Anxiety
		Combative behavior that compromises patient care
Morphine	N/A	Pain control
Naloxone	Narcan	Respiratory depression from narcotic overdoses
		Diagnostic tool in coma of unknown origin
Nitroglycerin	Nitrol	Chest pain of suspected cardiac origin
		Pulmonary edema
		Hypertension
Ondansetron	Zofran	Nausea or vomiting
Oxygen	N/A	Increase arterial oxygen tension (SaO2)
Rocuronium	Remuron	Paralysis for RSI
Sodium bicarbonate	N/A	Acidosis/acidemia from cardiac arrest
		Pre-existing metabolic acidosis or hyperkalemia
		Crush syndrome
		Wide QRS due to ingestion
Succinylcholine	Anectine	Paralysis for RSI
Tetracaine	Pontocaine	Suspected corneal abrasion or foreign body in eye
Tranexamic Acid	TXA	Hemorrhage
Vecuronium	Norcuron	Maintenance of paralysis following RSI

Acetaminophen

ACTION

Not fully understood, likely acts both centrally and peripherally.

INDICATIONS

- Mild to moderate pain
- Severe pain, as an adjunct to other analgesics
- Fever in critically ill patients

CONTRAINDICATIONS

- Liver disease
- Acetaminophen use within the last 4 hours
- Pediatric patients < 2 years old without physician order
- Allergy

PRECAUTIONS

- Current alcohol abuse or recent significant alcohol ingestion (> 3 drinks)

ADVERSE REACTIONS/SIDE EFFECTS

- Gastrointestinal discomfort
- Hepatotoxicity

ADMINISTRATION

- Adults >= 70 kg: 1,000 mg IV over 15 minutes or 650 mg PO
- Adults < 70 kg: 650 mg PO (no IV)

PEDIATRIC CONSIDERATIONS

- Pediatrics < 50 kg: 15 mg/kg PO, max 650 mg (no IV)

SPECIAL NOTES

- Ask about prescription pain medications, sleep aids, cough/cold/flu relievers, and headache medications, as many of these come in combination with acetaminophen.

Adenosine

ACTION

Slows conduction through AV node of the heart. It is cleared very rapidly, having a half-life of less than 10 seconds.

INDICATIONS

- Conversion of paroxysmal supraventricular tachycardia (narrow complex tachycardia) to normal sinus rhythm (NSR)
- Conversion of regular wide complex tachycardia (Ventricular tachycardia or uncertain).

CONTRAINDICATIONS

- Heart block
- Sick sinus syndrome, atrial fibrillation or atrial flutter

PRECAUTIONS

- Frequently followed by several seconds of asystole. Provide emotional support to the patient.

ADVERSE REACTIONS/SIDE EFFECTS

- Usually very short-lived
- Dyspnea and bronchoconstriction (especially in patients with asthma and COPD)
- Palpitations and chest pain
- Hypotension
- Facial flushing and headache
- At the time of conversion, a variety of new rhythms may appear on the ECG. Short-lasting first, second or third degree heart block or transient asystole may result after administration. Due to the drug's short half-life, these effects are generally selflimiting.
- At a dose of 12 mg, there are usually no hemodynamic side effects, i.e. hypotension.

ADMINISTRATION

- 12 mg IV/IO bolus may be given before contacting medical control. Document effect on rhythm on ECG strip.
- If rhythm does not convert or does not slow enough to allow diagnosis, a second dose of 12 mg may be given prior to medical control contact.

PEDIATRIC CONSIDERATIONS

- First dose is 0.1 mg/kg (max 6 mg single dose) IV/IO rapid push.
- Second dose can be given if no response (or transient response) at a dose of 0.2 mg/kg (max 12 mg single dose).

SPECIAL NOTES

- After the administration of adenosine, a rhythm other than PSVT may be evident. This should result in the selection of a different form of treatment.
- Adenosine IV/IO injection must be given rapidly. This can be facilitated by: 1) using the IV/IO med port closest to the patient, 2) following the med with a fluid flush to assure all of the drug has cleared the IV tubing, 3) using a larger bore IV catheter, and 4) elevating the arm during administration. Further orders must come from a medical control physician.

Albuterol

ACTION

Sympathomimetic bronchodilator (beta2-adrenergic agonist)

INDICATIONS

- For relief of acute bronchospasm (reversible airway obstruction)

CONTRAINDICATIONS

- Allergy or known hypersensitivity to albuterol

PRECAUTIONS

- Beta-receptor blocking agents and albuterol inhibit the effect of each other.
- Use with caution in patients with heart disease, hypertension, diabetes, the elderly and those being treated with antidepressants.

ADVERSE REACTIONS/SIDE EFFECTS

- Hypertension and headache
- Arrhythmias and chest pain
- Nervousness and shakiness
- Rare: May produce immediate allergic reactions or paradoxical bronchospasm, which can be life threatening. Discontinue treatment immediately if this occurs.

ADMINISTRATION

- Pour one unit dose bottle (2.5 mg = 3 ml of 0.083% solution) into nebulizer reservoir.
- Connect nebulizer to oxygen source at 6 or 8 liters per minute (depending on manufacturer).
- Have patient breathe as calmly and deeply as possible until no more mist is found in the nebulizer chamber (5 - 15 minutes). Routine nebulizer therapy should be accomplished by instructing the patient to close his/her lips tightly around the mouthpiece. An acceptable alternative to using the mouthpiece would be to attach the nebulizer reservoir to an oxygen mask, i.e. remove the bag from a non-rebreather nebulizer reservoir and do not use the T-piece or the mouthpiece.
- Continuous nebulizer treatments (with reassessment in between) may be given to all ages as indicated.
- Restart patient on oxygen at appropriate concentration if indicated. ALS
- Same as above except that ipratropium 500 mcg is added to the first (only) neb, unless contraindicated.
- In the intubated patient, albuterol should be administered with an adapter that permits in-line nebulization.

PEDIATRIC CONSIDERATIONS

- Continuous nebs, at adult strength, may be given on standing order. ALS
- Continuous nebs (with Atrovent added to first neb) at adult strength, may be given on standing order.

SPECIAL NOTES

- May begin treatment prior to IV therapy. This may decrease anxiety in the patient.
- Nebulizer treatments for a patient with active tuberculosis should be performed in well-ventilated areas (outside patient compartment if possible). Providers should use appropriate respiratory protection.
- ALS providers can provide in-line nebs during CPAP therapy as appropriate.

Amiodarone

ACTION

Amiodarone is considered a "broad spectrum" antiarrhythmic medication. It has multiple and complex effects on the electrical activity of the heart such as: 1) A delay in the rate at which the heart repolarizes. 2) A prolongation in the action potential of the heart. 3) A slowing of the speed of electrical conduction. 4) A reduction in the SA nodal firing rate. 5) A slowing of conduction through accessory pathways. In addition to being an antiarrhythmic, Amiodarone also causes blood vessels to dilate. This effect can result in a drop in blood pressure.

INDICATIONS

- Ventricular tachycardias (with and without a pulse)
- Ventricular fibrillation (VF)
- As prophylaxis following successful conversion of VF or VT or ICD firing
- WPW and PSVT with physician order

CONTRAINDICATIONS

- Allergy or known hypersensitivity to Amiodarone or its components including iodine
- Patients in cardiogenic shock
- Sinus bradycardia and second or third degree AV block (be ready to pace patient if severe bradycardia occurs)

PRECAUTIONS

- As with all antiarrhythmics, Amiodarone may cause a worsening of existing arrhythmias or precipitate a new arrhythmia.
- May produce vasodilation and hypotension.
- May have negative inotropic effects
- Watch for prolongation of QT interval
- ½ life is extremely long (up to 40-60 days)
- Use with caution if renal failure is present due to extremely long ½ life.
- May interact with beta-blockers such as atenolol, propranolol, metoprolol, or certain calcium-channel blockers such as verapamil or diltiazem, resulting in excessively slow heart rates.

ADVERSE REACTIONS/SIDE EFFECTS

- Hypotension, bradycardia, and arrhythmias
- Prolonged QT interval
- Cardiac arrest

ADMINISTRATION

- Patient must be on ECG monitor and Vital signs should be monitored at least every 5 minutes.

<u>VF/ Pulseless VT</u>

- Administer 300 mg IV/IO push, repeat 150 mg IV/IO push after 2 rounds of CPR (total dose of 450 mg). Further orders must come from Medical Control Physician.

<u>Wide QRS Complex Rhythms (usually VT with a pulse)</u>

- Administer 150 mg IV/IO slowly (over 10 minutes). Dilute into 100cc NS, or dilute with NS in large syringe (60 mL) and administer through most distal port. Further orders must come from Medical Control Physician.

PEDIATRIC CONSIDERATIONS

As an antiarrhythmic in Pediatrics

- Do not use in neonates!
- Contact Medical Control Physician for possible initial bolus of 5 mg/kg IV/IO over 20-60 minutes.

VF/Pulseless VT

- 5mg/kg IV/IO push

SPECIAL NOTES

- Draw up slowly, Amiodarone will foam and you will not be able to use it.
- Flush line with saline after use

Aspirin

ACTION

Analgesic; anticoagulant that slows the blood clotting mechanism in the body, and may help to reduce the damage caused by an acute myocardial infarction

INDICATIONS

- Suspected cardiac ischemia
- Pain control for mild pain symptoms

CONTRAINDICATIONS

- Allergy to aspirin or other non-steroidal anti-inflammatory agents (includes many non-aspirin/non-Tylenol pain relievers such as Advil and Alleve)
- Active GI bleeding
- Aortic dissection

PRECAUTIONS

- Recent internal bleeding (within last 3 months)
- Known bleeding diseases
- Recent surgery
- Possibility of pregnancy
- Allergies to ANY pain medication
- Patients with a history of asthma may take if they have tolerated ASA in the past and are not currently having asthma-related symptoms.

ADVERSE REACTIONS/SIDE EFFECTS

- Bleeding

ADMINISTRATION

- An EMT may assist the patient in taking aspirin as directed by the patient's personal physician.

<u>BLS with medication training or ALS</u>

- Have the patient chew 324 mg (generally one adult or four children's) aspirin.
- The patient may drink a small amount of liquid after chewing the tablets, if desired.
- Further orders must come from a medical control physician.

PEDIATRIC CONSIDERATIONS

- Do not give to patients < 12 years without physician order.

SPECIAL NOTES

- When used for pain control, aspirin does not need to be chewed. BLS
- It is unnecessary to administer aspirin to a patient that has taken it within the last 12 hours. If unsure, it is preferable to administer aspirin as above.
- Being on current anticoagulant therapy (e.g. Coumadin) is not necessarily a reason to withhold aspirin. Consult with Medical Control Physician if there are questions.

Atropine

ACTIONS

Antiarrhythmic, anticholinergic-antimuscarinic; blocks action of acetylcholine in parasympathetic nervous system

INDICATIONS

- For symptomatic bradyarrhythmias (< 50/minute), either supraventricular or ventricular in origin
- In RSI to pre-treat for prevention of bradycardia in children
- AV block with narrow QRS complex
- Organophosphate poisoning
- Bradycardia due to beta-blocker and/or calcium channel blocker overdose/toxicity

CONTRAINDICATIONS

- Acute hemorrhage

PRECAUTIONS

- Should be given rapidly to avoid paradoxical effect.

ADVERSE REACTIONS/SIDE EFFECTS

- Supraventricular or ventricular tachycardia, ventricular fibrillation
- Blurred vision, dry eyes, dilated pupils

ADMINISTRATION

For perfusing symptomatic bradycardia

- Administer atropine 0.5 - 1 mg IV/IO push every 5 minutes as needed to a total dose of 3 mg.
- May be repeated every five minutes up to a max total dose 3.0 mg.

Organophosphate poisoning or nerve agent exposure with respiratory symptoms

- Administer atropine 2 mg IV/IO push every 5-10 minutes until respiratory distress and airway secretions resolve
- Contact Medical Control Physician for further orders. Doses may be considerably larger than standard dosing.

PEDIATRIC CONSIDERATIONS

For symptomatic bradycardia (including beta-blocker and/or calcium channel blocker OD)

- Administer 0.02 mg/kg IV/IO

For premedication in RSA (Newborn - 7 years)

- Administer 0.02 mg/kg IV/IO push
- Minimum dose is 0.1 mg and maximum dose of 0.5 mg.

For organophosphate poisoning or nerve agent exposure with respiratory symptoms

- Administer 0.05 mg/kg IV/IO push every 5-10 minutes until respiratory distress and airway secretions resolve

SPECIAL NOTES

- Atropine is not indicated in the ACLS algorithm for pulseless (asystole/PEA) adult or pediatric patients.
- Second degree and complete heart block are generally unresponsive to atropine. In these situations, external pacing is the treatment of choice.

Buprenorphine

ACTIONS

Buprenorphine is a partial agonist and antagonist at the opioid receptor. It blocks effects of other opioids including fentanyl, morphine, oxycodone, hydromorphone, heroin. Onset of action 10 - 15 minutes, peak effect is at 1 - 4 hours, and effects can last for 24 - 36 hours.

INDICATIONS

- Opioid withdrawal symptoms with a Clinical Opioid Withdrawal Scale (COWS) score ≥8.

CONTRAINDICATIONS

- Known allergy to buprenorphine.
- COWS score < 8.
- Any methadone in the last 10 days.
- Altered mental status or unable to consent.
- Concurrent severe medical illness (sepsis, respiratory distress, etc.).
- Patients less than 16 years old.

PRECAUTIONS

- Buprenorphine can cause worsened opiate withdrawal symptoms if given to patients who are not in withdrawal. If opioid withdrawal symptoms are not improved or worsened with buprenorphine, additional buprenorphine and other medications are typically needed.
- Buprenorphine rarely causes respiratory depression in patients who are not opioid naïve.
- Buprenorphine is a schedule III-controlled substance. Follow your agency's controlled substance policy for control and monitoring of use.

ADVERSE REACTIONS/SIDE EFFECTS

- Like all opioids, buprenorphine administered to a patient without a history of opioid use disorder may cause somnolence and respiratory depression.

ADMINISTRATION

<u>For opiate withdrawal with COWS score ≥8</u>

- Administer 16 mg buprenorphine sublingual.
- May repeat after 10 minutes with additional 8 mg dose (24 mg max).

PEDIATRIC CONSIDERATIONS

- Not indicated

SPECIAL NOTES

- Repeat and document second COWS score following administration.
- Recommend transport to hospital.
- Ensure other medical issues are being addressed.

Calcium Chloride

ACTION

Electrolyte modifier; essential for the transmission of nerve impulses in cardiac muscle contraction

INDICATIONS

- Symptomatic hyperkalemia
- Hypocalcemia, especially from acute causes such as hydrofluoric acid or fluorine gas exposure
- Calcium channel blocker overdose or toxicity; including: verapamil (Calan, Isoptin), diltiazem (Cardizem), nifedipine (Procardia, Adalat), nicardipine (Cardene, Vasonase), nimodipine (Nimotop), amlodipine, felodipine, flunarizine, bepridil, isradipine, nisoldapine, nitrendapine
- Respiratory depression following administration of magnesium sulfate

CONTRAINDICATIONS

- Not to be used routinely during resuscitation unless hyperkalemia, hypocalcemia, or calcium channel blocker toxicity is suspected.

PRECAUTIONS

- Rapid administration of calcium in a beating heart may produce slowing of the cardiac rate.
- Patients taking digitalis may have increased ventricular irritability and calcium may produce digitalis toxicity.
- In the presence of sodium bicarbonate, it will precipitate calcium salts or carbonates.

ADVERSE REACTIONS/SIDE EFFECTS

- Syncope
- Arrhythmias, bradycardia, and cardiac arrest
- Tissue necrosis at injection site

ADMINISTRATION

- Dosage in adults: 1,000 mg (1 g) of 10% solution (1.0 ml = 100 mg).
- Administer as a slow push over 2-5 minutes in a critical situation.

PEDIATRIC CONSIDERATIONS

- Initial dose is 0.2 ml/kg (20 mg/kg) slowly IV or IO. Repeat doses for pediatric patients are not recommended.

SPECIAL NOTES

- If infiltration occurs, notify physician at receiving hospital immediately upon arrival so that antidotal therapy can begin immediately.

Dexamethasone

ACTIONS

Potent glucocorticoid, acts as an immunosuppressant

INDICATIONS

- For moderate to severe allergic reactions

CONTRAINDICATIONS

- Systemic fungal infections
- Hypersensitivity

PRECAUTIONS

- None

ADVERSE REACTIONS/SIDE EFFECTS

- None in the pre-hospital setting

ADMINISTRATION

For moderate to severe allergic reactions

- Administer dexamethasone 10mg PO as a single dose

PEDIATRIC CONSIDERATIONS

For moderate to severe allergic reactions

- Administer dexamethasone 0.6 mg/kg PO as a single dose, max 10 mg

SPECIAL NOTES

- This medication is intended for use at special events to treat allergic reactions and bee stings, where the patient does not necessarily need transport to a hospital but prolonged immunosuppression is desirable to reduce the risk of delayed and recurrent reactions.

Dextrose - Intravenous D-10, D-50

ACTION

Hyperglycemic; increases circulating blood sugar levels

INDICATIONS

- Suspected or known hypoglycemia (BS < 70 mg/dL)

CONTRAINDICATIONS

- Hyperglycemia

PRECAUTIONS

- May cause CNS symptoms in the alcoholic patient.
- Should not be used as a diagnostic agent in the patient with altered LOC unless the BS is known to be < 70 mg/dL or, if the BS cannot be determined and patient is known to be diabetic.
- If CVA or head trauma is suspected as the cause of altered mental status, contact medical control physician prior to administration.

ADVERSE REACTIONS/SIDE EFFECTS

- May aggravate HTN and CHF
- May cause tissue necrosis at injection site if infiltration occurs

ADMINISTRATION

- Repeat blood sugar measurement 5-10 minutes after administration.

Blood sugar between 40 and 70mg/dL in a conscious, alert patient

- Administer up to 25 g dextrose orally or IV/IO and recheck a blood sugar. Administer remaining amount if no change.

Blood sugar < 40 mg/dL with or without altered LOC

- Establish IV/IO of NS TKO in large vein.
- Administer up to 25 g dextrose IV/IO. Repeat as needed.

PEDIATRIC CONSIDERATIONS

For neonates between birth and 29 days old

- 0.5 g/kg (5 mL/kg) IV/IO of 10% dextrose (D10). **D50 must be diluted 1:4 with NS to achieve D10.**

For infants between 1 month and 2 years old

- 1.0 g/kg (10 mL/kg) IV/IO of 10% dextrose (D10). **D50 must be diluted 1:4 with NS to achieve D10.**

SPECIAL NOTES

- All patients whose hypoglycemia is due to oral hypoglycemic agents should be transported. Medical Control Physician consult required before patient can refuse transport.
- If infiltration occurs, notify physician at receiving hospital immediately upon arrival so that antidotal therapy can begin immediately.

ALS services

- In patients with BGL < 40 mg/dL, IV/IO dextrose and/or glucagon are considered first/second line treatments over oral agents.

Dextrose - Oral

ACTION

Hyperglycemic; increases circulating blood sugar levels

INDICATIONS

- Suspected or known hypoglycemia (BS < 70 mg/dL)

CONTRAINDICATIONS

- Intracranial hemorrhage

PRECAUTIONS

- Airway must be carefully maintained.
- Should not be used as a diagnostic agent in the patient with altered LOC unless the BS is known to be < 70 mg/dL or, if the BS cannot be determined and patient is known to be diabetic.

ADMINISTRATION

- Logroll patient to prevent aspiration and place in the recovery position.
- Check blood sugar.
- Administer 1 tube (Approximately 25 - 31 gm per tube) in downside cheek of log-rolled patient.
- Administer slowly, monitoring absorption. Maintain adequate airway.
- Repeat BS measurement.
- Further orders must come from a medical control physician.

PEDIATRIC CONSIDERATIONS

- The initial dosage is one half of the adult dose.

SPECIAL NOTES

- All patients whose hypoglycemia is due to oral hypoglycemic agents should be transported. Medical Control Physician consult required before patient can refuse transport.

<u>BLS with medication training</u>

- In patients with decreased level of consciousness from hypoglycemia, glucagon is considered first-line treatment. ALS
- In patients with BS < 40 mg/dL, IV/IO dextrose and/or glucagon are considered first/second line treatment over oral agents.

Diphenhydramine

ACTION

Antihistamine (H1 receptor antagonist); blocks the effects of histamine

INDICATIONS

- In anaphylaxis as an adjunct to epinephrine
- In allergic reactions
- Combative/aggressive patients
- Extrapyramidal (Parkinsonian-like, thick tongue, neck distorsion) symptoms

CONTRAINDICATIONS

- Allergy or known hypersensitivity to diphenhydramine HCL
- Acute asthma attacks
- Newborn or premature infants

PRECAUTIONS

- Benadryl has an atropine-like action, therefore use with caution in patients with bronchial asthma, hyperthyroidism, cardiovascular disease, hypertension, and COPD.

ADVERSE REACTIONS/SIDE EFFECTS

- Drowsiness and sedation
- Dizziness and headache
- Blurred vision
- Palpitations and chest tightness
- Wheezing and thickening of bronchial secretions
- Hypotension
- Hallucinations, paradoxical excitement and convulsions (especially in children)

ADMINISTRATION

- Administer diphenhydramine 25 mg IV/IO or 50 mg deep IM.

PEDIATRIC CONSIDERATIONS

- Initial dose is 1.0 mg/kg slow IV/IO or deep IM.
- Diphenhydramine should be avoided in infants < 30 days old.

SPECIAL NOTES

- Benadryl in the injectable form has a rapid onset of action.
- IV route is preferred. Deep IM route can be used if unable to establish an IV.

Droperidol

ACTION

Droperidol is a butyrophenone closely related to haloperidol. Droperidol produces a dopaminergic blockage, a mild alpha-adrenergic blockage, and causes peripheral vasodilation. Its major actions are sedation, tranquilization, and potent anti-emetic effect.

INDICATIONS

- Sedation of an agitated and/or combative patient

CONTRAINDICATIONS

- Hypotension
- Signs of respiratory or CNS depression
- Pregnancy
- Known allergy to droperidol or haloperidol

PRECAUTIONS

- Avoid administering droperidol or haloperidol to patients with Parkinson's DIsease
- Use caution when administering droperidol to patients who have taken other CNS depressant drugs
- Droperidol may prolong the Q-T interval which in theory could induce Torsades de Pointes. Cardiac monitoring should be initiated following administration.

ADVERSE REACTIONS/SIDE EFFECTS

- Transient hypotension or tachycardia
- Some patients may experience unpleasant sensations manifested as restlessness, hyperactivity, or anxiety following droperidol administration. This is called akathisia and is treated with diphenhydramine.
- Q-T prolongation

ADMINISTRATION

- Administer droperidol 2.5 - 5 mg IV/IO or 5 - 10 mg IM.

PEDIATRIC CONSIDERATIONS

- Medical control authorization is required prior to pediatric administration

SPECIAL NOTES

- Diphenhydramine should be considered if the patient demonstrates signs or symptoms of akasthesia following administration

Epinephrine 1:1,000

ACTION

Stimulates both and receptors; bronchodilator, cardiac stimulator, and peripheral vasoconstrictor

INDICATIONS

- Allergic reaction from stings, and ingested, inhaled, injected, or absorbed allergens resulting in the following: increased heart rate, decreased BP, respiratory distress, hives, facial or airway swelling.
- Anaphylaxis with evidence of difficulty communicating, muscle retraction, nasal flaring, and/or swelling of tongue or throat.
- Asthma, as a second line treatment after nebulization

CONTRAINDICATIONS

- None during cardiac arrest; otherwise tachyarrhythmias
- Do not administer IV bolus.

PRECAUTIONS

- **Do not use in patients > 50 years of age without physician order.** COPD is more common than asthma in this age range and responds poorly to epinephrine. The cardiac risks of epinephrine likely outweight any benefit.

ADVERSE REACTIONS/SIDE EFFECTS

- Nervousness, restlessness, and tremors
- Headache and HTN
- Arrhythmias and angina

ADMINISTRATION

- Obtain MD order before administering epinephrine in patients > 50 years of age unless an imminent life-threat is present.

For severe or life-threatening reactions (anaphylactic shock or impending respiratory or cardiac arrest)

- Administer 0.3 mg (0.3 mL) of epinephrine 1:1,000 IM every 5 minutes as needed.
- Follow with Benadryl 25 mg IV or 50 mg IM prior to Medical Control Physician contact.

For acute asthma attacks, if albuterol neb(s) have been unsuccessful

- 0.3 mg (0.3 mL) of epinephrine 1:1,000 IM may be given to patients (ages 12 - 50 years) prior to medical control contact.

PEDIATRIC CONSIDERATIONS

For severe reactions (see above for definition)

- May administer 0.15 mg (0.15mL) of epinephrine 1:1,000 IM every 5 minutes as needed.

For acute asthma attacks with unsuccessful neb treatment

- Administer 0.01 mg/kg IM.

SPECIAL NOTES

- IM is the initial route of choice for anaphylactic shock and should be administered in the 1:1,000 concentration.
- **Epinephrine 1:1,000 concentration should never be given intravenously**

Epinephrine 1:10,000

ACTION

Stimulates both - and - adrenergic receptors; bronchodilator, cardiac stimulator, and peripheral vasoconstrictor

INDICATIONS

- Cardiac arrest rhythms: VF, pulseless VT, asystole, and pulseless electrical activity (PEA)

CONTRAINDICATIONS

- None during cardiac arrest or profound anaphylaxis

PRECAUTIONS

- In severe anaphylaxis, may only be given IV/IO on standing order.
- May precipitate with sodium bicarbonate if tubing is not flushed between drugs.

ADVERSE REACTIONS/SIDE EFFECTS

- Nervousness, restlessness, and tremors
- Headache and HTN
- Arrhythmias and angina
- May induce or exacerbate ventricular ectopy, especially in patients receiving digitalis

ADMINISTRATION

Adult cardiac arrest (V-fib, V-tach, asystole, PEA)

- Administer 1 mg IV/IO push and circulate with CPR.
- Follow drug administration with defibrillation if indicated.
- May repeat 1.0 mg IV/IO every 5 CPR cycles (10 minutes) if rhythm has not converted.

PEDIATRIC CONSIDERATIONS

In cardiac arrest

- Refer to the weight based resuscitation tape and administer one dose of 0.01 mg/kg IV/IO push every 5 CPR cycles (10 minutes)

SPECIAL NOTES

- 1:10,000 is the only epinephrine concentration appropriate for intravascular administration.

Epinephrine Auto-Injector

ACTION

Stimulates both and receptors; bronchodilator, cardiac stimulator, and peripheral vasoconstrictor

INDICATIONS

- Patients experiencing a severe allergic reaction from stings or other allergens (anaphylactic shock or impending respiratory or cardiac arrest)

PRECAUTIONS

- Patients who have known allergic reactions to insect bites or other allergens will often have epinephrine prescribed in the form of an EpiPen (or other similar device) that delivers an injection of pre-measured epinephrine.
- **Use with caution in patients > 40 years.**
- At the time when a request to deliver or assist a patient with their epinephrine is made, any suspected complicating conditions, such as the following, should be reported: Heart disease, Age > 40 years, Pulmonary edema, Psychosis, COPD, Hyperthyroidism, Hypertension history, Glaucoma, Pregnancy

CONTRAINDICATIONS

- There are no absolute contraindications to the use of epinephrine in a life-threatening situation.

ADMINISTRATION

- In severe anaphylaxis, EMTs may assist a patient in administering their own prescribed EpiPen. BLS services with medication training may administer an EpiPen carried by that service to a patient in severe anaphylaxis. BLS providers should consult with the Medical Control Physician for orders in patients with non-severe anaphylaxis. Paramedics can administer as they would epi 1:1,000 solution.
- If possible, immediately remove insect stinger, but do not squeeze, pinch, or push it deeper into the skin.
- Pull off safety cap.
- Wipe injection site with alcohol.
- Place tip of EpiPen on exposed thigh (anterior/lateral) at right angle to the leg. Apply in this area regardless of what area of the body has been stung.
- Press hard into thigh until autoinjector mechanism triggers, and hold in place for several seconds. Remove the EpiPen and discard into sharps container.
- Massage injection site for 10 seconds to enhance absorption.
- With persistent severe anaphylaxis, additional injections may be necessary. Consult with Medical Control Physician if a second dose is indicated.
- Document any changes in patient condition.

PEDIATRIC CONSIDERATIONS

- In severe anaphylaxis, EMTs may assist a patient in administering their own prescribed EpiPen.
- BLS services with medication training should contact medical control prior to administering an EpiPen carried by that service to a pediatric patient in severe anaphylaxis.
- The EpiPen comes in two available dosing options: EpiPen delivers 0.3 mg (in 0.3 cc) of 1:1,000 epinephrine IM. EpiPen Jr. delivers 0.15 mg (in 0.3 cc) of 1:2,000 epinephrine IM and is intended for use in patients < 60 lbs.

Epinephrine Racemic 2.25%

ACTION

Stimulates both α- and β- adrenergic receptors; bronchodilator, and helps relieve the subglottic edema with laryngotracheobronchitis (Croup). Racemic Epinephrine causes local effects on the upper airway as well as systemic effects from absorption.

INDICATIONS

- Moderate to severe laryngotracheobronchitis (croup)
- Bronchial asthma
- Laryngeal edema

CONTRAINDICATIONS

- Hypertension
- Significant underlying cardiovascular disease

PRECAUTIONS

- Mask and noise may be frightening to small children. Agitation will aggravate symptoms.
- Monitor vital signs, ECG, and lung sounds every 5 minutes
- Given only by inhalation
- Should only be used once prehospital.
- Excessive use may cause bronchospasms
- May develop "rebound worsening" within 30-60 minutes

ADVERSE REACTIONS/SIDE EFFECTS

- Nervousness, restlessness, and tremors
- Headache
- Tremors
- Tachycardia
- Dysrhythmias, palpitations and angina
- Nausea/vomiting

ADMINISTRATION

- Add 0.5 ml of racemic epinephrine in 2 ml of saline placed into nebulizer reservoir.
- Connect nebulizer to oxygen source at 6 or 8 liters per minute (depending on manufacturer).
- Have patient breathe as calmly and deeply as possible until no more mist is found in the nebulizer chamber (5 - 15 minutes). Routine nebulizer therapy should be accomplished by instructing the patient to close his/her lips tightly around the mouthpiece. An acceptable alternative to using the mouthpiece would be to attach the nebulizer reservoir to an oxygen mask, i.e. remove the bag from a non-rebreather nebulizer reservoir and do not use the T-piece or the mouthpiece.
- Restart patient on oxygen at appropriate concentration.

SPECIAL NOTES

- Effects can last from 90-120 minutes.
- Nebulizer treatment may cause blanching of the skin in the mask area due to local epinephrine absorption.
- If respiratory arrest occurs, it is most likely due to fatigue, not obstruction.
- Patient must be transported after receiving Racemic Epinephrine.
- Racemic epinephrine is heat and light sensitive and should be stored in a dark cool place. Do not use if it becomes discolored.

Etomidate

ACTION

Nonbarbiturate hypnotic and general anesthetic without analgesic activity; has a minimal effect on myocardial activity, BP and respirations; onset: 30 – 60 seconds; duration: 3 – 5 min.

INDICATIONS

- For general anesthesia in conjunction with pharmacological paralysis in rapid sequence induction (RSI) in patients who have a systolic BP > 80.
- For premedication secondary to cardioversion, as an option for RSI medics.

CONTRAINDICATIONS

- Hypersensitivity
- Systolic BP < 80 (adults)
- Labor and delivery

PRECAUTIONS

- Make sure all RSI medications and airway equipment are prepared prior to induction.

ADVERSE REACTIONS/SIDE EFFECTS

- Hypotension
- Transient pain at IV site
- Transient clonic jerking of skeletal muscle
- Nausea and/or vomiting
- Hiccoughs
- Laryngospasm
- Transient adrenal suppression (seen mostly with repeat dosing)
- Allergic reactions (rare)

ADMINISTRATION

RSI

- May be administered prior to medical control contact. Administer 0.3 mg/kg IV/IO over ½ to 1 minute.
- Approved simplified adult dosing: Small (20 mg), Medium (25 mg), and Large (30 mg)

Cardioversion (RSI only)

- Administer Etomidate 0.1 mg/kg IV/IO over ½ to 1 minute.
- Maintain patent airway, and assist respirations as necessary with bag-mask and O2.

PEDIATRIC CONSIDERATIONS

- May be administered prior to medical control contact. Administer 0.3 mg/kg IV/IO.

Fentanyl

ACTION

Binds with opiate receptors in the CNS altering the perception of and emotional response to pain.

INDICATIONS

- Musculoskeletal pain
- Burns
- Chest pain
- Sedation of intubated patients

CONTRAINDICATIONS

- Allergy or known hypersensitivity to Fentanyl

PRECAUTIONS

- Use with caution in asthma, COPD, hepatic or renal disease and bradyarrhythmias.
- Because this drug can decrease respirations, be prepared to assist ventilations and to administer the narcotic antagonist naloxone (Narcan).
- May cause skeletal and/or thoracic muscle rigidity if given rapidly.
- Consider a reduced dose for hypotensive patients (SBP < 90 in adults, or 70 + (2 X age) in pediatrics)

ADVERSE REACTIONS/SIDE EFFECTS

- Respiratory depression, apnea, sedation, and confusion
- Bradycardia
- Seizures may occur
- Hypertension or hypotension
- Dry eyes, blurred vision, and vomiting

ADMINISTRATION

- Initial dose: 1 mcg/kg (max single dose 100 mcg) may be administered IV, IO, IM, or IN (IN doses may be doubled)
- Approved simplified dosing: Small (50 mcg), Medium (75 mcg), and Large (100 mcg)
- May repeat ½ of initial dose every 10 minutes if pain remains uncontrolled, for a total of 3 doses
- Further orders must come from a Medical Control Physician Sedation
- Same as above, except not necessary to obtain Medical Control Physician authorization for repeat dosing beyond 3 doses

PEDIATRIC CONSIDERATIONS

- Intranasal fentanyl is an excellent method of controlling acute musculoskeletal pain in pediatric patients who otherwise do not need vascular access.

SPECIAL NOTES

- Vital signs must be checked before and after dose.
- If respiratory depression or hypotension occurs after using, ventilate the patient and consider administering naloxone.
- MRCC must be notified when Fentanyl is given, and authorizing physician name must be documented on run form.
- Fentanyl is a controlled substance and its use must be documented according to the "Controlled Substance" policy.
- The maximum fluid volume for IN delivery is 1 cc per nostril.

Glucagon

ACTION

Antihypoglycemic; converts stored liver glycogen to glucose, resulting in circulating blood sugar

INDICATIONS

- Suspected or known hypoglycemia (BS < 80 mg/dL) in diabetic patents, if symptomatic and IV cannot be established.
- Beta blocker overdose or toxicity; including: acebutolol (Sectral), alprenolol, atenolol (Tenormin), betaxolol (Betoptic, Kerlone), bevantolol, bisoprolol, carteolol (Cartrol), flestolol, labetalol (Normadyne, Trandate), levobumolol (Betagan), metoprolol (Lopressor), nadolol (Corgard), oxprenolol, penbutolol (Levatol), pindolol (Visken), propranolol (Inderal, Blocadren, Timoptic), sofalol, timolol
- Calcium channel blocker overdose or toxicity; including: verapamil (Calan, Isoptin), diltiazem (Cardizem), nifedipine (Procardia, Adalat), nicardipine (Cardene, Vasonase), nimodipine (Nimotop), amlodipine, felodipine, flunarizine, bepridil, isradipine, nisoldapine, nitrendapine

CONTRAINDICATIONS

- Allergy or known hypersensitivity to glucagon

ADVERSE REACTIONS/SIDE EFFECTS

- Occasional nausea and vomiting

ADMINISTRATION

For hypoglycemia

- When IV access is unavailable, an initial dose of glucagon may be given prior to contact with medical control.
- Glucagon comes with one unit (1 mg) of powdered glucagon and 1 ml of diluting solution.
- Inject diluting solution into powdered glucagon vial. Shake gently until solution is clear and draw up medication into syringe.
- Inject IM into abdomen, buttocks, thigh or upper arm.
- Turn patient to one side in case vomiting should occur.
- If patient wakes up and is able to swallow, give a fast acting carbohydrate immediately.
- Repeat blood glucose measurement.
- Further orders must come from monitoring physician.

For beta-blocker or calcium channel blocker overdose or toxicity

- Administer 2 mg IV or IO if hemodynamic instability is present
- Higher doses may be required, contact a Medical Control Physician for further orders

PEDIATRIC CONSIDERATIONS

For hypoglycemia

- Administer 0.1 mg/kg (max 1 mg in a single dose)

For beta-blocker or calcium channel blocker overdose or toxicity

- Administer 0.1 mg/kg (max 2 mg in a single dose)

SPECIAL NOTES

- For conscious patients, simple, oral carbohydrates are most effective.
- If the family has already given patient glucagon, a dose may be administered prior to Medical Control Physician contact if still unconscious after 15 minutes.
- All patients whose hypoglycemia is due to oral hypoglycemic agents should be transported.

ALS

- For severe hypoglycemia (blood sugar < 40 mg/dL), dextrose IV/IO is treatment of choice.

BLS with medication training

- In the patient with decreased LOC, glucagon is preferred over oral dextrose.
- Services with medication training must have glucometry capabilities.

Haloperidol

ACTIONS

Antipsychotic. Acts on CNS to depress subcortical areas, mid-brain and ascending Reticular Activating System.

INDICATIONS

- Acute psychotic disorders including manic states, drug-induced psychoses and schizophrenia.
- Agitation
- Severe behavior problems in children (only after obtaining orders from Medical Control Physician)

CONTRAINDICATIONS

- Allergy or known hypersensitivity to Haloperidol.
- Agitation secondary to hypoxia or shock.
- Prolonged QT interval

PRECAUTIONS

- Avoid administering haloperidol or droperidol to patients with Parkinson's Disease
- Be prepared to ventilate the patient and support cardiovascular system.
- Use with caution when used concomitantly with barbiturates, narcotics, and/or any other CNS depressants.
- Use with extreme caution, or not at all, in clients with Parkinsonism.
- Obtain physician order before administering to any patient with hypotension (BP < 90 systolic).

ADVERSE REACTIONS/SIDE EFFECTS

- May cause mental, respiratory and cardiovascular depression.
- Hypotension
- ECG changes (torsades de pointes) with IV use.

ADMINISTRATION

- Ensure safety of the patient and EMS providers.
- Prepare to manage airway and assist ventilations
- Administer 5 mg IM or 2.5 mg IV/IO.
- Monitor vital signs every 5 minutes after receiving Haldol.
- Notify medical control that Haldol has been given.

PEDIATRIC CONSIDERATIONS

- Contact Medical Control Physician for orders in children < 12 years old.

SPECIAL NOTES

- Use caution when giving Haldol to elderly patients as side effects may be more pronounced.

Hydromorphone

ACTION

Narcotic analgesic

INDICATIONS

- Chest pain of suspected cardiac origin
- Musculoskeletal pain
- Kidney stones
- Burns
- Sedation after advanced airway management

CONTRAINDICATIONS

- Allergy or known hypersensitivity to hydromorphone

PRECAUTIONS

- Use with caution in asthma and COPD.
- Be prepared to assist ventilations and to administer the narcotic antagonist naloxone (Narcan).
- Consider a reduced dose if the patient is hypotensive (systolic BP < 90 systolic in adults)

ADVERSE REACTIONS/SIDE EFFECTS

- Respiratory depression, hypotension, sedation, and confusion
- Bradycardia, dry eyes, blurred vision, and vomiting

ADMINISTRATION

Pain Control

- Administer 0.5-1 mg IV/IO/IM slowly. 2 additional doses of 0.5 mg each can be administered if pain management has not been achieved with initial dose. Vital signs must be checked after each dose.
- Approved simplified dosing: Small (0.5 mg), Medium (0.5-1 mg), Large (1 mg)
- If respiratory depression or hypotension occurs after using, ventilate the patient and consider administering naloxone.
- MRCC must be notified when hydromorphone is given, and authorizing physician's name must be documented on run form.

Sedation

- Same as above, except not necessary to obtain Medical Control Physician authorization for repeat dosing beyond 3 doses

PEDIATRIC CONSIDERATIONS

- Patients < 12 years may be given an initial dose of 0.01 mg/kg (max initial dose 1 mg) IV/IO/IM on standing order. 2 additional doses may be given every 10 minutes if pain management has not been achieved with initial dose.

SPECIAL NOTES

- Hydromorphone is a controlled substance and its use must be documented according to the "Controlled Substance" policy.

Hydroxocobalamin

ACTIONS

When given IV, hydroxocobalamin binds cyanide ions to form Cyanocobalamin (vitamin B12) which is then excreted in the urine.

INDICATIONS

- Known cyanide poisoning.
- Smoke inhalation victims who show clinical evidence of closed-space smoke exposure (soot in mouth or nose, sooty sputum) and are either comatose, in shock, or in cardiac arrest.

CONTRAINDICATIONS

- None in the prehospital setting.

PRECAUTIONS

- May cause transient elevation of blood pressure.
- Will cause red colored urine (for up to 5 weeks) and red colored skin (for up to 2 weeks). The red color of the blood serum and urine will interfere with colorimetric laboratory tests for several days.

ADVERSE REACTIONS/SIDE EFFECTS

- Redness of skin and mucous membranes may be prominently noted.
- Other less common reactions include eadache, dizziness, restlessness, eye irritation, throat irritation, dyspnea, pulmonary edema, chest tightness, hypertension, tachycardia, palpitations, nausea, vomiting, diarrhea, abdominal pain, dysphagia, red urine, and hives.

ADMINISTRATION

- Administer 5 gm IV/IO over 15 min
- The 5 gram Cyanokit consists of 2 vials, each with 2.5 grams of hydroxocobalamin powder. Some kits contain a single 5 g vial so check concentration before administering. Each 2.5 g must be reconstituted with 100 mL of Normal Saline (or 200 mL if a single 5 g vial is provided. Saline is not included in the kit). Five grams (two vials) should be given IV over 15 minutes.
- Follow full instructions accompanying the CYANOKIT® for preparation and administration, including use of a transfer spike for normal saline addition to the vial(s), rocking, but not shaking the vial for 60 seconds prior to administration, and administering the infusion from the vial(s).

PEDIATRIC CONSIDERATIONS

- Hydroxocobalamin has not been approved for pediatric use, but in a life-threatening situation should be considered.
- Standard pediatric dose is 70 mg/kg (max single dose 5 g). Follow administration procedure as above.

SPECIAL NOTES

- Hydroxocobalamin is incompatible with many other medications, therefore a separate dedicated vascular access site should be obtained and used for the infusion.

Ibuprofen

ACTION

Analgesic; Non-Steroidal Anti-Inflammatory Drug (NSAID)

INDICATIONS

- Mild to moderate pain

CONTRAINDICATIONS

- Allergy to aspirin or other non-steroidal anti-inflammatory agents (includes many non-aspirin/non-Tylenol pain relievers such as Advil and Alleve)
- Active GI bleeding
- Aortic dissection
- Kidney disease
- Current use of anti-coagulant or anti-platelet medication

PRECAUTIONS

- Recent internal bleeding (within last 3 months)
- Known bleeding diseases
- Recent surgery
- Possibility of pregnancy
- Allergies to ANY pain medication
- Patients with a history of asthma may take if they have tolerated ASA in the past and are not currently having asthma-related symptoms.

ADVERSE REACTIONS/SIDE EFFECTS

- Bleeding

ADMINISTRATION

- 200 – 400 mg PO

PEDIATRIC CONSIDERATIONS

- 10 mg/kg PO
- Do not use under 6 months of age

SPECIAL NOTES

- None

Ipratropium

ACTION

Anticholinergic bronchodilator

INDICATIONS

- For relief of acute bronchospasm (reversible airway obstruction) in COPD patients only

CONTRAINDICATIONS

- Allergy or known hypersensitivity to Atrovent
- Hypersensitivity to atropine (chemically related)

PRECAUTIONS

- Use with caution in patients with heart disease, hypertension, glaucoma and the elderly.
- Ipratropium may worsen the condition of glaucoma if it gets into the eyes. Having the patient close their eyes during nebulization may prevent this.

ADVERSE REACTIONS/SIDE EFFECTS

- More common: cough, dry mouth or unpleasant taste
- Less common or rare: vision changes, eye burning or pain, dizziness, headache, nausea, nervousness, palpitations, sweating, trembling, increased wheezing or dyspnea, chest tightness, rash, hives or facial swelling

ADMINISTRATION

- Atrovent is used only in combination with albuterol in the prehospital setting.
- Dosage for adults: Pour one unit dose bottle (500 mcg = 2.5 ml of 0.02% solution) into nebulizer reservoir with one unit dose of albuterol.
- Connect nebulizer to oxygen source at 6 or 8 liters per minute (depending on manufacturer).
- Have patient breathe as calmly and deeply as possible until no more mist is found in the nebulizer chamber (5-15 minutes). An acceptable alternative to using the mouthpiece would be to attach the nebulizer reservoir to an oxygen mask, i.e. remove the bag from a non-rebreather nebulizer reservoir and do not use the T-piece or the mouthpiece. If a mask is used, adjust the mask to prevent mist from getting into the patient's eyes.
- One nebulizer treatment with ipratropium may be given to COPD patients prior to contact with medical control. If further nebulization is indicated, albuterol-only nebs should be given.
- In the intubated patient, Atrovent should be administered with an adapter that permits in-line nebulization.

PEDIATRIC CONSIDERATIONS

- One Atrovent/albuterol neb treatment at adult strength may be given to children suffering from asthma prior to contact with medical control. If further nebulization is indicated, albuterol-only nebs should be given.

SPECIAL NOTES

- Nebulizer treatments for patients with active tuberculosis should be performed in well-ventilated areas (outside patient compartment if possible). Providers should use approved respiratory protection.

Ketamine

ACTION

Dissociative anesthetic

INDICATIONS

- Induction of anesthesia for RSI procedures
- For pain control as an adjunct to narcotic medications
- For sedation of the intubated patient with a systolic BP < 100
- Control of the aggressive or severely agitated patient when an imminent safety threat is posed to providers, bystanders, or patients

CONTRAINDICATIONS

- Patients in whom significant blood pressure elevation would be a serious hazard
- Known hypersensitivity to the drug

PRECAUTIONS

- Emergence reactions occur in approximately 12% of patients. The incidence is least in young patients (< 15 years of age) and the elderly (> 65 years of age). Emergence also occurs less frequently when given IM.
- Use with caution in patients with known cardiac disease or evidence of cardiac strain (STEMI, CHF).
- Monitor vital signs frequently in patients with hypertension.

ADVERSE REACTIONS/SIDE EFFECTS

- Hypertension, tachycardia, hypotension, bradycardia, arrhythmia
- Emergence reaction (vivid imagery, hallucinations, delirium, confusion, excitement, irrational behavior)
- Anorexia, nausea, vomiting, hypersalivation
- Respiratory stimulation, respiratory depression, apnea (after rapid injection), laryngospasm, other airway obstruction

ADMINISTRATION

For RSI/RSA induction

- Administer 3 mg/kg IV/IO via slow infusion (over 60 sec.)
- Approved simplified dosing: Small (200 mg), Medium (250 mg), Large (300 mg)

For pain control as an adjunct to narcotic medications

- Administer 0.1 – 0.3 mg/kg IV/IO/IM as a single dose any time after narcotics have been given for severe pain
- Approved simplified dosing: Small (10 mg), Medium (20 mg), Large (30 mg)

For sedation of the intubated patient with systolic BP < 100

- Administer 1 mg/kg IV/IO/IM, may repeat every 10 minutes on standing orders
- Approved simplified dosing: Small (60 mg), Medium (80 mg), Large (100 mg)

For use in controlling aggressive patients who pose an imminent safety threat

- Administer 250 mg IM. May repeat x1 if adequate sedation not achieved in 5 minutes

PEDIATRIC CONSIDERATIONS

- Contact medical control for orders in children < 12 when considering use for behavioral chemical restraint.

SPECIAL NOTES

- Store ketamine at a controlled room temperature 60-86° F and protect from light.

Ketamine

- If an emergence reaction is recognized, administer a dose of a benzodiazepine (midazolam or lorazepam)
- This is a controlled substance and should be handled and documented as such.
- ***Cardiac and EtCO2 monitoring is required whenever ketamine is administered.***

Lidocaine

ACTION

Anesthetic agent

INDICATIONS

- Pain reduction and anesthesia for the conscious patient who has had an intraosseous needle placed
- Critical ventricular arrhythmias when amiodarone is not available

CONTRAINDICATIONS

- Hypersensitivity to lidocaine
- SA, AV, or intraventricular blocks

ADVERSE REACTIONS/SIDE EFFECTS

- CNS effects including seizure
- CV effects including bradycardia

ADMINISTRATION

For analgesia related to intraosseous infusion

- Slowly administer 40 mg of 2% preservative free lidocaine into the IO site

For VF/VT when amiodarone is not available

- Administer 100 mg IV/IO, may repeat 50 mg x4 every 10 minutes

PEDIATRIC CONSIDERATIONS

For analgesia related to intraosseous infusion

- Slowly administer 0.5 mg/kg of 2% preservative free lidocaine into the IO site

For VF/VT when amiodarone is not available

- Administer 1 mg/kg IV/IO, may repeat 0.5 mg/kg x4 every 10 minutes

SPECIAL CONSIDERATIONS

- Insertion of the IO in conscious patients has been noted to cause moderate to severe discomfort from fluids flowing into the medullary space It is recommended to slowly infuse lidocaine into the site allowing a few minutes for the lidocaine to work before pushing the bolus of saline to clear the site.

Magnesium Sulfate

ACTION

Electrolyte; central nervous system depressant; anticonvulsant; antiarrhythmic

INDICATIONS

- Torsades de pointes
- Severe asthma
- Obstetrical: to resolve seizures associated with eclampsia; contractions in premature labor
- Digitalis toxicity
- Tricyclic overdose

CONTRAINDICATIONS

- Heart block
- Shock
- Hypocalcaemia
- Renal disease
- Hypermagnesemia

PRECAUTIONS

- Be prepared to give calcium chloride if respiratory depression occurs.
- Use with caution in renal failure.

ADVERSE REACTIONS/SIDE EFFECTS

- Dizziness or drowsiness; altered level of consciousness
- Respiratory depression
- Hypotension (from rapid administration)
- Arrhythmias

ADMINISTRATION

- If respiratory depression develops after administration, consult with medical control physician regarding calcium chloride administration.

<u>For severe asthma, or Torsades de pointes</u>

- Administer 2 gm (4 cc of a 50% solution) diluted in 10 cc of NS and administer over 10 minutes. Pediatric dose is 40 mg/kg, maximum 2 gm per dose.

<u>For eclampsia</u>

- Administer 4 grams of magnesium sulfate diluted in 10cc NS over 2-3 minutes

PEDIATRIC CONSIDERATIONS

- Do not give to patients < 12 years without Medical Control Physician order.

Methylprednisolone

ACTIONS

Glucocorticoid, immunosuppressant, anti-inflammatory

INDICATIONS

- For moderate to severe allergic reactions
- For acute bronchospasm (asthma, COPD)

CONTRAINDICATIONS

- Systemic fungal infections
- Hypersensitivity

PRECAUTIONS

- None

ADVERSE REACTIONS/SIDE EFFECTS

- None in the pre-hospital setting

ADMINISTRATION

- Administer methylprednisolone 125 mg IV/IO as a single dose

PEDIATRIC CONSIDERATIONS

- Administer methylprednisolone 2 mg/kg IV/IO as a single dose

SPECIAL NOTES

- This medication will not cause an immediate effect. It can take up to 6 hours for steroids to demonstrate their desired effect. The purpose of administering this in the pre-hospital setting is to hopefully reduce the need for hospital admission after several hours of observation in an emergency department.

Midazolam

ACTIONS

Sedative/hypnotic; provides conscious sedation/amnesia; anticonvulsant

INDICATIONS

- Sedation of the intubated patient or for procedures such as external pacing or cardioversion
- Status seizures
- Combative behavior that compromises patient care
- Anxiety associated with trauma and burns

CONTRAINDICATIONS

- Allergy or known hypersensitivity to midazolam or benzodiazepines
- Pregnancy (unless actively seizing)
- Sustained SBP < 90 mm Hg

PRECAUTIONS

- Be prepared to ventilate the patient and support cardiovascular system.
- Use with caution when used concomitantly with narcotics, EtOH, or any other CNS depressant.
- Obtain physician order before administering to any patient with hypotension (BP < 90 systolic).

ADVERSE REACTIONS/SIDE EFFECTS

- Headache
- May cause mental, respiratory and cardiovascular depression
- Arrhythmias; cardiac arrest
- Hypotension

ADMINISTRATION

External Pacing and Cardioversion

- 2 mg IV/IO/IN (1/2 dose in each nostril)

Post-intubation sedation

- 0.05 mg/kg IV/IO initial dose, may repeat 1-2 mg every 5-10 minutes as needed
- Approved simplified dosing: Small (2 mg), Medium (2-5 mg), Large (5 mg)

Status seizures

- 2 mg IV/IO or 5 mg IM/IN, may repeat every 3-5 minutes until cessation of seizure activity. Max total dose 20 mg.
- Contact Medical Control Physician for further orders

Anxiety or agitation

- 1 – 2 mg IV/IO/IN
- 5 mg IM

PEDIATRIC CONSIDERATIONS

- Dosage listed on the Broselow-Luten tape is an induction dose (0.3 mg/kg) and is not for seizures.

Post-intubation sedation

- 0.05 mg/kg IV/IO, may repeat every 10 minutes as needed, no max

Status seizures

- 0.1 – 0.2 mg/kg (max dose = 5 mg) IV/IO/IM/IN

Anxiety or agitation

- 0.05 mg/kg (max dose = 2 mg) IV/IO/IM or 0.1 mg/kg (max dose = 5 mg) intranasal

SPECIAL NOTES

- Midazolam is a controlled substance and its use must be documented according to the "Controlled Substance" policy.
- Versed is carried in several concentrations, most commonly 2 mg/ 5 mL and 5 mg/1 ml concentration. For the 5 mg/1 mL concentration, to obtain a 5mg/5ml concentration, add 4 ml of normal saline.

Morphine Sulfate

ACTION

Narcotic analgesic; increases venous capacity and decreases systemic vascular resistance

INDICATIONS

- Chest pain of suspected cardiac origin
- Musculoskeletal pain
- Kidney stones
- Pulmonary edema
- Burns
- Sedation after advanced airway management

CONTRAINDICATIONS

- Allergy or known hypersensitivity to morphine sulfate

PRECAUTIONS

- Use with caution in asthma and COPD.
- Be prepared to assist ventilations and to administer the narcotic antagonist naloxone (Narcan).
- Consider a reduced dose or alternate medication if the patient is hypotensive (systolic BP < 90 systolic in adults)

ADVERSE REACTIONS/SIDE EFFECTS

- Respiratory depression, hypotension, sedation, and confusion
- Bradycardia, dry eyes, blurred vision, and vomiting

ADMINISTRATION

- Administer 0.1 mg/kg (max initial dose = 8 mg) IV/IO/IM slowly. 2 additional doses of 2-4 mg each can be administered if pain management has not been achieved with initial dose. Vital signs must be checked after each dose.
- Approved simplified dosing: Small (4 mg), Medium (6 mg), Large (8 mg)
- If respiratory depression or hypotension occurs after using, ventilate the patient and consider administering naloxone.
- MRCC must be notified when morphine is given, and authorizing physician's name must be documented on run form. Sedation
- Same as above, except not necessary to obtain Medical Control Physician authorization for repeat dosing beyond 3 doses

PEDIATRIC CONSIDERATIONS

- Patients < 12 years may be given an initial dose of 0.1 mg/kg (max initial dose 5 mg) IV/IO/IM on standing order. 2 additional half doses may be given every 10 minutes if pain management has not been achieved with initial dose.

SPECIAL NOTES

- Morphine is a controlled substance and its use must be documented according to the "Controlled Substance" policy.

Naloxone

ACTION

Narcotic antagonist

INDICATIONS

- Respiratory depression (< 12/min.) from narcotic overdoses such as: morphine (Roxanol, Duramorph), fentanyl, meperidine (Demerol), heroin, codeine, hydrocodone (Vicodin, Vicoprofen, Norco), oxycodone (Percodan, Percocet, OxyContin), oxymorphone (Numorphan), hydromorphone (Dilaudid), diphenoxylate (Lomotil), propoxyphene (Darvon, Darvocet), and pentazocine (Talwin)

CONTRAINDICATIONS

- Allergy or known hypersensitivity to Naloxone

PRECAUTIONS

- Short half-life; monitor patient closely and prepare to re-dose if deterioration occurs.
- Naloxone should be titrated to the patient's respiratory status, not the level of consciousness. In the patient with a protected airway (i.e. gag reflex, or advanced airway present), adequate respirations, and GCS of 10 - 14, use discretion regarding the administration of naloxone.
- Patient restraints may be required following reversal of some narcotics. Consider applying these prior to the administration of naloxone.
- Supportive BLS airway maneuvers need to take place both before and after naloxone administration.
- IN naloxone does not always work, and is less likely to be effective in someone who is inhaling vasoconstrictors (cocaine, meth).

ADVERSE REACTIONS/SIDE EFFECTS

- In the chronic narcotic abuser, may precipitate withdrawal symptoms, including seizures, violent behavior, nausea/vomiting, miscarriage or premature labor.
- Hypotension or hypertension

ADMINISTRATION

- 0.5 - 1 mg IV/IO, repeat as needed, titrated to adequate respiratory effect
- Up to 2 mg IM/IN, repeat as needed, titrated to adequate respiratory effect

PEDIATRIC CONSIDERATIONS

- 0.1 mg (max 2 mg) IV/IO/IN, titrate to adequate respiratory effort

SPECIAL NOTES

- Follow-up dosing will generally be every 2-3 minutes up to a total 10 Mg.
- If no response after 10 mg, it is unlikely to be effective.
- Remarkably safe and effective.

Nitroglycerin

ACTION

Antianginal, coronary and peripheral vasodilator

INDICATIONS

- Chest pain of suspected cardiac origin
- Pulmonary edema
- Hypertension (only on physician order)

CONTRAINDICATIONS

- Allergy or known hypersensitivity to nitroglycerin
- Head trauma
- Hypovolemia, hypotension (BP < 100 systolic in adults), and shock
- Recent sildenafil [Viagra, Levitra (24 hrs.) or Cialis (48 hrs.)] ingestion

PRECAUTIONS

- BLS: May be administered only to patients for whom it is prescribed.

ADVERSE REACTIONS/SIDE EFFECTS

- Headache, dizziness, and weakness
- Tachycardia, fainting, and hypotension

ADMINISTRATION

- Establish IV NS TKO.
- Inquire about Viagra, Levitra or Cialis use.

BLS

- Assist patient in taking nitroglycerine as prescribed by personal physician.
- If systolic BP drops < 90 after any nitroglycerine, discontinue nitroglycerine and administer a 250 cc fluid bolus if appropriately trained.

BLS with IV training

- If IV is established and systolic BP is at least 100, contact medical control operator for orders to administer up to 2 nitroglycerine SL 3 – 5 minutes apart. Further nitroglycerine orders must come from Medical Control Physician.

ALS: For myocardial ischemia or pulmonary edema:

- Give 0.4 mg nitroglycerine tablet or one metered dose NITROGLYCERINE spray sublingually. Repeat vitals.
- Repeat tablet or spray sublingually every 5 minutes as long as pain or pulmonary edema persists and patient is not hypotensive, regardless if patient has taken own prescription.
- Notify medical control that nitroglycerine has been given.

ALS: CHF/Pulmonary Edema

- If SBP > 100 give 0.4 mg nitroglycerine SL every 3-5 min to patient response.

ALS: For hypertension

- Obtain physician order.

PEDIATRIC CONSIDERATIONS

- Do not give to patients < 12 years without physician order.

SPECIAL NOTES

- Consider utilizing the age-appropriate pain control guideline if pain is unrelieved by nitroglycerine.
- Nitroglycerine is effective in relieving angina pectoris. Other conditions such as esophageal spasm can respond as well, thus improvement of symptoms following nitroglycerine administration is not necessarily diagnostic of cardiac ischemia.

Ondansetron

ACTION

Antinausea, antiemetic. Blocks serotonin, both peripherally on vagal nerve terminals and centrally in chemoreceptor trigger zone.

INDICATIONS

- Patients experiencing nausea or vomiting

PRECAUTIONS

- Use with caution in setting of prolonged QT interval

CONTRAINDICATIONS

- There are no absolute contraindications to the use of Zofran.

ADVERSE EVENTS

- Overdose may produce a combination of CNS stimulation or depressant effects.
- QT interval prolongation

SIDE EFFECTS

- Frequent: Anxiety, dizziness, drowsiness, headache, fatigue, constipation, diarrhea, hypoxia, and urinary retention.
- Occasional: Abdominal pain, fever, feeling of cold, paresthesia, weakness, headache
- Rarely: hypersensitivity reaction, blurred vision, QT prolongation

ADMINISTRATION

- Administer 4 mg IV/IO/IM/IN/PO push over 2-5 minutes. May repeat x1 if no improvement in 15 minutes
- Monitor patient for vomiting and potential airway compromise.

PEDIATRIC CONSIDERATIONS

- Pediatric dose is 0.15 mg/kg (max dose = 4 mg).

SPECIAL CONSIDERATIONS

- The IV formulation of zofran can be given orally and is very effective, especially in infants and young children. It can be mixed with juice to improve the likelihood of ingestion.

Oxygen

ACTION

Increases arterial oxygen tension (SaO2) and hemoglobin saturation

INDICATIONS

- Pre-existing baseline oxygen needs
- Smoke, carbon monoxide, or toxic gas inhalation
- Hypoxia (SpO2 < 94%) from any cause
- Respiratory distress, poor capillary refill or other indications of poor oxygenation
- Unresponsive patient
- Obstetric patients with known or suspected complications

CONTRAINDICATIONS

- None in the prehospital setting

PRECAUTIONS

- This guideline refers to spontaneously breathing and adequately ventilating patients only.
- High concentration oxygen in some cases (emphysema and asthma) may depress respiratory drive; be prepared to assist ventilation, but don't allow patients to become severely hypoxic for fear of respiratory arrest.
- Agitation or restlessness can be a sign of hypoxia.
- Do not use in the presence of open flames.
- Treatment for anxiety or hyperventilation should be directed at reassurance and coaching to slow breathing prior to oxygen administration. If the possibility of another underlying cause exists (i.e. pulmonary embolus, asthma, MI) then the patient should be treated with oxygen. DO NOT treat any patient by having them breathe into a paper bag or oxygen mask that is not supplied with oxygen.

ADVERSE REACTIONS/SIDE EFFECTS

- Nonhumidified oxygen can dry mucous membranes, but humidified O2 is not indicated in the prehospital setting

ADMINISTRATION

- Deliver via nasal cannula @ 1 - 6 lpm or non-rebreather mask @ 6 - 15 lpm as condition warrants.
- Attempt to obtain and document pulse oximetry readings before and during oxygen therapy.

PEDIATRIC CONSIDERATIONS

- Use pediatric mask or blow-by if mask is not tolerated.

SPECIAL NOTES

- If oximetry is unavailable, patients should receive oxygen if suspicion of hypoxia or poor perfusion.

Rocuronium

BRAND NAME(S)

Zemuron

CLASS OF DRUG

Non-depolarizing paralytic agent

INDICATIONS

- Relaxation of skeletal muscles during surgery or mechanical ventilation
- Paralyzation of skeletal muscle to facilitate rapid sequence intubation

CONTRAINDICATIONS

Allergy to rocuronium

DRUG INTERACTIONS

None

ADMINISTRATION

For rapid sequence intubation

- Administer 1.0 mg/kg IV/IO
- Approved simplified dosing: Small (60 mg), Medium (80 mg), Large (100 mg)
- Continuous SpO2 monitoring and BP monitoring must be utilized and documented.

For skeletal muscle paralysis to facilitate mechanical ventilation

Load: 0.6 mg/kg IV

Repeat: 0.2 mg/kg IV every 30-45 minutes

Infuse: 5 – 15 µg/kg/min

SPECIAL NOTES

- **This agent has no analgesic or amnestic properties.**
- **Adequate sedation must be ensured while patient is receiving this medication.**
- Rare bronchospasm can occur with this medication.

Sodium Bicarbonate

ACTION

Systemic hydrogen ion buffer; aids in the correction of metabolic acidosis

INDICATIONS

- Tissue acidosis and acidemia resulting from cardiac arrest and cardiopulmonary resuscitation
- Pre-existing metabolic acidosis or hyperkalemia
- QRS widening due to ingestion of a substance with sodium channel blockade properties
- Prophylaxis for systemic acidemia prior to extrication following prolonged entrapment with crush injury

CONTRAINDICATIONS

- None; when used in the treatment of metabolic acidosis

PRECAUTIONS

- EtCO2 readings will temporarily elevate following administration of sodium bicarbonate. In cardiac arrest, this does not necessarily imply that tissues have adequate metabolic function.
- May precipitate with concurrent administration of other medications. Flush tubing well between administrations of other drugs.

ADVERSE REACTIONS/SIDE EFFECTS

- May cause hypernatremia, hyperosmolality, hypokalemia, and hypocalcaemia
- Fluid retention

ADMINISTRATION

For tricyclic overdose

- If bradyarrhythmias, multifocal PVC's, V-tach, hypotension, or widened QRS (>100 ms) are present, administer 100 mEq (2 ampules) IV/IO of sodium bicarbonate. Administer an additional 50 mEq (1 ampule) every 5 minutes until QRS narrows to < 100 ms.

In cardiac arrest

- After 10 minutes in non-perfusing rhythm, administer initial dose of 1 amp (50 mEq) IV or IO push. Administer an additional amp (50 mEq) every 10 minutes until ROSC or until the arrest is called in the field.

For crush syndrome or prolonged entrapment

- Administer 100 mEq (2 ampules) IV/IO immediately prior to extrication.
- Ensure adequate saline hydration has been initiated.

For severe agitation with hemodynamic instability

- Administer 100 mEq (2 ampules) IV/IO once patient has been safely restrained and vascular access has been obtained.
- Ensure adequate saline hydration has been initiated.

PEDIATRIC CONSIDERATIONS

- Initial dose is 1.0 mEq/kg IV/IO.
- Repeated doses are 0.5 mEq/kg IV/IO.

SPECIAL NOTES

- In cardiac arrests of short duration, adequate ventilation and effective chest compressions limit accumulation of CO2, thus, in the early phases of resuscitation, buffer agents are generally unnecessary.

Succinylcholine

ACTION

Depolarizing neuromuscular block; onset: 30 – 60 seconds (peak 2 – 3 min.); duration: 3 – 10 min.

INDICATIONS

- When rapid muscle paralysis is necessary to facilitate emergency endotracheal intubation

CONTRAINDICATIONS

- Hypersensitivity
- Neuromuscular disease - (i.e. ALS, chronic para/quadriplegia, myasthenia gravis, multiple sclerosis, muscular dystrophy)
- Hyperkalemia
- Penetrating eye injury
- History of malignant hyperthermia
- Burns, multiple traumatic and soft tissue injuries > 24 hours old
- Acute or chronic renal failure with K+ > 5.0 mEq/L
- Suspected or known fractured larynx that prevents proper performance of Selleck's maneuver
- Known anatomical airway anomalies
- Increased intraocular pressure (relative contraindication)

PRECAUTIONS

- Make sure all RSI medications are prepared prior to induction.
- Pre-oxygenate the patient as much as possible.
- Must be prepared to intubate the patient immediately. An alternative method of ventilation (BVM with 100% O2) must be available.
- Have an assistant prepare to perform Selleck's maneuver to prevent regurgitation/aspiration.
- Be prepared to treat arrhythmias appropriately according to ACLS protocols.
- Measures to control anxiety (i.e. Versed) and pain must be utilized for the patient receiving paralytics.

ADVERSE REACTIONS/SIDE EFFECTS

- Dysrhythmias
- Prolonged apnea, respiratory depression, or bronchospasm
- Malignant hyperthermia (rare)
- Increase in serum potassium
- Increased intracranial pressure (ICP)
- Inability to perform adequate neurological exam

ADMINISTRATION

- Administer 2.0 mg/kg IV/IO.
- Approved simplified dosing: Small (120 mg), Medium (160 mg), Large (200 mg)
- Continuous SpO2 monitoring and BP monitoring must be utilized and documented.
- If additional paralysis is needed consider vecuronium.
- If consistent and dramatic rise in temperature is observed, utilize whatever means available to lower the patient's body temperature. Open external windows (weather permitting) or turn on air conditioning. Apply cold packs to the patient. Notify medical control and the receiving physician of the occurrence.

- If transport distance to the receiving facility is significant (>10 minutes), the crew may elect to divert to the closest facility that has the antidote to treat malignant hypothermia (dantrolene).

PEDIATRIC CONSIDERATIONS

- Initial dose is 2.0 mg/kg IV/IO.

SPECIAL NOTES

- **This agent has no analgesic or amnestic properties.**
- **Adequate sedation must be ensured while patient is receiving this medication.**
- If succinylcholine is contraindicated, vecuronium should be considered.

Tetracaine

ACTION

Topical ophthalmic anesthetic

INDICATIONS

- Suspected corneal abrasion
- Burns to the eye
- Foreign body in eye

CONTRAINDICATIONS

- Hypersensitivity
- Ruptured globe

PRECAUTIONS

- The patient should never be allowed to rub or touch eyes.
- After administration, remaining medication should be discarded to minimize the risk of infection.

ADVERSE REACTIONS/SIDE EFFECTS

- Transient burning or stinging sensation

ADMINISTRATION

- 1-2 drops in each affected eye
- May repeat every 15 minutes

PEDIATRIC CONSIDERATIONS

- Administer 1-2 drops in each affected eye; may repeat every 15 minutes as needed.

SPECIAL CONSIDERATIONS

- Patient should be transported if this medication has been given. If patient refuses transportation by ambulance, explain that they need to have additional medical care and need to be seen at an emergency department.
- Do not give the remaining medication to the patient for later use. Repeated use of topical eye anesthetics can result in delayed healing and infection.
- Solution must be clear. If crystals are present, do not use.

Tranexamic Acid

ACTION

Competitive inhibitor of plasminogen activation, which prevents clots from being efficiently broken down

INDICATIONS

- Significant hemorrhage unable to be readily controlled by mechanical means
- Signs/symptoms of hemorrhagic shock not corrected with standard trauma resuscitation treatments

CONTRAINDICATIONS

- Known active intravascular clotting
- Known subarachnoid hemorrhage (can cause cerebral edema)
- Hypersensitivity to tranexamic acid

PRECAUTIONS

- Venous and arterial thrombosis or thromboembolism has been reported.
- Patients with a previous history of thromboembolic disease may be at increased risk for venous or arterial thrombosis.

ADVERSE REACTIONS/SIDE EFFECTS

- Hypotension
- Dizziness
- Gastrointestinal upset

ADMINISTRATION

- Administer 2 g IV/IO

PEDIATRIC CONSIDERATIONS

- Administer 15 mg/kg IV/IO

SPECIAL NOTES

- This is an optional medication for agencies

Vecuronium

ACTION

Non-depolarizing neuromuscular blocking agent; onset: 1.5 - 4 min.; duration: 30 – 60 min; paralysis onset decreases and duration of maximal effect increases with increasing doses

INDICATIONS

- When further muscle paralysis is necessary following RSI due to risk of tube dislodgement from inadequate sedation
- Head injuries with agitation or uncontrolled motor activity that may threaten the airway or spine, or increase intracranial pressure
- As an initial paralytic when succinylcholine is contraindicated

CONTRAINDICATIONS

- Hypersensitivity
- Concern for inability to provide appropriate airway management

PRECAUTIONS

- Clinicians must provide total ventilatory support after vecuronium has been administered.
- The safety of this drug in pregnancy has not been established.
- Measures to control anxiety (i.e. Versed) and pain must be utilized for the patient receiving paralytics.

ADVERSE REACTIONS/SIDE EFFECTS

- Prolonged apnea/respiratory paralysis
- Inability to perform adequate neurological exam
- Quinidine, magnesium and certain antibiotics may intensify paralysis.

ADMINISTRATION

- Must be reconstituted with diluent provided.
- Administer 0.1 mg/kg IV/IO.
- Approved simplified dosing: Small (6 mg), Medium (8 mg), Large (10 mg)
- May be given on standing order if further paralysis is needed following intubation.

PEDIATRIC CONSIDERATIONS

- Administer 0.1 mg/kg.
- May be given on standing order if further paralysis is needed following intubation.

SPECIAL NOTES

- **This agent has no analgesic or amnestic properties.**
- **Adequate sedation must be ensured while patient is receiving this medication.**

Alteplase

BRAND NAME(S)

Activase, tPA

CLASS OF DRUG

Thrombolytics/fibrinolytics

INDICATIONS

- Myocardial infarction
- CVA – non-hemorrhagic
- Pulmonary embolus

CONTRAINDICATIONS

- Hypersensitivity
- Recent surgery (within 10 days)
- GI/GU bleeding
- Uncontrolled hypertension (systolic BP >180, or diastolic BP > 110)
- Active internal bleeding
- History of CVA (within 2 months)
- Recent brain, or spinal surgery (within 2 months)
- Recent trauma

DRUG INTERACTIONS

- Additive effect on bleeding with other anticoagulants, ASA, NSAID.

ADMINISTRATION

Acute CVA:	Bolus 0.09 mg/kg IV over 1 minute, then 0.81 mg/kg IV over next 60 minutes
Acute MI:	Bolus 15mg IV over 1-2 minutes, then 50mg IV over 30 minutes, then 35mg IV over 60 minutes
Acute PE:	100mg IV over 2 hours
Peds:	Not indicated

SPECIAL NOTES

- Monitor all puncture sites (e.g., catheters, incisions, etc.) during therapy, and subsequent heparin administration.
- Avoid new puncture sites or injections.
- When administering to the patient with AMI, (the most likely to receive this medication), watch the ECG closely for re-perfusion dysrhythmias.
- Allergic reactions and anaphylaxis can occur when administering this medication.
- Requires a dedicated infusion line.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Amiodarone

BRAND NAME(S)

Cordarone

CLASS OF DRUG

Antiarrhythmic

INDICATIONS

- Pulseless VF/VT refractory to initial electrical therapy
- Unstable VT refractory to lidocaine and/or electrical therapy

CONTRAINDICATIONS

- None, if the patient is in cardiac arrest with VF or VT.
- High degree AV blocks or sinus node dysfunction with marked bradycardia unless a functional pacemaker is in place.
- Congestive heart failure.

DRUG INTERACTIONS

- Enhanced bradycardia and hypotension when given with other beta-blockers or calcium channel blockers.

ADMINISTRATION

Pulseless VT/VF

Adult: 300 mg initial bolus IV after epinephrine. May re-bolus with 150mg once.

Peds: 5 mg/kg IV. May re-bolus every 3-5 minutes to a maximum of 15 mg/kg/24 hours

Sustained VT

Adult: 150 mg over 10 minutes. May re-bolus every 10 minutes as needed up to a maximum dose of 15 mg/kg/day.

Peds: 5 mg/kg IV over 15 minutes. May repeat twice, up to 15 mg/kg /24 hours; maximum single dose 150mg.

Maintenance

Adult: 1.0 mg/min over first 6 hours; 0.5 mg/min, 540 mg IV over 18 hours. Maximum dose is 2.2g in 24 hours.

Peds: Contact MRCC.

Note: Expert consultation advised prior to administration in pediatrics.

SPECIAL NOTES

- Must be drawn up slowly to avoid 'bubbles" do not shake the ampule for the same reason.
- Must be given concurrently with epinephrine in the pulseless patient.
- Can not be administered via ET tube.
- Hypotension and bradycardia can occur on patients with a pulse.

Critical Care Endorsement Required

Critical Care Endorsement Required

Anti-Infectives

CLASS OF DRUG

Anti-infective

INDICATIONS

(This is not an exhaustive list, but rather a list of the most common antibiotics).

- Aminoglycosides: Gram negative bacteria, bone and joint, soft tissue, Post-op, UTIs, and intra-abdominal infections.
- Cephalosporin: Gram positive cocci and limited use against gram negative (E. coli).
- Chloramphenicol: NOT TO BE USED IN TRIVIAL INFECTIONS. Serious infection caused by Salmonella, Rickettsia, and Chlamydia. Meningitis caused by hemophilus influenza, and Meningococcal meningitis.
- Erythromycin (EES) And Macrolides: Bacteriostatic against Streptococcus sp., Staphylococcus aureus, Mycoplasma pneumoniae, Hemophilus influenza (when used with sulfonamides), and many others.
- Penicillin: Bactericidal against Gram negative bacteria such as Hemophilus influenza, Escherichia coli, Proteus mirabilis, Neisseria gonorrhea; Gram positive organisms such as Streptococcus.
- Polymyxin: Has potent bactericidal activity against many gram negatives such as Pseudomonas, Proteus, and Hemophilus.
- Sulfonamide: Wide bacteriostatic spectrum against gram positives and gram negatives.
- Anti-fungal: Wide fungicidal activity against Candida, Trichophyton, Epidermophyton, and Microsporum.
- Fluoroquinolones: Broad spectrum of activity against gram positive and gram negative bacteria including pseudomonas
- Tetracycline: Rickettsia, Chlamydia, and Mycoplasma. Use to treat syphilis and gonorrhea for patients who are allergic to PCN

CONTRAINDICATIONS

- Contraindicated if any history of hypersensitivity to the particular class of antibiotics. Must use another class.
- Aminoglycosides: Can cause renal or hearing impairment.
- Cephalosporin: Use with caution with renal and hepatic impaired patients.
- Chloramphenicol: Pregnancy and nursing mothers.
- Erythromycin and Macrolides: In patients taking Seldane and other antihistamine(s) may lead to Torsades de Pointes.
- Penicillin: Use with caution on patients with hay fever or other allergies.
- Polymyxin: Use in pregnancy if benefits out weigh risks.
- Sulfonamide: Third trimester pregnancy, nursing mothers, and infants under two months.
- Anti-Fungal: None when indicated.
- Fluoroquinolones: Children and nursing mothers.
- Antitubercular: In Isoniazid use - Liver disease or a history of alcoholism or injection drug use is an important concern.

ADMINISTRATION

Refer to manufacturer's information.

SPECIAL NOTES

- Refer to manufacturer's information.

APPROVED ANTI-INFECTIVE AGENTS

(See list to right)

- Acyclovir
- Ampicillin (+/- Sulbactam)
- Azithromycin
- Aztreonam
- Cefazolin
- Cefepime
- Cefotaxime
- Ceftazidime
- Ceftriaxone
- Ciprofloxacin
- Clindamycin
- Ertapenem
- Gentamicin
- Imipenem
- Levofloxacin
- Linezolid
- Meropenem
- Metronidazole
- Moxifloxacin
- Nafcillin
- Oxacillin
- Penicillin G
- Piperacillin/Tazobactam
- Vancomycin

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Bumetanide

BRAND NAME(S)

Bumex

CLASS OF DRUG

Loop diuretic

INDICATIONS

- Heart failure
- Pulmonary Edema
- Hypertensive crisis

CONTRAINDICATIONS

- Hypersensitivity to drug or sulfonamides
- Anuria
- Severe electrolyte imbalance

DRUG INTERACTIONS

- May increase risk of digoxin toxicity from Bumetanide-induced hypokalemia

ADMINISTRATION

Adults:	1 - 2 mg IV over 1 - 2 minutes
Adult Infusion:	Do not titrate during transport. Typical dosing range: 0.1 – 1 mg/hr.
Peds:	Not recommended.

SIDE EFFECTS

- Muscle cramps
- Hypotension
- Dizziness
- Headache
- Nausea & vomiting

SPECIAL NOTES

- Larger doses may be necessary in patients with impaired renal function to obtain the same therapeutic response.
- Bumetanide may produce significant diuresis; it is important that patients are closely monitored for hypokalemia, hypomagnesemia, and volume depletion.

Critical Care Endorsement Required

Critical Care Endorsement Required

Calcium Chloride

CLASS OF DRUG

Electrolyte

INDICATIONS

- Used as antidote for calcium channel blocker overdoses
- Magnesium sulfate overdoses
- Black Widow spider bite
- Hyperkalemia with widened QRS or hemodynamic instability

CONTRAINDICATIONS

- Hypercalcemia
- Absence of indications

DRUG INTERACTIONS

- Increase toxicity of cardiac glycoside.
- Calcium should be given in a dedicated IV line.
- DO NOT mix with Sodium Bicarbonate.

ADMINISTRATION

Adults: 1 g slow IV push over 10 minutes. May push faster in cardiac arrest situations.

Peds: 0.2 ml/kg slow IV push over 10 minutes.

NOTE: RAPID INJECTION CAN CAUSE HYPOTENSION, BRADYCARDIA AND DEATH.

SPECIAL NOTES

- It is best to warm the drug to body temperature prior to administration.
- If heart is beating, rapid administration of calcium salts can produce bradycardia and/or arrest.
- May increase cardiac irritability, i.e., PVC's, particularly in the presence of digitalis.
- Local infiltration will cause tissue necrosis.

Critical Care Endorsement Required

Critical Care Endorsement Required

Calcium Gluconate

CLASS OF DRUG

Electrolyte

INDICATIONS

- Used as antidote for calcium channel blocker overdoses
- Magnesium sulfate overdoses
- Black Widow spider bite
- Hyperkalemia with widened QRS or hemodynamic instability

CONTRAINDICATIONS

- Hypercalcemia
- Absence of indications

DRUG INTERACTIONS

- Increase toxicity of cardiac glycoside.
- Calcium should be given in a dedicated IV line.
- DO NOT mix with Sodium Bicarbonate.

ADMINISTRATION

Adults: 1 g slow IV push over 10 minutes.

Peds: 0.6 ml/kg slow IV push over several minutes.

NOTE: RAPID INJECTION CAN CAUSE HYPOTENSION, BRADYCARDIA AND DEATH.

SPECIAL NOTES

- It is best to warm the drug to body temperature prior to administration.
- If heart is beating, rapid administration of calcium salts can produce bradycardia and/or arrest.
- May increase cardiac irritability, i.e., PVC's, particularly in the presence of digitalis.
- Local infiltration will cause tissue necrosis.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Cisatracurium

BRAND NAME(S)

Nimbex

CLASS OF DRUG

Non-depolarizing paralytic

INDICATIONS

- Relaxation of skeletal muscles during surgery or mechanical ventilation

CONTRAINDICATIONS

- None

DRUG INTERACTIONS

- None

ADMINISTRATION

Load: 0.1 mg/kg IV

Maint: 0.5 – 10.2 µg/kg/min (usual dose 3 µg/kg/min)

SPECIAL NOTES

- **This agent has no analgesic or amnestic properties.**
- **Adequate sedation must be ensured while patient is receiving this medication.**
- Rare bronchospasm can occur with this medication.

Critical Care Endorsement Required

Critical Care Endorsement Required

Clopidogrel

BRAND NAME(S)

Plavix

CLASS OF DRUG

Anti-platelet agent

INDICATIONS

- Treatment of acute coronary syndromes
- Prophylaxis of vascular ischemic events

CONTRAINDICATIONS

- Hypersensitivity to clopidogrel
- Active bleeding

DRUG INTERACTIONS

- The risk of bleeding increases when clopidogrel is combined with other anticoagulants.
- Omeprazole and other PPIs decrease the antiplatelet effect of clopidogrel.
- It may be more appropriate to use Ranitidine as ulcer prophylaxis in patients on clopidogrel.
- If clopidogrel is used concomitantly with a PPI the dosages should be separated by 12 hours.

ADMINISTRATION

Adults: 600mg PO loading dose followed by 75mg PO daily

Peds: 1.5mg/kg daily

SPECIAL NOTES

- Plavix brand clopidogrel can be crushed, mixed with water and administered via a nasogastric tube.
- Thrombotic Thrombocytopenic Purpura (TTP) has been reported rarely following use of clopidogrel bisulfate, sometimes after a short exposure (<2 weeks). TTP is a serious condition that can be fatal and requires urgent treatment including plasmapheresis (plasma exchange). It is characterized by thrombocytopenia, microangiopathic hemolytic anemia, neurological findings, renal dysfunction, and fever.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Dexmedetomidine

BRAND NAME(S)

Precedex

CLASS OF DRUG

Alpha2-adrenoceptor agonist with sedative properties

INDICATIONS

- Agitation

CONTRAINDICATIONS

- Bradycardia

DRUG INTERACTIONS

- In situations where other vasodilators or negative chronotropic agents are administered, co-administration of dexmedetomidine could have an additive pharmacodynamic effect and should be administered with caution.

ADMINISTRATION

Adults: Infuse at 0.2 – 0.7 µg/kg/hr.

Peds: Not indicated.

SPECIAL NOTES

- Cardiac Monitoring required.
- Clinically significant episodes of bradycardia and sinus arrest have been associated with dexmedetomidine administration.

Critical Care Endorsement Required

Critical Care Endorsement Required

Diltiazem

BRAND NAME(S)

Cardizem

CLASS OF DRUG

Calcium Channel Blocker; Coronary Vasodilator, Antidysrhythmic

INDICATIONS

- Atrial Fibrillation or Atrial Flutter
- Paroxysmal Supraventricular Tachycardia
- Angina due to coronary artery spasm

CONTRAINDICATIONS

- Sick sinus syndrome except in the presence of a functioning ventricular pacemaker.
- Patients with second- or third degree AV block except in the presence of a functioning ventricular pacemaker.
- Patients with severe hypotension or cardiogenic shock.
- Patients who have demonstrated hypersensitivity to the drug.
- Intravenous diltiazem and intravenous beta-blockers should not be administered together or in close proximity (within a few hours).
- Patients with atrial fibrillation or atrial flutter associated with an accessory bypass tract such as in WPW syndrome or short PR syndrome.
- Patients with ventricular tachycardia.

DRUG INTERACTIONS

- Additive effects in prolonging AV conduction when using beta-blockers or digitalis concomitantly with diltiazem HCl.

ADMINISTRATION

Adult bolus:	0.25 mg/kg IV slow push over 2 minutes (Avg dose: 20 mg). If response is inadequate, a second dose may be administered after 15 minutes at 0.35 mg/kg IV slow push over 2 minutes (Avg dose: 25 mg).
Adult infusion:	5 - 15 mg/hr
Peds:	Not indicated.

SPECIAL NOTES

- When given to a conscious patient, they will almost always produce nausea, vomiting and hypotension.

Critical Care Endorsement Required

Critical Care Endorsement Required

Diphenhydramine

BRAND NAME(S)

Benadryl

CLASS OF DRUG

Antihistamine, H1 blocker

INDICATIONS

- Allergic reactions
- Anaphylaxis
- Dystonic reaction to phenothiazines
- Motion sickness (Paramedic only)
- Anti-emetic (Paramedic only)

CONTRAINDICATIONS

- Acute asthma

DRUG INTERACTIONS

- Additive CNS depression with alcohol, sedatives, narcotics

ADMINISTRATION

Adults: 12.5 – 50 mg slow IV push or deep IM injection

Peds: 1 mg/kg slow IV push or deep IM injection (Max 50 mg)

SPECIAL NOTES

- May have an immediate effect in dystonic reactions.
- No early benefit in allergic reactions.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Dobutamine

BRAND NAME(S)

Dobutrex

CLASS OF DRUG

Sympathomimetic, beta agonist

INDICATIONS

- Primary indication is cardiogenic shock, with pulmonary edema.

CONTRAINDICATIONS

- None when indicated. Use cautiously in acute MI and atrial fibrillation.

DRUG INTERACTIONS

- Synergistic effect with sodium nitroprusside
- Reduced effects with Beta-adrenergic blocker
- Hypertensive crisis with tricyclic antidepressants

ADMINISTRATION

Dose: Start at 10 µg/kg/min. Titrate by 2.5 µg/kg/min every 5 minutes as needed. (Range 2 - 20 µg/kg/min).

SPECIAL NOTES

- Dobutamine should be titrated to effect.

Critical Care Endorsement Required

Critical Care Endorsement Required

Dopamine

BRAND NAME(S)

Intropin

CLASS OF DRUG

Potent sympathomimetic, dopaminergic

INDICATIONS

- Primary indication is cardiogenic shock.
- May be useful for other forms of shock.
- May be useful, at low doses, in renal failure.
- Used for refractory bradycardia unresponsive to atropine, and when pacing is unavailable.

CONTRAINDICATIONS

- Tachydysrhythmias
- Pheochromocytoma

DRUG INTERACTIONS

- Hypotension and/or bradycardia with phenytoin
- Reduced effects with Beta-adrenergic blocker

ADMINISTRATION

Dose: Start at 10 µg/kg/min. Titrate by 2.5 µg/kg/min every 5 minutes as needed. (Range 2 - 20 µg/kg/min).

SPECIAL NOTES

- Higher doses can cause central vasoconstriction limiting renal blood flow.
- Doses less than 5 µg/kg can lower B/P.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Epinephrine

BRAND NAME(S)

Adrenalin

CLASS OF DRUG

Sympathomimetic

INDICATIONS

- Severe Bronchospasm
- Bronchospasms unresponsive to albuterol
- Anaphylaxis
- Cardiac Arrest
- Symptomatic bradycardia after other treatments

CONTRAINDICATIONS

- None when indicated.

DRUG INTERACTIONS

- Reduced effects with Beta-adrenergic blocker

ADMINISTRATION

Cardiac Arrest

Adults: 1 mg (1:10,000) every 3 - 5 minutes IV, may be given ET (2 – 2 1/2 times IV dose)

Peds: 0.01 mg/kg (1:10,000) every 3-5 minutes IV, or 0.1 mg/kg (1:1000) ET

Bradycardia

Adults: 1 mg (1:1,000) in 250mL NS or D5W, infuse at 2 - 10 µg/min

Peds: 0.01 µg/kg IV every 3-5 minutes or 0.1-0.2 µg/kg/minute (0.6 x body weight (kg) equals milligrams to add to D5W to create a total volume of 100mL), infuse at 1mL/hr

Bronchospasm/Anaphylaxis

Adults: 0.3 mg (1:1,000) IM, or 5 – 20 mcg (1:100,000) slow IV push over 5 minutes, or infusion of 2 – 10 µg/min (concentration: 4 µg/mL – 1 mg in 250 mL NS).

Peds: 0.01 mg/kg (1:1000, max 0.3 mg) IM or infusion of 0.01 – 1 µg/min (concentration: 4 µg/mL – 1 mg in 250 mL NS).

Second or Third line pressor

Dose: Start at 0.1 µg/kg/min, titrate by 0.05 – 0.2 µg/kg/min every 5 minutes as needed (max 1 µg/kg/min).

SPECIAL NOTES

- When used for allergic reactions, increased cardiac workload can precipitate angina and/or AMI in susceptible individuals.
- Due to peripheral vasoconstriction, it should be used with caution on patients with peripheral vascular insufficiency.
- Consider pulmonary edema or pulmonary embolus in wheezing patients with a history of RAD.

Critical Care Endorsement Required

Critical Care Endorsement Required

Eptifibatide

BRAND NAME(S)

Integrilin

CLASS OF DRUG

Glycoprotein IIb/IIIa antagonists

INDICATIONS

- Treatment of acute coronary syndromes (unstable angina, non-Q-wave MI)
- Patients undergoing percutaneous coronary interventions (PCIs)

CONTRAINDICATIONS

- Hypersensitivity
- Active internal bleeding
- GI or GU bleeding within 6 weeks
- Recent major surgery
- Thrombocytopenia
- Intracranial neoplasm
- Intracranial bleeding within 6 months
- Renal dialysis
- Severe hypertension (systolic BP> 200 or diastolic BP > 110)
- Aneurysm
- Hemorrhagic stroke or other stroke within 30 days

PRECAUTIONS

- Hypersensitivity to related compounds (abciximab, tirofiban, lamifiban)
- Patients that have an increased risk of bleeding
- Pregnancy and lactation

ADMINISTRATION

Adults: 180 µg/kg IV initial bolus, give over 1-2 minutes, then 2 µg/kg/min infusion for up to 72 hours

Peds: Not indicated

SPECIAL NOTES

- Use vented tubing
- Use caution in patients taking oral anticoagulants or NSAID medications
- Arterial and venous punctures, IM injections, urinary catheters, NG tubes, and nasotracheal intubation should be minimized

Esmolol

BRAND NAME(S)

Brevibloc

CLASS OF DRUG

Beta blocker

INDICATIONS

- Short term treatment in the control of heart rate for patients with MI.
- Control ventricular rate in a-fib and a-flutter
- Stable, narrow complex tachycardias if rhythm remains uncontrolled or unconverted by adenosine or vagal maneuvers or if SVT is recurrent

CONTRAINDICATIONS

- Hypersensitivity to Esmolol
- Heart block greater than first degree
- Sinus bradycardia
- Cardiogenic shock
- Decompensated CHF
- Acute bronchospasm (asthma and COPD)

ADVERSE EFFECTS

- Hypotension (dose related)
- Bradyarrhythmias
- Myocardial depression
- Nausea and vomiting
- Dyspnea
- Bronchospasm

ADMINISTRATION

Adults: 500 µg/kg IV loading dose, give over 1 minute. Then start infusion at 50 µg/kg/min. Titrate every 5 minutes by 50 µg/kg/min until desired effect is achieved (Max 300 µg/kg/min).

Peds: Not indicated.

SPECIAL NOTES

- Patient must be on EKG monitor and VS should be monitored frequently.
- Esmolol has a very short duration of action, thus infusions are indicated if sustained response is needed.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Esomeprazole

BRAND NAME(S)

Nexium

CLASS OF DRUG

Proton pump inhibitor – diminishes daily production of acid

INDICATIONS

- Acid related gastrointestinal disorders
- Reduce risk of upper GI bleeding in critically ill patients

CONTRAINDICATIONS

- Hypersensitivity

DRUG INTERACTIONS

- Reduced clearance of diazepam
- Reduced bioavailability of drugs dependant on gastric pH
- Interacts with warfarin and cyclosporin

ADMINISTRATION

Adults: 80 mg IV bolus over 30 minutes, followed by infusion at 8 mg/hr

Peds: Follow physician's orders

SPECIAL NOTES

- Use with caution in severe liver disease.

Critical Care Endorsement Required

Critical Care Endorsement Required

Fentanyl

BRAND NAME(S)

Sublimaze

CLASS OF DRUG

Opiate analgesic

INDICATIONS

- Analgesia for patients with moderate to severe pain
- Short term sedation
- Anesthesia

CONTRAINDICATIONS

- Hypersensitivity/known intolerance
- Patients particularly sensitive to respiratory depression
- Myasthenia gravis
- Pregnancy

DRUG INTERACTIONS

- Benzodiazepines Diazepam - increased risk of CV depression.
- Sedatives/Hypnotics, other opioids, CNS depressants and alcohol - increased risk of hypotension.
- Avoid use in patients who have received MAO inhibitors within the previous 14 days - may produce unpredictable, potentially fatal reactions.

ADMINISTRATION

Analgesia

Adults: 0.5 – 1 µg/kg (50 – 100 µg) IV, or 1 – 2 µg/kg IN.

Peds: 0.5 - 1 µg/kg IV, or 1 – 2 µg/kg IN.

Sedation (intubated)

Adults: 0.5 – 2 µg/kg IV every 10 minutes as needed.

Peds: 0.5 – 2 µg/kg IV every 10 minutes as needed.

SPECIAL NOTES

- Use cautiously in geriatric or debilitated patient (use lower doses), diabetics, patients with pulmonary or hepatic disease, head trauma, increased ICP, undiagnosed abdominal pain and cardiac disease.
- Abdominal distension, muscle rigidity, and/or urinary retention may be seen at high doses.

Critical Care Endorsement Required

Critical Care Endorsement Required

Flumazenil

BRAND NAME(S)

Romazicon

CLASS OF DRUG

GABA/Benzodiazepine receptor blocker

INDICATIONS

- Reversal of the sedative effects of benzodiazepines

CONTRAINDICATIONS

- Hypersensitivity to flumazenil or benzodiazepines
- Benzodiazepine dependence

DRUG INTERACTIONS

- Caution is necessary when using flumazenil in cases of mixed drug overdoses as the toxic effects of other drugs taken in overdose may emerge with the reversal of the benzodiazepine effect by flumazenil.

ADMINISTRATION

Adults: 0.2 mg IV slow push over 1-2 minutes

Peds: 5 µg/kg IV slow push over 1-2 minutes (Max 200 µg)

SPECIAL NOTES

- The use of flumazenil has been associated with the occurrence of seizures.
- These are most frequent in patients who have been on benzodiazepines for long-term sedation or in overdose cases where patients are showing signs of serious cyclic antidepressant overdose.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Fosphenytoin

BRAND NAME(S)

Cerebyx

CLASS OF DRUG

Anti-epileptic

INDICATIONS

- Prevention of seizures
- Status epilepticus

CONTRAINDICATIONS

- Hypersensitivity to fosphenytoin, phenytoin, other hydantoins.
- Sinus bradycardia, sinoatrial block, or second- and third-degree AV block.

DRUG INTERACTIONS

- Tricyclic antidepressants may precipitate seizures in susceptible patients and phenytoin dosage may need to be adjusted.
- Drugs whose efficacy is impaired by phenytoin include: corticosteroids, warfarin, furosemide, oral contraceptives, rifampin, and theophylline.

ADMINISTRATION

Adults/Peds: 20 PE/kg IV infusion (max 1,500 PE, dose expressed in Phenytoin Equivalents – PE), infuse no faster than 150 PE/min

SPECIAL NOTES

- If intravenous phenytoin is given too rapidly, may result in cardiac dysrhythmias (including ventricular fibrillation or asystole) or hypotension.
- Subcutaneous extravasations of intravenous phenytoin may cause tissue necrosis or pain at the IV site

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Furosemide

BRAND NAME(S)

Lasix

CLASS OF DRUG

Potent loop diuretic

INDICATIONS

- Pulmonary edema
- Hypertensive emergencies (AMI, APE, or encephalopathy)

CONTRAINDICATIONS

- Hypovolemia
- Hypokalemia
- Hypotension

DRUG INTERACTIONS

- Severe hypotension with antihypertensives and nitrates

ADMINISTRATION

Adults:	For patients not currently taking furosemide, 20 - 40 mg slow IVP or 0.5 - 1.0 mg/kg slow IV/IO. If the patient is currently taking furosemide, double their current dose and administer IV/IO. You may repeat one dose in 2 hours.
Adult Infusion:	Do not titrate during transport. Typical dosing range: 20 – 160 mg/hr.
Peds:	1.0 mg/kg slow IVP. It may be repeated in 6 - 8 hours.

SPECIAL NOTES

- It can lead to profound diuresis with resultant shock and electrolyte depletion (particularly K+). Therefore, do not use in hypovolemic states and monitor closely, particularly after IV administration.
- It should be used cautiously in children or pregnant women.
- If patient is unconscious, must have Foley catheter in place and unobstructed urine outflow. Advise the physician if urine is bloody. Trauma to kidneys and urinary system makes the use of furosemide more hazardous.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Heparin

BRAND NAME(S)

N/A

CLASS OF DRUG

Anticoagulant

INDICATIONS

- Adjunct to treatment for coronary occlusion
- Thrombosis in deep vein phlebitis
- Pulmonary emboli
- Atrial fibrillation to prevent emboli
- Low dose to maintain IV patency
- Disseminated Intra-vascular Coagulation (DIC)

CONTRAINDICATIONS

- Uncontrolled bleeding, except in DIC
- Severe thrombocytopenia
- Hypersensitivity to heparin, and to pork and/or beef
- Severe hepatic disease with hypoprothrombinemia

DRUG INTERACTIONS

- Increased risk of bleeding when used with aspirin, non-steroidal anti-inflammatory agents, dipyridamole, dextran, quinidine, cefamandole, cefmetazole, cefoperazone, cefotetan, thrombolytics, and warfarin.

ADMINISTRATION:

Cardiac Dosing

Adults: Bolus 60 units/kg (Max 4,000 units), then infuse at 12 units/kg/hr (Max 1,000 units/hr)

Peds: Contact MRCC

DVT/PE Dosing

Adults: Bolus 80 units/kg (Max 5,000 units), then infuse at 18 units/kg/hr (Max 1,300 units/hr)

Peds: Contact MRCC

SPECIAL NOTES

- It must be administered by an infusion pump.
- Monitor all puncture sites (catheter, incision, etc) for bleeding.
- Avoid new puncture sites, incisions or injections.
- Have all dosages double-checked by another Paramedic or RN.
- Protamine Sulfate must be carried on long transports with patients receiving heparin.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Hydralazine

BRAND NAME(S)

Apresoline

CLASS OF DRUG

Antihypertensive, vasodilator

INDICATIONS

- Hypertension

CONTRAINDICATIONS

- Hypersensitivity to hydralazine or any component of the formulation
- Coronary artery disease
- Mitral valve rheumatic heart disease

DRUG INTERACTIONS

- Concomitant administration with other antihypertensive medications increases the risk of hypotension.

ADMINISTRATION:

Adults: 10 – 20 mg IV slow push over 1-2 minutes. Repeat every 4 hours as needed.

Peds: 0.1 – 0.2 mg/kg/dose (Max 20 mg) IV slow push. Repeat every 4 hours as needed

SPECIAL NOTES

- Monitor blood pressure closely following IV administration.
- Response may be delayed and unpredictable in some patients

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Hydromorphone

BRAND NAME(S)

Dilaudid

CLASS OF DRUG

Opiate analgesic

INDICATIONS

- Analgesia for patients with moderate to severe pain
- Sedation for procedures

CONTRAINDICATIONS

- Hypersensitivity.
- Hypotension is a relative contraindication to use. Remember that some people will be hypotensive in response to pain itself. Be cautious.
- Head or abdominal injuries also contraindicated, since the analgesic effect removes the clinical signs that need to be watched.
- Do not use in persons with respiratory difficulties because their respiratory drive might be depressed, except in pulmonary edema.
- In the presence of major blood loss, the body's compensatory mechanisms may be suppressed by the use of morphine, and the hypotensive effect will become very prominent. Do not use it in these circumstances.

DRUG INTERACTIONS

- Additive effects with other CNS depressants.
- MAO inhibitors can cause unpredictable and severe reactions reduce dose to 25% of a usual dose.

ADMINISTRATION

Analgesia

Adults: 0.2 – 1.0 mg slow IV push, repeat every 30 minutes as needed.

Peds: Analgesia: 0.01 mg/kg (Max 1 mg) slow IV push, repeat every 30 minutes as needed.

Sedation (intubated)

Adults: 0.5 – 2 mg IV every 20 minutes as needed.

Peds: 0.01 – 0.02 mg/kg every 20 minutes as needed.

SPECIAL NOTES

- Take vital signs before and 2 minutes after administration.
- May cause vomiting; administer slowly.

Critical Care Endorsement Required

Critical Care Endorsement Required

Hypertonic Saline

APPROVED SOLUTIONS

3% Sodium Chloride

INDICATIONS

- Cerebral edema
- Severe hyponatremia

CONTRAINDICATIONS

- Hypovolemic state
- Hypotension
- Acute congestive heart failure exacerbation

DRUG INTERACTIONS

- None

ADMINISTRATION

Cerebral Edema

Adults: 150 mL IV infuse over 15 minutes.

Peds: 2 – 6 mL/kg (max 150 mL), infuse slowly over 10 – 15 minutes

Hyponatremia

(Follow transferring provider's instructions)

SPECIAL NOTES

- Preferably this should be infused via a central venous catheter. A large bore peripheral line may be used in lifethreatening situations.
- Monitor IV site for redness, irritation, and patency.
- Cardiac monitoring required.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Insulin

CLASS OF DRUG

Hormone (natural or synthetic)

INDICATIONS

- Diabetic ketoacidosis
- Hyperglycemia
- Hyperkalemia
- Beta-blocker or calcium-channel blocker overdose

CONTRAINDICATIONS

- Hypersensitivity

DRUG INTERACTION

- Beta-adrenergic blocker may block signs and symptoms of hypoglycemia.
- Increase insulin requirements: alcohol, glucocorticoids, and thyroid preparations
- Decreased insulin requirements: anabolic steroids, tricyclic antidepressants, and MAO inhibitors.

ADMINISTRATION

Dosages vary dependent on the type of insulin, glucose level, and clinical situation. Typical doses:

DKA/Hyperglycemia:	0.1 units/kg/hr
Hyperkalemia:	10 units IV
BB/CCB Overdose:	1 – 10 units/kg/hr

SPECIAL NOTES

- It must be monitored by infusion pump.
- Insulin is sometimes added to TPN, dosage is usually 1- 5 u/liter of Regular insulin, or dosage dependent on blood sugar levels and orders of the transferring physician.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

IV Solutions

APPROVED SOLUTIONS

- 0.9% Sodium Chloride
- 0.45% Sodium Chloride
- Lactated Ringer's Solution
- 5% Dextrose 0.9% Sodium Chloride (D5NS)
- 5% Dextrose 0.45% Sodium Chloride (D5 1/2NS)
- 5% Dextrose in Water (D5W)
- 10% Dextrose in Water (D10W)

INDICATIONS

- Hypovolemia
- Facilitate intravenous medication administration
- Hypoglycemia (dextrose-containing solutions)
- Hyponatremia (hypertonic solutions)
- Hypernatremia (hypotonic solutions)

CONTRAINDICATIONS

- Evidence of acute congestive heart failure
- Evidence of renal failure with volume overload

DRUG INTERACTIONS

- None

ADMINISTRATION

Doses vary per physician direction

SPECIAL NOTES

- Solutions containing sodium ions should be used with great care, if at all, in patients with congestive heart failure, severe renal insufficiency and in clinical states in which there exists edema with sodium retention.
- Excessive administration of potassium-free solutions may result in significant hypokalemia.
- In patients with diminished renal function, administration of solutions containing sodium ions may result in sodium retention.
- The intravenous administration of these solutions can cause fluid and/or solute overloading resulting in dilution of serum electrolyte concentrations, overhydration, congested states or pulmonary edema.
- The risk of dilutional states is inversely proportional to the electrolyte concentrations of administered parenteral solutions. The risk of solute overload causing congested states with peripheral and pulmonary edema is directly proportional to the electrolyte concentrations of such solutions.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Ketamine

BRAND NAME(S)

Ketalar

CLASS OF DRUG

Dissociative anesthetic

INDICATIONS

- Sedation
- RSI
- Analgesia

CONTRAINDICATIONS

- Hypersensitivity
- Significant elevation in BP

DRUG INTERACTIONS

- Hallucinations
- Dream like feeling
- Nausea and vomiting
- Excessive bronchial secretions
- Increased skeletal muscle tone
- Hypotension
- Bradycardia
- Apnea

ADMINISTRATION

Analgesia:	0.2 mg/kg slow IV push
RSI:	3 mg/kg IV for induction
Sedation:	0.5 – 1 mg/kg IV every 20 minutes as needed, or titrate continuous infusion at 1 – 4 mg/kg/hr

SPECIAL NOTES

- Resuscitation equipment must be readily available
- ECG, SpO2, EtCO2 must be in place prior to administration
- Ketamine may be harmful to an unborn baby. Use with extreme prejudice in pregnant patients
- Cardiac function should be continually monitored during the procedure in patients found to have hypertension or cardiac decompensation.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Labetalol

BRAND NAME(S)

Normodyne

CLASS OF DRUG

Beta-adrenergic blocker

INDICATIONS

- Used alone or in combination with other agents in the management of hypertension.
- Management of angina pectoris.
- Prevention of myocardial infarction.

CONTRAINDICATIONS

- Uncompensated congestive heart failure
- Pulmonary edema
- Cardiogenic shock
- Bradycardia or heart block

DRUG INTERACTIONS

- General anesthesia, IV Phenytoin, and Verapamil may cause additive myocardial depression.
- May decrease the beta effects of Dopamine or Dobutamine.
- Additive bradycardia may occur with digitalis glycosides.
- Additive hypotension may occur with other antihypertensives, alcohol or nitrates.
- May alter effectiveness of insulin or oral hypoglycemic agents.
- May decrease effectiveness of beta-adrenergic bronchodilators.

ADMINISTRATION

Adults: 5 – 20 mg slow IV push, or infuse at 0.5 – 3 mg/min

Peds: 0.2 – 1 mg/kg slow IV push, or infuse at 0.25 – 3 mg/kg/hr

SPECIAL NOTES

- Use cautiously within 14 days of MAO inhibitor therapy.

Critical Care Endorsement Required

Critical Care Endorsement Required

Levetiracetam

BRAND NAME(S)

Keppra

CLASS OF DRUG

Anti-convulsant

INDICATIONS

- Status epilepticus
- Prevention of seizures

CONTRAINDICATIONS

- Hypersensitivity

DRUG INTERACTIONS

- No significant pharmacokinetic interactions were observed between levetiracetam, or its major metabolite, and concomitant medications.

ADMINISTRATION

Adults: 20 mg/kg IV (max 1,000 mg), infuse over 15 min.

Peds: 20 mg/kg IV (max 1,000 mg), infuse at 2 – 5 mg/kg/min.

SPECIAL NOTES

- Levetiracetam may cause behavioral abnormalities and psychotic symptoms.
- Monitor for development of rash and/or blistering.

Critical Care Endorsement Required

Critical Care Endorsement Required

Lidocaine

BRAND NAME(S)

N/A

CLASS OF DRUG:

Antidysrhythmic, local anesthetic

INDICATIONS

- Symptomatic ventricular dysrhythmias
- Sustained ventricular tachycardia
- Ventricular fibrillation/pulseless ventricular tachycardia
- Local anesthetic for nasal intubation

CONTRAINDICATIONS

- Hypersensitivity
- High AV Blocks

DRUG INTERACTIONS

- Additive cardiac depression with phenytoin, quinidine, procainamide, and propranolol

ADMINISTRATION

Ventricular tachycardia:	1 mg/kg IV. If VT persists, 0.5 mg/kg every 10 minutes, up to 3.0 mg/kg total. Start lidocaine infusion if VT converts.
VF and pulseless VT:	1 mg/kg IV followed by defibrillation. If VF or VT persists - repeat 0.5 mg/kg (up to 3.0 mg/kg total) followed by defibrillation. Start lidocaine infusion if VF converts.
Infusion:	Mix 1g of lidocaine in 250 mL D5W or NS (for a concentration of 4 mg/ml). Infuse at 1 - 4 mg/min.
Peds:	1 mg/kg IV. For continuous infusion, mix 120 mg of lidocaine in 100 mL D5W. Start drip at 20-50 µg/kg per min (1-2.5 mL/kg/hr at current dilution).

SPECIAL NOTES

- For patients over 70 years of age, or with hepatic or renal failure, the loading dose remains the same, but maintenance infusion is run at half the normal rate.

Critical Care Endorsement Required

Critical Care Endorsement Required

Lipid Emulsion

APPROVED SOLUTIONS

20% Lipid Emulsion

INDICATIONS

- Hemodynamic instability due to toxicity from lipid-soluble medications

CONTRAINDICATIONS

- Non-toxicologic cause of hemodynamic collapse

DRUG INTERACTIONS

- None

ADMINISTRATION

Dose: 1.5 mL/kg (approx 100 mL for average adult) IV over 1 minute. Then infuse at 0.25 mL/kg/min for up to 60 minutes, or 10 minutes after attaining hemodynamic stability (whichever comes first).

SPECIAL NOTES

- Patients who are candidates for this treatment are generally too unstable for transport and at imminent risk of cardiac arrest. Discuss the case with the transferring physician to ensure that the benefits of transport outweigh the risks of reduced resources during transport, and that the receiving facility has accepted the transfer and is aware of the critical status of the patient.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Lorazepam

BRAND NAME(S)

Ativan

CLASS OF DRUG

Anticonvulsant, anti-anxiety, sedative, muscle relaxant

INDICATIONS

- Control of seizures.
- Sedation for cardioversion.
- Reduction of anxiety.
- Skeletal muscle relaxant.

CONTRAINDICATIONS

- Hypersensitivity
- CNS depression

DRUG INTERACTIONS

- Additive effect to other CNS depressants such as alcohol, narcotics, etc

ADMINISTRATION

Anxiolysis

Adults: 0.5 – 1 mg IV.

Peds: 0.02 mg/kg (Max 1 mg).

Seizure:

Adults: 1 - 2 mg IV.

Peds: 0.05 mg/kg (Max 2 mg).

Sedation (intubated):

Adults: 1 - 4 mg IV.

Peds: 0.15 mg/kg (Max 4 mg).

SPECIAL NOTES

- Should not be mixed with other agents, or diluted with intravenous solutions. Give through the proximal end of IV tubing, then flush well.
- Most likely to produce respiratory depression in patients who have taken other depressant drugs, especially alcohol and barbiturates.
- It can cause local venous irritation. Use relatively large veins.
- Versed has short half- life. Additional doses may be necessary.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Magnesium Sulfate

BRAND NAME(S)

N/A

CLASS OF DRUG

CNS depressant; antidysrhythmic; electrolyte; smooth muscle relaxant

INDICATIONS

- Initial treatment of seizures associated with eclampsia, and seizures, refractory to benzodiazepines.
- Second-line antidysrhythmic in the treatment of ventricular fibrillation/pulseless ventricular tachycardia, refractory to lidocaine.
- First-line antidysrhythmic in the treatment of Torsades de Pointes.
- To control contractions in pre-term labor.
- Acute asthma refractory to other more conventional treatment, or when the effects of betaadrenergic medications contraindicate their use.

CONTRAINDICATIONS

- Hypermagnesemia
- Hypocalcemia
- Anuria
- Heart blocks

DRUG INTERACTIONS

- Potentiates neuromuscular blocking agents

ADMINISTRATION

Refractory ventricular arrhythmias:	2 g IV (slow push diluted in 10 mL of NS if pulse is present).
Pre-term labor:	2 - 4 g slow IV push, then start infusion at 1 - 2 g/hr.
Pre-eclampsia/eclampsia:	2 - 4 g slow IV push, then start infusion at 1 - 2 g/hr.
Refractory asthma:	1 - 2 g slow IV push, diluted in 10 mL of NS, infuse over 10 minutes.
Hypomagnesemia:	2 g IV, infuse over 1 hour.
Peds (all indications):	40 mg/kg (Max 2,000 mg), slow IV push diluted in 10 mL of NS

SPECIAL NOTES

- Monitor deep tendon reflexes often, especially those patients receiving a maintenance infusion.
- Calcium gluconate or calcium chloride will reverse the toxic effects of magnesium sulfate.
- Monitor for hypotension.

Critical Care Endorsement Required

Critical Care Endorsement Required

Mannitol

BRAND NAME(S)

Osmitrol

CLASS OF DRUG

Osmotic diuretic

INDICATIONS

- Cerebral edema
- Increased intra-cranial pressure

CONTRAINDICATIONS

- Hypersensitivity
- Anuria
- Hypovolemia/dehydration
- Active intra-cranial bleeding
- Pulmonary edema

DRUG INTERACTIONS

- None

ADMINISTRATION

Elevated ICP: 0.25 – 1 g/kg slow IV infusion over 20 minutes

SPECIAL NOTES

- Should be run through an in-line filter.
- Incompatible with most other drugs.
- May crystallize at low temperature.

Critical Care Endorsement Required

Critical Care Endorsement Required

Methylprednisolone

BRAND NAME(S)

Solu-Medrol

CLASS OF DRUG

Anti-Inflammatory; immunosuppressant

INDICATIONS

- Reactive airway disease with no response to Albuterol and other treatments
- Allergic reactions

CONTRAINDICATIONS

- Absolute – Hypersensitivity
- Relative – Immunocompromised state; serious infections; psychotic disorders

DRUG INTERACTIONS

- None

ADMINISTRATION

Adults: 125 mg IV every 6 hours

Peds: 1 - 2 mg/kg (max 125 mg) IV every 6 hours

SPECIAL NOTES

- Adverse effects – hyperglycemia; psychosis.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Metoclopramide

BRAND NAME(S)

Reglan

CLASS OF DRUG

Anti-emetic

INDICATIONS

- Nausea
- Gastroparesis

CONTRAINDICATIONS

- Parkinsons disease
- Hypersensitivity to metoclopramide
- Mechanical obstruction

DRUG INTERACTIONS

- The effects of metoclopramide on gastrointestinal motility are antagonized by anticholinergic drugs and narcotic analgesics.
- Additive sedative effects can occur when metoclopramide is given with alcohol, sedatives, hypnotics, narcotics, or tranquilizers.

ADMINISTRATION

Adults: 10 mg slow IV push over 2 minutes every 6 hours

Peds: 0.15 - 0.30 mg/kg slow IV push every 6 hours

SPECIAL NOTES

- Extra-pyramidal symptoms may be treated by administering diphenhydramine 50 mg IV (Peds: 1 mg/kg, max 50 mg) over 2 minutes

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Metoprolol

BRAND NAME(S)

Lopressor

CLASS OF DRUG

Beta-adrenergic blocker

INDICATIONS

- Used alone or in combination with other agents in the management of hypertension or tachycardia.
- Management of angina pectoris.
- Prevention of myocardial infarction.

CONTRAINDICATIONS

- Uncompensated congestive heart failure
- Pulmonary edema
- Cardiogenic shock
- Bradycardia or heart block

DRUG INTERACTIONS

- General anesthesia, IV Phenytoin, and Verapamil may cause additive myocardial depression.
- May decrease the beta effects of Dopamine or Dobutamine.
- Additive bradycardia may occur with digitalis glycosides.
- Additive hypotension may occur with other antihypertensives, alcohol or nitrates.
- May alter effectiveness of insulin or oral hypoglycemic agents.
- May decrease effectiveness of beta-adrenergic bronchodilators.

ADMINISTRATION

Adults: 2.5 – 5 mg slow IV push over 2 minutes, may repeat every 5 minutes as needed (max 15 mg)

Peds: Not indicated

SPECIAL NOTES

- Use cautiously within 14 days of MAO inhibitor therapy.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Midazolam

BRAND NAME(S)

Versed

CLASS OF DRUG

Anticonvulsant, anti-anxiety, sedative, muscle relaxant

INDICATIONS

- Control of seizures.
- Sedation for cardioversion.
- Reduction of anxiety.
- Skeletal muscle relaxant.

CONTRAINDICATIONS

- Hypersensitivity
- CNS depression

DRUG INTERACTIONS

- Additive effect to other CNS depressants such as alcohol, narcotics, etc

ADMINISTRATION

Anxiolysis

Adults: 1 – 2 mg IV, or 2 – 4 mg IN, every 30 minutes as needed.

Peds: ≤ 5 yrs 0.05 mg/kg slow IV push, > 5 yrs 0.025 mg/kg slow IV push, or any age 0.1 mg/kg IN, every 30 minutes as needed.

Seizure

Adults: 2 mg IV or 5 mg IM.

Peds: 0.1 mg/kg IV (max 2 mg) or 0.2 mg/kg IM (max 5 mg).

Sedation

Adults: 1 – 5 mg slow IV push over 2 minutes, repeat as needed

Peds: 0.05 – 0.1 mg/kg slow IV push, repeat as needed.

SPECIAL NOTES

- Should not be mixed with other agents, or diluted with intravenous solutions. Give through the proximal end of IV tubing, then flush well.
- Most likely to produce respiratory depression in patients who have taken other depressant drugs, especially alcohol and barbiturates.
- It can cause local venous irritation. Use relatively large veins.

Critical Care Endorsement Required

Critical Care Endorsement Required

N-Acetylcysteine

BRAND NAME(S)

Mucomyst

CLASS OF DRUG

Mucolytic

INDICATIONS

- Antidote to acetaminophen overdose

CONTRAINDICATIONS

- Hypersensitivity

DRUG INTERACTIONS

- None

ADMINISTRATION

Loading dose: 150 mg/kg (max 15 g), IV infusion over 60 minutes

Second dose: 50 mg/kg (max 5 g), IV infusion over 4 hours

Third dose: 100 mg/kg (max 10 g), IV infusion over 16 hours

SPECIAL NOTES

- 100% effective if initiated within 8 hours of an ingestion.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Naloxone

BRAND NAME(S)

Narcan

CLASS OF DRUG

Narcotic antagonist

INDICATIONS

- Reversal of narcotic effects, particularly respiratory depression, due to narcotic drugs, whether ingested, injected, or administered in the course of treatment. Narcotic drugs include agents such as morphine, Demerol, heroin, hydromorphone, Percodan, codeine, Lomotil, propoxyphene (Darvon), pentazocine (Talwin).
- For unconsciousness of unknown etiology to rule out (or reverse) narcotic depression of CNS.

CONTRAINDICATIONS

- Hypersensitivity
- Absences of indication

DRUG INTERACTIONS

- May induce narcotic withdrawal

ADMINISTRATION

Adults: 0.4 mg – 2 mg IV or IN, titrate to respiratory effort/rate. May be repeated at 2 - 3 minutes, if needed.

Peds: 0.1 mg/kg (< 5 yrs or ≤ 20 kg), 2 mg (≥5 yr or > 20kg) IV. May be repeated at 0.1 mg/kg if no response. Neonate: 0.1mg/kg slow IV push. Repeat in 2-3 minutes, if needed. Mix 1 mL of naloxone, 0.4 mg, in 9 mL of D5W, which gives 0.04 mg/mL.

SPECIAL NOTES

- The patient may quickly become conscious and combative.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Nicardipine

BRAND NAME(S)

Cardene

CLASS OF DRUG

Calcium Channel Blocker; Coronary Vasodilator, Antidysrhythmic

INDICATIONS

- Hypertension

CONTRAINDICATIONS

- Sick sinus syndrome except in the presence of a functioning ventricular pacemaker.
- Patients with second- or third degree AV block except in the presence of a functioning ventricular pacemaker.
- Patients with severe hypotension or cardiogenic shock.
- Patients who have demonstrated hypersensitivity to the drug.
- Intravenous calcium-channel blockers and intravenous beta-blockers should not be administered together or in close proximity (within a few hours).
- Patients with atrial fibrillation or atrial flutter associated with an accessory bypass tract such as in WPW syndrome or short PR syndrome.
- Patients with ventricular tachycardia.
- Severe aortic stenosis

DRUG INTERACTIONS

- Additive effects in prolonging AV conduction when using beta-blockers or digitalis concomitantly with calciumchannel blockers.

ADMINISTRATION

Adults: Start at 5 mg/hr, titrate by 2.5 mg/hr every 5 – 10 minutes as needed (Max 15 mg/hr).

Peds: Not indicated.

SPECIAL NOTES

- Carefully monitor for hypotension/excessive bradycardia or new A/V block
- PVC's can occur with conversion to NSR
- Don't use in the presence of a WIDE COMPLEX TACHYCARDIA
- May be contraindicated in severe Aortic Stenosis as nicardipine may decrease preload.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Nitroglycerin

BRAND NAME(S)

Nitrostat

CLASS OF DRUG

Anti-anginal agent/vascular dilating agent

INDICATIONS

- Chest pain, anginal pain
- Congestive heart failure with severe pulmonary edema

CONTRAINDICATIONS

- Hypersensitivity
- Severe hypotension
- Pericardial tamponade
- Increased intra-cranial pressure
- Hypovolemia/severe anemia

DRUG INTERACTIONS

- Additive hypotension with beta-adrenergic blockers, antihypertensives, calcium channel blockers, and phenothiazines.
- Tricyclic antidepressants and antihistamines may interfere with buccal absorption.
- Can cause a lethal drop in blood pressure in patients taking Sildenafil citrate (Viagra) within 48 hours of ingestion.

ADMINISTRATION

Adults: Sublingual: 0.4 mg tablet or metered dose spray. Repeat every 3 - 5 minutes as needed

Infusion: Start at 50 µg/min, titrate by 5 – 10 µg/min every 3 – 5 minutes (Range 10 - 250 µg/min). The infusion dose is leveled off when desired effect is reached or a decrease in blood pressure of more than 10 mmHg over baseline or less than 90 mmHg systolic is observed.

Peds: Not indicated.

SPECIAL NOTES

- Common side effects may include: throbbing headache, flushing, dizziness, and burning under the tongue (if these side effects are noted, the pills may be assumed potent, not outdated).
- Less common effect: marked hypotension, particularly orthostatic.
- Paramedics should use their supply of nitroglycerin, not the patient's.
- Use with caution with patient not previously receiving nitroglycerin.
- Generalized vasodilation may cause profound hypotension and reflex tachycardia.
- NTG tablets loose potency easily, should be stored in a dark glass container with a tight lid, and not exposed to heat. NTG spray does not have this problem.
- Use only with Medical Control on patients with systolic BP below 100 mm Hg.
- Nitroglycerin can be absorbed into standard PVC IV tubing sets. If available, specialized nitroglycerin infusion tubing sets should be used.

Critical Care Endorsement Required

Critical Care Endorsement Required

Norepinephrine

BRAND NAME(S)

Levophed

CLASS OF DRUG

Sympathomimetic

INDICATIONS

- Forms of shock with low or normal peripheral vascular resistance (e.g., spinal shock, sepsis, post-resuscitation).
- Second - line vasopressor for cardiogenic shock during inter-facility transports.

CONTRAINDICATIONS:

- Hypovolemia (relative)
- Vascular thrombosis, unless no alternative
- Hypoxia or hypercapnia

DRUG INTERACTIONS

- Cyclopropane or halothane anesthesia, cardiac glycosides, doxapram and cocaine may increase myocardial irritability.
- MAO inhibitors, methyldopa, doxapram, and tricyclic antidepressant may produce severe hypertension.
- Alpha-adrenergic blockers may negate effects.
- Beta-adrenergic blockers may exaggerate hypertension, and block cardiac simulation.
- Ergot alkaloids or oxytocin may result in enhanced vasoconstriction.

ADMINISTRATION

Infusion: Start at 0.1 µg/kg/min, titrate by 0.05-0.2 µg/kg/min every 5 minutes as needed (Max: 1 µg/kg/min)

SPECIAL NOTES

- Use with an infusion pump only.
- Must be infused through a central venous catheter.
- Incompatible with alkaline solutions, aminophylline, barbiturates, phenytoin.

Critical Care Endorsement Required

Critical Care Endorsement Required

Octreotide

BRAND NAME(S)

Sandostatin

CLASS OF DRUG

Hormone (gastrointestinal)

Antidiarrheal

INDICATIONS

- Treatment of active GI bleeds during transport.

CONTRAINDICATIONS

- Hypersensitivity

DRUG INTERACTIONS

- May alter insulin and oral hypoglycemic agent requirements.
- May interfere with beta-adrenergic blocking agents, calcium channel blockers, and agents to control fluid and electrolyte balance.

ADMINISTRATION

Adults: 50 µg IV bolus, then infuse at 25-50 µg/hr, no titration necessary.

Peds: Not indicated.

SPECIAL NOTES

- Use with caution in diabetics, patients with gallbladder disease, severe renal failure requiring dialysis and during lactation.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Oxytocin

BRAND NAME(S)

Pitocin

CLASS OF DRUG

Pituitary hormone - uterine vasoconstrictor

INDICATIONS

- Control of post-partum hemorrhage, when other methods fail

CONTRAINDICATIONS

- Potential of a remaining fetus

DRUG INTERACTIONS

- Hypertension with vasopressors

ADMINISTRATION

Adults: 10 - 40 units in 1,000 mL NS. Infuse at 125 mL/hr, titrate to severity of hemorrhage and uterine response. *(Injectable oxytocin (PITOCIN) contains 10 USP units (20 mg) per ml)*

SPECIAL NOTES

- None

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Pancuronium

BRAND NAME(S)

Pavulon

CLASS OF DRUG

Non-depolarizing paralytic

INDICATIONS

- Relaxation of skeletal muscles during surgery or mechanical ventilation

CONTRAINDICATIONS

None

DRUG INTERACTIONS

None

ADMINISTRATION

Dose: 10 mg/kg, may repeat every 1-2 hours as needed

SPECIAL NOTES

- **This agent has no analgesic or amnestic properties.**
- **Adequate sedation must be ensured while patient is receiving this medication.**
- Rare bronchospasm can occur with this medication.

Critical Care Endorsement Required

Critical Care Endorsement Required

Pantoprazole

BRAND NAME(S)

Protonix

CLASS OF DRUG

Proton pump inhibitor – diminishes daily production of acid

INDICATIONS

- Acid related gastrointestinal disorders
- Reduce risk of upper GI bleeding in critically ill patients

CONTRAINDICATIONS

- Hypersensitivity

DRUG INTERACTIONS

- Reduced clearance of diazepam
- Reduced bioavailability of drugs dependant on gastric pH
- Interacts with warfarin and cyclosporin

ADMINISTRATION

Adults: 80 mg IV bolus over 5 minutes, followed by infusion at 8 mg/hr

Peds: Follow physician's orders

SPECIAL NOTES

- Use with caution in severe liver disease.

Critical Care Endorsement Required

Critical Care Endorsement Required

Phenylephrine

BRAND NAME(S)

Neosynephrine

CLASS OF DRUG

Alpha-adrenergic agent, vasoconstrictor

INDICATIONS

- Shock, pathophysiologic states with low systemic vascular resistance but normal cardiac output

CONTRAINDICATIONS

- Known hypersensitivity
- Severe hypertension
- Ventricular tachycardia

DRUG INTERACTIONS

- May decrease effectiveness of insulin, and oral hypoglycemic agents.
- Use with beta blockers may result in initial hypertension followed by bradycardia.
- MAO inhibitors – hypertension.

ADMINISTRATION

Adults: Start at 0.5 µg/kg/min, titrate by 0.1-0.2 µg/kg/min every 10 minutes as needed (Max: 5 µg/kg/min).

Peds: 0.1-0.5 µg/kg/min.

SPECIAL NOTES

- Use with extreme caution in geriatric patients, severe arteriosclerosis, bradycardia, partial heart block, pregnancy and lactation.
- Produces pure alpha- stimulation, no effect on cardiac contractility or output.

Critical Care Endorsement Required

Critical Care Endorsement Required

Phenytoin

BRAND NAME(S)

Dilantin

CLASS OF DRUG

Anti-epileptic

INDICATIONS

- Prevention of seizures
- Status epilepticus

CONTRAINDICATIONS

- Hypersensitivity to fosphenytoin, phenytoin, other hydantoins.
- Sinus bradycardia, sinoatrial block, or second- and third-degree AV block.

DRUG INTERACTIONS

- Tricyclic antidepressants may precipitate seizures in susceptible patients and phenytoin dosage may need to be adjusted.
- Drugs whose efficacy is impaired by phenytoin include: corticosteroids, warfarin, furosemide, oral contraceptives, rifampin, and theophylline.

ADMINISTRATION

Adults/Peds: 20 mg/kg IV infusion (max 1,500 mg), infuse no faster than 50 mg/min (or 1 mg/kg/min).

SPECIAL NOTES

- If intravenous phenytoin is given too rapidly, may result in cardiac dysrhythmias (including ventricular fibrillation or asystole) or hypotension.
- Subcutaneous extravasations of intravenous phenytoin may cause tissue necrosis or pain at the IV site

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Potassium

BRAND NAME(S)

N/A

CLASS OF DRUG

Electrolyte

INDICATIONS

- IV preparations are used for treatment or prophylaxis of hypokalemia.

CONTRAINDICATIONS

- Severe renal impairment
- Hyperkalemia
- Untreated Addison's disease
- Severe tissue trauma

DRUG INTERACTIONS

- None

ADMINISTRATION

Adults: 10 to 20 mEq/hour IV

Peds: 2 - 3 mEq/kg/day IV

SPECIAL NOTES

- Cardiac Monitoring required.
- Infusion rates greater than 10 mEq/hour require central venous access.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Procainamide

BRAND NAME(S)

Pronestyl

CLASS OF DRUG

Antidysrhythmic

INDICATIONS

- Sustained ventricular tachycardia (with pulse) refractory to lidocaine
- Premature ventricular contractions refractory to lidocaine
- Management of ventricular dysrhythmias when lidocaine contraindicated
- Chemical conversion of atrial fibrillation

CONTRAINDICATIONS

- Pre-existing QT prolongation or torsades de pointes
- High AV blocks unless a pacemaker is in place.
- Hypersensitivity

DRUG INTERACTIONS

- Additive effect with other antidysrhythmics.
- Antihypertensives may produce hypotension.
- Additive anticholinergic effects with other anticholinergics.
- Neurological toxicity with lidocaine.

ADMINISTRATION

Adults: Infuse 1 g in 250 mL D5W or NS over 60 minutes. Alternatively, infuse at 1 – 4 mg/min.

Peds: Not indicated.

SPECIAL NOTES

- May cause severe hypotension, bradycardia and heart blocks.
- Nausea and vomiting are common.
- Stop administration if:
  - The arrhythmia disappears.
  - Hypotension ensues.
  - The QRS is widened by 50% of its original width.
  - A total of 17 mg/kg of the medication has been administered.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Prochlorperazine

BRAND NAME(S)

Compazine

CLASS OF DRUG

Antiemetic

INDICATIONS

- Nausea/vomiting
- Migraine headache

CONTRAINDICATIONS

- Hypersensitivity
- Comatose patients
- Patients that have received large amounts of CNS depressants
- Do not use in pediatric patients under 2 years of age or under 20 lbs.

DRUG INTERACTIONS

- Use caution when administering with other anti-psychotic or dopaminergic medications.

ADMINISTRATION

Adults: 5 – 10 mg slow IV push over 2 minutes, every 4 hours as needed.

Peds: Not indicated.

SPECIAL NOTES

- May potentiate the effects of narcotics, sedatives, hypnotics, and alcohol.
- Extra-pyramidal symptoms may be treated by administering diphenhydramine 50 mg IV over 2 minutes

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Promethazine

BRAND NAME(S)

Phenergan

CLASS OF DRUG

Anti-emetic

INDICATIONS

- Treatment and prevention of nausea and vomiting.

CONTRAINDICATIONS

- Hypersensitivity to phenothiazines
- Comatose patients
- CNS depression due to drugs
- Children < 2yrs old, or critically ill or dehydrated.
- Lactation

DRUG INTERACTIONS

- CNS depressants -may increase, prolong or intensify the sedative action.
- Anticholinergics - use caution.
- MAO inhibitors - use caution.

ADMINISTRATION

Adults: 6.25 – 25 mg IV every 4 hours as needed.

Peds: > 2 years: 0.25 – 0.5 mg/kg (max 25 mg) IV every 4 hours as needed.

SPECIAL NOTES

- Use cautiously in patients with hypertension, epilepsy, sleep apnea, cardiovascular disease, impairment of the liver, and pregnancy.
- May caused marked drowsiness.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Propofol

BRAND NAME(S)

Diprivan

CLASS OF DRUG

Anesthetic

INDICATIONS

- Maintenance of sedation in intubated, mechanically ventilated patients.

CONTRAINDICATIONS

- Not recommended in children ≤ 3 years old.
- Avoid in patients with severe systemic disease.

DRUG INTERACTIONS

- Additive CNS and respiratory with alcohol, antihistamines, opiates and sedative/hypnotics.

ADMINISTRATION

Adults: 5 – 80 µg/kg/minute, titrate by 5-10 µg/kg/minute every 5 minutes to maintain adequate sedation.

Peds: 5 – 150 µg/kg/minute, titrate by 5-10 µg/kg/minute every 5 minutes to maintain adequate sedation.

SPECIAL NOTES

- May cause hypotension and/or bradycardia.
- Patient should be continuously monitored for early signs of hypotension, apnea, airway obstruction, and/or oxygen desaturation.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Sodium Bicarbonate

BRAND NAME(S)

N/A

CLASS OF DRUG

Alkalinizing agent

INDICATIONS

- To correct metabolic acidosis found during prolonged cardiac arrest, after initial interventions.
- May be used as an adjunct in other causes of metabolic acidosis.
- Overdoses of tricyclic antidepressants or phenobarbital.

CONTRAINDICATIONS

- Suspected metabolic or respiratory alkalosis

DRUG INTERACTIONS

- Inactivates most drugs, and must not be given in the same IV at the same time.
- Causes calcium preparations to precipitate.

ADMINISTRATION

Cardiac Arrest:	1 mEq/kg IV initially, then 0.5 mEq/kg (max 50 mEq every 10 minutes until ROSC)
Overdose situations:	1 mEq/kg IV, repeat every 10 minutes until QRS duration < 100 ms.
Hyperkalemia:	1 mEq/kg/IV (max 100 mEq)
Adult Infusion:	150 mEq in 1,000 mL D5W, infuse per transferring provider's orders. Typical starting dose is 25 mL/hr.

SPECIAL NOTES

- This agent is no longer a first-line drug for cardiac arrest as per ACLS algorithms.
- Each amp of bicarbonate contains 44 or 50 mEq of sodium. In persons with cardiac disease this will increase intra-vascular volume and further stress the heart.
- Hyperosmolarity of the blood can occur because the NaHCO3 is concentrated. This results in cerebral impairment.
- These dosages are a very rough guide. Blood gasses should be obtained as soon as possible to direct further therapy.
- Correct CPR, hyperventilation, defibrillation and drug therapy are more important than bicarbonate.

Critical Care Endorsement Required

Critical Care Endorsement Required

Sodium Nitroprusside

BRAND NAME(S)

Nipride

CLASS OF DRUG

Potent antihypertensive agent; vasodilator

INDICATIONS

- Hypertensive emergencies
- Reduction of cardiac pre-load and after-load
- It is often used with vasopressor agents to maintain a blood pressure while decreasing the pre-load and afterload.

CONTRAINDICATIONS

- Hypersensitivity
- Decreased cerebral perfusion

DRUG INTERACTIONS

- Additive effect with other antihypertensives

ADMINISTRATION

Dose: Start at 0.25 µg/kg/min, increase by 0.25 – 0.5 µg/kg/min every 5 minutes as needed (Max 10 µg/kg/ min)

SPECIAL NOTES

- Solution bag line must be covered in opaque material.
- Solution is stable for only 24 hours.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Tenecteplase

BRAND NAME(S)

TNKase

CLASS OF DRUG

Thrombolytics/fibrinolytics

INDICATIONS

- Myocardial infarction
- CVA – non-hemorrhagic
- Pulmonary embolus

CONTRAINDICATIONS

- Hypersensitivity
- Recent surgery (within 10 days)
- GI/GU bleeding
- Uncontrolled hypertension (systolic BP >180, or diastolic BP > 110)
- Active internal bleeding
- History of CVA or intracranial hemorrhage
- Recent brain or spinal surgery (within 3 months)
- Recent trauma (within 3 months)
- Intracranial neoplasm
- Arteriovenous malformation, aneurysm, or suspected aortic dissection

DRUG INTERACTIONS

- Additive effect on bleeding with other anticoagulants, ASA, NSAID.

ADMINISTRATION

Acute CVA: 0.25 mg/kg IV (max 25 mg)

Acute MI/PE:

- <60 kg: 30 mg
- ≥60 to <70 kg: 35 mg
- ≥70 to <80 kg: 40 mg
- ≥80 to <90 kg: 45 mg
- ≥90 kg: 50 mg

Peds: Not indicated - contact medical control

SPECIAL NOTES

- Monitor all puncture sites (e.g., catheters, incisions, etc.) during therapy.
- Avoid new puncture sites or injections.
- When administering to the patient with AMI, watch the ECG closely for re-perfusion dysrhythmias.
- Requires a dedicated infusion line.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Terbutaline

BRAND NAME(S)

Terbutaline Sulfate

CLASS OF DRUG

Bronchodilator, uterine smooth muscle relaxant

INDICATIONS

- Control of pre-term labor

CONTRAINDICATIONS

- Hypersensitivity

DRUG INTERACTIONS

- Additive effect with other adrenergic drugs.
- Beta-adrenergic blockers may negate effects.

ADMINISTRATION

Adults: 2.5 to 5 µg/min, titrate by 2.5 to 5 µg/min every 20 – 30 minutes (Max 20 µg/min).

Peds: Not indicated

SPECIAL NOTES

- None

Critical Care Endorsement Required

Critical Care Endorsement Required

Ticagrelor

BRAND NAME(S)

Brilinta

CLASS OF DRUG

Platelet aggregation inhibitor

INDICATIONS

- Acute Coronary Syndrome

CONTRAINDICATIONS

- Hypersensitivity (eg, angioedema)
- History of intracranial hemorrhage (ICH)
- Active pathologic bleeding (eg, peptic ulcer, ICH)

DRUG INTERACTIONS

- Additive effect with other anti-platelet or anti-coagulant drugs.

ADMINISTRATION

Adults: 180 mg PO

Peds: Not indicated

SPECIAL NOTES

- None

Critical Care Endorsement Required

Critical Care Endorsement Required

TPN

BRAND NAME(S)

N/A

CLASS OF DRUG

Total Parenteral Nutrition

INDICATIONS

- Need for intravenous nutrition

CONTRAINDICATIONS

- Infection at site of infusion

DRUG INTERACTIONS

- Requires a dedicated line. Do not infuse any other medications through the same line.

ADMINISTRATION

Maintain infusion at rate specified by transferring facility.

SPECIAL NOTES

- Requires infusion pump.
- Should not be titrated.
- Some TPN solutions may contain insulin. Discuss frequency of glucose checks with transferring provider.
- Should be infused through a central venous catheter or PICC line.

Critical Care Endorsement Required

Critical Care Endorsement Required

Valproic Acid

BRAND NAME(S)

Depakote

CLASS OF DRUG

Anti-epileptic

INDICATIONS

- Prevention of seizures
- Status epilepticus

CONTRAINDICATIONS

- Hypersensitivity.
- Hepatic disease.

DRUG INTERACTIONS

- Aspirin may increase the level of valproic acid due to decreased metabolism.
- Carbapenem antibiotics may decrease the level of valproic acid due to an unknown mechanism.

ADMINISTRATION

Adults: 20 – 40 mg/kg IV infusion, infuse no faster than 6 mg/kg/min.

Peds: 20 – 40 mg/kg IV infusion, infuse no faster than 3 mg/kg/min. A continuous infusion may be initiated at 5 mg/kg/hr until a 6 hour seizure-free period, then reduced at a rate of 1 mg/kg/hr every 2 hours.

SPECIAL NOTES

- May cause CNS depression.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Vasopressin

BRAND NAME(S)

Pitressin

CLASS OF DRUG

Hormone (antidiuretic)

INDICATIONS

- May be used as an alternative pressor to epinephrine in the treatment of adult shock-resistant Ventricular Fibrillation.
- Useful in hemodynamic support in vasodilatory shock (e.g. septic shock).

CONTRAINDICATIONS

- Chronic renal failure
- Known hypersensitivity to beef or pork proteins

DRUG INTERACTIONS

- Vasopressor effect may be increased by concurrent administration of ganglionic blocking agents.

ADMINISTRATION

Cardiac Arrest

Adults: 40 units IV x 1 dose. May replace either 1st or 2nd dose of epinephrine.

Peds: Not indicated.

Shock (Second or Third line pressor agent)

Adults: Infuse at 0.03 units/min, no titration.

Peds: Not indicated.

GI Bleed

Adults: Start at 0.4 units/min, titrate by 0.1 units/min every 5 minutes as needed. (Range 0.2 – 0.8 units/min)

Peds: Not indicated.

SPECIAL NOTES

- Potent vasoconstrictor. Increased peripheral vascular resistance may provoke cardiac ischemia and angina. 2. Do not use in responsive patients with coronary artery disease.

Critical Care Endorsement Required

Critical Care Endorsement Required

Vecuronium

BRAND NAME(S)

Norcuron

CLASS OF DRUG

Non-depolarizing paralytic

INDICATIONS

- Relaxation of skeletal muscles during surgery or mechanical ventilation

CONTRAINDICATIONS

None

DRUG INTERACTIONS

None

ADMINISTRATION

Load: 0.1 mg/kg IV

Repeat: 0.1 mg/kg IV every 20 – 30 minutes

Infuse: 0.01 mg/kg/min

SPECIAL NOTES

- **This agent has no analgesic or amnestic properties.**
- **Adequate sedation must be ensured while patient is receiving this medication.**
- Rare bronchospasm can occur with this medication.

Critical Care Endorsement Required

Critical Care Endorsement Required

Vitamin K

BRAND NAME(S)

Phytonadione

CLASS OF DRUG

Essential cofactor for precursors of coagulation factors

INDICATIONS

- Correction of elevated INR due to administration of warfarin or liver impairment

CONTRAINDICATIONS

- Hypersensitivity

DRUG INTERACTIONS

None

ADMINISTRATION

Adults: 1 – 10 mg slow IV infusion

Peds: 0.1 mg/kg (max 5 mg) slow IV infusion

SPECIAL NOTES

- Allergic reactions can occur during IV administration.
- Pro-coagulant effects are not immediate.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

12 Lead ECG

INDICATIONS

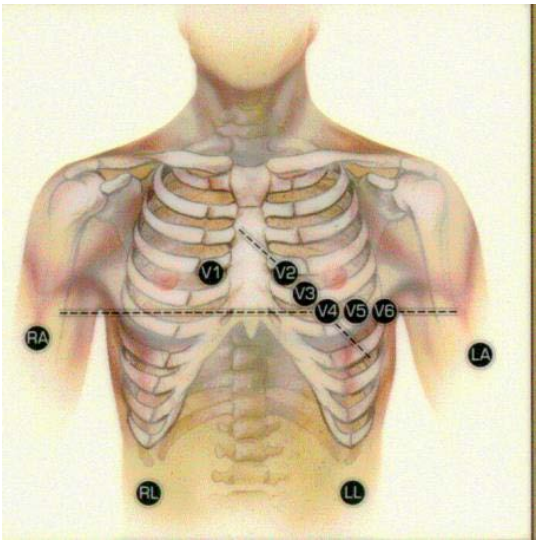
- Conscious, stable patients presenting with presumed signs and symptoms of cardiac origin
- Chest pain or pressure of presumed cardiac etiology
- Shortness of breath of presumed cardiac etiology
- Syncope
- Resuscitated cardiac arrest patient
- Suspected CVA patients
- Post synchronized cardioversion

PRECAUTIONS

- Do not significantly delay transport to conduct test.
- On female patients, always place leads V3 – V6 under the breast rather than on the breast.
- Never use the nipples as reference points for electrode location as nipple locations may vary widely.
- A "normal" ECG does not definitively rule out a MI nor should it be justification for nontransport.
- Women, the elderly, and persons with diabetes may present with atypical S&S of AMI.

PROCEDURE

- Whenever possible, attempt to obtain 12-lead with patient in supine position. If patient does not tolerate, place in semireclining or sitting position. Document the patient's position.
- Document patient name, sex, and age. Leave ECG size preset at x 1.
- Prep the skin and shave hair as necessary.
- Apply electrodes as follows and attach the appropriate lead to an electrode:
    - Limb (extremity) Leads: Precordial (chest) Leads:
    - Right arm (RA) – Right forearm
    - Right leg (RL) – Right calf
    - Left arm (LA) – Left forearm
    - Left leg (LL) – Left calf
    - V1 – Fourth intercostal space to the right of the sternum
    - V2 – Fourth intercostal space to the left of the sternum
    - V3 – Directly between leads V2 and V4
    - V4 – Fifth intercostal space at midclavicular line
    - V5 – Level with V4 at left anterior auxiliary line
    - V6 – Level with V5 at left midaxillary line



- Secure the cable with the cable clasp to an item of the patient's clothing.
- Attempt to obtain the 12-lead while the vehicle is not moving. Ask the patient to remain motionless and breathe normally for 10 seconds. Acquire and print two copies of the 12-lead ECG report.
- If the monitor detects signal noise (such as patient motion or a disconnected electrode), the 12-lead acquisition is interrupted until noise is removed. Take appropriate action as required (such as reconnecting leads).
- Interpretation should be relayed to receiving hospital during patient report. Document "Obtained 12-lead ECG." on patient run report and attach one copy to run report.

- Notify receiving hospital immediately after 12-lead has been performed and found to meet Cath Lab Activation Criteria. Leave one copy of 12-lead with receiving physician.
- Replace supplies and service per manufacturer recommendations.

SPECIAL NOTES

- Locating the V1 position (fourth intercostal space) is critically important because it is the reference point for locating the placement of remaining V leads. To locate the V1 position:
    - Place your finger at the notch in the top of the sternum. Move your finger slowly downward about 1.5 inches until you feel a slight horizontal ridge or elevation. This is the "angle of Louis" where the manubrium joins the body of the sternum.
    - Locate second intercostal space on the right side, lateral to and just below the angle of Louis.
    - Move your finger down two more intercostal spaces to the fourth intercostal space, which is the V1 position.
- Because treatment can affect how ST-elevation looks on a 12-Lead, the 12-Lead should be performed with the initial set of vital signs and before the administration of nitroglycerine.
- Patients with ST-Elevation should be transported to a facility that can have the patient in their cath lab within 60 minutes and have balloon inflation under 90 minutes. Regions Hospital EMS has received confirmation from Regions, United, St. Johns, University of Minnesota, and the VA Hospital of their ability to meet the above criteria.

Active Compression/Decompression CPR

INTRODUCTION

The ResQPUMP ACD-CPR Device is used to perform active compression decompression CPR (ACD-CPR), which is intended to promote active chest wall recoil to further increase blood flow to the brain and vital organs during CPR and improve the likelihood of survival.

INDICATIONS

The ResQCPR System is intended for use with CPR to improve the likelihood of survival in adult patients with nontraumatic cardiac arrest.

CONTRAINDICATIONS

None known.

WARNINGS

- Improper use of the ResQCPR System could cause serious injury to the patient and ineffective chest compressions/ decompressions. The ResQCPR System should only be used by personnel who have been trained in its use.
- Improper positioning of the ResQPUMP suction cup may result in possible injury to the rib cage and/or internal organs, and may also result in suboptimal circulation during ACD-CPR.
- Do not use the ResQPUMP if the patient's chest is not large enough for the ResQPUMP suction cup to provide adequate compressions/decompressions during use.
- Moisture, gels, or other lubricating materials on the patient's chest should be removed before applying the ResQPUMP.
- The ResQPUMP should not be used in patients who have had a recent sternotomy (within the past 6 months).

PRECAUTIONS

- The safety and effectiveness of using the ResQCPR System to treat cardiac arrest in patients with drug/medication overdose etiology have not been assured.
- If the patient has a return of spontaneous circulation (ROSC) during the resuscitation efforts, the ResQPOD should be immediately removed from the airway circuit and use of the ResQPUMP should be discontinued.

PROCEDURE

- Position the ResQPUMP's suction cup in the middle of the sternum, between the nipples (mid-nipple line). Make sure that the edge of the suction cup does not extend below the xiphoid process, as this could result in inadequate suction and/or rib injury.
- Turn on the metronome and begin performing compressions at a rate of 80/min, spending equal time compressing and lifting. Avoid interruptions.
- Compression: Compress to recommended depth (e.g. 2" or 5 cm). Observe the force required to achieve that depth, as it will vary according to how compliant the chest is. The tip of the red arrow indicates the force being applied. Once the amount of force required is known, use that target as a guide for continued compressions.
- Compress with elbows locked and shoulders directly over the sternum. Bend at the waist, using the entire upper body and large thigh muscles to compress and lift.
- Decompression: To fully achieve the benefits of ACD-CPR, attempt to actively pull up until the tip of the red arrow on the force gauge registers ≈10 kg. Lift using the upper body and large thigh muscles, and bend at the waist.
- Attach the ResQPOD ITD 16 to the facemask as soon as chest compressions begin; use a 2-handed technique to maintain a tight facemask seal and airway position.
- Rotate ACD-CPR duties every two minutes (or more often) to avoid fatigue.
- If the patient has a return of spontaneous circulation (ROSC) the ResQPOD should be immediately removed from the airway circuit, and use of the ResQPUMP should be discontinued.

SPECIAL CONSIDERATIONS

- Signs and symptoms of improved cerebral blood flow (e.g., eye opening, gagging, spontaneous breathing, and limb or body movement) have been reported in patients without a pulse but who are undergoing ResQCPR
- Automated CPR is the preferred method of resuscitation if patient transport is required.

Automated CPR

INTRODUCTION

LUCAS is an automated device designed to deliver uninterrupted chest compressions to a victim of cardiac arrest.

INDICATIONS

- Patients at least 12 years of age (or appropriately fits in the device with ability to have the CPR pad make contact with the chest)
- Patients in cardiac arrest from non-traumatic causes

CONTRAINDICATIONS

- Traumatic cardiac arrest
- Patients who are too large to fit in the device
- Patients in which the compression pad does not contact the chest when fully extended (generally pediatrics)
- Pregnant patients (2nd trimester and greater)

GENERAL INSTRUCTIONS (Refer to user guide for specifics)

- Begin manual CPR compressions while preparing the patient for the LUCAS
- Remove clothing from the chest and ensure skin contact with the plunger pad
- Open the LUCAS pack and peel back the sides of the case
- Ensure the LUCAS device is turned to "adjust"
- Place the yellow back plate under the patient, back plate should be just below the patient's armpits and centered on the patient's nipples
- Attach the claw hook to the back plate, first on the side opposite the rescuer performing manual CPR, then place across patient and connect to the opposite side
- With both hands on the suction pad, place fingers on compression pad and pull suction pad down until compression pad touches the chest. Align lower edge of the suction pad with the xiphoid.
- Turn LUCAS to the lock position
- Check the placement of the compression pad/suction pad
- Turn the LUCAS device on (the device will now deliver continuous compressions or 30-2 depending on mode selected. Ventilate the patient per the prompts of the ResQPod or other ITD device)
- Upon return of ROSC or to check pulse, press Turn LUCAS device to Lock (no need to remove the device)
- If there is failure or malfunction of device return to manual CPR

SPECIAL NOTES

- Make sure defibrillation pads are not positioned under the suction pad/compression pad
- Patients may be transported under LUCAS CPR without a return of spontaneous circulation at any time.

Automated External Defibrillation

INDICATIONS

- Patients in cardiac arrest (pulseless, non-breathing).

CONTRAINDICATIONS

- Pediatric patients who are so small that the pads cannot be placed without touching one another.

PROCEDURE

- If multiple rescuers available, one rescuer should provide uninterrupted chest compressions while the AED is being prepared for use.
- Apply defibrillator pads per manufacturer recommendations. Avoid placing directly over an implanted device (pacemaker, AICD).
- Remove any medication patches on the chest and wipe off any residue.
- If necessary, connect defibrillator leads: white to the anterior chest pad and the red to the posterior or lateral pad.
- Activate AED for analysis of rhythm.
- Stop CPR and clear the patient for rhythm analysis. Keep interruption in CPR as brief as possible.
- Defibrillate if appropriate by depressing the "shock" button. Assertively state "CLEAR" and visualize that no one, including yourself, is in contact with the patient prior to defibrillation. The sequence of defibrillation charges is preprogrammed for monophasic defibrillators. Biphasic defibrillators will determine the correct joules accordingly.
- Begin CPR (chest compressions and ventilations) immediately after the delivery of the defibrillation.
- After 2 minutes of CPR, analyze rhythm and defibrillate if indicated. Repeat this step every 2 minutes.
- If "no shock advised" appears, perform CPR for two minutes and then reanalyze.
- Transport and continue treatment as indicated.
- Keep interruption of CPR compressions as brief as possible. High-quality CPR is a key to successful resuscitation.
- If pulse returns please use the Post Resuscitation Guideline.

PEDIATRIC CONSIDERATIONS

- Age < 8 years, use Pediatric Pads if available and can be placed appropriately without touching each other.
- If pediatric pads are not available, adult pads may be used if they can be placed appropriately without touching each other.

Blood Glucose Analysis

CLINICAL INDICATIONS

Patients with suspected hypoglycemia (diabetic emergencies, change in mental status, bizarre behavior, etc.)

PROCEDURE

- Gather and prepare equipment.
- Insert test strip into glucometer and verify that display is waiting for a blood sample.
- Blood samples for performing glucose analysis can be obtained through a finger-stick or when possible simultaneously with intravenous access.
- Place correct amount of blood on reagent strip or site on glucometer per the manufacturer's instructions.
- Time the analysis as instructed by the manufacturer.
- Document the glucometer reading and treat the patient as indicated by the analysis and appropriate guideline.
- Repeat glucose analysis as indicated for reassessment after treatment and as per appropriate guideline.
- Perform Quality Assurance on glucometers at least once every 7 days, if any clinically suspicious readings are noted, and/or as recommended by the manufacturer and document in the log.

PEDIATRIC CONSIDERATIONS

- For neonates, obtain blood sample via a heel-stick rather than finger-stick.

Blood Product Transfusion

ACTION

To improve the hemodynamics of patients suffering hemorrhagic shock.

INDICATIONS

- Suspected or confirmed hemorrhagic shock from blunt or penetrating trauma with signs of inadequate perfusion such as hypotension (SBP < 90 or absent radial pulse), tachycardia, or altered mental status
- Shock index (heart rate / systolic blood pressure) > 1
- Administration of Tranexamic Acid indicated: signs/symptoms of hemorrhagic shock not corrected with standard trauma resuscitation treatments
- Postpartum vaginal hemorrhage with evidence of hemorrhagic shock

CONTRAINDICATIONS

- Cardiac arrest or signs of non-survivable injury
- Hemodynamic instability from non-traumatic cause
- Religious or personal beliefs not in line with blood product administration

PRECAUTIONS

- Patients with a history of transfusion reactions
- Medications may not be infused through the same IV/IO site as blood transfusion

ADVERSE REACTIONS/SIDE EFFECTS

- Hemolytic reactions such as fever, low back or flank pain
- Allergic reactions such as rash, wheezing, or anaphylaxis
    - If a reaction occurs, immediately STOP the transfusion and refer to Anaphylaxis Guideline

PROCEDURE

- Perform all appropriate interventions according to the Universal Patient Care and Traumatic Injuries guidelines
- Ensure bleeding is controlled at its source when possible
- Ensure patent IV/IO access
    - 2 separate access sites recommended (1 for blood transfusion and 1 for medication administration)
- Document vital signs, including temperature, prior to initiating blood transfusion
- Prepare the blood warming device and connect any necessary cartridges, cables, and tubing
- Initiate blood product transfusion using blood-compatible administration set with filter
    - Adults, administer 1 unit of blood
    - Pediatrics, administer 10 ml/kg. May repeat once if signs and symptoms persist
    - A pressure bag or rapid infusion device may be used to expedite the transfusion
- Monitor patient for Adverse Reactions/Side Effects listed above
- Administer 2 grams TXA in a separate access site from blood transfusion
- Administer 1 gram calcium chloride in a separate access site from blood transfusion
- Reassess and document vital signs (heart rate, blood pressure, pulse, pulse oximetry) every 5 minutes
- Reassess and document (on Blood Transfusion Handoff Documentation form) patient's temperature every 15 minutes

HANDOFF RESPONSIBILITIES

- Ensure that the blood infusion bag (even if empty), all tubing segments attached to the bag, and the Blood Transfusion Handoff Documentation form is given to the receiving facility
- Receiving facility should send all items to their blood bank

SPECIAL NOTES

- Although blood type O-negative is considered the universal donor, O-positive blood type is more commonly available. O-positive blood has been studied and is safe for administration in emergency situations.
- Whole blood is the preferred transfusion product, however depending on availability packed red blood cells (PRBCs) may be administered following the same guidelines and procedures.

Carbon Monoxide Oximetry

INTRODUCTION

Carbon monoxide oximetry devices, such as the Rad57, can be use to evaluate potential carbon monoxide poisoning in patients or firefighters.

INDICATIONS

Patients exhibiting the following signs and symptoms:

- Flu-like symptoms
- Dyspnea
- Headache
- Chest pain
- Lethargy
- Nausea/vomiting
- Hallucinations or giddiness

PROCEDURE

- Obtain a history of potential carbon monoxide exposure and history of smoking.
- Secure or maintain the airway
- Provide oxygenation and ventilation as needed
- Consider ALS response.
- Apply finger probe to patient using the correct technique.
    - If patient SpCO = 0-5%, no further evaluation for carbon monoxide exposure is necessary.
    - If patient SpCO = 5-10% with no altered mental status and no symptoms, no further evaluation necessary.
    - If patient SpCO = 5-10% with symptoms listed above (regardless of the presence of altered mental status), treat with 100% O2 and transport for further evaluation.
    - If patient SpCO > 10%, treat with 100% O2 and transport for further evaluation.

SPECIAL NOTE

- Patients requiring further evaluation should be transported according to the destination recommendations in the Carbon Monoxide Exposure Guideline.

Cardioversion

INDICATIONS

- Unstable patient with a tachydysrhythmia (rapid atrial fibrillation, supraventricular tachycardia, ventricular tachycardia)
- Patient is not pulseless (the pulseless patient requires unsynchronized cardioversion, i.e. defibrillation)

PROCEDURE

- Ensure the patient is attached properly to a monitor/defibrillator capable of synchronized cardioversion.
- Have all equipment prepared for unsynchronized cardioversion/defibrillation if the patient fails synchronized cardioversion and the condition worsens.
- Consider the use of pain or sedating medications per guideline.
- Set energy selection to the appropriate setting.
- Set monitor/defibrillator to synchronized cardioversion mode (press the "Sync" button once pads are connected).
- Make certain all personnel are clear of patient.
- Press and hold the shock button to cardiovert. Stay clear of the patient until you are certain the energy has been delivered. NOTE: It may take the monitor/defibrillator several cardiac cycles to "synchronize", so there may a delay between activating the cardioversion and the actual delivery of energy.
- Note patient response and perform immediate unsynchronized cardioversion/defibrillation if the patient's rhythm has deteriorated into pulseless ventricular tachycardia/ventricular fibrillation.
- If the patient's condition is unchanged, repeat steps 2 to 8 above, using escalating energy settings.
- Repeat until maximum setting or until efforts succeed. Consider discussion with Medical Control if cardioversion is unsuccessful after 2 attempts.
- Note procedure, response, and time in the patient care report (PCR).

Chest Needle Decompression

INDICATIONS

- To relieve a tension pneumothorax evidenced by:
  - Absent breath sounds
  - Distended neck veins
  - Falling systolic blood pressure
  - Narrowing pulse pressure
  - Central cyanosis
  - Tracheal deviation
  - Pulseless electrical activity
  - Increased tympany
  - Increased respiratory difficulty

PRECAUTIONS

- Crepitus and/or subcutaneous air may be present with a simple or tension pneumothorax.
- Always insert needle over (cephalad to) rib to avoid neurovascular bundle.

PROCEDURE

- This procedure may be performed on a patient when indications are present prior to physician order.
- On the appropriate side, identify the 2nd intercostal space.
- Needle insertion
  - In adults, use a 10 g. 3" needle through catheter or Cook Needle.
  - Position tip of needle in incision over 3rd rib and insert.
  - Advance needle into chest walking the needle up over the inferior rib at 45° angle to the chest wall and parallel to sternum. At pleural cavity a slight "give" is felt.
  - Advance further into chest until bevel clears pleura. Do not advance the needle any further than is necessary to advance the catheter.
- Advance the catheter over the needle and then remove needle.
- Connect tubing, making sure to pay attention to proper flow direction of the Heimlich valve.
- Secure catheter to chest.
- Catheter may be connected to LOW suction to assist evacuation of pneumothorax. Do not clamp tubing. Suction may be applied intermittently.
- Contact the EMS On-Call Clinical Supervisor following performance of the procedure.

PEDIATRIC CONSIDERATIONS

- In children < 12 years, use a 14 g. 1 ¾" needle through catheter instead.

SPECIAL NOTES

- Rush of air and/or tube fogging and/or patient improvement indicates correct placement.
- In the majority of circumstances, bilateral decompression will be required.
- Once needle is placed, prehospital personnel should not remove it.

INDICATIONS

Imminent delivery with crowning

CONTRAINDICATIONS

If umbilical cord is the presenting part, DO NOT DELIVER. Use a gloved finger to relieve pressure on the cord and transport emergently to the closest appropriate facility.

PRECAUTIONS

If the infant is in a breech position, transport rapidly, discourage mother from pushing, but do not attempt to prevent delivery by applying direct pressure to the infant.

PROCEDURE

- Delivery should be controlled so as to allow a slow controlled delivery of the infant. This will prevent injury to the mother and infant.
- Support the infant's head as needed.
- Check the umbilical cord surrounding the neck. If it is present, slip it over the head. If unable to free the cord from the neck, double clamp the cord and cut between the clamps.
- Routine suctioning of the airway with a bulb syringe is not recommended, unless respiratory distress is evident.
- Grasping the head with hands over the ears, gently pull down to allow delivery of the anterior shoulder.
- Gently pull up on the head to allow delivery of the posterior shoulder.
- Slowly deliver the remainder of the infant.
- Clamp the cord 2 inches from the abdomen with 2 clamps and cut the cord between the clamps.
- Record APGAR scores at 1 and 5 minutes.
- Follow the Newly Born Guideline for further treatment.
- The placenta will deliver spontaneously, usually within 5 minutes of the infant. Do not force the placenta to deliver.
- Massaging the uterus may facilitate delivery of the placenta and decrease bleeding by facilitating uterine contractions.
- Continue rapid transport to the hospital.

CPAP

INTRODUCTION

Continuous Positive Airway Pressure has been shown to rapidly improve vital signs, gas exchange, the work of breathing, decrease the sense of dyspnea, and decrease the need for endotracheal intubation in patients who suffer from shortness of breath from asthma, COPD, pulmonary edema, CHF, and pneumonia. In patients with CHF, CPAP improves hemodynamics by reducing preload and afterload.

INDICATIONS

- Any patient who is complaining of shortness of breath for reasons other than pneumothorax and:
  - Is awake and oriented
  - Is over 12 years old and is able to fit the CPAP mask
  - Has the ability to maintain an open airway (GCS > 10)
  - A respiratory rate greater than 25 breaths per minute
  - Has a systolic blood pressure above 90 mmHg
  - Uses accessory muscles during respirations
  - Sign and Symptoms consistent with asthma, COPD, pulmonary edema, CHF, or pneumonia

CONTRAINDICATIONS

- Patient is in respiratory arrest
- Patient is suspected of having a pneumothorax
- Patient has a tracheostomy

PRECAUTIONS

- Use caution if patient:
  - Has impaired mental status and is not able to cooperate with the procedure
  - Has failed at past attempts at noninvasive ventilation
  - Has active upper GI bleeding or history of recent gastric surgery
  - Complains of nausea or vomiting
  - Has inadequate respiratory effort
  - Has excessive secretions
  - Has a facial deformity that prevents the use of CPAP
- Intubation should be performed if:
  - Respiratory or cardiac arrest
  - Unresponsive to verbal stimuli (GCS is < 9) and attending paramedic is able to perform RSI or attempt intubation.

PROCEDURE

- Make sure patient does not have a pneumothorax!
- EXPLAIN THE PROCEDURE TO THE PATIENT
- Ensure adequate oxygen supply to ventilation device (100% when starting therapy and until SaO2 is >95%)
- Place the patient on continuous pulse oximetry
- Place the delivery device over the mouth and nose
- Secure the mask with provided straps or other provided devices
- Use 10 cm H2O of PEEP

- Check for air leaks
- Monitor and document the patient's respiratory response to treatment
- Monitor vital signs at least every 5 minutes. CPAP can cause BP to drop.
- Continue to coach patient to keep mask in place and readjust as needed
- If respiratory status deteriorates, remove device and consider intermittent positive pressure ventilation with or without endotracheal intubation.

REMOVAL PROCEDURE

- CPAP therapy needs to be continuous and should not be removed unless the patient can not tolerate the mask or experiences continued or worsening respiratory failure.
- Intermittent positive pressure ventilation and/or intubation should be considered if the patient is removed from CPAP therapy.

PEDIATRIC CONSIDERATIONS:

- CPAP should not be used in children under 12 years of age

SPECIAL NOTES:

- Advise MRCC so receiving hospital can be prepared for patient.
- Do not remove CPAP until hospital therapy is ready to be placed on patient.
- Most patients will improve in 5-10 minutes. If no improvement within this time, consider intermittent positive pressure ventilation.
- Watch patient for gastric distention.
- Use nitroglycerine tablets to avoid nitroglycerine spray from being dispersed on medics.
- May be the treatment of choice in a patient with a DNI order.
- In-line nebs can be delivered with CPAP as appropriate

Cricothyrotomy

ACTION

To ventilate a patient who has a complete airway obstruction that cannot be ventilated adequately by any other means.

INDICATIONS

Complete airway obstruction caused by:

- Foreign body obstruction of the proximal airway
- Laryngeal fracture
- Laryngeal edema caused by inhaled materials, burns, or anaphylaxis
- Epiglottitis
- Massive Maxillofacial injury causing complete upper airway obstruction

CONTRAINDICATIONS

- Ability to ventilate patient by any other means (BVM, oral airways, rescue airway, ETI)
- Laryngeal fractures that have distorted or obliterated landmarks
- Less than 8 years of age

PRECAUTIONS

- May cause false passage, subcutaneous emphysema, and bleeding.
- Use with caution in patients with bleeding disorders.

PROCEDURE

- If possible, provide optimal O2 saturation of the patient before starting the procedure.
- Take appropriate BSI precautions
- Identify the cricothyroid membrane and clean with Betadine, followed by alcohol.
- Make a vertical mid-line incision approximately 1.5" long with a #10 scalpel over the cricothyroid membrane into the underlying strap of muscle.
- Insert the Sklar hook into the membrane perpendicular to the trachea. Once the Sklar hook is in the trachea, rotate towards the patient's feet and lift upward and caudad (towards the patient's feet) traction.
- Use the scalpel to open transversely into the trachea through the cricothyroid membrane, keeping the blade near or against the Sklar hook.
- Using cricoid pressure, insert index finger into the incision.
- Introduce a 6.0 ETT perpendicular to the trachea, rotating as it is advanced (Tracheal Tube introducer may be used).
- Inflate the cuff with 5-10 cc of air.
- Confirm placement with EtCO2, auscultating epigastric area and bilateral lung sounds.
- Secure tube with appropriate ET tube securing method or device.
- Position patient on backboard and secure head with V-block.
- Monitor patient for evidence of subcutaneous air.

PEDIATRIC CONSIDERATIONS

- Contraindicated in children under 8 years of age.

SPECIAL NOTES

- The ET tube must be left in place when a patient is pronounced dead in the field.
- Clean, disinfect, and return Sklar hook, according to your services policies.

Defibrillation

INDICATIONS

Cardiac arrest with ventricular fibrillation or pulseless ventricular tachycardia

CONTRAINDICATIONS

None in cardiac arrest

PROCEDURE

- **Ensure that Chest Compressions are adequate and interrupted only when absolutely necessary.**
- Clinically confirm the diagnosis of cardiac arrest and identify the need for defibrillation.
- After application of an appropriate conductive agent if needed, apply defibrillation hands free pads (recommended to allow more continuous CPR) or paddles to the patient's chest in the proper position. These can be applied either anteriorposterior (over sternum and middle of back), or anterior-lateral (over upper right chest and lower lateral left chest). Attempt to avoid placing paddles or pads directly over implanted devices or medication patches.
- Set the appropriate energy level
- Charge the defibrillator to the selected energy level. **Continue chest compressions while the defibrillator is charging.**
- If using paddles, assure proper contact by applying 25 pounds of pressure on each paddle.
- Hold Compressions, assertively state, "CLEAR" and visualize that no one, including yourself, is in contact with the patient.
- Deliver the countershock by depressing the discharge button(s) when using paddles, or depress the shock button for hands free operation.
- **Immediately resume chest compressions** and ventilations for 2 minutes. After 2 minutes of CPR, analyze rhythm and check for pulse only if appropriate for rhythm.
- Repeat the procedure every two minutes as indicated by patient response and ECG rhythm.
- Keep interruption of CPR compressions as brief as possible. High quality CPR is a key to successful resuscitation.

Donut Magnet

INDICATIONS

- ICD shocks not preceded by Ventricular Tachycardia or Ventricular Fibrillation
- Multiple shocks in a patient with a suspect ICD (Medtronic with Fidelis lead 2008)
- Multiple shocks without warning symptoms, such as, palpitations, fainting, or near fainting

CONTRAINDICATIONS

- Patients who have evidence of Ventricular Tachycardia or Ventricular Fibrillation

PRECAUTIONS

- If external defibrillation or cardioversion is required external magnet should be removed.
- ALL patients in which the magnet is to be utilized need to be on the cardiac monitor with external defibrillation pads applied.
- Magnet will abort the ability of the ICD to deliver shocks for Ventricular Tachycardia or Ventricular Fibrillation.

PROCEDURE

- Place the patient on the cardiac monitor with external defibrillation pads.
- Locate the patients ICD battery pack in the subclavicular area and tape the magnet directly over the device on the skin.
- Magnet will not affect the programmed pacing mode for bradycardia.
- If evidence of VT or VF is present, removal of the magnet reactivates the ICD and will result in therapy delivery of shock for VT or VF.

SPECIAL NOTES

- Medtronic ICDs should emit a constant tone for 30 seconds when the magnet is first applied.
- Boston Scientific (formerly Guidant) ICDs will continue to emit a beep on the R wave as long as the magnet is in place.
- St. Jude ICDs do not emit any tones when the magnet is applied.

Double Sequential Defibrillation

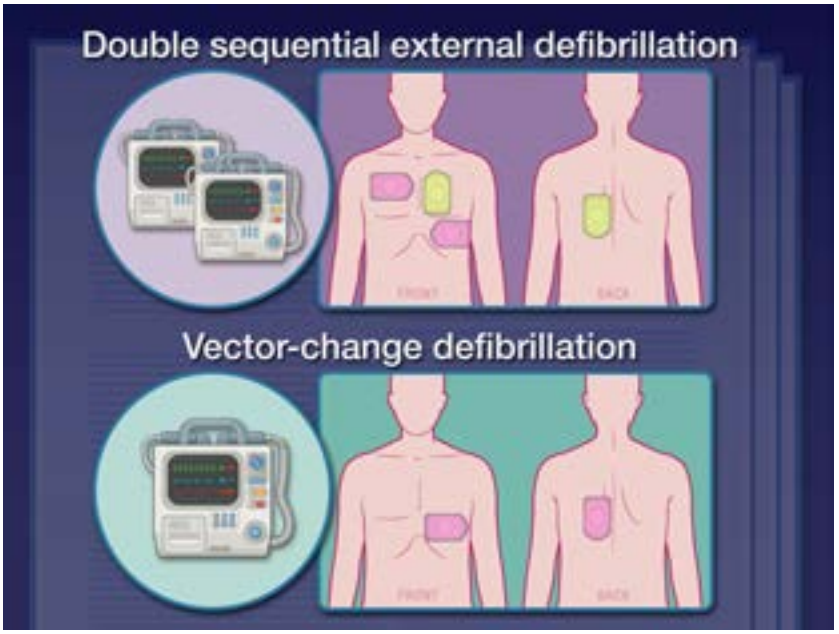
Definition:

Double sequential defibrillation involves the placement of two sets of pads in the anterior-posterior (AP) and antero-lateral (AL) positions with two monitors, two AEDs, or a combination of a monitor and an AED. Vector change defibrillation involves changing pad placement from AP to AL, or AL to AP, after failed defibrillation attempts.

Background:

Double sequential defibrillation has been brought back to the forefront of shockable cardiac arrest management with the publication of a study (linked below) in the New England Journal of Medicine. This was a prospective cluster-randomized controlled trial involving 405 patients in Canada. Patients who remained in refractory v-fib despite 3 defibrillation attempts were randomized to three groups: double sequential defibrillation, vector change defibrillation, or standard defibrillation. This study found that there was a significant improvement in survival to discharge in the double sequence group as well as the vector change group. Patients assigned to the double sequential defibrillation group also had better neurological outcomes while the vector change did not have a significant difference. Because of this data, it seems that double sequential defibrillation is our best bet in not only improving rates of survival, but also maintaining a good neurologic outcome.

Procedure:



- The first personnel arriving with a defibrillator should place the pads in the AP vector. This will avoid pauses in compressions later when a mechanical CPR device is applied.
- When a second monitor/AED arrives, the pads will be placed in the AL vector ensuring that the pads are not touching each other.
- If the patient continues to remain in a shockable rhythm after three defibrillation attempts, the patient should be defibrillated sequentially (<1 second pause).
- Other cardiac arrest care should be continued per our normalguidelines.
- If the patient is an ECMO candidate, do not delay calling the ECMO line to determine eligibility. If the patient is accepted to ECMO, do not delay transportation; consider double sequential defibrillation while in route to the receiving ECMO facility.
- Vector change (AL -> AP or AP -> AL) should be considered if a second AED or monitor is not available.

Special Notes:

- Whenever possible, a SINGLE provider should be the one to push both shock buttons.
- It is not crucial that both shocks be delivered exactly simultaneously. Hence the term "sequential".

References:

- REBEL Cast Ep113: Defibrillation Strategies for Refractory Ventricular Fibrillation - REBEL EM - Emergency Medicine Blog (https://rebelem.com/defibrillation-strategies/)
- Defibrillation Strategies for Refractory Ventricular Fibrillation | NEJM (https://www.nejm.org/doi/full/10.1056/NEJMoa2207304)
- Using Double Sequential Defibrillation to Help Cardiac Arrest Patients - JEMS: EMS, Emergency Medical Services - Training, Paramedic, EMT News (https://www.jems.com/patient-care/cardiac-resuscitation/using-double-sequential-defibrillation-to-help-cardiac-arrest-patients/)

ECMO Team Activation

INTRODUCTION

In refractory V fib/tach, there is an option of the patient possibly being placed on extracorporeal membrane oxygenation (ECMO) while still in full arrest, and then receiving a heart catheterization (PCI). Any patient placed on ECMO, who survives and was treated per this guideline, will be admitted to an ECMO unit (EU) for further care.

INDICATIONS

- Have an initial recorded, shockable rhythm
- Must be between 18-75 years old
- Have no DNR orders
- Have an estimated transport time of less than 30 minutes
- Must fit in a LUCAS, and be transported using LUCAS/ITD.
- Have no other initial rhythm, including PEA and asystole. Rhythms that occur after an initial recorded rhythm of V fib/ tach, including PEA and asystole, do not disqualify the patient

CONTRAINDICATIONS

- Have contraindications to mechanical CPR e.g., recent thoracotomy
- Are known to be pregnant
- Have a known terminal illness
- Have known dementia
- Have a family or caregiver who objects

PROCEDURE

- Refractory V fib/tach (RVF) is defined as V fib/tach that fails 2 consecutive defibrillation attempts. If the patient meets the above inclusion/exclusion criteria for ECMO, the family or caregiver, if present, will be presented with the transport options (*"Your loved one is suffering from cardiac arrest. We advise that he or she go to the University or Regions, whichever is closest. However, you can go to any hospital you choose. Where would you like to go?"*). If there are no objections, transport will begin immediately, under LUCAS/ITD CPR, to the designated center for consideration of ECMO.
- The crew will call Life Link III (LLIII) dispatch at 612-638-4901, or MRCC to inform them of the transport of an ECMO candidate. Life Link will alert the lead physician on the ECMO team (MD1).
- MD1 will inform the crew of EU bed availability. If a bed is available, the crew will proceed to the hospital MD1 selects. If there is no EU bed available, the crew will proceed to the nearest appropriate hospital and LLIII will cancel the ECMO team. In either case the team will call MRCC and inform them of the case and the ETA. MRCC will, in turn, call the receiving hospital and relay that information to the hospital.

SPECIAL NOTES

- IN ALL CICRCUMSTANCES THE FAMILY OR CAREGIVER HAS THE FINAL SAY AS TO THE PATIENT'S DESTINATION.
- THE MOBILE ECMO TEAM WILL ONLY BE DISPATCHED IF THERE IS EU BED AVAILABLE. IF THERE IS NO EU BED AVAILABLE, LLIII WILL NOTIFY THE CREW TO PROCEED TO THE NEAREST APPROPRIATE HOSPITAL.
- Do not guarantee that the patient will receive ECMO or go to the cath lab. If there is no EU bed available in the Twin Cities, the patient will not be placed on ECMO.
- A main determinant of whether or not the patient is going to the cath is the length of time the patient is in full arrest. Maintaining a short scene time is VERY important. A general goal would be to keep the scene time to 10 minutes, or less.
- ONCE THE ECMO TEAM IS DISPATCHED, UNDER NO CIRCUMSTANCES WILL EMS CANCEL THEM. This includes the patient returning to spontaneous circulation (ROSC). It is the natural course of RVF to go into a meta arrest pattern. The hallmark of this pattern is obtaining a ROSC and returning repeatedly to VF. This pattern will generally continue until the coronary blockage which is causing the RVF is corrected. Not correcting the blockage most often results in death.

Endotracheal Intubation

INDICATIONS

Endotracheal intubation is an appropriate method of airway control in the following patients:

- Patients with a decreased level of consciousness (GCS of < 8)
- Cardiac or respiratory arrest
- Profound respiratory depression, especially in:
  - Pulmonary edema, chronic obstructive pulmonary disease, or asthma
  - Cerebral insult or injury (use C-spine precautions)

PRECAUTIONS

- Intubation should be done with in-line spinal stabilization in trauma victims.
- Take appropriate universal precautions, including facial protection.
- Good continuous compressions and ventilations should be the priority during a cardiac arrest with manageable airway. During cardiac arrest, intubation should not take place until after the second defibrillation or four minutes of high quality CPR.

INSERTION PROCEDURE

- Begin positive pressure ventilation with 100% oxygen and oral airway. Ventilate initially, attempting to maximize oxygen saturation, and giving ventilations slowly, over 1.5 - 2 seconds
- Clear airway of foreign bodies/secretions. Have suction available.
- Check equipment, insert stylet/introducer, and lubricate tube.
- Place patient in sniffing position. In trauma, manually maintain in-line stabilization and remove anterior portion of c-collar.
- Hold laryngoscope in left hand; insert in right side of mouth and move the tongue to the left.
- Visualize vocal cords. Attempts at intubation should last no longer than 30 seconds. Use of the tracheal tube introducer is expected.
- Insert tube until proximal end of cuff lies 1/2"-1" beyond cords. Manually secure the tube until it has been properly secured. Note tube depth at teeth.
- Inflate cuff with 10 cc air and remove stylet/introducer.
- Secure tube with one hand and confirm placement with auscultation, waveform capnography, colorimetric capnography, or TubeChek-B™.
- Ventilate patient with 100% oxygen while assessing for stomach sounds, chest rise and lung sounds.
- After 6 – 7 ventilations, attach electronic EtCO2 to continuously monitor patient and record number in report.
- Other indications that the tube is placed correctly include:
  - The patient's SpO2 reading and color improvement.
  - Condensation collects inside the tube with each breath.
- A maximum of two attempts is allowed. In non-cardiac or respiratory arrest patients, the patient's SpO2 should not drop below 90%, regardless of the number of attempts.
  - Patient should be ventilated for 2 minutes between attempts.
  - If intubation is not successful after 2 attempts, other means of airway management should be utilized, such as a supraglottic airway device or oral/nasal airway with a BVM.
- Ventilate patient for at least 2 minutes
- Apply 5cm PEEP in all intubated respiratory arrests with a pulse. DO NOT use if suspected pneumothorax. Stop use if patient becomes hypotensive
- Secure tube with appropriate screw down or slip lock device (tape is unacceptable unless mechanical device cannot be used), again noting tube depth.

- Consider immobilizing head and neck with C-collar.
- If evidence of gastric distention, consider inserting a gastric tube:
  - Lubricate tube.
  - Place head in neutral or slightly flexed position (non-trauma only) to facilitate passage into esophagus.
  - Insert gastric tube into mouth and advance to the second black line.
  - Aspirate gastric contents with catheter-tipped syringe to confirm correct tube placement. If no return, advance tube to third marker and repeat aspiration attempt.
  - If unable to aspirate stomach contents, assess tube placement by quickly injecting about 25 cc of air while auscultating over epigastrium. If no air gurgling is heard, remove tube and reinsert.
- Frequently reassess ET tube placement (especially when patient is moved and before entering the ED) and document on patient care report. Use direct visualization if necessary.
- If sedation is necessary following intubation, refer to the Post Intubation Sedation Guideline. Sedation is generally preferred to extubation for improved level of consciousness.

REMOVAL PROCEDURE

The ET tube should not be removed unless placement cannot be determined or position is felt to be nontracheal.

- Have suction equipment ready.
- Log roll the patient to the side.
- Deflate the distal cuff. The pilot balloon should completely collapse.
- Remove ET tube during inspiration (if patient is spontaneously breathing) while suctioning the airway.

PEDIATRIC CONSIDERATIONS

Endotracheal intubation should not be performed on pediatric patients. Research has demonstrated that the risks of ET intubation in pediatric patients are high, and generally these patients are more appropriately managed with BLS airway skills including oral/nasal airways and a BVM. Supraglottic airway devices should be utilized if advanced airways are felt to be necessary.

SPECIAL NOTES

- When appropriate and indicated, paramedics should attempt intubation. The tracheal tube introducer can greatly facilitate placement.
- Supraglottic airway devices are considered equivalent to endotracheal tubes for the purposes of airway management, except in the following situations:
  - Inhalational burns, especially if vocal changes or stridor are present
  - Anaphylaxis or angioedema with respiratory symptoms
- The ET tube must be left in place when a patient is pronounced dead in the field.
- If intubation was unsuccessful, document difficulties such as "jaws clenched" or "copious vomiting". Also, document reasons why intubation was not performed if it was indicated.
- Proper placement of an ET tube in an adult is calculated as 3 times the tube size, or approximately:
  - Males: 23 cm at the lips and 22 cm at the teeth
  - Females: 22 cm at the lips and 21 cm at the teeth
  - If in doubt, 22 cm at the lips should work for most adults.

End-Tidal Waveform Capnography

INTRODUCTION:

Carbon dioxide (CO_2) is a byproduct of respiration. Approximately 5% of the exhaled air of a healthy patient is carbon dioxide. End-tidal CO_2 ($EtCO_2$) detection is useful in identifying the correct placement of an advanced airway. Waveform capnography can also provide information about the airflow through the patient's airway in cases of restriction or obstruction.

INDICATIONS

- To assist in determining correct advanced airway placement patients

PRECAUTIONS

- In low perfusion states (such as cardiac arrest), severe acidosis (sepsis, DKA, toxic ingestions), or vascular obstruction (massive PE), the production or elimination of CO_2 is significantly diminished and therefore measured values may remain low. In these cases, assessment of other airway device placement indicators is crucial (lung sounds, equal chest rise, absent epigastric sounds).
- Waveform capnography should always be used in conjunction with other assessments such as lung sounds, chest rise, absence of gastric sounds, tube fogging, pulse oximetry, and direct visualization (in the case of ET intubation). Never rely entirely on $EtCO_2$ values as the sole method of assessment for tube placement.
- A patient who has received mouth to mouth ventilation may exhibit false positive readings.
- A patient that has recently consumed carbonated beverages may cause a false positive reading if ventilation is attempted through a tube placed in the esophagus.

PROCEDURE

- Perform advanced airway management per guideline.
- Assess tube placement by observing waveform capnography tracings, listening for lung sounds, gastric sounds, and looking for chest rise.
- If the waveform capnography values are lower than expected, and other assessment indicators are positive or questionable for correct tube placement, IMMEDIATELY USE DIRECT VISUALIZATION TO DETERMINE TUBE POSITION.
- Document results of $EtCO_2$ detection on run report form.

Heimlich Maneuver

INDICATIONS

Sudden onset of respiratory distress often with coughing, wheezing, gagging, or stridor due to a foreign-body obstruction of the upper airway.

PROCEDURE

- Assess the degree of foreign body obstruction
  - Do not interfere with a mild obstruction allowing the patient to clear their airway by coughing.
  - In severe foreign-body obstructions, the patient may not be able to make a sound. The victim my clutch his/her neck in the universal choking sign.
- **For an infant**, deliver 5 back blows (slaps) followed by 5 chest thrusts repeatedly until the object is expelled or the victim becomes unresponsive.
- **For a child**, perform a subdiaphragmatic abdominal thrust (Heimlich Maneuver) until the object is expelled or the victim becomes unresponsive.
- **For adults**, a combination of maneuvers may be required.
  - First, subdiaphragmatic abdominal thrusts (Heimlich Maneuver) should be used in rapid sequence until the obstruction is relieved.
  - If abdominal thrusts are ineffective, chest thrusts should be used. Chest thrusts should be used primarily in morbidly obese patients and in the patients who are in the late stages of pregnancy
- If the victim becomes unresponsive, begin CPR immediately but look in the mouth before administering any ventilations. If a foreign-body is visible, remove it.
- **Do not perform blind finger sweeps in the mouth and posterior pharynx. This may push the object farther into the airway.**
- In unresponsive patients, ALS providers should visualize the posterior pharynx with a laryngoscope to potentially identify and remove the foreign-body using Magil forceps.
- Document the methods used and result of these procedures in the patient care report (PCR).

Hemorrhage Control Agents

INTRODUCTION

Hemorrhage control agents provide rapid hemostasis at the wound site, even when there is profuse bleeding.

INDICATIONS

- Hemorrhage control agents are to be used as a topical application to control and manage a wound with severe bleeding.
- Hemorrhage control agents can be used for actively bleeding open wounds.

PRECAUTIONS

- Indicated for topical use only
- Do not use on:
  - Sucking chest wounds
  - Open brain injuries
  - Open fractures with exposed bone
- Do not use if foil package has been opened or damaged
- Hemorrhage control agents are not intended for intravenous application

PROCEDURE – EXCELARREST XT FOAM HEMOSTAT PAD

- Tear open the ExcelArrest pouch and remove the pad.
- Blot excess blood from the wound with a gauze pad.
- Apply ExcelArrest foam to cover the wound with the tan backing face up.
- Apply gauze over foam and press firmly for 5 minutes.
- With foam in place, wrap and secure bandage around wound to maintain pressure.
- Discard any unused product after opening.

PROCEDURE – BLEEDARREST CP

- Tear open BleedArrest pouch.
- Blot excess blood from the wound with gauze pad.
- Apply liberal amount of BleedArrest particles to cover wound.
- Using gauze, firmly apply pressure to the wound for 5 minutes. If bleeding continues, apply more BleedArrest and repeat step 4.
- Wrap and secure bandage around wound to maintain pressure.
- Discard any unused product after opening.

PEDIATRIC CONSIDERATIONS

- Both products can be used on all pediatric patients

SPECIAL NOTES – EXCELARREST XT FOAM HEMOSTAT PAD

- This product comes in 2x2, 2x4, and 4x4 sizes. This guideline covers the use of all sizes commercially available.
- If this product need to be removed in the emergency department, please instruct the ED staff to irrigate one edge of the dressing with normal saline in a standard syringe and apply firm upward pressure slowly.
- Removal of this product may cause the clot to dislodge, leading to additional bleeding at the wound site.

Intramuscular (IM) Injection

INDICATIONS

- Administration of medications that are ordered or authorized for IM use (e.g. epinephrine, naloxone, droperidol, versed, etc.)
- Patient requiring medication and IV access is not immediately available or not indicated
- Rapid absorption of medication is desired

CONTRAINDICATIONS

- Known allergy to medication
- Infection or trauma at the intended injection site

PROCEDURE

- Confirm and cross check medication order and verify six rights (right patient, right medication, right dose, right route, right time, right documentation)
- Select and prepare the appropriate injection site

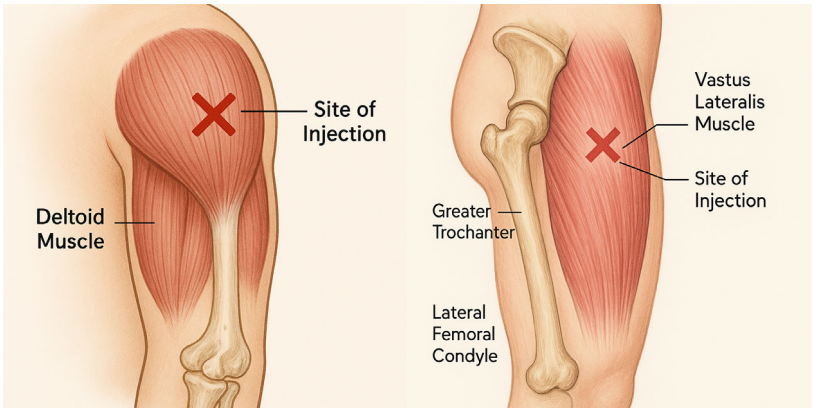
Site	Landmark	Max Volume	Pros	Cons
Deltoid	2–3 finger widths below the acromion process	1-2 mL	Easily accessible; good for small volumes	Limited volume; avoid in small children or underweight adults
Ventrogluteal	Palm on greater trochanter; index finger on ASIS; middle finger to iliac crest	2.5–3 mL	Safer site with fewer nerves/vessels; good for moderate volumes	Can be harder to landmark without experience
Vastus Lateralis	Middle third of the anterolateral thigh	3-4 mL	Large muscle; safe; preferred in children	May be more painful; more vascular
Dorsogluteal	Upper outer quadrant of the gluteal muscle	2–3 mL	Can accommodate larger volumes	Risk to sciatic nerve and vessels; not preferred unless no alternatives

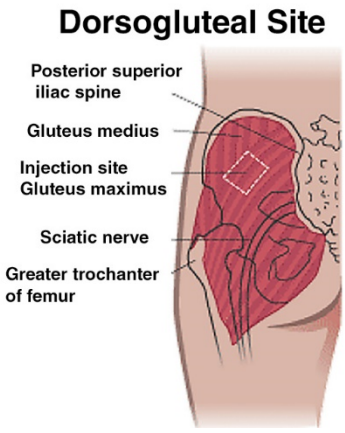
- Cleanse the site with an alcohol pad or similar product, allow site to air dry
- Draw up the medication using sterile technique
- Strech the skin taut and insert the needle at a 90-degree angle
- Aspirate looking for blood return, if return, choose different site
- Inject medication slowly and steadily
- Withdraw the needle and apply light pressure with gauze or bandage
- Dispose of needle safely in sharps container

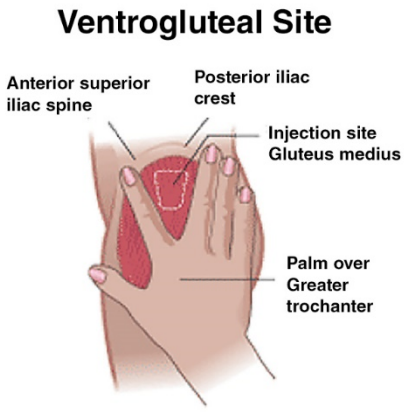
Intramuscular (IM) Injection

SPECIAL NOTES

- Rotate injection sites if multiple doses are required
- Do not exceed max volume per site, split doses if needed
- Use caution with needle length in very thin or obese patients
- Observe for signs of allergic reaction or injection site complications







Intranasal Administration

INDICATIONS

- For use in adult and pediatric patients for whom IV/IO access is anticipated or known to be difficult to obtain.
- Naloxone, midazolam, fentanyl, and ondansetron are the ONLY medications approved for administration via IN. See the respective medication guideline for correct dosing.

PRECAUTIONS

- Do not use in patients with epistaxis or with excessive nasal discharge or congestion.

PROCEDURE

- Determine the appropriate medication dose per medication protocol.
- Draw the medication into the syringe and place the atomizer device on the end of syringe and screw into place.
- Gently place the atomizer into the nare, stop when resistance is met.
- Rapidly administer the medication.
- Document the results in the patient care record.

SPECIAL NOTES

- Maximum volume delivery per nostril should be no greater than 1mL.

Intraosseous Infusion

INDICATIONS

- Patients in critical need of vascular access for volume replacement or medication administration and who have either poor vein selection or in whom one or two intravenous attempts have failed. If a patient needs immediate access for medications or fluid therapy, the EZ-IO may be used in patients who are alert and oriented.
- Pediatric needle (PD) weight guide = up to 39 kg, Adult needle (AD) >40 kg, bariatric needle (LD) as indicated by patient tissue depth over insertion site.
- Decreased level of consciousness (GCS < 6 with no purposeful movement) due to medical or traumatic insult or injury

CONTRAINDICATIONS

- Fracture of bone to be used for insertion
- Joint replacement adjacent to insertion bone
- Severe osteoporosis or tumor of the selected extremity
- Infection over the insertion site
- Inability to locate landmarks for insertion
- Excessive tissue over the insertion site which precludes identification of landmarks

PROCEDURE

- Assemble and prepare all equipment and BSI, including a bag of normal saline with tubing purged.
- Prep site with Betadine or alcohol prep.
- Locate the appropriate landmarks for insertion site:
    - **Proximal Tibia** – Insertion site is approximately 2 cm below the patella and approximately 2 cm (depending on patient anatomy) medial to the tibial tuberosity.
    - **Distal Tibia** - Insertion site is located approximately 3 cm proximal to the most prominent aspect of the medial malleolus. Place one finger directly over the medial malleolus; move approximately 2 cm (depending on patient anatomy) proximal and palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone.
    - **Distal Femur** - Insertion site is located approximately 2-3 cm above the patella in the center of the femur. Place one finger directly over the femur above and adjacent to the patella. Ensure that your insertion site is completely perpendicular to the bone.
    - **Proximal Humerus** – Insertion site is located directly on the most prominent aspect of the greater tubercle. Slide thumb up the anterior shaft of the humerus until you feel the greater tubercle, this is the surgical neck. Approximately 1 cm (depending on patient anatomy) above the surgical neck is the insertion site. Ensure that the patient's hand is resting on the abdomen and that the elbow is adducted (close to the body).
- Open the EZ-IO cartridge and attach the needle set to the driver (there should be a snap).
- Remove the cap from the needle by rotating clockwise until loose and pulling it free.
- Stabilizing the bone with one hand, position the driver over the site at a 90 degree angle to the bone surface and power the needle through the skin only to the bone surface.
- Ensure the 5 mm mark (closest to the flange) on the catheter is visible. If the mark is not visible, do not proceed as the needle set is not long enough to penetrate the IO space.
- Apply gentle pressure to drill and power needle set into the bone until a sudden lack of resistance is felt.
- While supporting the needle set with one hand, pull straight back on the driver to detach it from the needle set.
- Grasping the hub firmly with one hand, rotate the stylet counter clockwise until loose, pull it from the hub, place it in the stylet cartridge, and place in a biohazard container.
- Confirm placement by: visible blood at the tip of the stylet, free flow of IV fluid without evidence of leakage or extravasation. A cold and hard area on the extremity below the insertion site is sign of extravasation.
- If the patient responds to pain (GCS>8), administer Lidocaine, 40 mg IO slowly (30 sec.) (Pediatric dose – 0.5 mg/kg).

- Rapidly infuse a 10 cc flush of N.S.
- Secure catheter and IV tubing with tape.
- Watch for soft tissue swelling.

PEDIATRIC CONSIDERATIONS

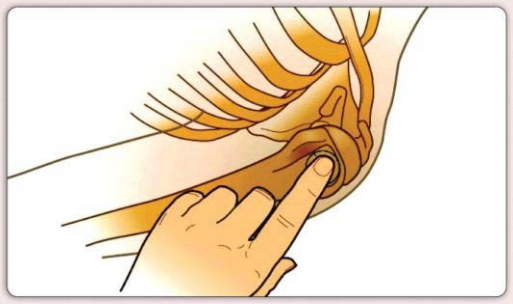
In addition to the tibial site, the distal femur is an approved site by RHEMS for placement of the EZ-IO. The placement procedure is the same as above except for the following:

- Locate the appropriate landmarks for insertion site:
  - Femoral placement = patella, distal condyles of femur.
  - Appropriate placement location = 3 finger widths above and exactly between the distal condyles of the femur. If placement of the EZ-IO at the femoral site fails with the driver, manual insertion is permitted. The technique for manual insertion is identical to driver placement, with the following exception:
    - After locating the appropriate landmark and insertion site, attach large syringe with a luer-lock end to the needle.
    - Keeping the needle perpendicular to the bone surface, manually twist the needle and syringe through the skin to the bone surface.
    - Ensure the 5 mm mark (closest to the flange) on the catheter is visible. If the mark is not visible, do not proceed as the needle set is not long enough to penetrate the IO space.
    - Apply firm pressure and twist the syringe in a clockwise fashion into the bone until a sudden lack of resistance is felt.

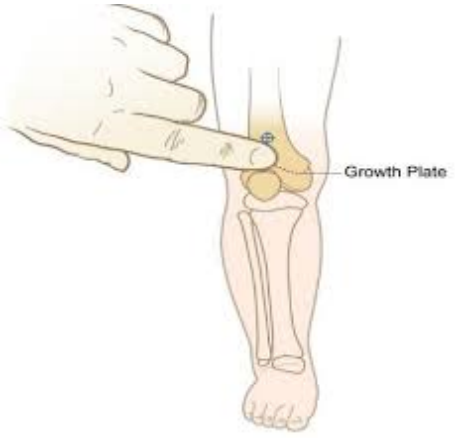
SPECIAL NOTES

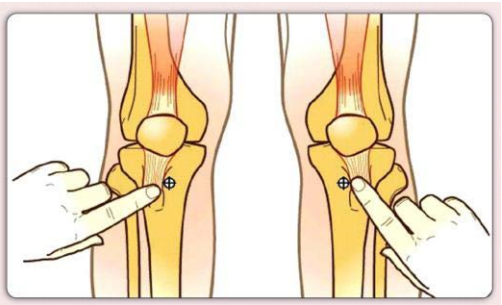
- If drip rate is slow, flush with 10 cc normal saline. If slow drip continues, consider inflating BP cuff on bag to 300 mm/Hg.
- All medications and blood or blood products that are given via the IV route may be given IO.
- Device may be left in place for up to 24 hours.
- Use caution giving lidocaine in the patient who only has a ventricular rhythm.
- The device can be removed by grasping the catheter hub and rotating while pulling gently. A syringe can be attached if a larger handle is desired (rotate clockwise).

Intraosseous Infusion



Drawing courtesy of Vidacare Corp, San Antonio, Texas.





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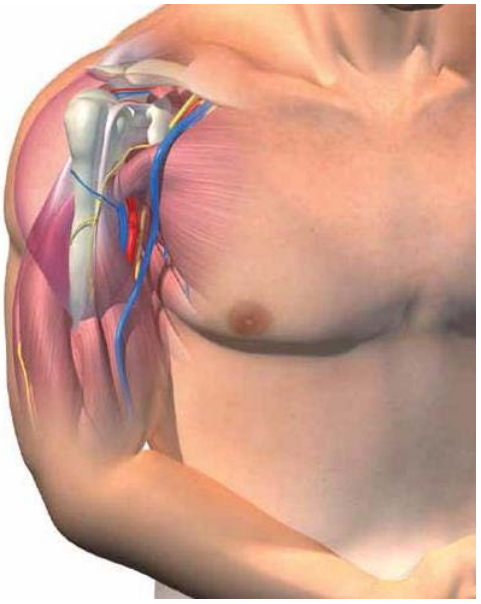
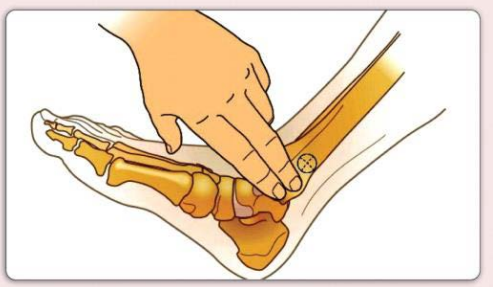




Drawing courtesy of Vidacare Corp, San Antonio, Texas.

Intravenous Infusion

INDICATIONS/NORMAL SALINE 1000 cc BAG

- Bleeding or potential bleeding from traumatic or non-traumatic causes, e.g. ectopic pregnancy, GI bleed, abdominal pain
- Hypotension/dehydration from other causes, i.e. septicemia, hypothermia, anaphylaxis, spinal cord injury, protracted vomiting or diarrhea
- Burn patients with arrhythmia, hypotension, delayed transport times, or need for analgesia
- Diabetics with BS > 240 mg/dL, with signs of dehydration or when it is unclear if the situation is diabetic ketone acidosis.
- Fluid challenges
- Cardiac or respiratory arrest.

INDICATIONS/NORMAL SALINE 250 or 500 cc BAG

- Anticipated need for medication administration in nonhypovolemic medical conditions such as chest pain, isolated head injuries with brief LOC, confusion or amnesia, seizures, hypoglycemia, shortness of breath, drug overdose, tachycardia > 120, hypertension with systolic BP > 200 and CVAs.
- All non-traumatic pediatric patients (≤ 12 years) requiring IV.

INDICATIONS/SALINE LOCK

- Any patient > 12 years, not requiring volume replacement or multiple medication administration.

PEDIATRIC CONSIDERATIONS

- In the arrested or unconscious patient < 8 years, IO is the preferred vascular access route.

SPECIAL NOTES

- Vascular access may be established prior to medical control contact.
- For penetrating, thoracic, or abdominal trauma and all trauma patients with a systolic BP < 90 or pulse > 120, attempts at IV insertion should not delay transport. Obtain IV access enroute in these patients unless there is prolonged extrication.
- The Needle-Lock™ device should be used on all piggyback IVs. It eliminates the need for a separate needle and secures the piggyback line better than tape.
- Distal sites, such as the forearm, are preferred in non-critical patients. The antecubital and external jugular site can be used in cases where rapid cannulation is required, i.e. cardiac arrest or severe trauma.
- Hickman catheters®, peripherally inserted central catheter (PICC), implanted central venous access lines (Portacath®) and AV shunts should not be used for prehospital venous access, except by trained paramedics only, when the patient is in critical need of venous access and an IV is unavailable. Avoid placing IVs in the same extremity as shunts if possible.
- Document site, type fluid, rate, needle gauge, and total volume infused.
- If IV solutions have been "setup" (tubing inserted into bag) prior to use, the date and time of the setup must be documented on the IV bag. This setup must be used within 24 hours of the time it was prepared.

Impedance Threshold Device

INTRODUCTION

An inspiratory impedance threshold device is a valve used in cardiopulmonary resuscitation (CPR) to decrease intrathoracic pressure and improve venous return to the heart.

INDICATIONS

- The ITD should be utilized to assist with control of ventilatory rate and improve cardiac preload for patients who are receiving CPR.
- It may be utilized with an endotracheal tube, supraglottic airway device, or with a BVM.

CONTRAINDICATIONS

- The ITD should not be utilized for patients who have spontaneous respirations. It should be removed from the endotracheal tube/ BVM once spontaneous respirations have returned.
- The ITD should not be used for traumatic cardiac arrest.
- The ITD should be not used for pediatric patients <1 year of age.

PROCEDURE

- Ensure airway is adequate per airway/failed airway guideline.
- Place the ITD between the airway device and the EtCO2 detector (for intubated/BIAD patients) or between the bag and mask (for patients ventilated with the BVM).
- Flip the red switch to the "on" position so that the respiratory timing lights flash.
- Provide a ventilation after each flash of the LED timing lights.
- Perform chest compressions as indicated.
- Once there is return of spontaneous circulation, remove the ITD. Place the device near the patient's head so that it may be replaced if the patient rearrests, and can be used to guide ventilations once removed. The ITD should also be removed if the patient has spontaneous respirations.
- Carefully monitor the placement of the endotracheal tube after movement of the patient, placement of the ITD, and/or removal of the ITD.
- Document the procedure and results in the Patient Care Report (PCR).

Pelvic Circumferential Compression Device Application

INTRODUCTION

Pelvic circumferential compression devices (PCCDs) are used to reduce pelvic volume, stabilize unstable pelvic fractures, and minimize hemorrhage in patients with suspected pelvic injury.

INDICATIONS

- Suspected unstable pelvic fracture
- Pelvic pain after trauma
- Hypotension or signs of shock from suspected pelvic injury

CONTRAINDICATIONS

- Open pelvic fracture with protruding bone
- Isolated hip fracture without pelvic instability

PRECAUTIONS

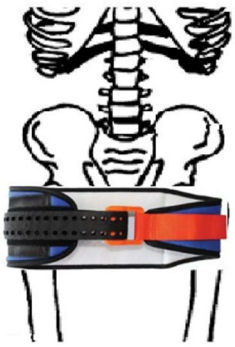
- Avoid excessive manipulation of pelvis during application, do not rock the pelvis
- Maintain spinal precautions when indicated

PROCEDURE

- Expose and assess the pelvis as necessary
- Position the binder under the patient at the level of the **greater trochanters**
    - Do not place over iliac crest or abdomen
    - If log rolling is required, minimize pelvic movement. Consider sliding the device beneath without rolling
- Tighten until snug enough to stabilize without being overly constrictive
- Secure feet together to ensure anatomically appropriate positing with toes pointed straight up
- Reassess circulation by checking distal pulses, cap refill, and skin color

PEDIATRIC CONSIDERATIONS

- Most devices are too large for small children, if indicated, consider using a sheet wrap



Pulse Oximetry

INTRODUCTION

The use of pulse oximetry aids in the assessment of respiratory function in the field. The pulse oximeter allows for non-invasive monitoring of oxygen saturation (the percent of hemoglobin saturated with oxygen; referred to as SpO2 or O2 sat. A normal SpO2 for healthy individuals is 95-100%. A low (≤ 93%) or falling SpO2 indicates that the airway or ventilatory status may be compromised.

INDICATIONS

- Respiratory distress/complaints
- Cardiac problems
- Multiple system trauma
- Poor color
- Patients requiring use of airway adjuncts and/or assisted ventilations
- Suspected shock
- Altered level of consciousness

PRECAUTIONS

- Patients with hemoglobin disorders such as CO poisoning, anemia, and methemoglobinemia may give artificially high SpO2 readings. Readings in such patients should be interpreted with extreme caution.
- Pulse oximetry readings may be difficult to obtain in states of low perfusion.

PROCEDURE FOR PATIENTS WITH SpO2 < 90% OR FALLING SpO2

- Check airway and manage as indicated.
- Increase oxygen delivery (increase liter flow) and/or assist ventilation.
- Check pulse oximetry device placement. Possible causes of inaccurate readings include:
    - Excessive probe movement
    - Optical interference by bright light (direct sunlight, fluorescent and xenon arc lighting). Cover the sensor.
    - Poor waveforms/signals (hypovolemia, hypothermia, profound hypotension, or vasoconstriction)
    - Artificial fingernails and certain dark colored nail polishes may interfere with use.

PEDIATRIC CONSIDERATIONS

- Special probes may be required to obtain readings in pediatric patients.

SPECIAL NOTES

- Best probe site in adults is usually the middle fingertip with nail polish removed.
- Attempt to obtain and document pulse oximetry readings before and during oxygen therapy.
- The use of pulse oximetry as a vital sign is encouraged, as the oximeter may be helpful in detecting hypoxia not evidenced by signs or symptoms.

Remote Ischemic Conditioning

INTRODUCTION

Remote Ischemic Conditioning (R.I.C.) has shown benefit in reducing the ischemic injury due to ST-elevation myocardial infarction by inducing ischemic chemical signals which circulate throughout the body and reduce the risk of cell injury.

INDICATIONS

Remote Ischemic Conditioning is intended for use with patients suffering from an acute ST-elevation myocardial infarction (STEMI) who are being transported to a cardiac catheterization capable facility.

CONTRAINDICATIONS

- Patient has already received thrombolytics for treatment of this STEMI
- History of venous or arterial thrombosis (blood clots) in either arm
- History of a mastectomy or dialysis fistula, as both arms are necessary to perform this procedure and continue ongoing blood pressure measurements
- Systolic blood pressure is less than 100 mmHg or is receiving a vasopressor

PROCEDURE

- Perform remote ischemic conditioning as soon as feasible, preferably upon departing the referring facility or scene.
- Discuss with the patient the remote ischemic conditioning procedure.
- Place the automated blood pressure cuff on the arm with the primary intravenous line site without overlapping the IV site.
- Place a manual blood pressure cuff on the non-IV arm (over biceps). If there are IV sites on both arms, place the manual BP cuff on the left arm without overlapping the IV site.
- Inflation/Deflation Cycle: Inflate the manual BP cuff to 200 mmHg, clamp, and set the timer for 5 minutes. After 5 minutes, deflate the manual BP cuff and set the timer for another 5 minutes.
- After 5 minutes with the manual BP cuff deflated, repeat an inflation/deflation cycle as above for a total of 4 cycles.
- If systolic BP is >100mmHg, patient may receive fentanyl (per usual pain management dosing) every 5 minutes as needed up to 4 doses. If pain continues contact online medical control.
- If the patient reports excessive discomfort from the manual BP cuff, deflate the BP cuff and document the time. Discontinue additional inflation cycles.
- Continue blood pressure measurements using the automated cuff on the other arm as per standard procedure.
- Report the use of remote ischemic conditioning to the staff at the receiving facility and the number of cycles completed at the time of transfer. If at the time of transfer the BP cuff is inflated, ensure that it is deflated within 5 minutes of inflation.
- Upon completion of the transport, document use of remote ischemic conditioning (RIC) in the patient care record.

SPECIAL CONSIDERATIONS

- Performance of remote ischemic conditioning should not delay transfer to a PCI capable hospital.
- If 4 cycles of inflation/deflation cycles are completed in transport, do not perform additional cycles.
- If arrival at the destination facility occurs with less than 4 inflation/deflation cycles completed, report number of cycles remaining to the staff at receiving facility.

Restraints

INTRODUCTION

Any patient who may harm himself, herself, or others may be gently restrained to prevent injury to the patient or crew. This restraint must be in a humane manner and used only as a last resort. Other means to prevent injury to the patient or crew must be attempted first. These efforts could include reality orientation, distraction techniques, or other less restrictive therapeutic means. Physical or chemical restraint should be a last resort technique.

INDICATIONS

Physical and/or chemical restraint should be considered when an ill or injured person who is behaving in such a manner as to interfere with their examination, care and treatment to the extent they endanger their life or the safety of others.

PROCEDURE

- Attempt less restrictive means of managing the patient.
- Request law enforcement assistance.
- Ensure that there are sufficient personnel available to physically restrain the patient safely.
- Restrain the patient in a lateral or supine position. No devices such as backboards, splints, or other devices will be on top of the patient. The patient will never be restrained in the prone position.
- The patient must be under constant observation by the EMS crew at all times. This includes direct visualization of the patient as well as cardiac and pulse oximetry monitoring whenever possible.
- The patient should be placed on cardiac and respiratory monitors once danger has been mitigated.
- Documentation in the patient care report (PCR) should include the reason for the use of restraints, the type of restraints used, and the time restraints were placed.
- If the above actions are unsuccessful or the patient is resisting the restraints, consider administering medications per protocol. (Chemical restraint may be considered earlier.)
- If a patient is restrained by law enforcement personnel with handcuffs or other devices EMS personnel can not remove, a law enforcement officer must accompany the patient to the hospital in the transporting EMS vehicle.

SPECIAL CONSIDERATIONS

- The type and style of restraints used by an agency should be an agency-specific decision, and appropriate training should be provided to all crew regarding the safe use of the devices.
- Stay with a restrained patient at all times, be observant for possible vomiting and be prepared to turn the patient and suction if necessary.
- Documentation MUST adequately justify the need for and the type of restraints used. This should include:
    - A description of the circumstance / behavior which precipitated the use of restraints.
    - Time of application of the restraints.
    - Type of restraint used.
    - The position in which the patient was restrained.
- When restraint devices are applied by law enforcement officers, an officer must be present with the patient at all times at the scene as well as in the ambulance during transport, and the restraint and position must not be so restrictive that the patient is in a position that might compromise patient care.
- EMS Personnel may NOT use:
    - Backboards to "sandwich" the patient.
    - Restraints which secures the patient's hands and feet behind the back.
    - Restraints that "hog tie" the patient.
    - Any device that restricts normal breathing.

Supraglottic Airway Devices

INTRODUCTION

Supraglottic airways are designed to provide a patent airway in a cardiac arrest, or as a rescue airway when endotracheal intubation is unsuccessful. Regions EMS currently recommends use of the I-Gel or KING LTS-D airway as the supraglottic airway for providers to use within the system. These devices are designed to provide a patent airway for patients without an intact gag reflex as an alternative to endotracheal intubation or when endotracheal intubation is not possible. Both devices are designed to be placed blindly. The gastric access lumen allows for passage of a gastric tube up to 18 Fr (King) or 14 Fr (I-Gel).

INDICATIONS

- Patients in cardiac arrest
- Patients with respiratory arrest
- Medication assisted airway management when ETI is not used

CONTRAINDICATIONS

- Intact gag reflex
- Patient's height less than manufacturer's recommendations for device
- Known esophageal disease
- Caustic substance ingestion
- Known or suspected airway burns
- Anaphylaxis with respiratory symptoms
- Known or suspected airway obstruction.

KING INSERTION PROCEDURE

- Apply chin lift and introduce the KING airway into the corner of the mouth
- Advance the tip under the base of the tongue while rotating the tube back to the midline
- Without exerting excessive force, advance tube until the base of the connector is aligned on the teeth or gums
- Inflate the cuff to 60–80 ml
- Attach the BVM. While gently bagging the patient to assess ventilation, simultaneously withdraw the airway until ventilation is easy and free flowing (large tidal volume with minimal airway resistance)
- Secure the device using the larger Thomas tube holder
- Lubricate and insert a gastric tube into the gastric access lumen

I-GEL INSERTION PROCEDURE

- Apply chin lift and introduce the i-Gel airway into the corner of the mouth
- Advance the tip over the base of the tongue
- Without exerting excessive force, advance tube until resistance is met
- Attach the BVM. While gently bagging the patient to assess ventilation, gently advance the device to ensure it is seated against the larynx. Gurgling may be heard, however the device will seal and provide adequate ventilation and protection against aspiration.
- Secure the device using the Thomas Select tube holder, twill tape, or medical tape.
- Lubricate and insert a gastric tube into the gastric access lumen per size recommendations on the i-Gel packaging.

SPECIAL NOTE

- It may be advisable to partially insert the gastric tube before introduction of the device into the patient, in an attempt to slow any return of gastric contents through the gastric lumen. There is no check valve on that lumen to prevent backflow.

Taser Probe Removal

INTRODUCTION

Taser probes are barbed metal projectiles that may embed themselves up to 13 mm into the skin.

INDICATIONS

- Patient with uncomplicated conducted electrical weapon (Taser®) probes embedded subcutaneously in non-sensitive areas of skin.

CONTRAINDICATIONS

- Patients with conducted electrical weapon (Taser®) probe penetration in vulnerable areas of body as mentioned below should be transported for further evaluation and probe removal
    - Skin above level of clavicles
    - Female breasts
    - Genitalia
    - Suspicion that probe might be embedded in bone, blood vessel, or other sensitive structure.

PROCEDURE

- Ensure wires are disconnected from weapon.
- Stabilize skin around probe using non-dominant hand.
- Grasp probe by metal body with pliers or hemostats to prevent puncture wounds to EMS personnel.
- Remove probe in single quick motion.
- Wipe wound with antiseptic wipe and apply dressing.

Tourniquet Application

INTRODUCTION

Tourniquets have long been a source of controversy because of the problems associated with their use (ischemia, nerve injury, etc). Recent advances in military medicine have improved the design and allowed for increased use for civilian EMS.

INDICATIONS

- Penetrating trauma from firearms and stabbings involving severe hemorrhage
- Incidents involving blast injuries to extremities
- Incidents resulting from industrial or farm accidents involving severe hemorrhage
- Multiple causality injuries and lack of resources to handle hemorrhage control

CONTRAINDICATIONS

- Any bleeding that can be managed by direct pressure, elevation, or cold pack administration.
- Major bleeding to a non-extremity

PROCEDURE

- Recognition that bleeding is uncontrollable with direct pressure
- Apply tourniquet to the proximal segment of the bleeding limb
- Tighten device until bleeding is stopped and secure device
- Transport patient to trauma center and report time of placement

SPECIAL NOTE

If transport to trauma center will be greater than 30 minutes, reassess tourniquet for possible removal (see Tourniquet Conversion)

Tourniquet Conversion

INTRODUCTION

In the prehospital setting, complications from prolonged tourniquet times are rarely an issue. The issue is primarily with patient tolerance because of the discomfort, pain, and loss of feeling in the extremity. A tourniquet should never be completely removed but rather loosened, as the goal is to control any bleeding by less aggressive means and administer less (or none) pain medication to an already compromised patient.

INDICATIONS

- Tourniquet has been applied
- Patient is hemodynamically stable with no other concern for uncontrolled hemorrhage
- No other life-threatening injuries or illness are present
- Isolated extremity injury

CONTRAINDICATIONS

- Extremity amputation proximal to ankle or wrist
- Major bleeding to a non-extremity
- Inability to obtain reliable vascular access
- Signs of shock and/or hypotension (systolic BP < 90)

PROCEDURE

- Visualize blood loss, if placed by a first responder get their estimate of blood loss
- Assess for other unrecognized hemorrhage and control all sources of bleeding.
- Fully expose the affected extremity
- Ensure that IV access has been obtained and is reliable
- Ensure at least 2 sets of vital signs have been obtained
- Prepare and apply a pressure dressing to the wound and if appropriate, place a splint on the affected extremity
- Loosen the tourniquet but LEAVE IN PLACE - DO NOT REMOVE COMPLETELY
- Frequently reassess for break-through bleeding and re-tighten the tourniquet if necessary

SPECIAL NOTE

This procedure only applies to ALS providers

Tracheal Tube Introducer

INTRODUCTION

The tracheal tube introducer is a gum-elastic bougie (intubating bougie) that is an adjunct for difficult endotracheal intubations.

INDICATIONS

- For directional control during routine or difficult endotracheal intubations when the laryngeal inlet cannot be completely seen
- May be used as a tracheal tube exchanger.

PRECAUTIONS

- Excessive force, passage beyond the carina, or blind introduction may result in soft tissue damage or rupture the bronchus.
- ET tube should not be threaded over the introducer without the laryngoscope in place.

CONTRAINDICATIONS

- None

PROCEDURE

- A 15 French introducer should be used for ET tube sizes 6.0 to 11.0.
- Lubricate introducer with KY jelly.
- Perform laryngoscopy. If cords not visible, identify landmarks to aid intubation.
- Place introducer into the pharynx and direct into larynx. If necessary, bend the introducer to negotiate the corner. Correct placement may be confirmed by detection of tracheal "clicks".
- Leave laryngoscope in place while assistant threads ET tube over introducer into trachea. If tube stick at laryngeal inlet, a 90° counterclockwise rotation may help.
- Hold the tube firmly in place and gently withdraw the introducer.
- Remove laryngoscope and confirm tube placement as usual.
- If preferred, the ET tube may be placed over the introducer prior to intubation, instead of using stylet.

PEDIATRIC CONSIDERATIONS

- A 10 French introducer should be used for ET tube sizes 4.0 to 5.5. This is a recommended but optional piece of equipment for ALS services.

Transcutaneous Pacing

INDICATIONS

- Patients with symptomatic bradycardia (less than 60 per minute) with signs and symptoms of inadequate cerebral or cardiac perfusion such as:
  - Chest Pain
  - Hypotension
  - Pulmonary Edema
  - Altered Mental Status, Confusion, etc.
  - Ventricular Ectopy
- In Asystole pacing is general not helpful, but must be done early to have any chance of effectiveness.

PROCEDURE

- Attach standard three-lead monitor.
- Apply defibrillation/pacing pads to chest and back:
  - One pad to left mid chest next to sternum
  - One pad to mid left posterior chest next to spine.
- Select pacing option on monitor unit.
- Adjust heart rate to 70 BPM for an adult and 100 BPM for a child.
- Note pacer spikes on EKG screen.
- Slowly increase output until capture of electrical rhythm on the monitor.
- If unable to capture while at maximum current output, stop pacing immediately.
- If capture observed on monitor, check for corresponding pulse and assess vital signs.
- Consider the use of sedation or analgesia if patient is uncomfortable.
- Document the dysrhythmia and the response to external pacing with ECG strips in the PCR.

Cardiac

Indications

- Cardiac Arrest (PEA)
- Blunt Trauma
- Penetrating Trauma
- Chest Pain
- Shortness of Breath

Clinical Question

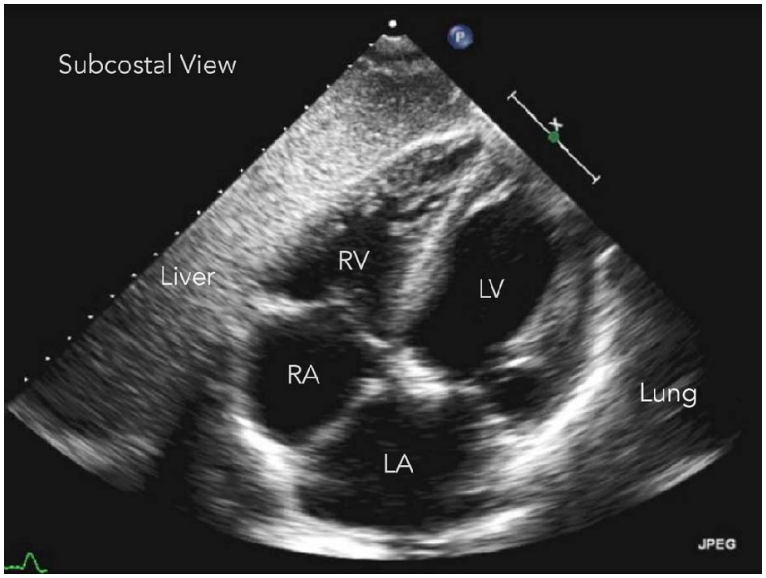
- Is effective cardiac contractility present?

Positioning

Probe should be placed under the xiphoid process with the marker facing the patient's left at the 3 o'clock position

Recording and Documentation

Capture video of heart during pulse and rhythm checks. Find the proper position while LUCAS or manual compressions are being performed and record the video for less than 10 seconds during pulse and rhythm checks.



PEARLS

- Do not prolong pulse checks to capture video of cardiac activity.
- Patients who are undergoing 12 Lead EKGs are good candidates for cardiac U/S examination for either clinical use or practice
- Ultrasound should be used to collect data in addition to your patient interview and physical exam, not as a replacement.

Thoracic

Indications

- Shortness of breath
- Chest pain
- Suspected pneumothorax
- Blunt chest trauma
- Penetrating chest trauma

Clinical Questions

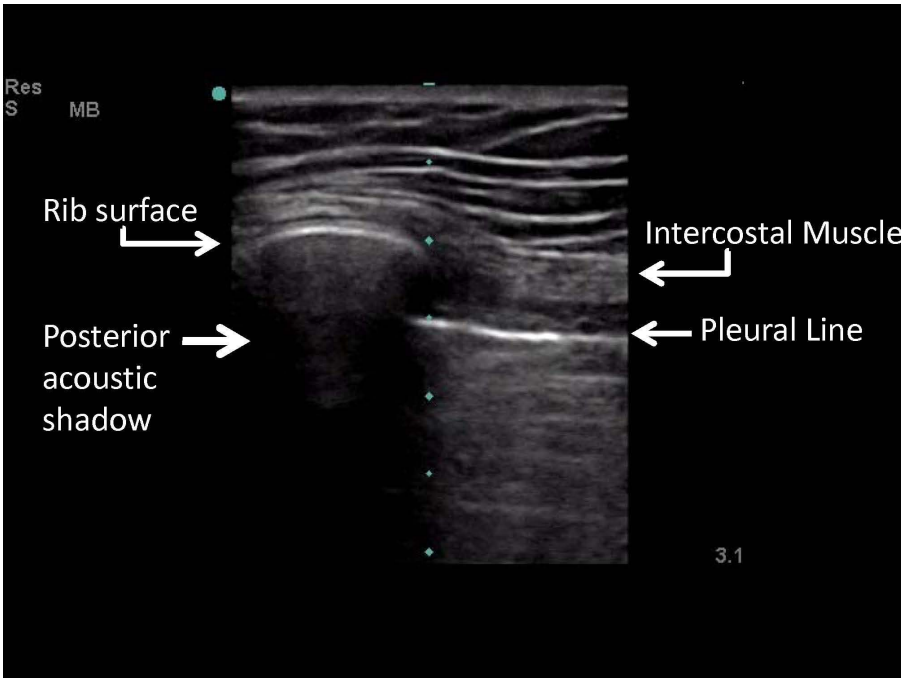
- Is there a pneumothorax present?
- Is there lung sliding present?

Positioning

Place probe on anterior chest near the midclavicular line with the marker in the 12 o'clock position.

Recording and Documentation

- Capture video of lungs at one level between two ribs.
- Obtain second image by sliding down one to two rib spaces.
- Repeat on opposite side of chest



PEARLS

- In patients with trauma who are in shock and tension pneumothorax is on the differential diagnosis, U/S evaluation of sliding signs can help to identify a pneumothorax
- Tension physiology is not diagnosed by U/S but by vital signs.

INDICATIONS/NORMAL SALINE 1000 cc BAG

- Bleeding or potential bleeding from traumatic or non-traumatic causes, e.g. ectopic pregnancy, GI bleed, abdominal pain
- Hypotension/dehydration from other causes, i.e. septicemia, hypothermia, anaphylaxis, spinal cord injury, protracted vomiting or diarrhea
- Burn patients with arrhythmia, hypotension, delayed transport times, or need for analgesia
- Diabetics with BS > 240 mg/dL, with signs of dehydration or when it is unclear if the situation is diabetic ketone acidosis.
- Fluid challenges
- Cardiac or respiratory arrest.

INDICATIONS/NORMAL SALINE 250 or 500 cc BAG

- Anticipated need for medication administration in nonhypovolemic medical conditions such as chest pain, isolated head injuries with brief LOC, confusion or amnesia, seizures, hypoglycemia, shortness of breath, drug overdose, tachycardia > 120, hypertension with systolic BP > 200 and CVAs.
- All non-traumatic pediatric patients (≤ 12 years) requiring IV.

INDICATIONS/SALINE LOCK

- Any patient > 12 years, not requiring volume replacement or multiple medication administration.

SPECIAL NOTES

- Vascular access may be established prior to medical control contact.
- For penetrating, thoracic, or abdominal trauma and all trauma patients with a systolic BP < 90 or pulse > 120, attempts at IV insertion should not delay transport. Obtain IV access enroute in these patients unless there is prolonged extrication.
- Distal sites, such as the forearm, are preferred in non-critical patients. The antecubital and external jugular site can be used in cases where rapid cannulation is required, i.e. cardiac arrest or severe trauma.
- Hickman catheters®, peripherally inserted central catheter (PICC), implanted central venous access lines (Portacath®) and AV shunts should not be used for prehospital venous access, except by trained paramedics only, when the patient is in critical need of venous access and an IV is unavailable. Avoid placing IVs in the same extremity as shunts.
- Document site, type fluid, rate, needle gauge, and total volume infused.
- If IV solutions have been "setup" (tubing inserted into bag) prior to use, the date and time of the setup must be documented on the IV bag. This setup must be used within 24 hours of the time it was prepared.

INTRAOSSEOUS ACCESS (IO)

- Preferred in unresponsive patients whenever rapid vascular access is needed.
- Approved sites are the proximal tibia, distal tibia, proximal humerus, and distal femur.
- Proximal tibia and proximal humerus are the preferred sites for adult patients, proximal tibia or distal femur is preferred for pediatric patients.
- If necessary, Lidocaine 2% can be infused for analgesia immediately after obtaining IO access. The adult dose is 50 mg, pediatric dose is 0.5 mg/kg (max 50 mg).

Wound Care

INDICATIONS

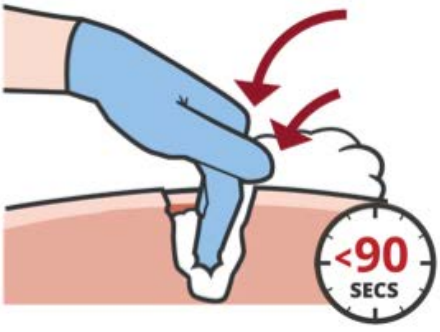
Protection and care for open wounds prior to and during transport.

GENERAL WOUND CARE PROCEDURES

- Use personal protective equipment, including gloves, gown, and mask as indicated.
- If there is active bleeding, elevate the affected area if possible and hold direct pressure. Do not rely on a "compression" bandage to control bleeding. Direct manual pressure is much more effective.
- Consider a tourniquet early for extremity bleeding unable to be controlled with direct pressure.
- Once bleeding is controlled, irrigate severely contaminated wounds with saline as appropriate (this may have to be avoided due to extreme pain or if bleeding was difficult to control). Consider analgesia per protocol prior to irrigation.
- Cover wounds with sterile gauze/dressings. Check distal pulses, sensation, and motor function to ensure the bandage is not too tight.
- Monitor wounds and/or dressings throughout transport for bleeding.
- Document the wound and assessment and care in the patient care report (PCR).

WOUND PACKING

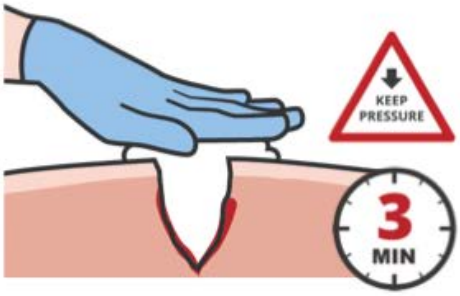
- Wounds of the extremities and junctional areas are amenable to packing. Wounds of the chest, abdomen or pelvis should not be packed as bleeding from these wounds is generally from a deep source that cannot be reached from the outside. Direct pressure will usually suffice for bleeding neck wounds.
- The goal is to completely and tightly pack the wound cavity to stop hemorrhage. Begin packing the gauze into the wound with your finger, while simultaneously maintaining pressure on the wound. When no more gauze can be packed inside the wound, hold direct pressure on the wound for 3 minutes.
- The key to successful wound packing is that the wound be very tightly packed, applying as much pressure as possible to the bleeding vessel.
- If bleeding continues, confirm that the wound is packed as tightly as possible. Add more gauze if needed. Also consider that the source of bleeding may be from an area not reachable by wound packing. If applicable, apply a tourniquet as proximally as possible and continue with rapid transport for surgical intervention.



Identify **exact source** of bleeding and **APPLY direct pressure UNTIL** gauze is placed

Pack the wound **maintaining CONSTANT** direct pressure within **90 SECONDS** to be effective

Fill and pack the wound tightly, ensuring gauze extends 1-2 inches above the skin



HOLD direct pressure for at least **3 MINS** ***(this is necessary**, even with the active ingredient in hemostatic gauze)*

When packing a large wound, more than one hemostatic gauze and/or **additional** gauze may be **needed**

Carefully **observe** to determine if bleeding has been **controlled**

Once you are sure the bleeding has **stopped**, apply a pressure bandage

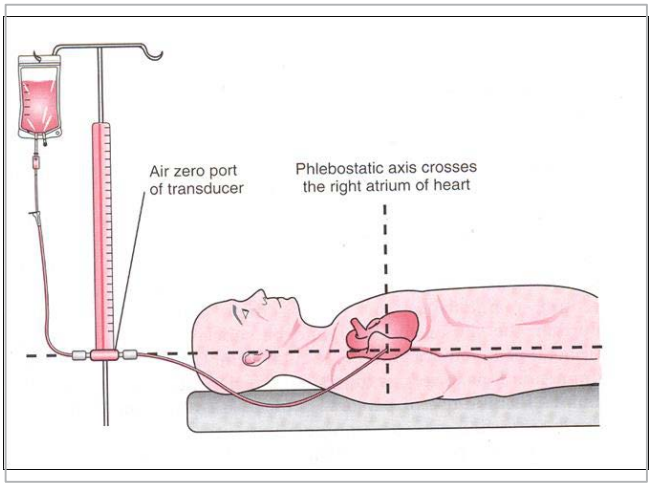
Arterial Lines

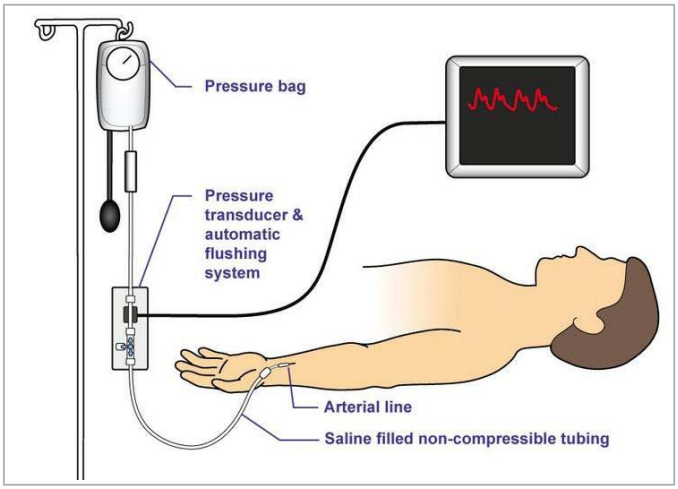
Background

Arterial cannulation with continuous pressure waveform display remains the accepted standard for blood pressure monitoring in hemodynamically unstable patients. The most common sites for arterial blood pressure monitoring include the radial and femoral arteries.

Management

- Ensure the pressure bag is pressurized to 300 mm Hg
- With the transducer connected to the monitor, select arterial monitor, and perform a transducer check by fast flushing the line. As you do this, you should see a change in the waveform. This is called a square wave test.
- Zero the transducer and monitor
  - Place the transducer at the phlebostatic axis of the patient.
  - Close the line off to patient and open to air.
  - Press zero on the monitor.
  - To monitor pressure, close the port off to an air and open to patient.
- Connect the catheter and fast flush to clear the catheter of blood.
- Check for good waveform





Pearls

- When changing the hemodynamic monitoring equipment for transport, use aseptic technique.
- All stopcocks should be tightly secured and covered with male end caps.
- If waveform is dampened on monitor, reassess position of the wrist or leg and check the inflation pressure in pressure bag.
- Patients with invasive monitoring in the femoral artery should have the head of stretcher maintained at less than thirty degrees with the leg straight to prevent kinking of invasive line.
- Femoral artery sites should have distal pulses reassessed with patient movement to stretcher and hospital bed.
- All Insertion sites should be reassessed for signs of bleeding or dislodgement with patient movement.
- Should the invasive line become dislodged, apply direct pressure.
- The pressure tubing should be monitored to prevent dislodgement of end caps or tubing that may result in hemorrhage.

Central Venous Catheters

Background

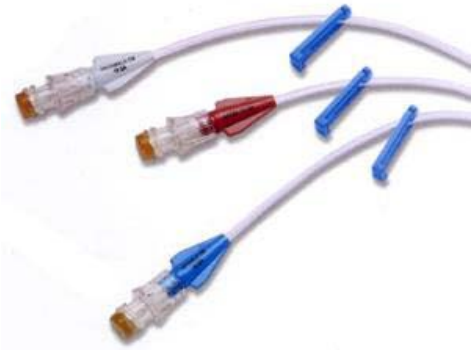
Central venous catheters provide access to the central venous system. Often these catheters have multiple ports, allowing for simultaneous administration of medications. The central venous system also allows for the administration of potent vasoactive medications as well as medications which would normally be painful and irritating to a peripheral vein (such as potassium chloride). Common sites include the internal jugular vein, the subclavian vein, and the femoral vein.

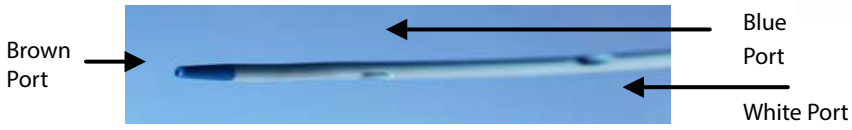
Management

- Use aseptic technique whenever manipulating a central line as well as before and after any medication administration.
- Before transport:
  - Inspect the insertion site of the device for redness, swelling, bleeding, and patency. If unable to directly visualize site, discuss with nursing staff the patency and condition of the site at the last dressing change.
  - *Be sure you are familiar with the operation of the stopcocks and catheters in use! If not, ask the nurse to give you a bedside review of its proper use.*
  - Keep insertion site covered with a sterile dressing at all times.
  - Ensure the device is adequately secured to prevent accidental removal during transport or movement of patient.
  - If the device is in the internal jugular or subclavian vein, verify that a chest x-ray has been obtained to confirm proper placement/ position of the line and that no pneumothorax is present.
  - Move one pressure cable at a time to the transport monitor, ensuring that wave forms and values are similar to those that were displayed on the hospital monitor.
  - Review written transfer orders and check for orders that pertain to:
    - Any special management of the device in transit.
    - Desired values/pressure readings during hemodynamic monitoring and what steps to take (or adjustment in medications to make) if the values fall outside the desired parameters. These must be clearly understood before leaving the transferring facility.
- Should an invasive line come completely out of a patient, apply direct pressure to the insertion site and hold until bleeding stops.
- DO NOT attempt to replace a catheter that dislodges but does not come completely out of the patient.
  - Check for patency by attempting to aspirate blood from each of the lumens to determine if each remains in a blood vessel.
  - Options for continued use should be discussed with online medical control.

Continuous Venous Pressure Monitoring (CVP)

- The pressure transducer setup for CVP monitoring is identical to the setup for arterial line monitoring. Refer to the Arterial Lines device management guideline for reference.
- CVP monitoring is typically performed intermittently rather than continuously, as any infusions through the same catheter must be paused during CVP checks.
- The CVP transducer should be connected to the distal port on the cathter. This is commonly the brown port.





Pearls

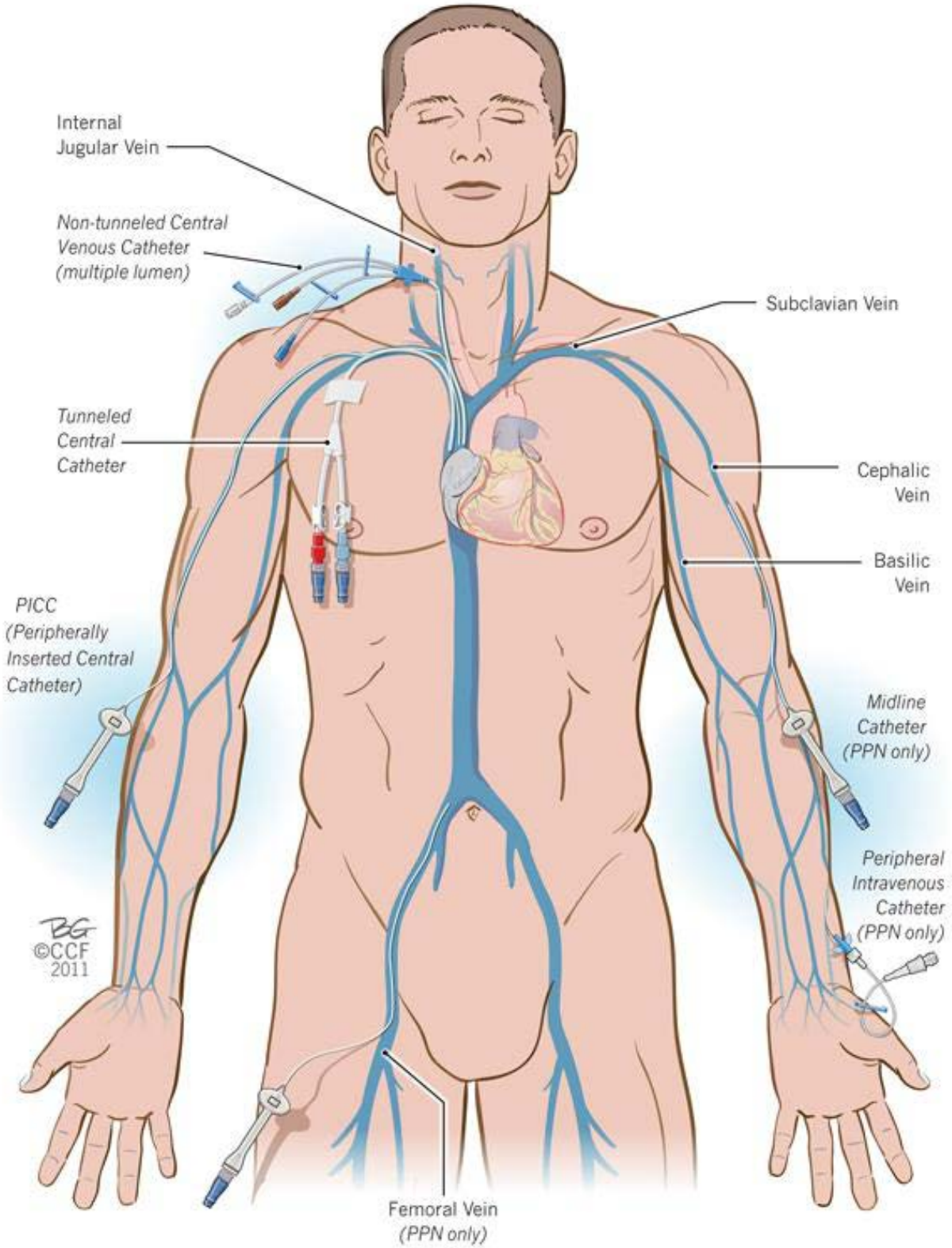
- Re-assess the catheter/line/setup each time the patient is moved to assure no change in position.
- Pressure transducers MUST be re-leveled with every position change of the patient.
- All continuous infusions used to treat critical patients MUST be on an IV pump.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Central Venous Catheters



Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Chest Tubes

Background

Chest tubes are indicated for pneumothorax, hemothorax and pleural empyema (abscess). Tubes are commonly placed through the lateral chest wall, but smaller "pigtail" tubes may occasionally be placed anteriorly.

Management

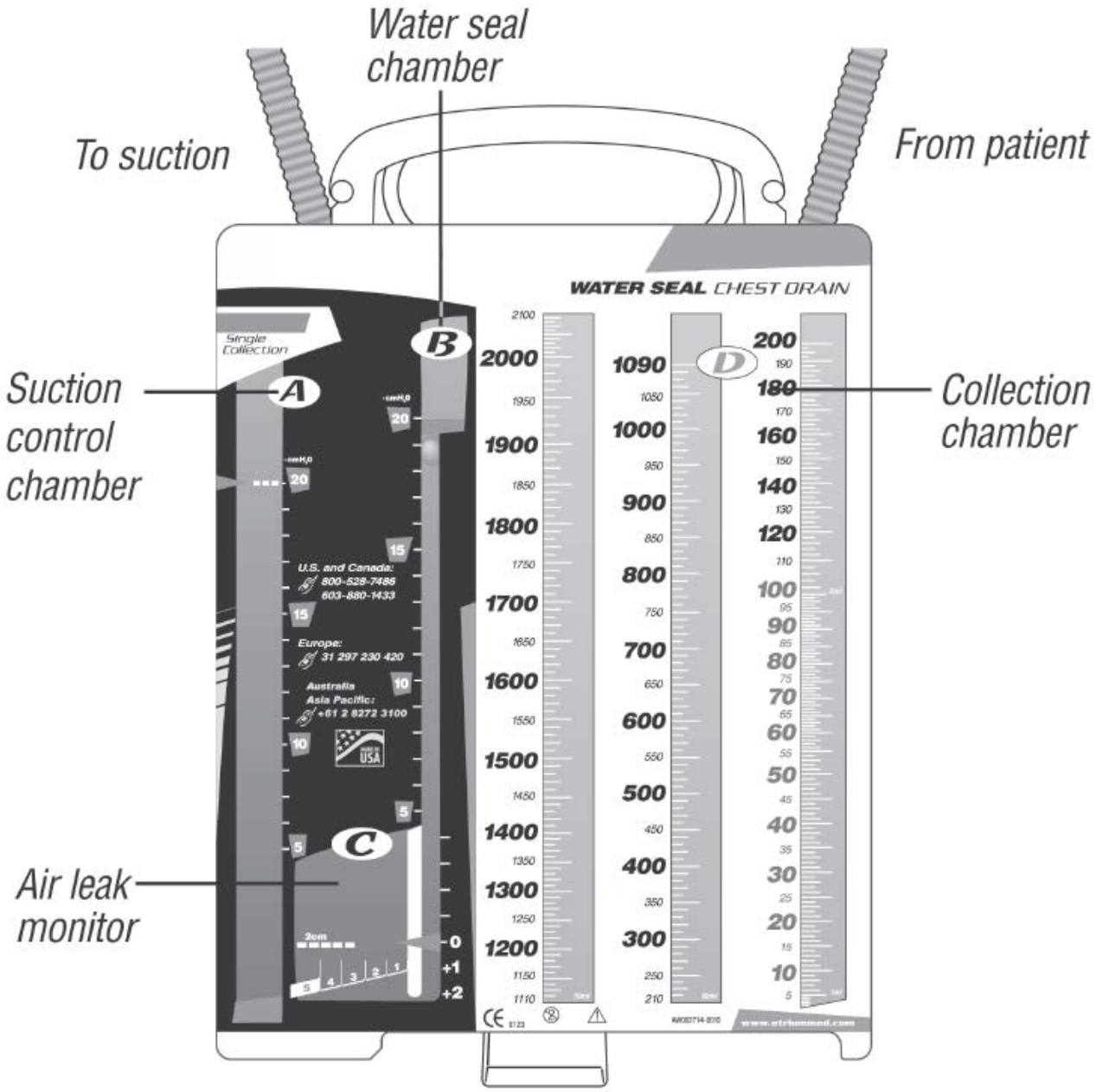
- Assure that the chest tube is securely fastened to the patient.
- Check chest tube for patency and proper function prior to transport.
- Assure that the long flexible tubing is securely fastened to the container that acts as a drainage device, water seal and suction control device. Assure that the tubing is free of kinks.
- Make note of the fluid and blood levels in the drainage and water seal compartments.
- Obtain orders as to the water seal level and whether or not the device should be connected to suction.
- When suction is used, assure that there is bubbling in the suction control chamber. (if not, check the suction unit).
- If the water seal fails to stop bubbling after the lung is reinflated or begins to bubble again:
  - Momentarily clamp the flexible tubing near the chest. If the bubbles quit emanating from the tube while it is clamped, then the problem is either a persistent air leak in the patient's lung or the chest tube is not sealed at the chest wall.
  - Never leave the clamp on for more than a few seconds.
  - Evaluate the insertion site.
  - Bolster the occlusive dressing at the site.
  - Evaluate the patient for distress.
  - Consult physician immediately if needed.
  - If the bubbling does not cease during the clamping of the proximal end, then suspect a leak at a connection site in the tubing or the tubing itself.
    - Check all connections and secure with tape.
    - Seal the leak with occlusive dressing and tape or replace the tubing. When replacing the tubing, remember to clamp the distal end of the chest tube to avoid the re-accumulation of a pneumothorax.
- If the water seal device becomes damaged, a temporary water seal can be accomplished by putting flexible tubing into a bottle of sterile saline. Keep this device and tubing below chest level.
- To clear clots from the tubing, squeeze the proximal end of the tubing with one hand and with the other below, squeeze the tube, stripping the material down the tube toward the drainage container.
- If the chest tube is not functioning and a tension pneumothorax is suspected, perform a needle decompression of the affected side.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Chest Tubes



Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Intravenous Pumps

Background

Intravenous medication pumps are used to deliver precise doses over a controlled time period. Any continuous infusions delivered during a critical care interfacility transport should be managed with an IV medication pump. This device management guideline applies to the Baxter Sigma Spectrum pump used by HealthPartners facilities.

Management

- Starting a New Infusion Using the Dose Error Reduction System (DERS)
  - Press the ON/OFF button to turn the pump on.
  - If the previous setup needs to be erased, press YES soft key when prompted "New Patient?".
  - NOTE: 'New Patient?' Prompt – When the pump is turned on and programmed infusion data exists in memory, a screen is displayed asking the operator if the intended use for the pump is for a New Patient. Answering YES to this prompt clears the existing infusion data, answering NO retains the data and allows the operator to resume the infusion.
  - Load the primed IV set.
  - Select your Care Area, select drug or fluid (Type first 2 letters of drug name), confirm a Concentration if more than one is displayed, select Delivery Bag (if required), then enter and press OK to confirm all required values on the Setup Screen.
  - Confirm that all clamps and vents are in the proper position.
  - Press RUN/STOP to start the infusion, check and confirm proper flow.
- Starting a New Infusion using the BASIC Mode (For use only when drug is not in the Drug Library)
  - Press the ON/OFF button to turn the pump on.
  - If the previous setup needs to be erased, press YES soft key when prompted "New Patient?", (see "New Patient" prompt above).
  - Load the primed IV set.
  - Select your Care Area, select drug or fluid (Enter "B""A" prompts to BASIC Selection), select Delivery Bag, select a Dose Mode (default is mL/hr), then enter and press OK to confirm all required values on the Setup Screen.
  - Confirm that all clamps and vents are in the proper position.
  - Press RUN/STOP to start the infusion, check and confirm proper flow.
- Secondary Infusions
  - Stop the pump if it is running.
  - Lower the primary bag at least 20" below the secondary bag.
  - Open secondary roller clamp.
  - Press the REVIEW/PROGRAM soft key, then press the PROGRAM SECONDARY soft key.
  - Select drug or fluid for the secondary infusion (type first 2 letters of drug name), select and confirm Concentration if more than one is displayed, press OK to select/confirm the secondary delivery bag, then enter and press OK to confirm all required values on the setup screen.
  - Confirm that all clamps and vents are in the proper position.
  - Press RUN/STOP to begin secondary infusion, check the flow and confirm drops are falling in secondary drip chamber and no drops falling in the primary drip chamber

Critical Care Endorsement Required
Critical Care Endorsement Required
Critical Care Endorsement Required

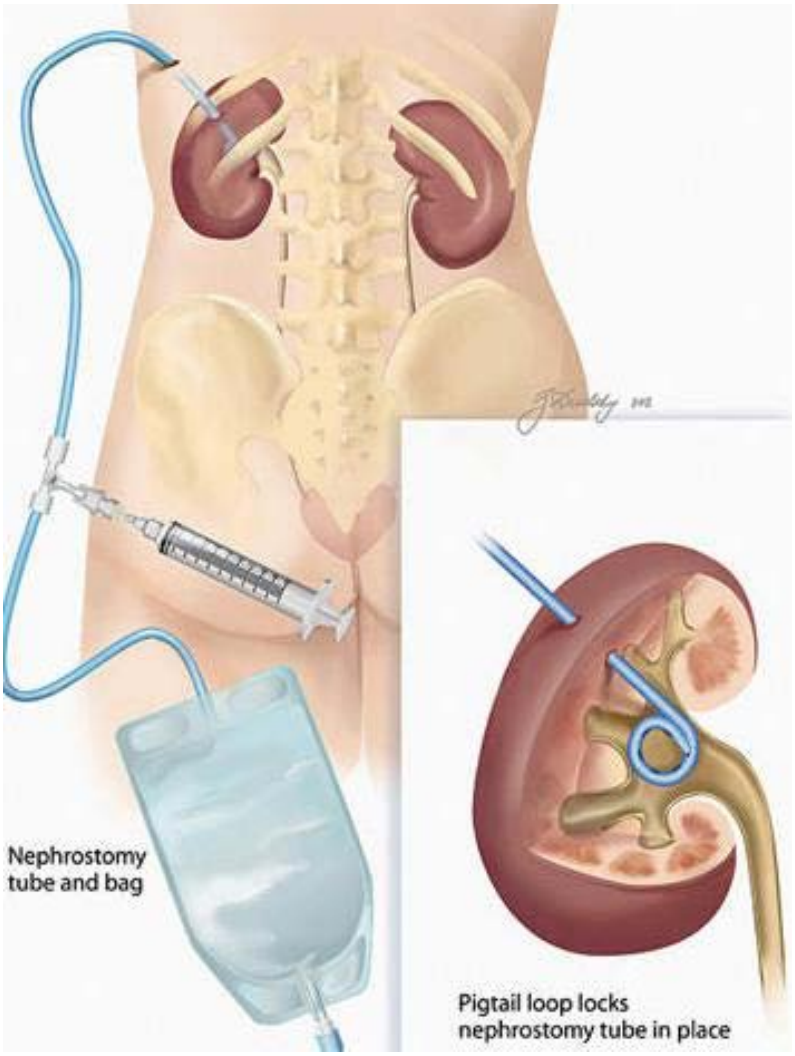
Percutaneous Drains

Background

Percutaneous drains are placed to facilitate drainage of bodily fluids where an obstruction is present, or to drain infected material from an abscess or cyst.

Management

- Before transport:
  - Inspect the insertion site of the device for redness, swelling, bleeding, and patency. If unable to directly visualize site, discuss with nursing staff the patency and condition of the site at the last dressing change.
  - *Be sure you are familiar with the operation of the stopcocks and catheters in use! If not, ask the nurse to give you a bedside review of its proper use.*
  - Determine if the insertion site should be covered with a sterile dressing.
  - Ensure the device is adequately secured to prevent accidental removal during transport or movement of patient.
  - Verify that the device placement has been confirmed and is functioning appropriately.
  - Note the volume of drainage present in the collection bag.
- Should a drain come completely out of a patient, apply direct pressure to the insertion site and hold until bleeding stops.
- DO NOT attempt to replace a catheter that dislodges. Options for continued use should be discussed with online medical control.



Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Transvenous Pacing

Background

A temporary pacing electrode is utilized to increase the heart rate in the bradyarrhythmias and asystole, or to overdrive pace tachyarrhythmias. It may also be used prophylactically following a myocardial infarction and for diagnostic testing (pacing induced ischemia).

Management

- Temporary transvenous pacemakers are placed through a central venous catheter sheath. Refer to the Central Venous Catheter device management guideline for additional information.
- Verify whether a single-chamber or dual-chamber device is in use. Most emergent situations will involve pacing of a single heart chamber (ventricle) even if the device is capable of dual-chamber pacing.
- Ensure battery in the pulse generator is fresh.
- If more than one set of wires is present (i.e. dual-chamber pacemaker), identify each wire set as atrial or ventricular. If a single-chamber device is in use, there will only be one set of wires and will likely be ventricular.
- Attach wires to the appropriate site(s) on the pulse generator.
- Power on the pulse generator.
- Set rate based on patient's need and physician orders (generally 70 – 90 bpm)
- Set the output (amperage):
  - Nonurgent: 10mA
  - Emergent: 15-20mA
- Set the sensitivity:
  - Start at 2 – 5 mV
  - If failure occurs (lack of pacer output due to not sensing native electrical activity) turn sensitivity DOWN
  - If pacer is sensing beats not present turn sensitivity UP
  - *In emergent situations, asynchronous pacing should be used*
- Observe patient for response
- Secure all wires, connections, and pacemaker in a safe location

Critical Care Endorsement Required
Critical Care Endorsement Required
Critical Care Endorsement Required

Ventilators/BiPAP/CPAP

Exclusion Criteria

If patient meets any of the following criteria, discuss options with the transferring provider. These would include further stabilization at the current facility, ventilate manually with a BVM, contact MRCC for further consultation.

- Patients requiring the following advanced modes of ventilation will require a specialty transport team (respiratory therapist):
  - Patients on ventilatory modes that cannot be replicated by the transport ventilator.
  - Patients on Pressure Control where the driving pressure plus PEEP is greater than 35 cmH2O.
  - Patients on Volume Control where the plateau pressure is greater than 35 cmH2O or the Peak Inspiratory Pressure (PIP) is greater than 40 cmH2O.
- Any patient for whom the following conditions exist on their current ventilator settings:
  - SaO2 < 95%.
  - Peak airway pressure greater than 45 cmH20 (or greater than 30 cmH20 with a supraglottic airway).
  - Patient is not tolerating the current ventilator settings.

Ventilator Management

- Confirm endotracheal tube placement or supraglottic airway placement
- Support ventilation as needed with BVM and O2.
- Determine current ventilator settings and attempt to match on transport ventilator prior to switching patient over. If the transferring facility has not yet initiated mechanical ventilation, initiate with the following ventilator settings:
  - **Ventilator mode:** Assist Control (A/C)
  - **Tidal volume:** 6-8 mL/kg (based on ideal body weight) - This should be reduced to 4 - 6 mL/kg in the setting of ARDS / Acute Lung Injury
  - **Rate:** Adult 10 – 12 bpm, Children 12 – 24, Toddler/Infants 20 - 30 (titrate by 2 breaths/min as needed to maintain desired EtCO2 – use caution with PEEP at higher respiratory rates)
  - **FiO2:** 100% (titrate to keep SpO2 between 93% - 99%)
  - **PEEP:** 5 cmH2O (Titrate in increments of 2 cmH2O (max of 10 cmH2O) every 15 minutes to increase SpO2 where other measures (sedation, paralysis) have failed and SBP is > 90mmHg)
- Ensure adequate sedation prior to moving the patient
- Switch patient over to the transport ventilator and observe for any distress. It may take a minute or so for the patient to become accustomed to the new ventilator.
- Contact MRCC immediately if:
  - SaO2 < 95%
  - Peak airway pressure > 45 cm H2O (or > 30cm H2O with supraglottic airway).
  - Patient is not tolerating ventilator settings.

Pearls

- Hyperoxygenation may be harmful for patients with ischemic conditions. Titrate FiO2 and PEEP to a goal SpO2 between 93% - 97%.
- If patient becomes hypotensive, consider reducing PEEP level to reduce intra-thoracic pressure, which will enhance the venous return to the heart.
- Be aware of pneumothorax risk (especially with traumatic chest injuries, situations requiring high PEEP, or potential for auto-PEEP such as asthma or COPD)
- Maintain EtCO2 between 35-40 for most patients; 30-35 if signs of imminent herniation are present.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

Ventilators/BiPAP/CPAP

Ideal Body Weight Calculations

MALE: 50 + 2.3 [height (in inches) - 60]

FEMALE: 45.5 + 2.3 [height (in inches) - 60]

Ventilation Strategies for Specific Patient Types

ARDS / Acute Lung Injury

- **Mode:** Assist Control
- **Breath type:** Pressure or Volume Ventilation can be used.
  - Pressure control ventilation ensures pressure limited breaths which also limit PIP and Plateau pressure. If compliance deteriorates, exhaled volumes will decrease. This will worsen CO2 retention.
  - Volume ventilation provides a consistent tidal volume. Appropriate alarm parameters are necessary in this context. High PIP's are an indication of in increase the risk of barotrauma.
- **Tidal volume:** 4 – 8 mL/kg ideal body weight (Maintain plateau pressure less than or equal to 30)
- **Breath Rate:** Adults 12 to 20 breaths/min, Children 16 to 30 breaths/min
- **PEEP:** 5 to as much as 15 cm (High PEEP may cause hypotension, particularly if the patient is hypovolemic. Permissive hypercapnia may be necessary to reduce tidal volume to reduce PIPs / Plateau pressures)
- **Inspiratory time:** 0.8 – 1.2 seconds
- **FIO2:** Titrate to maintain SpO2 90 – 95%

Asthma and COPD

- **Mode:** If the patient is breathing spontaneously, SIMV may be helpful in reduction of auto-PEEP.
- **Tidal Volume:** 4 – 8 mL/kg ideal body weight (Maintain plateau pressure less than or equal to 30)
- **Breath Rate:** Adults 6 to 25 breaths/min, Children 8 to 30 breaths/min (Adjust the breath rate to allow for full exhalation prior to the next breath being initiated)
- **PEEP:** 4 – 10 cm
- **Inspiratory Time:** 0.8 to 1.2 seconds (Keep the inspiratory time short enough to allow the patient to fully exhale prior to the initiation of the next breath)
- **FIO2:** Titrate to maintain SpO2 90 – 95%
- **Breath type:** Pressure Ventilation is preferred (Adjust to total PIP of less than or equal to 30)

Burns and Smoke Inhalation

- **Mode:** Assist Control
- **Tidal Volume:** 4 – 8 mL/kg ideal body weight (Maintain plateau pressure less than or equal to 30)
- **Breath Rate:** Adults 6 – 20 breaths/min, Children 8 – 30 breaths/min
- **PEEP:** 5 – 10 cm (Adjust based on FIO2 requirements and hemodynamics)
- **Inspiratory Time:** 0.8 – 1.2 seconds
- **FIO2:** 100% (Due to the possibility of carbon monoxide poisoning)

Critical Care Endorsement Required

Critical Care Endorsement Required

Ventilators/BiPAP/CPAP

Alarm Troubleshooting

- Low Battery/power source (check battery or plug into wall outlet)
- Low-pressure alarm:
  - Leak or disconnected tubing (reconnect or tighten connections)
  - Cuffed tube may be leaking (check tube, inflate cuff)
  - Check O2 supply
- High-pressure alarm (Ventilator uses too much pressure to deliver the tidal volume):
  - Bronchospasm
  - Secretions in airway (suction airway)
  - Kinks in ET tube (includes biting on ET tube)
  - Coughing, gagging, breathing asynchronously, anxiety (optimize sedation)
  - Alveolar over-distension
  - Improper ventilator settings (High or low tidal volumes, excessive rate causing stacking and auto PEEP)
  - Water in the ventilator tubing (disconnect the tubing, empty water, reconnect tubing)
  - Pneumothorax

If unable to identify the cause of the ventilator alarm and/or patient's condition deteriorates, disconnect from ventilator and assist respirations via a BVM.

Critical Care Endorsement Required

Critical Care Endorsement Required

Ventilators/BiPAP/CPAP

Exclusion Criteria

If patient meets any of the following criteria, discuss options with the transferring provider. These would include further stabilization at the current facility or advanced airway management.

- Recurrent aspiration, vomiting, or large volumes of secretions
- Inability to protect the airway
- Obstructed bowel
- Upper airway obstruction
- Uncooperative, confused or combative patient
- ARDS
- Inability to tolerate a tight mask
- Orofacial abnormalities which interfere with mask/face interface
- Hemodynamic instability
- Untreated pneumothorax

CPAP Management

- Contact MRCC for orders for pediatric patients
- Initiate CPAP at 3 – 5 cmH2O
- Titrate up by 1 -2 cmH2O as needed to maintain SpO2 between 93% and 99%, max 10 cmH2O
- If patient does not improve as expected, consider advanced airway management
- Re-evaluate every 15 minutes to titrate down or discontinue CPAP

BiPAP Management

- Contact MRCC for orders for pediatric patients
- Review current settings with respiratory therapist, nurse, or physician at transferring facility and attempt to match on transport ventilator using BiPAP (NPPV) mode.
- Do not disconnect patient from current BiPAP machine until the transport ventilator is ready
- If current settings have not been established at the transferring facility, use the following guidelines:
  - **Inspiratory Pressure** (top number, sometimes represented as the pressure control value): start at 10 cmH2O, titrate up by 2 cmH2O every 5 – 10 minutes as needed, max 20 cmH2O
  - **Expiratory Pressure** (bottom number, sometimes represented as PEEP): start at 5 cmH2O, titrate up by 1 – 2 cmH2O every 5 – 10 minutes as needed, max 10 cmH2O.
  - Maintain a 5 to 8 point difference between inspiratory and expiratory pressures
  - **Inspiratory Time:** 0.8 to 1.0 second
- If improvement in ventilation and oxygenation is not achieved, discontinue BiPAP and consider endotracheal intubation

Pearls

- BiPAP delivers CPAP but also senses when an inspiratory effort is being made and delivers a higher pressure during inspiration. This positive pressure wave during inspirations unloads the diaphragm decreasing the work of breathing.
- There have been an increased number of MIs in patients on BiPAP compared to CPAP, thus it is recommended that CPAP be attempted first.
- If patient becomes hypotensive, discontinue BiPAP and use other means to manage the airway.

Critical Care Endorsement Required

Critical Care Endorsement Required

Critical Care Endorsement Required

For use when applying for admission of a person on an emergency hold order. The term "Peace Officer" means a sheriff, municipal or other local police officer, or state patrol officer. The term "Health Officer" means a licensed physician, licensed psychologist, licensed social worker, psychiatric or public health nurse, advance practice registered nurse, emergency room registered nurse, or a formally designated member of a pre-petition screening unit.

Health or Peace Officer's Statement (M.S. 253B.05 (subd. 2)

I am a _____ with _____ and am hereby making a written application
(Title or Position) (Agency)

to the head of the treatment facility for the admission of _____ of _____.
(Patient's Full Name) (County)

I believe that this person is mentally ill, developmentally disabled or chemically dependent and in danger of injuring self or others if not immediately detained; or is intoxicated in public.

THE REVERSE SIDE OFTHIS FORM MUST ALSO BE COMPLETED BY THE HEALTH OR PEACE OFFICER.

Printed Name and Signature	Title	Date	Time
			❑AM ❑PM

Medical Officer on Duty Statement (M.S. 253B.05 (subd. 2(b))

I am a medical officer on duty at _____ treatment facility and upon preliminary examination find that this patient **(has) (does not have)** symptoms of mental illness or developmental disability and **(appears) (does not appear)** to be in danger of injuring self or others if not immediately detained, and thereby **(recommend admission) (do not recommend admission)** to this treatment facility.

OR:

I am the institution program director, or designee on duty at _____ treatment facility, and upon preliminary examination find that this patient **(has) (does not have)** symptoms of chemical dependency and **(appears) (does not appear)** to be in danger of injuring self or others if not immediately detained or **(is) (is not)** intoxicated in public, and thereby **(recommend admission) (do not recommend admission)** to this treatment facility.

Printed Name and Signature	Title	Date	Time
			❑AM ❑PM

Consent of Head of Treatment Facility

I am the head of the _____ treatment facility or designee and **(consent) (do not consent)** to the admission of _____ to this treatment facility.
(Patient's Full Name)

Printed Name and Signature	Title	Date	Time
			❑AM ❑PM

Initial Assessment (M.S. 253B.06)

Pursuant to M.S. 253B.06 (subd. 1), I hereby declare that I am a physician knowledgeable and trained in the diagnosis of the alleged disability and have examined this person within 48 hours of admission to this treatment facility, and in my opinion there is an apparent need for care, treatment, and evaluation as a person with a mental illness or developmental disability.

OR:

Pursuant to M.S.253B.06 (subd. 2.), I hereby declare that this person has been examined according to procedures established by a physician and that I am a staff person knowledgeable and trained in the diagnosis of the alleged disability and in my opinion there is an apparent need of admission as a person with chemical dependency.

Printed Name and Signature	Title	Date	Time
			❑AM ❑PM

If you ask, we will give you this information in another format, such as Braille, large print or audiotape.

Facility Name:

Patient Name:

Birthdate:

Sex:

Pursuant to Minnesota Statutes 253B.05, subd. 2, a peace or health officer shall make written application for admission of the person to the treatment facility. The application shall contain the peace or health officer's statement specifying the reasons for and circumstances under which the person was taken into custody. If danger to specific individuals is a basis for the emergency hold, the statement must include identifying information on those individuals, to the extent practicable. A copy of the statement shall be made available to the person taken into custody.

In the space provided below, please identify the specific reasons for the circumstances under which the person was taken into custody. **You must include a statement with identifying information regarding any individuals who might be endangered if this person is not held.** Please print.

Signature of Health or Peace Officer

If you ask, we will give you this information in another format, such as Braille, large print or audiotape.

Facility Name:

Patient Name:

Birthdate:

Sex:

EMERGENCY HOLD ORDER APPLICATION
(Minnesota Statutes 253B.05 and 253B.06)

POLST: Provider Orders for Life Sustaining Treatment POLST

HIPAA PERMITS DISCLOSURE OF POLST TO OTHER HEALTH CARE PROVIDERS AS NECESSARY

PROVIDER ORDERS FOR LIFE-SUSTAINING TREATMENT (POLST)

FIRST follow these orders, THEN contact the patient's provider. This is a provider order sheet based on the patient's medical condition and wishes. POLST translates an advance directive into provider orders. Any section not completed implies the most aggressive treatment for that section. Patients should always be treated with dignity and respect.

Last Name

First/Middle Initial

Date of Birth

Primary Care Provider/Phone

A — CARDIOPULMONARY RESUSCITATION (CPR):

Check One

Patient has no pulse and is not breathing.

☐ **CPR/ATTEMPT RESUSCITATION**

☐ **DNR/DO NOT ATTEMPT RESUSCITATION** (Allow Natural Death)

When not in cardiopulmonary arrest, follow orders in **B and C.**

An automatic external defibrillator (AED) should not be used for a patient who has chosen "Do Not Attempt Resuscitation."

B — GOALS OF TREATMENT:

Check One Goal

Patient has pulse and/or is breathing. See Section A regarding CPR if pulse is lost.

Additional Orders (e.g. dialysis, etc.)

☐ **COMFORT CARE** — Do not intubate but use medication, oxygen, oral suction, and manual clearing of airways, etc. as needed for immediate comfort.

Check all that apply:

- ❑ Avoid calling 911, call _____ instead
- ❑ If possible, do not transport to ER (when patient can be made comfortable at residence)
- ❑ If possible, do not admit to the hospital from the ER (e.g. when patient can be made comfortable at residence)

☐ **LIMIT INTERVENTIONS AND TREAT REVERSIBLE CONDITIONS** — Provide interventions aimed at treatment of new or reversible illness / injury or non-life threatening chronic conditions. Duration of invasive or uncomfortable interventions should generally be limited. (Transport to ER presumed)

Check one:

- ❑ Do not intubate
- ❑ Trial of intubation (e.g._____days) or other instructions: _____
- ❑ Intubate long-term if necessary

☐ **PROVIDE LIFE SUSTAINING TREATMENT**

Intubate, cardiovert, and provide medically necessary care to sustain life. (Transport to ER presumed)

C — INTERVENTIONS AND TREATMENT

Check All That Apply

ANTIBIOTICS *(check one)*:

- ❑ No Antibiotics (Use other methods to relieve symptoms whenever possible.)
- ❑ Oral Antibiotics Only (No IV/IM)
- ❑ Use IV/IM Antibiotic Treatment

NUTRITION/HYDRATION *(check all that apply)*:

Additional Orders:

- ☑ Offer food and liquids by mouth (Oral fluids and nutrition must always be offered if medically feasible)
- ❑ Tube feeding through mouth or nose
- ❑ Tube feeding directly into GI tract
- ❑ IV fluid administration
- ❑ Other: _____

Provider Name (MD/DO/NP/PA when delegated, are acceptable) Provider Signature Date

FAXED COPIES AND PHOTOCOPIES OF THIS FORM ARE VALID.

TO VOID THIS FORM, DRAW A LINE ACROSS SECTIONS A - D AND WRITE "VOID" IN LARGE LETTERS.

POLST

D SUMMARY OF GOALS

POLST

Check All That Apply

DISCUSSED WITH:

- ☐ PATIENT
- ☐ PARENT(S) OF MINOR
- ☐ HEALTH CARE AGENT: _____
- ☐ COURT-APPOINTED GUARDIAN
- ☐ NONE ☐ OTHER: _____

THE BASIS FOR THESE ORDERS IS PATIENT'S (check *all* that apply):

- ☐ REQUEST
- ☐ KNOWN PREFERENCE
- ☐ HEALTH CARE DIRECTIVE/ LIVING WILL
- ☐ BEST INTEREST
- ☐ OTHER: _____

Name of Health Care Professional Preparing Form	Preparer Title	Phone Number	Date Prepared

E SIGNATURE OF PATIENT OR HEALTH CARE AGENT / GUARDIAN / SURROGATE

THESE ORDERS REFLECT THE PATIENT'S TREATMENT WISHES

Name	Date
Relationship to Patient	Phone Number
Signature*	

DIRECTIONS FOR HEALTH CARE PROFESSIONALS

COMPLETING POLST

- Must be completed by a health care professional based on patient preferences and medical indications.
  - If the goal is to support quality of life in last phases of life, then DNR must be selected in Section A.
  - If the goal is to maintain function and quality of life, then either CPR or DNR may be selected in Section A.
  - If the goal is to live as long as possible, then CPR must be designated in Section A.
- POLST must be signed by a physician, nurse practitioner, Doctor of Osteopathy, or Physician Assistant (when delegated). * The signature of the patient or heath care agent / guardian/ surrogate is strongly encouraged.

USING POLST

- Any section of POLST not completed implies most aggressive treatment for that section.
- An automatic external defibrillator (AED) should not be used for a patient who has chosen "Do Not Attempt Resuscitation."
- Oral fluids and nutrition must always be offered if medically feasible.
- When comfort cannot be achieved in the current setting, the patient, including someone with "Comfort Measures Only," should be transferred to a setting able to provide comfort.
- An IV medication to enhance comfort may be appropriate for a patient who has chosen "Comfort Measures Only".
- Artificially-administered hydration is a measure which may prolong life or create complications. Careful consideration should be made when considering this treatment option.
- A patient with capacity or the surrogate (if patient lacks capacity) can revoke the POLST at any time and request alternative treatment.
- **Comfort care only**: At this level, provide only palliative measures to enhance comfort, minimize pain, relieve distress, avoid invasive and perhaps futile medical procedures, all while preserving the patients' dignity and wishes during their last moments of life. This patient must be designated DNAR status in section A for this choice to be applicable in section B.
- **Limit Interventions and Treat Reversible Conditions**: The goal at this level is to provide limited additional interventions aimed at the treatment of new and reversible illness or injury or management of non life-threatening chronic conditions. Treatments may be tried and discontinued if not effective.
- **Provide Life-Sustaining Care:** The goal at this level is to preserve life by providing all available medical care and advanced life support measures when reasonable and indicated. For patient's designated DNR status in section A above, medical care should be discontinued at the point of cardio and respiratory arrest.

REVIEWING POLST

This POLST should be reviewed periodically and a new POLST completed if necessary when:

1. The patient is transferred from one care setting or level to another, **or**
2. There is a substantial change in the patient's health status.
3. A new POLST should be completed when the patient's treatment preferences change.

Minnesota POLST — October, 2011

Minnesota Medical Association

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TO VOID THIS FORM, DRAW A LINE ACROSS SECTIONS A - D AND WRITE "VOID" IN LARGE LETTERS.

POLST

12 Lead ECG Interpretation

1) RATE, RHYTHM, R TO R

2) PLACE ELECTRODES

Right Arm (RA) = Right forearm

Right Leg (RL) = Right calf

Left Arm (LA) = Left forearm

Left Leg (LL) = Left calf

V1 = 4th ICS right of sternum

V2 = 4th ICS left of sternum

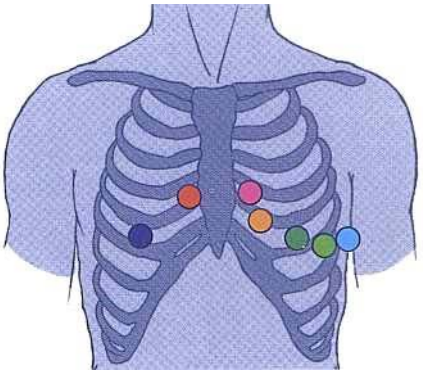
V3 = Between V2 and V4

V4 = 5th ICS at left midclavicular line

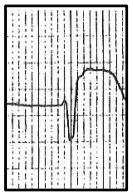
V5 = Level with V4 at left anterior axillary line

V6 = Level with V4 at left midaxillary line

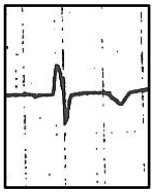
V4R - V6R = Same positioning as V4-V6 only **RIGHT** side



3) FIND INJURY PATTERNS



ST Elevation



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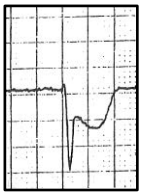
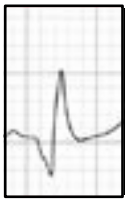
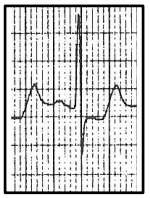


ST Depression



Q-wave



Posterior in V1-V2

4) IDENTIFY LOCATION

I LATERAL	aV_R	V_1 SEPTAL	V_4 ANTERIOR
II INFERIOR	aV_L LATERAL	V_2 SEPTAL	V_5 LATERAL
III INFERIOR	aV_F INFERIOR	V_3 ANTERIOR	V_6 LATERAL

5) ARE THERE RECIPROCAL CHANGES?

Location	***Arterial Supply***	***Injury / Ischemia changes in:***	***Reciprocal***
Septal	LAD	V1 – V2	None
Anterior	LCA/LAD	V3-V4	I, III, & AVF
Inferior	RCA	II, III, AVF	I, AVL
Lateral	Circumflex	I, AVL, V5, V6	V1-V3
Right Ventricle	RCA	V4R, V5R, V6R	V2-V4
Posterior	RCA/Circumflex	None	V1-V2

6) IF INFERIOR MI - IS IT RIGHT SIDED?

Right Side MI:

- Inferior MI on standard 12-Lead ECG
- ST elevation in lead III greater than in lead II
- ST elevation in V1 (could go through V6)
- ST depression in V2 (less than ½ elevation in AVF)
- ST elevation in V4R –V6R

7)IF INFERIOR MI - IS IT POSTERIOR?

Posterior MI:

- Inferior MI on Standard 12-Lead ECG
- Tall & wide R-wave in V1 & V2
- ST depression with upright T wave in V1 & V2

Emergency Medical Services: Buprenorphine (Bup) Field Start Protocol

BRIDGE
Treatment. Equity. Connection.

This treatment protocol can be used for patients experiencing opioid withdrawal symptoms and for patients recently administered naloxone.

Assess opioid withdrawal signs and symptoms.

Opioid Withdrawal Signs & Symptoms: Patient must present with ≥ 2 objective signs to be considered for bup treatment.

Objective Signs		Subjective Symptoms	
• Yawning	• Diaphoresis	• Nausea	• Restlessness
• Rhinorrhea or lacrimation	• Restlessness and/or agitation	• Stomach/abdominal cramps	• Hot and cold
• Dilated pupils	• Vomiting, diarrhea	• Body aches	• Nasal congestion
• Tachycardia	• Piloerection	• Achy bones/joints	

Assess for exclusion criteria.

Exclusion Criteria: Patient is not a candidate for buprenorphine treatment if any of the following are present.

- No opioid withdrawal signs or symptoms
- Under 16 years of age
- Any methadone use within last 10 days
- Severe medical illness (sepsis, respiratory distress, etc.)
- Altered mental status and unable to give consent or comprehend potential risks and benefits for any reason

Are any exclusion criteria present?

NO

Check for COWS Score ≥ 8
(Clinical Opioid Withdrawal Scale)

NO → **Not eligible for bup field start.**

1. Provide medication for addiction treatment (MAT) brochure.
2. Provide naloxone.
3. Offer transport to Bridge hospital.

YES

Offer patient bup and counseling on treatment options.
Consider MD Base contact for complex cases/additional support.

PATIENT DENIES TREATMENT → (same 3 steps above)

PATIENT AGREES TO TREATMENT

Administer Buprenorphine.
1. Administer buprenorphine 16 mg SL.
2. Reassess after 10 minutes.

IF SYMPTOMS IMPROVE →

1. Verify patient contact information for hospital follow up, two phone numbers recommended.
2. Provide naloxone and MAT brochure.
3. Repeat and document second COWS.
4. Recommend transport to Bridge hospital.
5. If patient declines transport, inform them that a navigator may initiate contact for further support.

IF SYMPTOMS WORSEN OR PERSIST

Re-dose with bup 8 mg SL.
Total maximum bup dose not to exceed 24 mg SL. → (same 5 steps above)

This project was supported by the CARESTAR Foundation.

April 2024

Clinical Opiate Withdrawal Scale (COWS)

Resting Pulse Rate: beats / minute

Measured after patient is sitting or lying for one minute

- (0) *pulse rate 80 or below*
- (1) *pulse 81 to 100*
- (2) *pulse 101 to 120*
- (4) *pulse rate greate than 120*

GI Upset:

over last 1/2 hour

- (0) *no GI symptoms*
- (1) *stomach cramps*
- (2) *nausea or loose stool*
- (3) *vomiting or diarrhea*
- (5) *multiple episodes of diarrhea or vomiting*

Sweating: *over past 1/2 hour not accounted for by room temperature or patient activity.*

- (0) *no report of chills or flushing*
- (1) *subjective report of chills or flushing*
- (2) *flushed or observable moistness on face*
- (3) *beads of sweat on brow or face*
- (4) *sweat streaming off face*

Tremor:

Observation of outstretched hands

- (0) *no tremor*
- (1) *tremor can be felt, but not observed*
- (2) *slight tremor observable*
- (4) *gross tremor or muscle twitching*

Restlessness:

Observation during assessment

- (0) *able to sit still*
- (1) *reports difficulty sitting still, but is able to do so*
- (3) *frequent shifting or extraneous movements of legs/arms*
- (5) *unable to sit still for more than a few seconds*

Yawning:

Observation during assessment

- (0) *no yawning*
- (1) *yawning once or twice during assessment*
- (2) *yawning three or more times during assessment*
- (4) *yawning several times/minute*

Pupil size:

- (0) *pupils pinned or normal size for room light*
- (1) *pupils possibly larger than normal for room light*
- (2) *pupils moderately dilated*
- (5) *pupils so dilated that only the rim of the iris is visible*

Anxiety or Irritability:

Measured after patient is sitting or lying for one minute

- (0) *none*
- (1) *patient reports increasing irritability or anxiousness*
- (2) *patient obviously irritable or anxious*
- (4) *patient so irritable or anxious that participation in the assessment is difficult*

Bone or Joint aches:

If the patien was having pain previously, only the additinal component attributed to opiates withdrawal is scored

- (0) *not present*
- (1) *mild diffuse discomfort*
- (2) *patient reports severe diffuse aching of joints/muscles*
- (4) *patient is rubbing joints or muscles and is unable to sit still because of discomfort*

Gooseflesh skin:

- (0) *skin is smooth*
- (3) *piloerrection of skin can be felt or hairs standing up on arms*
- (5) *prominent piloerrection*

Runny nose or tearing:

Not acounted for by cold symptoms or allergies

- (0) *not present*
- (1) *nasal stuffiness or unusually moist eyes*
- (2) *nose running or tearing*
- (4) *nose constantly running or tears streaming down cheeks*

Total Score:

The total score is the sum of all 11 items

Initials of person completing assessment:

Score: 5- 12 = ***mild;*** 13-24 = ***moderate;***
25-36 = ***moderately severe;***
more than 36 = ***severe withdrawal***

Common Medications

Generic Name	Brand Name	Typical Use
Acetaminophen/butalbital/caffeine	Americet	Analgesics, non-narcotic
Acetaminophen/codeine	Tylenol with Codeine	Analgesics, narcotic
Acetaminophen/hydrocodone	Vicodin, Norco	Analgesics, narcotic
Acetaminophen/oxycodone	Endocet, Oxycet, Percocet	Analgesics, narcotic
Acetaminophen/propoxyphene-N	Darvocet	Analgesics, narcotic
Acetaminophen/tramadol	Ultracet	Analgesics, non-narcotic
Acyclovir	Zovirax;Zovirax Topical	Antivirals, herpes genitalis
Albuterol Aerosol	Proventil, Ventolin, Volmax Vospire	Adrenergic agonists, bronchodilators
Albuterol/ipratropium	Combivent	Anticholinergics, bronchodilators
Alendronate	Fosamax	Bisphosphonates, osteoporosis
Allopurinol	Aloprim; Zyloprim	Antigout agents
Alprazolam	Xanax	Anxiety disorder
Amitriptyline	Elavil; Vanatrip	Depression
Amlodipine	Norvasc	Hypertension, angina
Amlodipine/benazepril	Lotrel	Hypertension
Amoxicillin	Amoxicot, Trimox	Antibiotics, penicillins
Amoxicillinpotassium clavulanate	Augmentin	Anitbiotics, penicillins
Amphetamine/dextroamphetamine	Adderall	Adrenergic agonists, amphetamines
Aspirin, enteric-coated	Entaprin	Analgesics, non-narcotic, antipyretics
Atenolol	Tenormin	Antiadrenergics, beta blocking, HTN
Atomoxetine	Strattera	ADHD
Atorvastatin	Lipitor	Antihyperlipidemics
Azithromycin	Zithromax, Z-Pak	Antibiotics, macrolide
Benazepril	Benazepril Hydrochloride	Antihypertension
Benzonatate	Tessalon	Cough
Bisoprolol/hydrochlorothiazide	Ziac	Hypertension
Budesonide	Nasal Rhinocort	Rhinitis, allergic, asthma
Buproprion	Sustained-Release Wellbutrin	Depression, smoking cessation
Buspirone HCl	BuSpar	Anxiety disorder
Captopril	Capoten	Hypertension, heart failure
Carisoprodol	Soma	Pain, musculoskeletal
Carvediol	Coreg	Hypertension, heart failure
Cefdinir	Omnicef	Antibiotics, cephalosporin
Cefprozil	Cefzil	Antibiotics, cephalosporin
Celecoxib	Celebrex	Arthritis, osteoarthritis, pain
Cephalexin	Keflex	Antibiotics, cephalosporin
Cetirizine	Zyrtec	Rhinitis, allergic, urticaria
Chlorpheniramine maleate/hydrocodone	S-T Forte 2	Cough, common cold
Ciprofloxacin	Cipro	Infection, fluoroquinolones
Citalopram	Celexa	Depression
Clarithromycin extended-release	Biaxin	Antibiotics, macrolide

Common Medications

Generic Name	Brand Name	Typical Use
Clindamycin	Cleocin HCl	Antibiotic
Clonazepam	Klonopin	Seizures, absence, panic disorder
Clonidine	Catapres	Hypertension, withdrawal, pain-cancer
Clopidogrel	Plavix	Stroke, myocardial infarction
Clotrimazole/betamethasone	Lotrisone	Antifungals
Codeine/promethazine	Codeine	Cough, common cold
Cyclobenzaprine	Flexeril	Pain, musculoskeletal
Desloratadine	Clarinex	Rhinitis, allergic
Desogestrel/ethinyl estradiol	Apri	Contraception
Diazepam	Valium	Anxiety disorder, seizures
Diclofenac	Cataflam	Arthritis, osteoarthritis
Digoxin	Lanoxin	Heart failure, atrial fibrillation
Diltiazem	Cardizem	Hypertension, atrial fibrillation
Divalproex Sodium	Depakote	Seizures, mood stabilization
Donepezil	Aricept	Alzheimer's disease
Doxazosin	Cardura	Hypertension
Doxycycline	Adoxa	Antibiotics
Drospirenone/ethinyl estradiol	Yasmin	Contraception
Enalapril	Vasotec	Hypertension, heart failure
Escitalopram	Lexapro	Depression
Esomeprazole	Nexium	Ulcer, esophagitis
Estradiol	Alora, Climara	Menopause, breast cancer
Estrogens, conjugated	Cenestin	Menopause, prostate cancer
Estrogens, medroxyprogesterone	Premphase, Prempro	Menopause
Ethinyl estradiol/levonorgestrel	Alesse, Aviane	Contraception
Ethinyl estradiol/norelgestromin	Ortho Evra	Contraception
Ethinyl estradiol/norgestimate	Mononessa	Contraception
Ezetimibe	Zetia	Hypercholesterolemia
Famotidine	Pepcid	Ulcer
Fenofibrate	Lipidil Supra	Hypercholesterolemia
Fentanyl (transdermal)	Actiq	Analgesics, narcotic
Ferrous Sulfate	N/A	Anemia
Fexofenadine	Allegra	Rhinitis, allergic
Fluconazole	Diflucan	Candidiasis, meningitis, antifungals
Fluoxetine	Prozac	Panic disorder, depression
Fluticasone	Flonase, Flovent	Rhinitis, allergic, asthma
Fluticasone/salmeterol	Advair Diskus	Asthma, COPD
Folic Acid	N/A	Anemia
Fosinopril	Monopril	Hypertension
Furosemide	Lasix	Hypertension
Gabapentin	Neurontin	Seizures, pain

Common Medications

Generic Name	Brand Name	Typical Use
Gemfibrozil	Lopid	Hypercholesterolemia
Glimepiride	Amaryl	Diabetes mellitus
Glipizide	Glucotrol	Diabetes mellitus
Glyburide	DiaBeta, Glycron	Diabetes mellitus
Glyburide/metformin	Glucovance	Diabetes mellitus
Insulin	Isophane, Humulin	Diabetes mellitus
Hydrochlorothiazide	Aquazide	Hypertension
Hydroxyzine	Atarax, Hyzine	Anxiety, urticaria
Ibuprofen	Advil, Motrin	Arthritis, analgesics, non-narcotic
Insulin Glargine	N/A	Diabetes mellitus
Insulin Lispro	Humalog	Diabetes mellitus
Irbesartan	Avapro	Hypertension
Isosorbide Mononitrate	Imdur	Angina pectoris
Lansoprazole	Prevacid	Ulcer, esophagitis
Latanoprost	Xalatan	Glaucoma
Levofloxacin	Levaquin	Antibiotics, fluoroquinolones
Levothyroxine	Synthroid	Hypothyroidism
Lisinopril	Prinivil, Zestril	Hypertension
Lisinopril/hydrochlorothiazide	Prinzide	Hypertension
Lorazepam	Ativan	Anxiety disorder
Losartan	Cozaar	Hypertension
Losartan/hydrochlorothiazide	Hyzaar	Hypertension
Lovastatin	Altocor	Hypercholesterolemia
Meclizine	Antivert	Motion sickness, vertigo
Medroxyprogesterone	Depo-Provera	Contraception
Metaxalone	Skelaxin	Pain
Metformin	Glucophage	Diabetes mellitus
Methylphenidate	Ritalin	ADHD, ADD
Methylprednisolone	Solu-Medrol	Corticosteroids
Metoclopramide	Reglan	Nausea, GERD, acid reflux
Metoprolol Succinate	Lopressor	Hypertension, MI
Metronidazole	Flagyl	Antibiotics
Minocycline	Arestin	Antibiotics
Mometasone	Nasonex	Rhinitis
Montelukast	Singulair	Rhinitis, asthma
Mupirocin	Bactroban	Skin infections
Naproxen	Aflaxen, Anaprox	Arthritis, analgesics, non-narcotic
Nifedipine extended-release	Procardia	Hypertension, angina
Nitrofurantoin	Macrobid	Antibiotics
Nortriptyline	Aventyl, Pamelor	Depression
Olanzapine	Zyprexa	Schizophrenia, bipolar, mania

Common Medications

Generic Name	Brand Name	Typical Use
Olopatadine	Patanol	Conjunctivitis
Omeprazole	Prilosec	Ulcer
Oxybutynin	Ditropan	Dysuria
Oxycodone	OxyContin	Analgesics, narcotic
Pantoprazole	Protonix	Esophagitis
Paroxetine	Paxil	Anxiety
Penicillin VK	N/A	Antibiotics, penicllin
Phenazopyridine	Pyridium, Eridium	Dysuria
Phenytoin	Dilantin	Seizures
Pimecrolimus	Elidel	Dermatitis
Pioglitazone	Actos	Diabetes mellitus
Polyethylene Glycol 3350	N/A	Constipation
Potassium Chloride	Cena K, K-Dur, K-Lor, Klor-con	Hypokalemia
Pravastatin	Pravachol	Stroke, hypercholesterolemia
Prednisone	Deltasone	Corticosteroids
Promethazine	Adgan	Nausea
Propranolol	Inderal	Hypertension, anxiety, tremors
Quetiapine	Seroquel	Schizophrenia, mood disorder
Quinapril	Accupril	Hypertension
Rabeprazole	Aciphex	Ulcer, esophagitis
Raloxifene	Evista	Osteoporosis
Ramipril	Altace	Hypertension, CHF
Ranitidine	Zantac	Ulcer, esophagitis
Risedronate	Actonel	Paget's disease
Risperidone	Risperdal	Schizophrenia, bipolar, mania
Rofecoxib	Vioxx	Arthritis, osteoarthritis
Rosiglitazone	Avandia	Diabetes mellitus
Sertraline	Zoloft	Panic disorder, depression
Sildenafil	Viagra	Erectile dysfunction
Simvastatin	Zocor	Stroke, hypercholesterolemia
Spironolactone	Aldactone	Hypertension
Sumatriptan	Imitrex	Migraine
Tamsulosin	Flomax	Benign prostatic hyperplasia
Temazepam	Restoril	Insomnia
Terazosin	Hytrin	Hypertension
Tizanidine	Zanaflex	Spasticity
Tolterodine	Detrol	Incontinence
Topiramate	Topamax	Seizures
Tramadol	Ultram	Analgesics, non-narcotic
Trazodone	Desyrel	Depression
Triamcinolone	Acetonide Nasal, Aristocort	Rhinitis

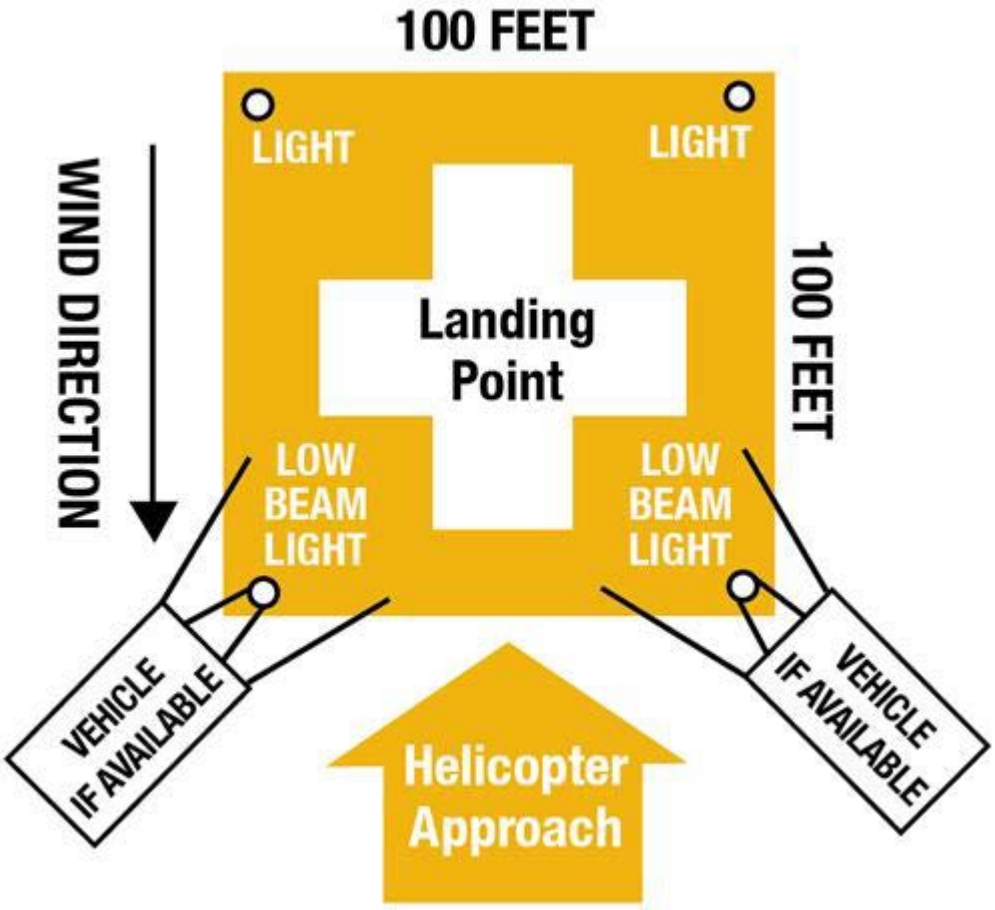
Common Medications

Generic Name	Brand Name	Typical Use
Triamterene/hydrochlorothiazide	Dyazide	Hypertension
Trimethoprim/Sulfamethoxazole	Bactrim	Antibiotics
Valacyclovir	Valtrex	Herpes genitalis
Valdecoxib	Bextra	Osteoarthritis
Valsartan	Diovan	Hypertension, CHF
Venlafaxine	Effexor	Anxiety disorder, depression
Verapamil	Calan	Arrhythmia, ventricular, HTN
Warfarin	Coumadin	DVT/PE treatment or prevention
Zolpidem	Ambien	Insomnia

GRIEV_ING Mnemonic

G	**Gather**	Gather the family; ensure all members are present.
R	**Resources**	Call for support resources available to assist the family with their grief (chaplain services, ministers, family, friends, etc.)
I	**Identify**	Identify yourself, identify the deceased patient by name, and identify the state of knowledge of the family relative to the events of the day.
E	**Educate**	Briefly educate the family as to the events that have occurred, educate them about the current state of their loved one.
V	**Verify**	Verify their family member has died. Be clear! Use the words "dead" or "died."
[_]	**Space**	Give the family personal space and time for an emotional moment; allow the family time to absorb the information.
I	**Inquire**	Ask if there are any questions, and answer as many as you can.
N	**Nuts and bolts**	Inquire about organ donation and personal belongings. Offer the family the opportunity to view the body.
G	**Give**	Give them contact information for resources that can assist them.

Helicopter Landing Zone



WARNING - PILOTS MUST BE NOTIFIED OF POWER LINES AS THEY ARE INVISIBLE FROM THE AIR!

- Illuminate night landing areas.
- Headlights should be directed into the wind and on to the landing area.
- Approach and departure path should be clear of trees, power lines and loose debris.

Important Phone Numbers

CISD (Metro Region Team):	(612) 347-5710
Children's Home Crisis Nursery:	(651) 646-4033
East Metro MRCC:	(651) 254-2990
EMSRB:	(612) 627-6000
M Health Fairview Lakes Region ER:	(651) 982-7320
M Health Fairview Ridges ER:	(952) 892-2022
HCMC ER:	(612) 347-3132
Lakeview ER:	(651) 430-4554
Life Link III:	(612) 778-0416, (800) 328-1377
NREMT:	(614) 888-4484
Poison Control:	(800) 222-1222
Ramsey County Coroner:	(651) 224-7627
Ramsey County Child Protection:	(651) 266-4500
Ramsey County Adult Crisis Program:	(651) 523-7900
Regions Hospital ER:	(651) 254-3307
Regina ER:	(651) 480-4340
Sexual Offense Services (SOS):	(651) 643-3006
St. John's ER:	(651) 232-7073
St. Paul Children's ER:	(651) 220-6988
St. Paul Domestic Abuse Hotline:	(651) 645-2824
State Duty Officer:	(651) 649-5451, (800) 422-0798
United ER:	(651) 241-5184
Washington County Child Protection:	(651) 430-6457
Washington County Mental Health-Crisis:	(651) 777-4455
West Metro MRCC:	(612) 347-2123
Woman's Advocates:	(651) 227-8284
Woodwinds Health Campus:	(651) 232-0020

MIST Report Format

Pediatric Vital Signs

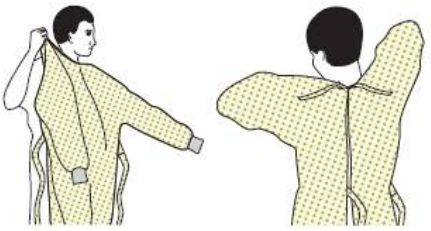
Age	Weight (kilograms)	Pulse	Respirations	Systolic BP	Diastolic BP
Premature	1	145	< 40	42 +/- 10	21 +/- 8
Premature	1-2	135	--	50 +/- 10	28 +/- 8
Newborn	2-3	125	--	60 +/- 10	37 +/- 8
1 month	4	120	24-35	80 +/- 16	46 +/- 16
6 month	7	130	--	89 +/- 29	60 +/- 10
1 year	10	120	20-30	96 +/- 30	66 +/- 25
2-3 years	12-14	115	--	99 +/- 25	64 +/- 25
4-5 years	16-18	100	--	99 +/- 20	65 +/- 20
6-9 years	20-26	100	12-25	100 +/- 20	65 +/- 15
10-12 years	32-42	75	--	112 +/- 20	68 +/- 15
Over 14 years	> 50	70	12-18	120 +/- 20	75 +/- 15

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit

4. GLOVES

- Extend to cover wrist of isolation gown

USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

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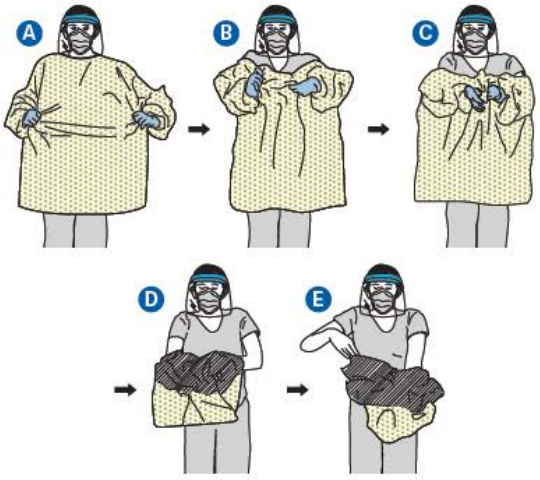
HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE) EXAMPLE 2

Here is another way to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

1. GOWN AND GLOVES

- Gown front and sleeves and the outside of gloves are contaminated!
- If your hands get contaminated during gown or glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp the gown in the front and pull away from your body so that the ties break, touching outside of gown only with gloved hands
- While removing the gown, fold or roll the gown inside-out into a bundle
- As you are removing the gown, peel off your gloves at the same time, only touching the inside of the gloves and gown with your bare hands. Place the gown and gloves into a waste container

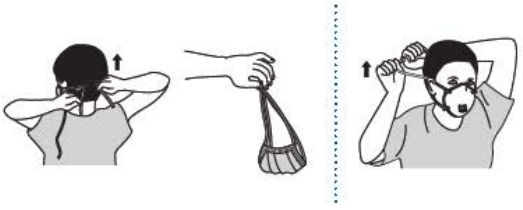


2. GOGGLES OR FACE SHIELD

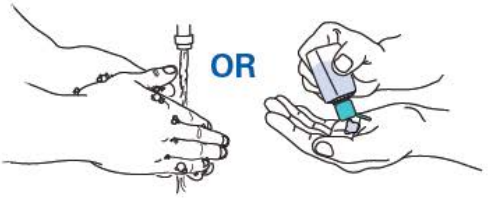
- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band and without touching the front of the goggles or face shield
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container

3. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in a waste container



4. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE

CS250672-E

Trauma Triage and Destination Plan

Critical

Critical Criteria
- Compromised airway (inability to ventilate and/or oxygenate by EMS)

Needs critical intervention. Transport to the *closest designated trauma center* within 30 minutes, otherwise transport to the closest hospital for stabilization.

Tier 1 (Level 1 Trauma Center)

Physiologic Criteria
- GCS < 14 due to trauma
- SBP < 90 or signs/symptoms of altered perfusion (pediatric < 70 + 2 x age)
- RR < 10 (< 20 in infants under 1 yr)
- RR > 29 (excluding anxiety)
- Need for ventilatory support
- Hypothermia < 90 F

Consider air transport if appropriate
- Level 1 Trauma Center > 30 minutes away

Significant Traumatic Injuries are present. Transport to the closest *Level 1 trauma center*. A Trauma Team Activation (TTA) should be requested if appropriate. See Policy 115 (Prehospital Alert Criteria) for current activation criteria.

Anatomic Criteria
- Penetrating injuries to head, neck, torso, or proximal extremities
- Flail chest
- 2 or more proximal long-bone fractures, or suspicion of a femur fracture
- Amputation proximal to wrist or ankle
- Suspected pelvic fractures
- Open or depressed skull fracture
- Focal neurologic deficits or paralysis
- Significant abdominal pain, tenderness, or distension
- Burns > 10% or significant burns involving face, airway, hands, feet, or genitalia
- Significant maxillofacial trauma (including mandible fractures, extensive complex facial lacerations likely to require surgical repair, or orbital trauma with visual loss)
- Significant extremity vascular injury
- Orthopedic injuries with neurovascular compromise or significant soft tissue injury
- Hanging

Continue ONLY if patient does not meet physiologic or anatomic criteria

Tier 2 (Level 1, 2, or 3 Trauma Center)

Mechanism Criteria
- Falls
  - Adult > 20 ft
  - Peds > 2 times the child's height
- MVC
  - High energy (rollover, > 40mph, or involving larger industrial/commercial equipment)
  - Entrapment with extrication time > 20 minutes
  - Significant passenger compartment intrusion > 12 inches
  - Ejection (partial or complete)
  - Death in same passenger compartment
- Vehicle vs pedestrian/bicycle
- Motorcycle/ATV crash
- Isolated head trauma, +/- LOC, currently alert and oriented
- Isolated orthopedic extremity injuries from a high energy event (including dislocations and open fractures) without significant soft tissue damage or neurovascular deficits
- Fall from large animal
- Near drowning

(If a patient meets ANY Tier 1 criteria they should go to the closest Level 1 Trauma Center)

Special Considerations
- Age > 70 or < 8
- Anti-coagulants or anti-platelet agents (other than aspirin)
- Pregnancy > 20 weeks
- Significant medical comorbidities

Exceptions to mandatory transport destinations
- Medical necessity for initial stabilization
- Unsafe or medically inappropriate due to adverse weather conditions or excessive transport time
- Transport to recommended facility would result in an inappropriate critical shortage of local EMS resources
- No trauma center is able to receive and provide care to the patient without undue delay
- The patient requests transport to a nonrecommended facility, does not meet "Critical" or "Tier 1" criteria, and understands the reasoning for the trauma center referral

Potential for Significant Traumatic Injuries exists. Transport to a *Level 1, 2, or 3 trauma center*. Level 4 and non-designated facilities may not have capability for definitive care should an injury be identified.

Regions EMS Contacts

Main Office Number:	(651) 254-7780
Fax Number:	(651) 778-3778
Education Hotline:	(651) 254-7788
Education Email:	emseducation@healthpartners.com

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EMS Manager

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