# SOUTH CAROLINA EMS

## CLINICAL OPERATING GUIDELINES




**2025**

# SOUTH CAROLINA PREHOSPITAL EMS CLINICAL OPERATING GUIDELINES

## Authors' Statement

Attached are the 2025 revised SC DPH Division of EMS Prehospital Clinical Operating Guidelines (COGs). This is one section of a multi-section manual that will be continually updated and revised. In addition to the Clinical Operating Guideline (COG) Section - other sections related to Prehospital Procedures and Interventions, Prehospital Policies, and a Clinical Operating Guideline Supplement Section will be developed to expand upon the information provided in the shorter (flowchart) type COG will be forthcoming.

These Clinical Operating Guidelines (COGs) have been developed and implemented through the combined efforts of the SC DPH Division of EMS, the SC EMS Advisory Committee, the SC Trauma Advisory Committee, the SC Stroke Advisory Committee, the SC EMS for Children s Committee, and other specialty groups and providers. They have been approved by the SC DPH Division of EMS Medical Control Committee.

In developing these Clinical Operating Guidelines (COG) input was sought from all the committees listed above, EMS field personnel, as well as private and academic specialists in areas related to specific Clinical Operating Guidelines. These then are consensus Clinical Operating Guidelines (COGs).

The question often arises as to why a specific Clinical Operating Guideline (COG) does not follow verbatim a similar Clinical Operating Guideline (COG) published by a national body. For example, why does the South Carolina Clinical Operating Guideline (COG) on Asystole/Pulseless Electrical Activity not follow the AHA/ECC Clinical Operating Guideline (COG) of similar title exactly. This is a reasonable question and has been much debated.

First – all Clinical Operating Guidelines (COGs) are consensus documents –and this applies to national organization Clinical Operating Guidelines (COGs) as much as it does to State or local Clinical Operating Guidelines (COGs). The goal of the Clinical Operating Guideline (COG) is to utilize the best information known at the time and to account for generally accepted medical practice. Often the final answer is based on the precept of "will this activity harm the patient" versus the less defined "will this activity possibly help the patient". In the case of life-threatening situations we tend to err on the side of activities that may possibly help the patient –even if evidence to that result is not firm.

Second – often conclusions regarding the benefit (or lack of benefit) are gathered from large, combined meta-studies where the application of that particular intervention was not directly studied but the results were inferred

Third - national guidelines generally reflect the most basic, minimum care that we expect to be provided to a patient in a certain situation. National guidelines are not intended to be promoted as a rule to limit what can be done for patients and should not be thought of as such.

Finally, national guidelines often err on the side of not including an intervention where there is inadequate evidence to support its inclusion – i.e. insufficient evidence based medical therapy. This does not equate to the statement that the intervention will not work or is harmful – only that to date, evidence is lacking to support its use. It may be that studies have not yet been done – or cannot be done – to determine the efficacy of a specific intervention.

Some typical interventions that are not yet incorporated into national guidelines include double sequence defibrillation, the use of lipid infusion therapy for toxicologic cardiovascular collapse codes, – and the list goes on. These are all utilized in the practical real-world scenario and within the Medical specialties. Similarly, some interventions are still being utilized by Emergency Medicine practitioners – even though they are no longer reflected within the specialty National Guidelines. The reasons for this are varied – but are often anecdotal. In an in extremis life-threatening situation where previous interventions have not resulted in a positive outcome we feel that it is not unreasonable to try such interventions. These are situations where there is truly nothing to lose and a small chance of monumental life-restoring results.

Currently the medical literature tends to grade the strength of evidence for an intervention based upon the perceived or documented Benefit : Risk ratio. A Class 1 recommendation generally means that the benefits of the intervention far outweigh the risks of the intervention – with that ratio reversing for a Class 3 recommendation (i.e. the risks of the intervention outweigh the benefits). The Level of Certainty of the recommendation varies from Level A where large populations have been studied in randomized clinic trials to Level C where there is very limited populations which have been studied. Level C also includes consensus opinion of experts. A copy of the Standard Level of Evidence Nomogram is attached to help you understand the medical literature as you review it.

In conclusion, these Clinical Operating Guidelines are a consensus document. These Clinical Operating Guidelines will be frequently revised and updated. There is no single way to provide good medicine. We specifically note that these Clinical Operating Guidelines (COGs) are **NOT** a Standard of Care Document. Standard of Care is broadly defined as the actions that would be taken by a person of similar training, with similar information (or lack thereof), in similar circumstances for provision of adequate appropriate care. We acknowledge that these Clinical Operating Guidelines are designed for a typical or best case scenario which is rarely the case in EMS Prehospital environments. Therefore, as noted they do not purport to be a Standard of Care document and implementation relies upon the level of education and certification of the prehospital clinician, their training, and their experience.

## CLINICAL OPERATING GUIDELINES – OR – PROTOCOLS?

We have adopted on this publication a change from the older terminology of "EMS Protocols" to the less restrictive term "Clinical Operating Guidelines". The term "Protocol" may be construed as a regimented, mandatory, step-by-step procedural treatment. This limited construction – and understanding by non-medical personnel – may lead to questions or conflicts about patient care when some particular element of a "protocol" is omitted, moved within the flowchart hierarchy, or otherwise not completed in a stepwise manner from beginning to end. As medical professionals we recognize that a strict, regimented, mandatory protocol could not be written for every EMS medical eventuality and even if this were possible would not be retainable by those personnel for whom they were written – including the authors.

## CLINICAL OPERATING GUIDELINE SUPPLEMENTS

Clinical Operating Guideline Supplements are in development at this time. When reviewing the Clinical Operating Guidelines Supplement these should be approached as supplemental materials to help explain the findings noted on and rationale for the flowchart style Clinical Operating Guidelines (COGs) that for years were referred to as "EMS Protocols".

The goal, therefore, is to broadly aggregate typical EMS medical problems and symptom syndromes into relatively logical and easy to remember Clinical Operating Guidelines (COGs). We realize that by necessity these documents must be relatively brief and flow from one point to another – but that does not mandate that one intervention must always follow the previous. Frequently at medical emergencies multiple activities are occurring simultaneously. These Clinical Operating Guidelines (COGs) and the Clinical Operating Guideline Supplements should not be interpreted as mandatory. These are our best consensus determination of the treatments and interventions that should be accomplished for a particular medical situation – and a relative determination of what we feel is most important in a "global approach" to the situation. Certainly the medical education, training, level of certification, and experience of the practitioner on the scene are of primary importance in the determination of the therapy.

The Division of EMS recognizes the need for statewide (and national) EMS clinical guidelines to help state EMS systems ensure a more standardized approach to the practice of patient care now and, as experience dictates, the adoption of future practices. The value of EMS clinicians to the patient has no boundaries - as magnified by the historic 2019 novel coronavirus pandemic as well as other interjurisdictional and global responses.

Model EMS clinical guidelines promote uniformity in EMS medicine which, in turn, fosters a more consistent skilled practice as EMS clinicians move across healthcare systems. They also provide a standardized foundation to EMS medical directors upon which to base practice. For those aspects of clinical care where evidence-based guidelines derived in accordance with the national evidence-based guideline model process are not available, consensus-based clinical guidelines are developed utilizing current available research. **Unless otherwise specified**, the SC

Division of EMS Model EMS Clinical Operating Guidelines are not mandatory, nor are they meant to be all-inclusive. The focus of these guidelines is solely patient-centric. As such, they are designed to provide a resource for EMS clinical practice, appropriate patient care, safety of patients and clinicians, and outcomes regardless of the existing resources and capabilities within an EMS system. This document provides a clinical basis that can be used as is or adapted for use on a state, regional, local, or organizational level to enhance patient care and to set benchmark performance of EMS practice.

The SC EMS Working Group for the revision of the Clinical Operating Guidelines (COG) has elected to use as a basis for development the excellent work published by the National Association of State EMS Officials (NASEMSO) in their Version 3.0 National Model EMS Clinical Guidelines (See: NASEMSO.org Model EMS Clinical Guidelines). Where possible the basic NASEMSO Clinical Guideline for a particular subject has been utilized as the format for the SC Prehospital EMS Clinical Operating Guideline Supplement for each topic. Where NASEMSO did not yet have a particular Clinical Operating Guideline Supplement on a topic that the SC EMS Working Group felt was important to our personnel we have developed one. In order to somewhat reduce the size of this document we have elected, in most instances, to not include specific references within the document.

The appendices contain material such as neurologic status assessment and burn assessment tools to which many guidelines refer to increase consistency in internal standardization and to reduce duplication. While some specific guidelines have been included for pediatric patients, considerations of patient age and size (pediatric, geriatric, and bariatric) have been interwoven in the guidelines throughout the document. Where IV access and drug routing are specified, it is intended to include IO access and drug routing when IV access and drug routing is not possible. Generic medication names are utilized throughout the guidelines.

Accurate and quality data collection is crucial to the advancement of EMS and a critical element of EMS research. The National EMS Information System (NEMSIS) has the unique ability to unify EMS data on a national scope to fulfill this need. There is significant information contained within the actual (flowchart) style Clinical Operating Guidelines (COGs) as well as the text format Clinical Operating Guidelines Supplement regarding important Data Points (referenced as Key Documentation Elements). This information for the EMS Clinician is often included within the PEARLS section of the (flowchart) Clinical Operating Guidelines.

## PERFORMANCE EVALUATION AND IMPROVEMENT

Quality assurance (QA) and/or continued performance improvement (CPI) programs are an indispensable element of medical direction as they facilitate the identification of gaps and potential avenues of their resolution within an EMS system. The National EMS Quality Alliance (NEMSQA) Performance Measures is a resource for these programs.

For the Local EMS Medical Director we have included within the Clinical Operating Guidelines Supplements particular points that should be reviewed for QA/CPI/CQI based upon the given Clinical Operating Guideline (COG) utilized by EMS Personnel for a particular event. These basic elements are included within the section for Quality Improvement and include both the Key Documentation Elements and the Performance Measures. With rare exceptions, the SC Division of EMS does not mandate any specific QA/CPI/CQI review – but – ongoing reviews by the Local EMS Medical Director are expected and are a large component of that Medical Director's duty and responsibility. EMS Inspectors may ask for QA/CPI/CQI reviews during inspections or at anytime.

When reviewing runs for QA/CPI/CQI the Medical Director should look for appropriate documentation – i.e. Key Documentation Elements as well as the appropriate Performance Measures. These items are not intended to be comprehensive – but to serve as a starting point for QA/CPI/CQI reviews. It is certainly within the scope of the Local Medical Director to add to any of the topics therein listed. Also, as frequently occurs, a particular medical event may necessitate movement from one Clinical Operating Guideline to another. In these instances, the QA/CPI/CQI review should include the summary of the Key Documentation Elements and Performance Measures from all of the COGs that were utilized during the event.

The Clinical Operating Guideline Supplements are designed to address topical information. For example, there are Clinical Operating Guideline Supplements for Tachycardia with a Pulse; Tachycardia without a Pulse; General Trauma management, etc. The COG Supplements will generally incorporate the care of all patient demographics (i.e. pediatric, adult, geriatric, etc.) within the one Supplement. The (flowchart) Clinical Operating Guidelines (COGs) will instead often separate out Pediatric and Adult care for specific topics. We consciously did not provide separate Clinical Operating Guideline Supplements for the care of Adult or Pediatric patients in general. There are some exceptions for certain situations - for example, the Brief Resolved Unexplained Event (pediatrics).

## SC PREHOSPITAL EMS CLINICAL OPERATING GUIDELINES

The following medical treatment Clinical Operating Guidelines are developed for South Carolina EMS agencies. The process has evolved since 2007 and continues with input from Medical Directors, EMS Administration, EMS field personnel and members of specialty organizations.

The 2025 update expands on the 2017 version and continues to incorporate evidence-based guidelines, expert opinion and historically proven practices meant to ensure that citizens and visitors of South Carolina will continue to be provided the highest quality pre-hospital patient care available.

The South Carolina Department of Public Health Division of EMS Medical Control Committee develops and provides final approval. The purpose of the Clinical Operating Guideline section is to provide treatment Guidelines outlining permissible and appropriate assessment, delivery of

care, reassessment and procedures which may be rendered by pre-hospital providers. The Clinical Operating Guidelines (COGs) also outline which medical situations require direct voice communication with medical control. In general treatment Guidelines are specific orders which may and should be initiated prior to contact with Medical Control.

Whereas a Clinical Operating Guideline (algorithm) guides decisions and criteria for diagnosis, management, and treatment of specific cases, a Standing Order is a specific written policy that prescribes a definitive action to be taken for a particular condition or situation. Standing Orders include medication dosages, routes of administration, therapeutic procedures, etc. to be implemented. Standing Orders are often included within Clinical Operating Guidelines.

Note that the Clinical Operating Guidelines are divided into three (3) to four (4) sections. The upper section includes three (3) boxes (History, Signs and Symptoms; and Differential) which serve as a guide to assist in obtaining pertinent patient information and exam findings as well as considering multiple potential causes of the patient s complaint. It is not expected that every historical element or sign / symptom be recorded for every patient. It is expected that those elements pertinent to the specific patient encounter will be included in the patient evaluation. The algorithm section describes the essentials of patient care. Virtually every patient should receive the care outlined in this section, usually in the order described. However, each medical emergency must be dealt with individually and appropriate care determined accordingly. Professional judgment is mandatory in determining treatment modalities within the parameters of these Clinical Operating Guidelines (COGs). Circumstances will arise where treatment may move ahead in the algorithm or move outside to another Clinical Operating Guideline and possibly then re-enter the original COG later.

While Clinical Operating Guidelines are written based on body systems and primary complaints the patient should be treated as a whole and therefore the Clinical Operating Guidelines (COGs) should be considered as a whole in providing care.

Professional judgment hierarchy: The pre-hospital provider may determine that no specific treatment is needed; OR the pre-hospital provider may follow the appropriate treatment Guidelines; and then consult Medical Control (as indicated); OR the pre-hospital provider may consult Medical Control before initiating any specific treatment.

While the Clinical Operating Guidelines are not (generally) mandatory for EMS Services Within these protocols, there are four Clinical Operating Guidelines that are **MANDATED** by the Division of EMS  These Clinical Operating Guidelines are marked by a Green Circle with inlaid **M**.

1. **EMS COG: 300-001** – **Field Triage and Bypass**. ALL EMS Services MUST adopt this Clinical Operating Guideline. It is contingent upon the Service Medical Control Physician – in consultation with the Service Director – to specify which facilities within their area meet the criteria for Trauma Centers and to determine to which of these facilities the EMS Service WILL transport patients who meet the appropriate criteria as outlined
2. **EMS COG: 200-302 – SC R.A.C.E. Tool** (Rapid Arterial oCclusion Evaluation Scale) is mandated per statute ["The Department shall adopt and distribute a nationally recognized, standardized stroke-triage assessment tool. The department must post the stroke-triage assessment tool on its website and provide a copy, which may be an electronic copy, of the stroke-triage assessment tool to each licensed emergency medical services provider before January 31, 2012. Each licensed emergency medical services provider must establish a stroke assessment and triage system that incorporates the department approved stroke-triage assessment tool."]
3. **EMS COG:  200-303 – Stroke Patient Destination – Determination by Stroke Center Capability.** ALL EMS Services MUST adopt this Clinical Operating Guideline. It is contingent upon the Service Medical Control Physician – in consultation with the Service Director – to specify which facilities within their area meet the criteria for Trauma Centers and to determine to which of these facilities the EMS Service WILL transport patients who meet the appropriate criteria as outlined.
4. **EMS COG: 500-401** – **Pediatric Trauma Triage & Transport**. ALL EMS Services MUST adopt this Clinical Operating Guideline. It is contingent upon the Service Medical Control Physician – in consultation with the Service Director – to specify which facilities within their area meet the criteria for Trauma Centers and to determine to which of these facilities the EMS Service WILL transport patients who meet the appropriate criteria as outlined

All other COGs are optional to be chosen and utilized by the EMS Service in consultation with and approval from their Local Medical Control Physician. However, within the remaining COGs there are **4** Clinical Operating Guidelines – which if adopted by the service - MUST be followed as written.

These Clinical Operating Guidelines are indicated with a Purple Circle inlaid with an R.

1. **EMS COG 200-107 – Adult: Pain Management**
2. **EMS COG 200-204 – Airway, Drug Assisted Airway Management (DAAM)**
3. **EMS COG: 300-302: - Blood Administration.**
4. **EMS COG 500-001 – Pediatric: Pain Control**

Two Clinical Operating Guidelines require the EMS Service to obtain a letter of understanding or a Memorandum of Understanding from the receiving facility prior to institution of the COG. These are:

1. **EMS COG: 300-301 – Tranexamic Acid Administration**
2. **EMS COG: 300-302 – Blood Administration**

Specific Process Improvement / Quality Control measurements for certain Clinical Operating Guidelines may, are, or will be established by the Bureau. For example, the use of Sedation prior to contact with Online Medical Control requires 100% review by the Local Medical Control Physician and/or the designated surrogate. Similarly, review of administration of Schedule II Narcotics (Morphine or Fentanyl) prior to establishing Online Medical Control is required as well as documentation of timely signature for this administration (i.e within 1 week) by the Medical Control Physician. Completion of the Ketamine Evaluation Form must be accomplished for each utilization of this agent for management/control/sedation of the Agitated or Combative Patient.

These Clinical Operating Guidelines will encompass at least two (2) pages. The PEARLS section will generally be located at the bottom of page 2. The PEARLS section provides points regarding the main Clinical Operating Guideline based on evidence to date, common medical knowledge and expert medical opinion. This section will also usually contain Key Documentation Elements that are expected to be captured on every patient for which that Clinical Operating Guideline is utilized. Often the PEARLS section will contain information on Performance Measures as well.

Information boxes are found throughout. These areas are editable at the local level. They will mainly involve specific medications and dosages utilized by the local EMS agency. Clinical Operating Guidelines Page 2 will often have a section highlighted in purple where the local Medical Director may edit as they see fit to provide expanded points and treatment not otherwise specified in the algorithm.

Finally, these medical treatment Clinical Operating Guidelines are established to ensure safe, efficient and effective interventions to relieve pain and suffering and improve patient outcomes without inflicting harm. They also serve to ensure a structure of accountability for Medical Directors, EMS agencies, pre-hospital providers and facilities to provide continual performance improvement. A recent report of the Institute of Medicine calls for the development of standardized, evidence-based pre-hospital care Clinical Operating Guidelines for the triage, treatment and transport of patients. These Clinical Operating Guidelines establish current recommendations of pre-hospital care in South Carolina.

While these Clinical Operating Guidelines have been extensively reviewed - the Division of EMS acknowledges that errors (usually typographical) may evade the reviewers. The Bureau has established a dedicated e-mail address to allow the professionals who utilize these Clinical Operating Guidelines to identify errata and suggest corrections.

That e-mail is: **Protocols@DPH.sc.gov**.

As Clinical Operating Guidelines are revised or updated the most recent approved Clinical Operating Guideline may be identified by the Revision Identifier located along the lower left ribbon and of the format:  Rev: 20250315.

## TARGET AUDIENCE:

While this material is intended to be integrated into an EMS system's operational guidance materials by its medical director and other leaders, it is written with the intention that it will be consumed by field EMS clinicians.

To the degree possible, it has been assembled in a format useful for guidance and quick reference so that leaders may adopt it in whole or in part, harvesting and integrating as they deem appropriate to the format of their guideline, Clinical Operating Guideline, or procedure materials.

Any set of guidelines must determine a balance between education and patient care. This document purposefully focuses on the patient care aspect of EMS response. This does not preclude the individual medical director from using these guidelines and including additional education as well as incorporation of state, local, or jurisdictional operational procedures.

## ACKNOWLEDGEMENTS:

The authors of this document are the members of the SC Prehospital Clinical Operating Guidelines Working Group. This group is comprised of members of the SC EMS Advisory Council's Medical Control Committee, SC Paramedics, and Physician Fellows from the USC School of Medicine Emergency Medicine Fellowship. In addition to the primary working group significant contribution and time have been provided in review and updating the guidelines by specialty committees from the SC Trauma Advisory Council, SC EMS for Children's Committee, SC Stroke Committee. In addition, we would like to individually express our appreciation to:

Garrett Clanton, M.D. (SC EMS Assistant State Medical Director)

Marty Lutz, M.D. (SC Medical Control Committee)

Spencer Robinson, M.D. (SC Medical Control Committee, Director USC EMS Fellowship Program)

Christopher Gainey, M.D. (SC Medical Control Committee)

Thomas Holbrook, M.D. (USC EMS Fellowship)

Evert Erikkson, M.D. (SC Trauma Advisory Council, MUSC)

Kevin Polley, M.D. (SC EMS-C Committee)

Austin Freeman (SC Paramedic)

The SC Department of Public Health Division of EMS and Trauma Prehospital Clinical Operating Guidelines (2025) are published and provided to the EMS Community as of: 8/14/2025.

Jon Jones, BA, NRP, MCCP, MHRO, ESO
Director, EMS & Trauma Section
S.C. Department of Public Health

Mitch Stewart, BS, NRP, FP-C, NCI, CHEP
Manager, EMS Section
S.C. Department of Public Health

Edgar G. DesChamps, M.D.
State Medical Director
EMS & Trauma Section
SC Department of Public Health

Garret Clanton, M. D.
Assistant State Medical Director
EMS & Trauma Section
SC Department of Public Health

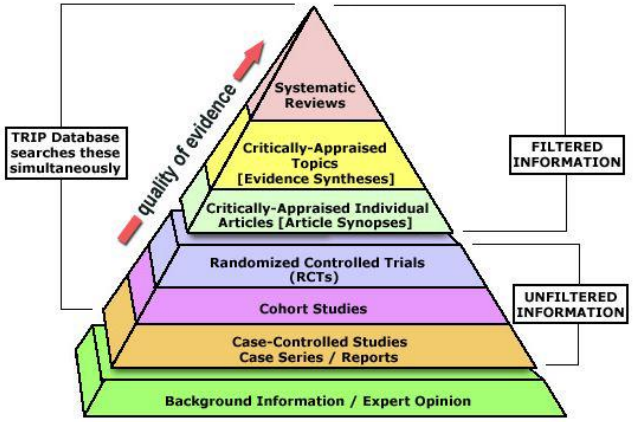
## GRADE for Evidence Guidelines

| Grade of recommendation* | Clarity of risk/benefit | Quality of supporting evidence | Implications |
|---|---|---|---|
| 1A<br>Strong recommendation<br>High quality evidence | Benefits clearly outweigh risk and burdens, or vice versa | Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk. | Strong recommendation, can apply to most patients in most circumstances without reservation |
| 1B<br>Strong recommendation<br>Moderate quality evidence | Benefits clearly outweigh risk and burdens, or vice versa | Evidence from randomized, controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other form. Further research (if performed) is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate. | Strong recommendation, likely to apply to most patients |

| Grade of recommendation* | Clarity of risk/benefit | Quality of supporting evidence | Implications |
|---|---|---|---|
| 1C<br>Strong recommendation<br>Low quality evidence | Benefits appear to outweigh risk and burdens, or vice versa | Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain. | Relatively strong recommendation; might change when higher quality evidence becomes available |
| 2A<br>Weak recommendation<br>High quality evidence | Benefits closely balanced with risks and burdens | Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk. | Weak recommendation, best action may differ depending on circumstances or patients or societal values |
| 2B<br>Weak recommendation<br>Moderate quality evidence | Benefits closely balanced with risks and burdens, some uncertainty in the estimates of benefits, risks and burdens | Evidence from randomized, controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other form. Further research (if performed) is likely to have an impact on our confidence in the estimate of | Weak recommendation, alternative approaches likely to be better for some patients under some circumstances |

| Grade of recommendation* | Clarity of risk/benefit | Quality of supporting evidence | Implications |
|---|---|---|---|
| | | benefit and risk and may change the estimate. | |
| 2C<br>Weak recommendation<br>Low quality evidence | Uncertainty in the estimates of benefits, risks, and burdens; benefits may be closely balanced with risks and burdens | Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain. | Very weak recommendation; other alternatives may be equally reasonable |

* GRADE can be implemented with either three or four levels of quality of evidence.



# INTRODUCTION

These Clinical Operating Guidelines were developed for the following reasons:

1. To provide the EMS clinician with a quick field reference, and
2. To develop written Guidelines (not Standards of Care) which are consistent throughout the State of South Carolina.

Users of these Guidelines are assumed to have knowledge of more detailed and basic patient management principles found in EMS textbooks and literature appropriate to the EMS clinician's level of training and certification.

EMS clinicians are encouraged to contact Online Medical Control (OLMC) in any situation in which advice is needed, not only in situations as directed by these written Guidelines.
To use these Guidelines as they are intended, it is necessary to know the philosophy, treatment principles, and definitions which guided the physicians and other EMS clinicians who drafted these Guidelines:

- Treatment should very RARELY delay transport !
  - This is especially true for trauma patients, patients with chest pain, and patients with suspected stroke. IVs should be started en route except in those situations where treatment at the scene is in the patient's best interest, such as shock, prolonged extrication, or a cardiac patient when full ACLS care is available. Delays in transport should be discussed with OLMC.

- Inability to establish voice contact with OLMC:
  - There are rare situations where the patient is unstable and delay in treatment threatens the patient's life or limb. If, after good faith attempts, the EMS clinician cannot contact OLMC, then the EMS clinician is authorized to use any appropriate treatment Guidelines as if they were standing orders. In such cases, treatments must still be consistent with the EMS clinician's training and certification. EMS should always continue attempts to contact OLMC and document these attempts on the patient run record.

- Transports and transfers:
  - During transports and transfers, EMS crews will follow these SC EMS Guidelines, including use of only those medications and procedures for which they are trained and authorized by Guideline and level of certification

- Hospital destination choice:
  - If a patient needs care which the EMS crew, in consultation with OLMC, believes cannot be provided at the most accessible hospital, the patient will be transported to the nearest facility capable of providing that care upon the patient's arrival.
  - If, with OLMC consultation, a patient is believed to be too unstable to survive such a diversion, then the patient will be transported to the most appropriate and accessible hospital with an emergency department.
  - Diversion is also non-binding, and if a patient insists or if the EMS crew deems that bypass is not in the patient's best interest, then going to a hospital "on diversion" is appropriate.
  - If OLMC contact is not possible, the EMS crew is authorized to make this determination. A licensed hospital may not legally refuse these patients.

- Destination:
  - Each region and Local Medical Director has the authority to develop protocols which designate the appropriate destination for patients transported from the scene. Any such protocol should be patient-centric and created exclusively to offer patients appropriate emergent care only available at selected regional sites. Examples of such protocols include the SC Prehospital Clinical Operating Guidelines for Trauma Triage and Bypass, the Stroke Guideline, and Regional destination protocols such as STEMI/ACS Guidelines, as well as others.

- All EMS Clinicians are expected to perform all duties within their listed scope of practice as well as those of the subsidiary scopes of practice in the appropriate logical order.

- Treatments/medications should generally be given in the order specified. However , the Division of EMS recognizes that often treatments are delivered simultaneously and more than one Guideline may be used. OLMC or ALS clinicians may request or provide treatments/medications out of sequence for medical reasons.

- SC EMS Electronic Patient Care Report
  - This will be legible and thoroughly completed for each call or for each patient when more than one patient is involved in a call.
  - This document is our legacy of patient care and holds valuable information for hospital clinicians.
  - This information is essential to patient care and safety.
  - Services must provide a patient care document before leaving the hospital.
    - In MOST circumstances, this document should be a completed copy of the patient care report although, in rare circumstances, when it is not possible to complete the electronic patient care record before leaving the hospital, services may provide the hospital with an-approved, one page, patient care summary. THIS DOCUMENT DOES NOT REPLACE THE COMPLETED ELECTRONIC PATIENT CARE REPORT. These Summary documents may become part of the patient's hospital record and, in an effort to ensure excellent patient care, all information on this written summary must reflect the information in the ePCR.
  - Services must still complete the electronic patient care report and make the report available to the hospital as soon as possible and within the time frame required by SC Division of EMS Rules and Regulations.

- Process Improvement or Quality Assurance:
  - All EMS clinicians and services must be in compliance with the requirement to maintain and participate in an ongoing Process Improvement or Quality Improvement Program. Incumbent within this Program is the requirement to report actual and potential adverse events associated with patient care as outline in Regulation 61-7.

  - *Assuming and Reassessing care already provided:*
    - EMS clinicians who will be assuming the responsibility for patient care will also be responsible for assessing the care provided before their arrival, and for all subsequent care after they arrive up to and including their level of training and certification. If an EMS clinician has not been trained in a par ticular treatment listed at their level, or if that treatment is not within the EMS clinician's scope of practice, the clinician may not perform the treatment/intervention.

# SC EMS PREHOSPITAL CLINICAL OPERATING GUIDELINES

## SECTION 100 – UNIVERSAL CARE GUIDELINES



## SECTION 200 – ADULT MEDICAL GUIDELINES

## SECTION 300 – ADULT TRAUMA GUIDELINES

## SECTION 400 – OB - GYN GUIDELINES



## SECTION 500 – PEDIATRIC GUIDELINES

500.303. Pediatric Pulseless (Ventricular Tachycardia / Ventricular Fibrillation)

500-304. Pediatric Asystole / PEA

500-305. Pediatric Post Resuscitation

500-306. Pediatric Tachycardias (With a Pulse)

500-307. Pediatric Bradycardia

500-308. Pediatric Pulmonary Edema / CHF

500-401. Pediatric Trauma Triage & Transport

500-402. Pediatric Major Trauma

500-403. Pediatric Head Trauma

## SECTION 600 – ENVIRONMENTAL / TOXIC GUIDELINES

600-001. Overdose / Toxic Ingestion

600-101. Nerve Agent Protocol

600-102. Stimulant Overdose

600-103. Cyanide Exposure

600-104. Carbon Monoxide / Smoke Exposure

600-105. Respiratory Irritants

600-106. Riot Control Agents

600-201. Topical Chemical Burn

600-202. Electrical Burn

600-203. Radiation Incident

600-204. Conducted Electrical Device (TASER®)

600-301. Bites and Envenomations

600-302. Marine Envenomations

600-401. Hyperthermia

## SECTION 700 – SPECIAL SITUATIONS GUIDELINES



## SECTION 800 – TACTICAL MEDIC GUIDELINES



## SECTION 850 – K9 MEDIC GUIDELINES



## SECTION 900 – CRITICAL CARE MEDIC GUIDELINES

## SECTION 1000 – EMS FORMS

1000-001. SC EMS Interfacility Transport Form

1000-002. SC EMS DNR Form

1000-003. SC POST Form

1000-004. SC Medical Control Physician Change Form

1000-005. EMS Preliminary Hand Off Form

1000-006. EMS Request for change Form

1000-007. SC RACE Form

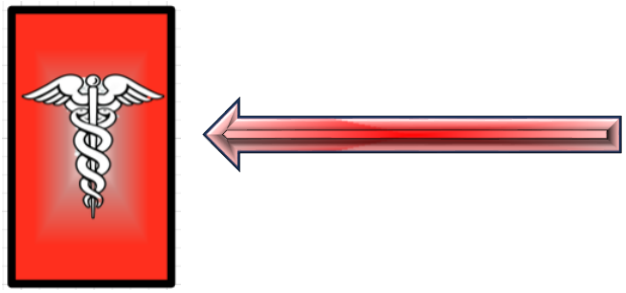
# SC PREHOSPITAL CLINICAL OPERATING GUIDELINES

# LEGEND

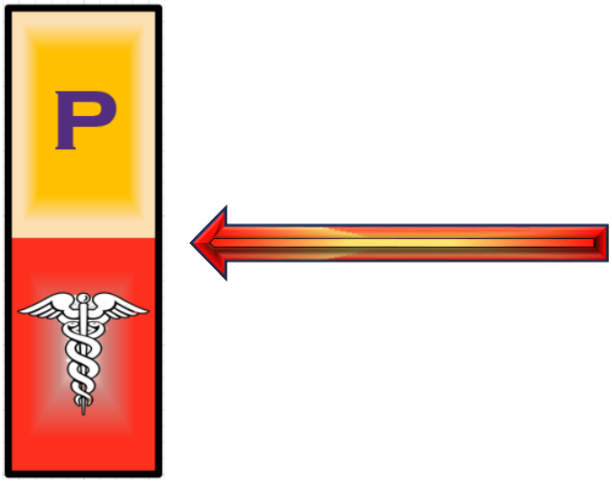

*B Indicates that this procedure may be done by personnel with BASIC or Higher Endorsements.*


*A Indicates that this procedure may be done by personnel with ADVANCED or Higher Endorsements.*


*P Indicates that this procedure may be done by personnel with PARAMEDIC or Higher Endorsements.*

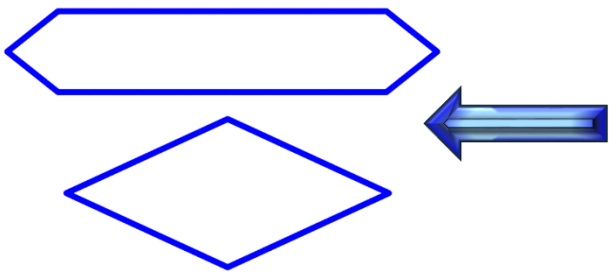


*Indicates contact with Medical Control*

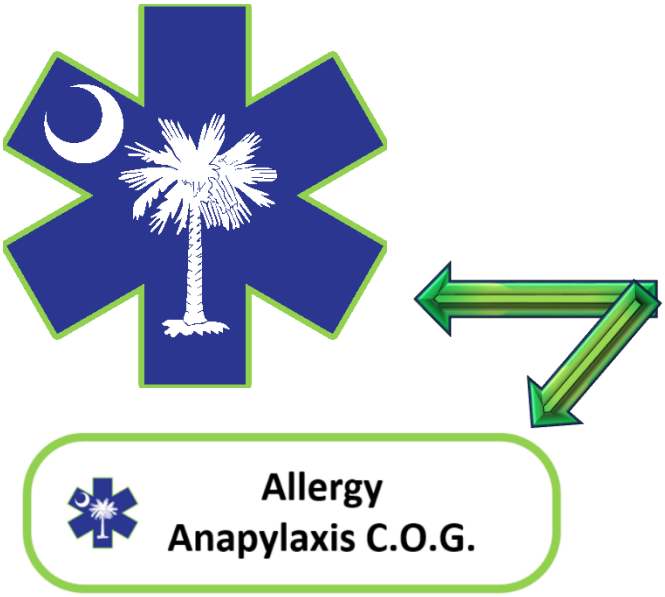



*Indicates contact with Medical Control should be established prior to proceeding with intervention/medication.*


*Indicates a procedure that may encompass multiple levels. For example a BASIC may apply a Cardiac Monitor or 12 Lead EKG and transmit a reading – HOWEVER – a PARAMEDIC is required to INTERPRET an EKG tracing.*



*Hexagon and Diamond shaped shapes indicate a decision point. This may be binary – i.e. "Yes"/"No" or "Present"/"Absent" – or may include multiple branch point options.*




*The SC EMS STAR OF LIFE with Green Outline – OR – a rounded corner shape with Green Outline indicates movement (or potential movement) to another Clinical Operating Guideline as indicated*

# Universal Patient Care

**Scene Safety**
Bring all necessary equipment to patient's side
Demonstrate Professionalism and Courtesy

PPE (Consider Airborne or Droplet if indicated)

**Consider Spinal Motion Restriction [as indicated]**
**Age Appropriate Assessment Procedure**
**(PEDIATRIC: < 12 years old AND [a] < 55 Kg -or- [b] Fits on Standardized Pediatric Length Based Tape)**

**B**
- ABCDE Assessment
- Consider F.A.S.T / R. A. C. E. Assessment
- Consider Load & Go Management
- Consider Need for Additional Resources

**As Indicated - Go To Appropriate C.O.G. – such as-**
**Airway, Respiratory Distress, Cardiac Arrest, Hemorrhage Control, Altered Mental Status**

**B**
- History
  Full Secondary Assessment or Problem Focused Assessment as indicated
- Vital Signs Assessment
- Consider Mechanism of Injury, Environment/ Exposures, Comorbidities/Risk Factors
- Consider Pulse Oximetry / Capnography
- Consider Blood Glucose Assessment

**Glucose Management C.O.G.**

Cardiac Monitor/12 Lead ECG Acquisition / Interpretation

**At any point where findings dictate - Exit To Appropriate C.O.G.**

**B**
- REPEAT Assessment / Vital Signs per Protocol or as warranted during care and Transport
- **Transfer:** Patient hand-off includes patient information – including history, physical examination, vital signs throughout, personal property, and summary of care and response to care

**A patient is defined as any person who meets ANY of the following criteria:**
- Receives basic or advanced medical or trauma treatment or;
- Is physically examined or;
- Has visible signs of injury or illness or has a medical complaint or;
- Requires EMS **specific** assistance to change locations and/or position or;
- Identified by any party as a possible patient because of some known, or reasonably suspected illness or injury or;
- Has a personal medical device evaluated or manipulated by EMS or;
- Requests EMS assistance with the administration of personal medications or treatments.

Patient does not fit specific C.O.G.

**Notify Destination or Contact Medical Control**

UNIVERSAL PATIENT CARE

# Universal Patient Care Protocol

**A patient is defined as any person who meets ANY of the following criteria:**

- Receives basic or advanced medical or trauma treatment or;
- Is physically examined or;
- Has visible signs of injury or illness or has a medical complaint or;
- Requires EMS **specific** assistance to change locations and/or position or;
- Identified by any party as a possible patient because of some known, or reasonably suspected illness or injury or;
- Has a personal medical device evaluated or manipulated by EMS or;
- Requests EMS assistance with the administration of personal medications or treatments.

**Completion of a PCR (ePCR) is required for any and all patient encounters.**

**Normal Vital Signs**

| Age | Pulse-Awake (bpm) | Pulse-Sleeping (bpm) | Respiratory Rate | Systolic B/P |
|---|---|---|---|---|
| Preterm (<1Kg) | 120-160 | | 30-60 | 39-59 |
| Preterm (1 - 3Kg | 120-160 | | 40-60 | 60-76 |
| Newly Born | 100-205 | 85-160 | 40-60 | 67-84 |
| Up To 1 Y | 100-190 | 90-160 | 30-60 | 72-104 |
| 1-2 Y | 100-190 | 90-160 | 24-40 | 86-106 |
| 2-3 Y | 98-140 | 60-120 | 24-40 | 86-106 |
| 3-4 Y | 80-140 | 60-100 | 24-40 | 89-112 |
| 4-5 Y | 80-140 | 60-100 | 22-34 | 89-112 |
| 5-6Y | 75-140 | 58-90 | 22-34 | 89-112 |
| 6-10 Y | 75-140 | 58-90 | 18-30 | 97-115 |
| 10-12 Y | 75-118 | 58-90 | 18-30 | 102-120 |
| 12-13 Y | 60-100 | 58-90 | 15-20 | 110-131 |
| 13-15 Y | 60-100 | 50-90 | 15-20 | 110-131 |
| > 15 Y | 60-100 | 50-90 | 15-20 | 110-131 |

**PEDIATRIC GLASGOW COMA SCALE (PGCS)**

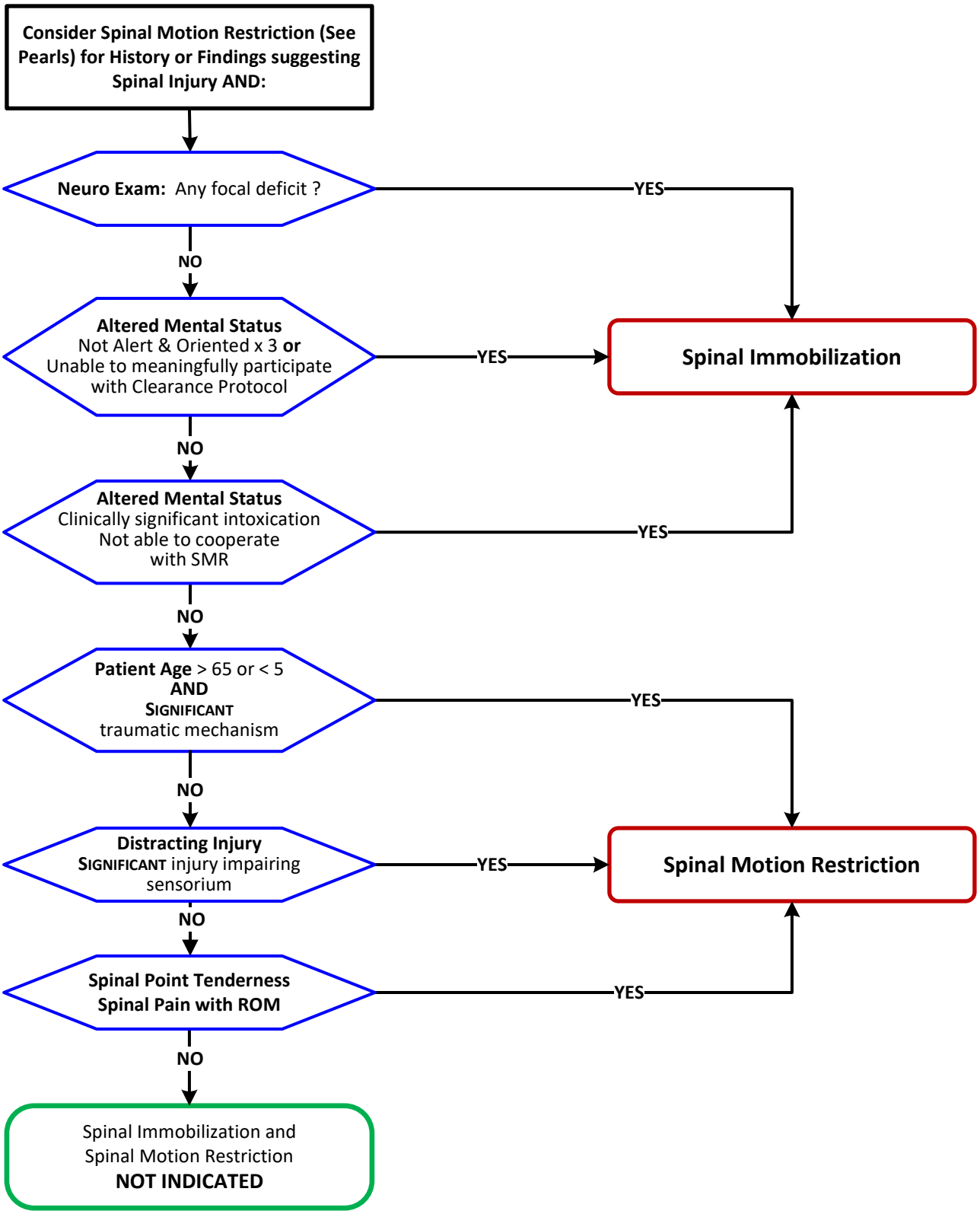
| ACTION | AGE > 1 year | AGE < 1 YEAR | | SCORE |
|---|---|---|---|---|
| EYE Opening | Spontaneously | Spontaneously | | 4 |
| | To Verbal Command | To Shout | | 3 |
| | To Pain | To Pain | | 2 |
| | No Response | No Response | | 1 |
| MOTOR Response | Obeys | Spontaneously | | 6 |
| | Localizes Pain | Localizes Pain | | 5 |
| | Flexion - Withdrawal | Flexion - Withdrawal | | 4 |
| | Flexion - Abnormal (Decorticate Rigidity) | Flexion - Abnormal (Decorticate Rigidity) | | 3 |
| | Extension (Decerebrate Rigidity) | Extension (Decerebrate Rigidity) | | 2 |
| | No Response | No Response | | 1 |
| | **> 5 years** | **2 - 5 Years** | **0 - 23 Months** | |
| VERBAL Response | Oriented | Appropriate words/pharases | Smiles/coos appropriately | 5 |
| | Disoriented/Confused | Inappropriate words | Cries and IS Consolable | 4 |
| | Inappropriate words | Persistent cries and screams | Persistent inappropriate crying and/or screaming | 3 |
| | Incomprehensible sounds | Grunts | Grunts, agitated, and restless | 2 |
| | No Response | No Response | No Response | 1 |
| Total Pediatric Glascow Coma Score (3-15) | | | | |

## PEARLS

- **Recommended Exam: Minimal exam if not noted on the specific C.O.G. is vital signs, mental status with GCS, and location of injury or complaint.**
- **Any patient contact which does not result in an EMS transport must have a completed disposition form.**
- **Required vital signs on every patient include Mental Status, blood pressure, pulse, and respirations.**
- **Pulse oximetry, ETCO2, and temperature documentation is dependent on the specific complaint.**
- **At least 2 sets of vital signs should be documented for every patient.**
- **All patient interventions and response to care should be documented**
- **ALL Major changes in clinical status including – but not limited to – vital signs and data from monitoring equipment should be documented**
- **Capnography is:**
  - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
  - **Strongly Recommended / Strongly Encouraged for all unstable patients**
  - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **A pediatric patient is defined as < 12 years old AND either [a] < 55 Kg -or- [b] Fits on Standardized Pediatric Length Based Tape**
- Timing of transport should be based on patient's clinical condition and the transport policy.
- **Never hesitate to contact medical control for patient who refuses transport.**
- **NO SCENE should be cleared prior to contact with the patient EMS has been called for or contact with the person who called for EMS.**
- **The EMS Service WILL HAVE a policy in place to address instances where no patient contact is made – i.e. call for Supervisor, call for Law Enforcement for "Wellness Check", etc.**
- **Patient Safety Considerations:**
  - **Routine use of Lights and sirens is not warranted**
  - **Be aware of potential need to adjust management based on patient age and comorbidities, including medication dosages**
  - **Medical Direction should be contacted when mandated or as needed.**
  - **Consider Air Medical Transport, if available, for patients with time critical conditions where ground transport time exceeds 30 minutes.**
- **KEY DOCUMENTATION ELEMENTS**
  - ❑ At least two sets of vital signs should be documented for every patient who is treated and/or transported..
  - ❑ Appropriate Physical Examination findings as per relevant protocols.
  - ❑ All patient interventions and response to care should be documented. **Including any care provided by First Responders / Others.**
  - ❑ All major changes in clinical status including – but not limited to – vital signs and data from monitoring equipment.
  - ❑ Maintain records of all ancillary recording equipment – e.g. monitor/EKG, Capnography, etc.
  - ❑ Documentation of transfer of care at receiving facility.

UNIVERSAL PATIENT CARE

# Spinal Motion Restriction




**Spinal Immobilization** = C-Collar + Long Spine Board / Scoop Stretcher + HID
**Spinal Motion Restriction (SMR)** = Cervical Collar + Patient remains in position of comfort, assisted movement to prevent extremes of spinal motion.

# Spinal Motion Restriction



## Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Consider Spinal Motion Restriction [SMR] in any patient with arthritis, cancer, or other underlying spinal or bone disease.**
- Significant mechanism includes high-energy events such as ejection, high falls, and abrupt deceleration crashes and may indicate the need for spinal motion restriction in the absence of symptoms.
- Range of motion should NOT be assessed if patient has midline spinal tenderness. Patient's range of motion should not be assisted. The patient should touch their chin to their chest, extend their neck (look up), and turn their head from side to side (shoulder to shoulder) without spinal process pain.
- The acronym "NSAIDS" should be used to remember the steps in this protocol.
- "**N**" = Neurologic exam. Look for focal deficits such as tingling, reduced strength, on numbness in an extremity.
- "**S**" = Significant mechanism or extremes of age.
- "**A**" = Alertness. Is patient oriented to person, place, time, and situation? Any change to alertness with this incident?
- "**I**" = Intoxication. Is there any indication that the person is intoxicated (impaired decision making ability)?
- "**D**" = Distracting injury. Is there any other injury which is capable of producing significant pain in this patient?
- "**S**" = Spinal exam. Look for point tenderness in any spinal process or spinal process tenderness with range of motion.

- **Key Documentation Elements**
  - ❑ Patient complaint of neck or spine pain
  - ❑ Spinal tenderness
  - ❑ Mental status/GCS
  - ❑ Neurologic examination
  - ❑ Evidence of intoxication
  - ❑ Documentation of multiple trauma
  - ❑ Documentation of mechanism of injury
  - ❑ Document patient capacity with:
    - ❑ All barriers to patient care in the NEMSIS element “Barriers to Patient Care” (eHistory.01—required of all software systems)
    - ❑ Exam fields for Mental Status and Neurological Assessment
    - ❑ Vitals for Level of Responsiveness and Glasgow Coma Scale
    - ❑ Alcohol and drug use indicators
  - ❑ Patient age
  - ❑ Patient who is underage and not emancipated: legal guardian name, contact, and relationship

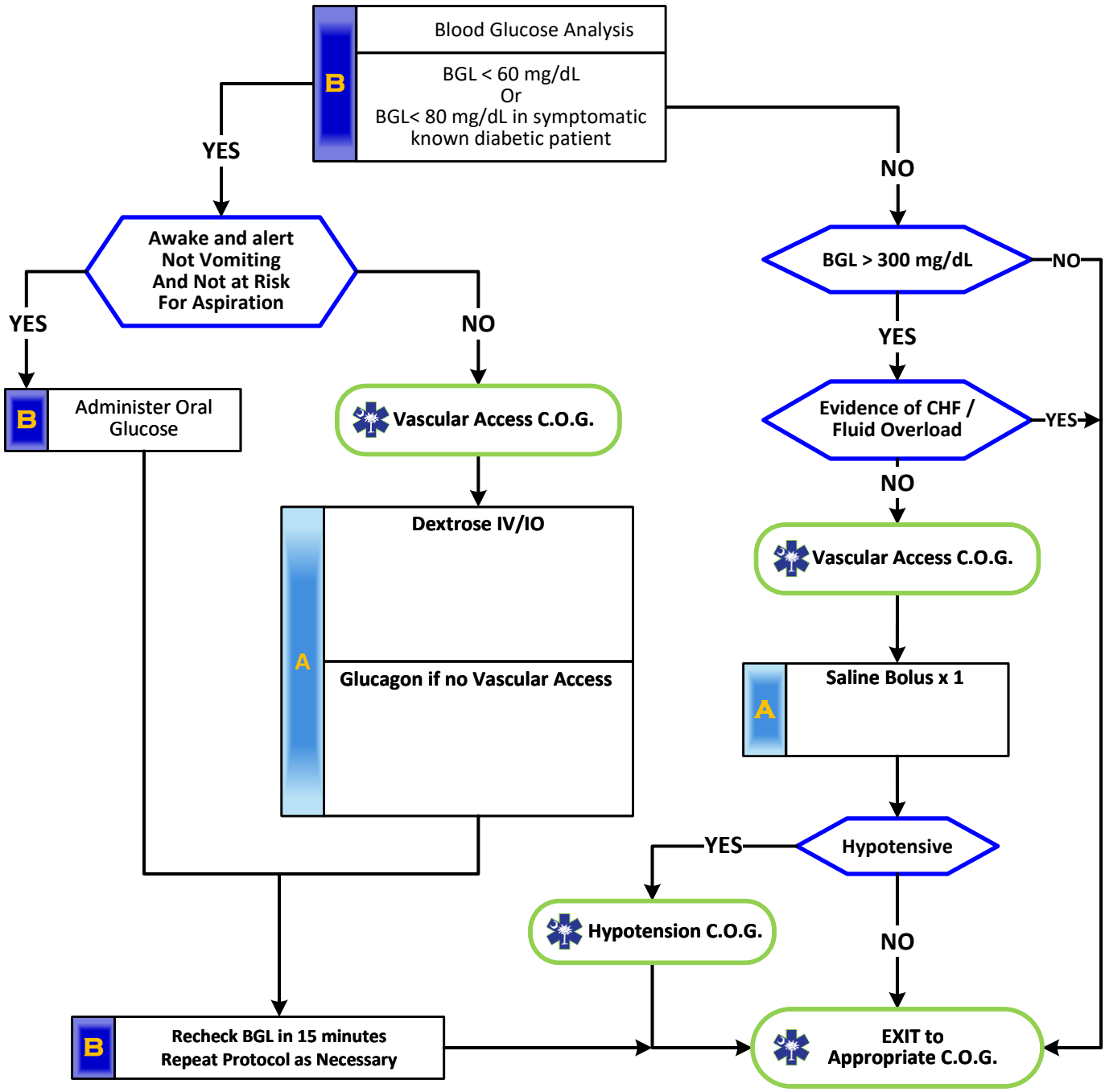
- **Key Performance Measures**
  - ❑ Percentage of patients with high-risk mechanisms of injury and/or signs or symptoms of cervical spine injury who are placed in a cervical collar
  - ❑ Percentage of patients without known trauma who have a cervical immobilization device placed (higher percentage creates a negative aspect of care)
  - ❑ Percentage of trauma patients who are transported on a long backboard (target is a low percentage)
  - ❑ Percentage of patients with a cervical spinal cord injury or unstable cervical fracture who did not receive cervical collar

# Glucose Management

**History**
- Past medical history
- Medications
- Recent blood glucose check
- Last meal

**Signs and Symptoms**
- Altered mental status
- Combative / irritable
- Diaphoresis
- Seizures
- Abdominal pain
- Nausea / vomiting
- Weakness
- Dehydration
- Deep / rapid breathing

**Differential**
- Alcohol / drug use
- Toxic ingestion
- Trauma; head injury
- Seizure
- CVA
- Altered baseline mental status.




UNIVERSAL: GLUCOSE MANAGEMENT

# Glucose Management

| Formula for calculating a 0.5 G/Kg dose of IV Dextrose: | | |
|---|---|---|
| 50 / (_____% Concentration of Glucose) = Fluid Dose (_____mL/Kg) | | |
| Desired Dose (G/Kg) | Fluid Type | mL of Fluid Dose |
| | 50% Dextrose (D50W) | 1 mL/Kg |
| 0.5 G/Kg | 25% Dextrose (D25W) | 2 mL/Kg |
| | 10% Dextrose (D10W) | 5 mL/Kg |
| | 5% Dextrose (D5W) | 10 mL/Kg |
| | 50% Dextrose (D50W) | 2mL/Kg |
| 1 G/Kg | 25% Dextrose (D25W) | 4 mL/Kg |
| | 10% Dextrose (D10W) | 10 mL/Kg |
| | 5% Dextrose (D5W) | 20 mL/Kg |

- Age < 31 days: Dextrose Concentration **NO MORE THAN D10**
- Age 31 d – 2 Y: Dextrose Concentration **NO MORE THAN D25**
- Age > 2 Y - Adult: Dextrose Concentration **UP TO D25**
- Age: Adult: Dextrose Concentration**: UP TO D50**

D25 = 25 ml D50 with 25 ml water/saline
D10 = 10 ml D50 with 40 ml water/saline
D5 = 5 ml D50 with 45 ml water/saline

## PEARLS

- **Recommended exam: Mental Status, Skin, Respirations and effort, Neuro.**
- Patients with prolonged hypoglycemia (or who have already received Glucagon) may not respond to Glucagon.
- Do not administer oral glucose to patients that are not able to swallow or protect their airway.
- In extreme circumstances with no IV and no response to glucagon, Dextrose 50 % can be administered rectally. Contact medical control for advice.
- Infiltration of D50 may causes significant pain, swelling, and necrosis of tissues.
- **Patient's refusing transport to medical facility after treatment of hypoglycemia:**
  - **Oral Agents:**
    - Patient's 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.
    - Patient's who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.
  - **Insulin Agents:**
    - Many forms of insulin now exist. Longer acting insulin places the patient at risk of recurrent hypoglycemia even after a normal blood glucose is established. Not all insulins have prolonged action so Contact Medical Control for advice.
    - Patient's who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Document reassessment of vital signs and mental status after administration of glucose/dextrose/glucagon
  - ❑ Document initial and repeat point of care glucose levels
  - ❑ If patient released at scene, criteria documented for safe release and signed.
  - ❑ When hyperglycemia documented, appropriate volume replacement given while avoiding overzealous repletion before insulin therapy administered at receiving facility
  - ❑ 12 lead EKG obtained – if indicated.
  - ❑ For pediatrics – documentation of estimated weight.

# Altered Mental Status

**History**
- Known diabetic, medic alert tag
- Drugs, drug paraphernalia
- Report of illicit drug use or toxic ingestion
- Past medical history
- Medications / Trans-Dermal Patches
- History of trauma
- Change in condition
- Changes in feeding or sleep habits

**Signs/Symptoms**
- Decreased mental status or lethargy
- Change in baseline mental status
- Bizarre behavior
- Hypoglycemia (cool, diaphoretic skin)
- Hyperglycemia (warm, dry skin; fruity breath; Kussmaul resps; signs of dehydration)
- Irritability

**Differential**
- **AEIOU-TIPS**
- **A**cidosis / **A**lkalosis / **A**lcohol
- **E**pilepsy - Seizure-CNS (stroke, tumor, seizure, infection)
- **I**nfection (CNS, Sepsis, Other)
- **O**verdose/Toxicologic/Ingestion
- **U**remia / Electrolyte abnormality
- **T**rauma / Head trauma
- **T**hyroid (hyper / hypo)
- **I**nsulin - Diabetes (hyper / hypoglycemia)
- **P**sychiatric disorder
- **P**ulmonary (Hypoxia)
- **S**hock (septic, metabolic, traumatic)
- Cardiac (MI, CHF)
- Hypothermia / Hyperthermia
- Environmental exposure
- Hypoxia / Hypercarbia

Age Appropriate Airway C.O.G.s *if indicated*

**B**
- **Assess Blood Glucose** ↔ **Glucose Management C.O.G.**
- **Pulse Oximetry**
- **Consider Capnograpy**

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

↓

**Vascular Access C.O.G.**

↓

**Signs of shock / Poor perfusion Traumatic Injury**
- YES → Exit to Age Appropriate **Hypotension/Shock C.O.G.** **Multiple Trauma C.O.G. / Head Injury C.O.G.**
- NO ↓

**Signs of OD / Toxicology**
- YES → Exit to **Overdose / Toxic Exposure C.O.G.**
- NO ↓

**Signs of CVA Or Seizure**
- YES → Exit to **Seizure C.O.G. / Suspected Stroke C.O.G.**
- NO ↓

**Signs of Hypo / Hyperthermia**
- YES → Exit to **Hypothermia -or- Hyperthermia C.O.G.**
- NO ↓

**Arrhythmia / STEMI / CP**
- YES → Exit to **Age Appropriate Cardiac C.O.G.s**
- NO ↓

**Fever / Sepsis**
- YES → Exit to **Fever C.O.G. / Suspected Sepsis C.O.G.**
- NO ↓

**Hypoxemia/Hypercarbia**
- YES → Exit to **Airway/Respiratory C.O.G.**
- NO ↓

**Notify Destination or Contact Medical Control**

ADULT MEDICAL

# Altered Mental Status



**PEARLS**

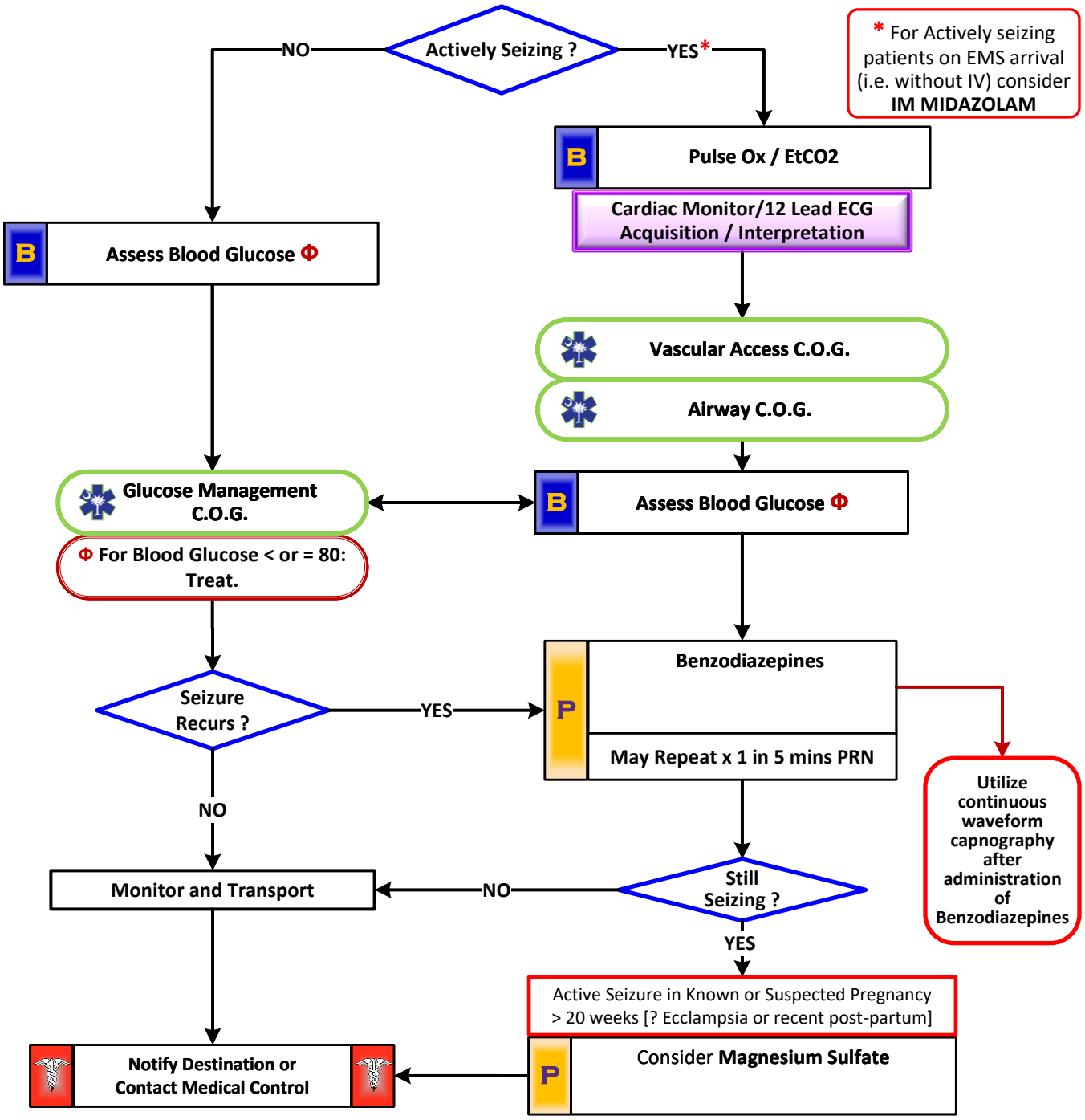
- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro. Pay careful attention to the head exam for signs of bruising or other injury. Skin Turgor may provide clues to sepsis/dehydration.**
- **AMS may present as a sign of an environmental toxin or Haz-Mat exposure - protect personal safety.**
- **General:**
  - **The patient with AMS poses one of the most significant challenges.**
  - **A careful assessment of the patient, the scene and the circumstances should be undertaken.**
  - **Assume the patient has a life threatening cause of their AMS until proven otherwise.**
  - **Information found at the scene must be communicated to the receiving facility.**
- Naloxone may be given by EMTs, or AEMTs by either auto-injector or nasal spray only per local medical control option.
- Do not let alcohol confuse the clinical picture. Patients who routinely consume alcohol frequently develop hypoglycemia and may have unrecognized injuries.
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.
- **Substance misuse:**
  - Patients ingesting substances can pose a great challenge.
  - DO NOT assume recreational drug use and / or alcohol are the sole reasons for AMS.
  - Misuse of alcohol may lead to hypoglycemia.
  - More serious underlying medical and trauma conditions may be the cause.
- **Behavioral health:**
  - The behavioral health patient may present a great challenge in forming a differential.
  - DO NOT assume AMS is the result solely of an underlying psychiatric etiology.
  - Often an underlying medial or trauma condition precipitates a deterioration of a patients underlying disease.
- **Spinal Motion Restriction / Trauma:**
  - Only utilize spinal immobilization if the situation warrants.
  - The patient with AMS may worsen with increased agitation when immobilized.
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.
- **It is safer to assume hypoglycemia than hyperglycemia if doubt exists. Recheck blood glucose after Dextrose or Glucagon**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Glasgow Coma Score (GCS) or AVPU description
  - ❑ Baseline developmental status and change from baseline.
  - ❑ Known / Suspected Alcohol or Drug use
  - ❑ Vital signs to include: Temperature – when able. SpO2.
  - ❑ Consideration of Sepsis as etiology
  - ❑ Pupil and Neck Examination
  - ❑ IV Fluids administered for poor perfusion / hypotension – Fluid Type and Volume administered.
  - ❑ Blood Glucose Level
  - ❑ Naloxone used as therapeutic intervention – not diagnostic tool
  - ❑ Carbon Monoxide Detector used when available.

# Seizure

**History**
- Reported / witnessed seizure activity
- Previous seizure history
- Medical alert tag information
- Seizure medications – Names and Compliance
- History of trauma
- History of diabetes
- History of pregnancy
- Time of seizure onset
- Alcohol use abuse or abrupt cessation
- Fever
- Abrupt cessation of Benzodiazepines
- Document Number and Duration of Seizures

**Signs and Symptoms**
- Decreased mental status
- Sleepiness
- Incontinence
- Observed seizure activity
- Evidence of trauma
- Unconscious

**Differential**
- **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 MEDICAL

# Seizure

ADULT MEDICAL

## PEARLS

- **Recommended Exam: Vital Signs (including Temperature), Mental Status, Neuro, HEENT, Heart, Lungs,**
- **Consider Spinal Motion Restriction.**
- **Maintain SpO2 > or = 94%.**
- **Φ For Blood Glucose Level of < or = 80 – TREAT for hypoglycemia.**
- ***Status epilepticus*** is defined as two or more successive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid treatment, and transport – and may require airway control,
- **Grand mal seizures (generalized)** are associated with loss of consciousness, incontinence, and tongue trauma.
- **Focal seizures (petit mal)** effect only a part of the body and are not usually associated with a loss of consciousness
- **Jacksonian seizures** are seizures which start as a focal seizure and become generalized.
- Be prepared for airway problems and continued seizures.
- Assess possibility of occult trauma and substance abuse.
- Be prepared to assist ventilations especially if diazepam or midazolam is used.
- Medication Administration:
  - IM route is preferred over IV or IO if IV not already established.
  - IN route as an alternative.
  - **Midazolam IM preferred if no access.** Dosages per local medical control.
  - Other Benzodiazepines may be effective if Midazolam is not available.
- **Obtain continuous waveform capnography after Benzodiazepine administration.**
- For any seizure in a pregnant or recently delivered patient, follow the OB Emergencies Protocol.
- **For actively seizing patients on EMS arrival, (i.e. no IV) consider IM VERSED (Midazolam) prior to establishing IV access.**
- Hypoglycemic patients who are treated in the field for seizure should be transported to hospital, regardless of whether they return to baseline mental status after treatment
- For new onset seizures or seizures that are refractory to treatment, consider other potential causes including, but not limited to, trauma, stroke, electrolyte abnormality, toxic ingestion, hyperthermia, pregnancy or post-partum woman with eclampsia.
- The use of midazolam IM as an intervention is at least as safe and effective as intravenous lorazepam for prehospital seizure cessation
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Actively seizing during transport and time of seizure onset/cessation
  - ❑ Document Number and Duration of Seizures
  - ❑ Onset, focality, direction of eye deviation
  - ❑ Concurrent symptoms of apnea, cyanosis, vomiting, bowel/bladder incontinence, or fever
  - ❑ Medication amounts/routes given by bystanders or prehospital clinicians
  - ❑ Neurologic status (GCS, nystagmus, pupil size, focal neurologic deficit, or signs of stroke)
  - ❑ Blood glucose level

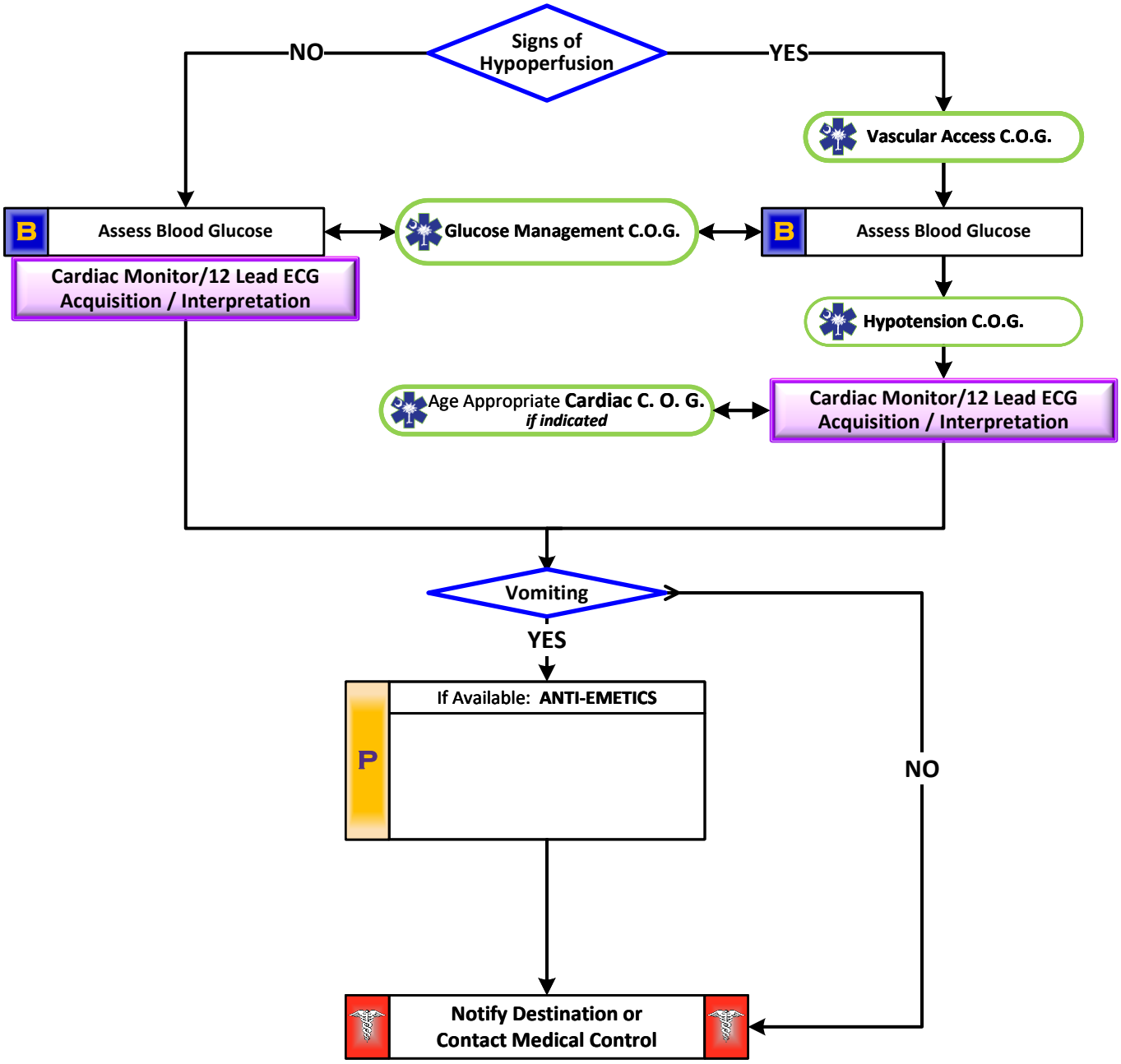
# Nausea, Vomiting, Diarrhea

**History**
- Age
- Time of last meal
- Last bowel movement/ emesis
- Improvement or worsening with food or activity
- Duration of problem
- Other sick contacts
- Past medical history
- Past surgical history
- Medications
- Menstrual history (pregnancy)
- Travel history
- Bloody emesis / diarrhea

**Signs and Symptoms**
- Pain
- Character of pain (constant, intermittent, sharp, dull, etc.)
- Distention
- Constipation
- Diarrhea
- Anorexia
- Radiation

**Associated symptoms:**
**(Helpful to localize source)**
Fever, headache, blurred vision, weakness, malaise, myalgias, cough, headache, dysuria, mental status changes, rash

**Differential**
- CNS (increased pressure, headache, stroke, CNS lesions, trauma or hemorrhage, vestibular)
- Myocardial infarction
- Drugs (NSAID's, antibiotics, narcotics, chemotherapy)
- GI or Renal disorders
- Diabetic ketoacidosis
- Gynecologic disease (ovarian cyst, PID)
- Infections (pneumonia, influenza)
- Electrolyte abnormalities
- Food or toxin induced
- Medication or Substance abuse
- Pregnancy
- Psychological




ADULT MEDICAL

# Nausea, Vomiting, Diarrhea

ADULT MEDICAL

**PEARLS**

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro, in females – Prenancy Status**
- **Abdominal / back 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, with or without back and / or lower extremity pain or diminished pulses, especially in patients over 50 and / or patients with shock/ poor perfusion. Notify receiving facility early with suspected abdominal aneurysm.**
- **Consider cardiac etiology in patients > 50, diabetics and / or women especially with upper abdominal complaints.**
- Document the mental status and vital signs prior to administration of antiemetic medications.
- Beware of vomiting only in children. Pyloric stenosis, bowel obstruction, Trauma, and CNS processes (bleeding, tumors, or increased CSF pressures) all often present with vomiting.
- Heart Rate: One of the first clinical signs of dehydration 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.
- Vomiting and diarrhea are common symptoms, but can be the symptoms of uncommon and serious pathology such as stroke, carbon monoxide poisoning, acute MI, new onset diabetes, diabetic ketoacidosis (DKA), and organophosphate poisoning. Maintain a high index of suspicion.
- **Promethazine (Phenergan) may cause sedative effects in pediatric patients and ages ≥ 60 and the debilitated, etc.) When giving promethazine IV dilute with 10 mL of normal saline and administer slowly as it can also harm the veins.**
  - ❖ ***Infiltration of Promethazine can cause severe injury – even loss of the extremity – ensure IV patency before administration.***
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Patient Age, Weight and/or Length based weight measure for pediatric patients
  - ❑ Risk Factors for Heart Disease
  - ❑ Blood Glucose Level
  - ❑ Medications Given Including: Time, Dose, Dose Units, Route, Response, and Complications or Adverse Events
  - ❑ Vital Signs – Before AND After medication administration AND After each fluid bolus
  - ❑ History and Physical regarding etiology of Nausea, Vomiting, and/or Diarrhea
  - ❑ EKG performed and interpretation documented if cardiac risk factors are present.

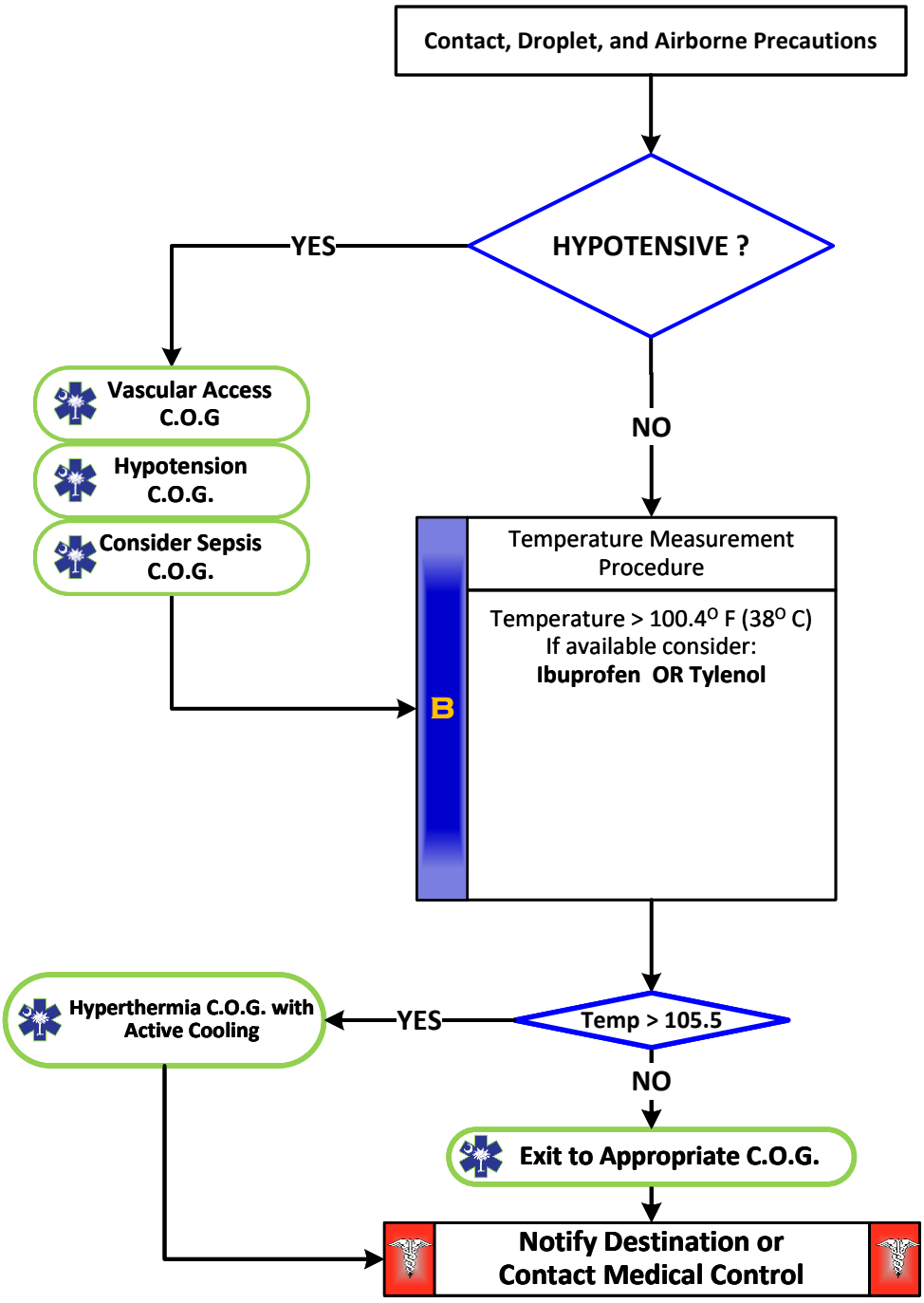
# Fever / Infection Control

**History**
- Age
- Duration of fever
- Severity of fever
- Past medical history
- Medications
- Immunocompromised (transplant, HIV, diabetes, cancer)
- Environmental exposure
- History of Travel – especially outside of US
- Last acetaminophen or ibuprofen
- **Vaccine History**

**Signs and Symptoms**
- Warm
- Flushed
- Sweaty
- Chills/Rigors

**Associated Symptoms (Helpful to localize source)**
- myalgias, cough, chest pain, headache, dysuria, abdominal pain, mental status changes, rash

**Differential**
- **Infections / Sepsis**
- **Cancer / Tumors / Lymphomas**
- **Medication or drug reaction**
- **Connective tissue disease**
  - **Arthritis**
  - **Vasculitis**
- **Hyperthyroidism**
- **Heat Stroke**
- **Meningitis**




ADULT MEDICAL

# Fever / Infection Control



## PEARLS

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Febrile seizures are more likely in children with a history of febrile seizures and with a rapid elevation in temperature.
- **Droplet precautions**
  - include standard PPE plus a standard surgical mask for providers who accompany patients in the back of the ambulance and a surgical mask or NRB O2 mask for the patient.
  - This level of precaution should be utilized when influenza, meningitis, mumps, streptococcal pharyngitis, and other illnesses spread via large particle droplets are suspected.
  - A patient with a potentially infectious rash should be treated with droplet precautions.
- **Contact precautions**
  - include standard PPE plus utilization of a gown, change of gloves after every patient contact, and strict hand washing precautions.
  - This level of precaution is utilized when multi-drug resistant organisms (e.g. MRSA), scabies, or zoster (shingles), or other illnesses spread by contact are suspected.
- **All-hazards precautions**
  - include standard PPE plus airborne precautions plus contact precautions.
  - This level of precaution is utilized during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g. SARS).
- Rehydration with fluids increased the patient's ability to sweat and improves heat loss.
- **Do not** give aspirin to a child.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ History of exposure (pets, occupational, wild animals) or other recent illness.
  - ❑ History of Travel (particularly outside of the US)
  - ❑ Drug and Toxin history including recent antimicrobials
  - ❑ Physical Examination and any localizing symptoms
  - ❑ Initial Vital Signs (including temperature and how it was measured – i.e. core, axillary, oral, rectal, tympanic, etc)
  - ❑ All interventions and response to interventions
  - ❑ Medications administered – including timing and dose of medication
  - ❑ Active Cooling measures administered.

# Sepsis

**History**
- Age > 18 years old
- Duration of fever
- Severity of Fever
- Altered Mental Status
- Past Medical History
- Absent Spleen
- Medications
- Indwelling Medical Device
- Immunocompromise
  - Transplant
  - HIV
  - Diabetes
  - Cancer
  - Date of Last Chemotherapy
- Environmental Exposure
- Last Acetaminophen
- Recent hospitalization/Healthcare Facility Stay
- Bedridden or Immobile

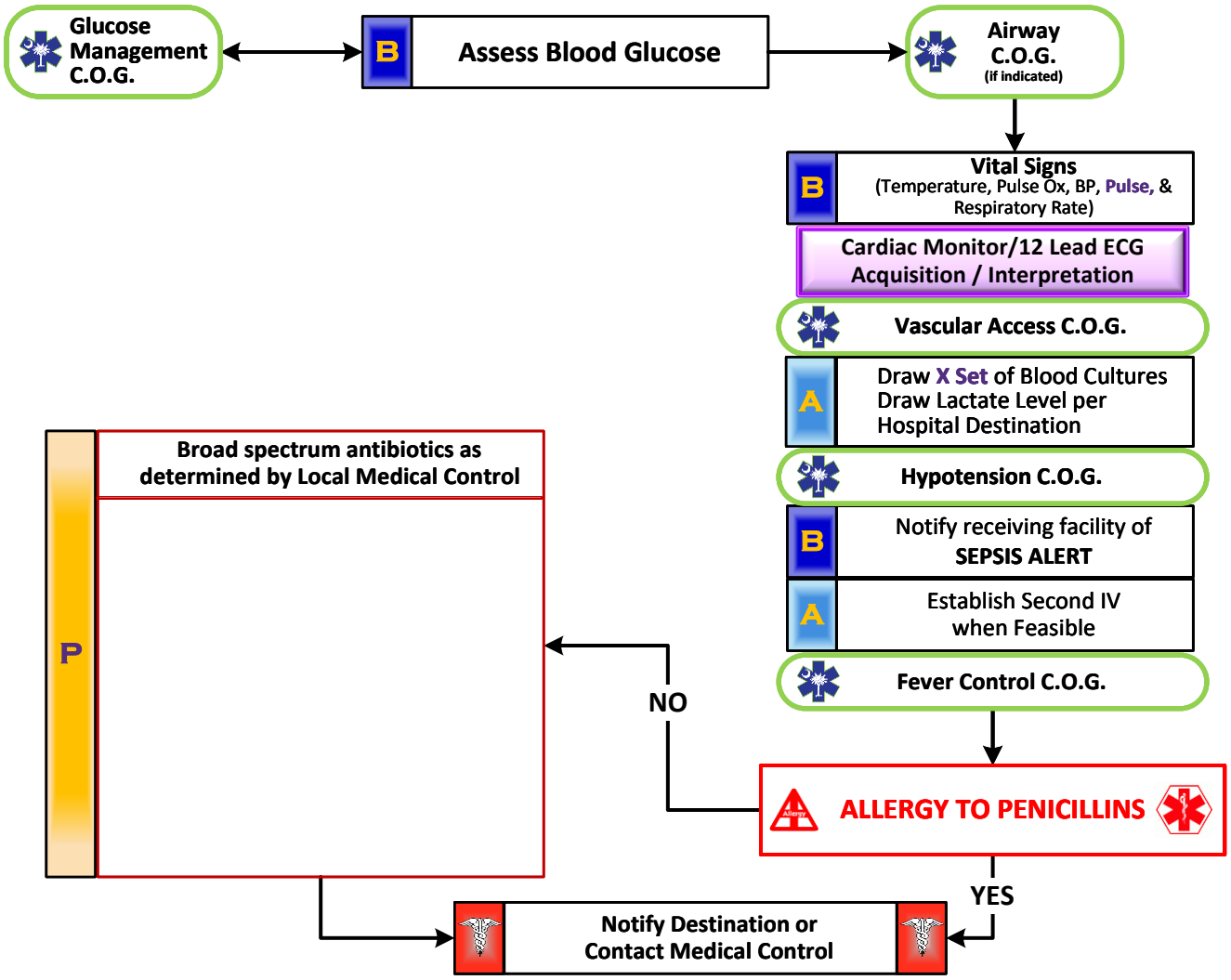
**Signs and Symptoms/ Significant Findings**
- Hyperthermia (>100.4$^{O}$ F / 38$^{O}$ C)
- Hypothermia (< 96.8$^{O}$ F / 35$^{O}$ C)
- Tachypnea
- Tachycardia
- Acute mental status change
- Urinary Tract Infection
- Pneumonia
- Skin / soft tissue infection
- Abdominal Infection
- Wound Infection
- Suspected meningitis, endocarditis, or osteomyelitis

**Differential:**
- Infections
- Malignancy - Cancer
- Medication / Drug Reaction
- Hyperthyroidism
- Acute mental status change
- Urinary Tract Infection
- Pneumonia
- Skin / soft tissue infection
- Abdominal Infection
- Wound Infection
- Suspected meningitis, endocarditis, or osteomyelitis
- MI / CVA
- Heat Stroke

**CRITERIA FOR SEPSIS PROTOCOL:**

1.Are any two of the following symptoms present AND new to the patient?
- Hyperthermia (> 100.4 $^{O}$ F or 38 $^{O}$ C) or Hypothermia ( < 96.8 $^{O}$ F or 36 $^{O}$ C)
- Heart Rate > 90 beats per minute
- Respiratory Rate > 20 breaths per minute OR Mechanical Ventilation
- Signs of poor perfusion (such as SBP < 90 mmHg)

2.Is the patient's presentation suggestive of any of the following infections?
- Pneumonia (cough/thick sputum)
- Urinary Tract Infection
- Acutely AMS / change
- Blood stream / Catheter related
- Abdominal pain and/or diarrhea
- Wound Infection
- Skin / Soft Tissue Infection




ADULT MEDICAL

# Sepsis

**Collecting Cultures**

- **Maintain aseptic technique at all times**
- **Put on a new set of clean gloves**
- **Prepare site with Chloraprep**
  - **Clean 2 inch site**
  - **Allow site to dry**
  - **Do not touch once cleaned**
- **Remove cap from culture bottles**
- **Clean bottle diaphragm with alcohol and allow to dry**
- **Venipuncture and draw blood**
- **Add 5 – 10 mL of blood in each bottle**
  - **Aerobic first**
  - **Anaerobic Second**

**ADULT SIRS Criteria:**

**Temperature**
≥ 100.4°F (38°C)
**OR**
≤ 96.8° F (36° C)
**AND**
Any 1 of the following:
HR > 90
RR > 20
EtCO2 < 25 mmHg

**ADULT qSOFA Criteria**
SBP ≤ 100 mmHg
RR ≥ 22
AMS or new mental status change

**PEARLS:**

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Recommended Exam Pediatrics: In childhood, physical assessment reveals important clues for sepsis. Look for mental status abnormalities such as anxiety, restlessness, agitation, irritability, confusion, or lethargy. Cardiovascular findings to look for include cool extremities, capillary refill >3 seconds, or mottled skin.**
- **If unable to obtain cultures, do NOT administer antibiotics.**
- **Determine the hospital destination prior to drawing cultures. Use appropriate kit for that destination hospital (kits differ based on the hospital facility).**
- **Utilize Sepsis Checklist**
- **Specific Broad Spectrum Antibiotics are determined by the Local MCP. State Approved Formulary notes these as "Broad Spectrum Antibiotics".**
- **Sepsis** is a life threatening condition where the body's immune response to infection injures its own tissues and organs.
- **Severe sepsis** is a suspected infection and 2 or more SIRS criteria (or qSOFA) with organ dysfunction such as AMS or hypotension.
- **Septic shock** is severe sepsis and poor perfusion unimproved after fluid bolus.
- Agencies administering antibiotics should **inquire about drug allergies specific to antibiotics or family of antibiotics**.
- Following each fluid bolus, assess for pulmonary edema. Consider administration of agency specific vasopressor.
- Supplemental oxygen should be given and titrated to guideline oxygenation saturation
- EKG should be obtained with suspected sepsis, but should not delay care in order to obtain.
- Abnormally low temperatures increase mortality and found often in geriatric patients. Quantitative waveform capnography can be a reliable surrogate for lactate monitoring in detecting metabolic distress in sepsis patients. EtCO2 < 25 mm Hg are associated with serum lactate levels > 4 mmol/L.
- ***Droplet precautions***:
  - Include standard PPE plus a standard surgical mask for providers who accompany patients in the back of the ambulance and a surgical mask or NRB O2 mask for the patient.
  - This level of precaution should be utilized when influenza, meningitis, mumps, streptococcal pharyngitis, and other illnesses spread via large particle droplets are suspected.
  - A patient with a potentially infectious rash should be treated with droplet precautions.
- ***Airborne precautions:***
  - Include standard PPE plus utilization of a gown, change of gloves after every patient contact, and strict hand washing precautions.
  - This level of precaution is utilized when multi-drug resistant organisms (e.g. MRSA), scabies, or zoster (shingles), or other illnesses spread by contact are suspected.
- ***All-hazards precautions:***
  - Include standard PPE plus airborne precautions plus contact precautions.
  - This level of precaution is utilized during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g. SARS).
- **Agency Medical Director may require contact of medical control prior to administering any medication.**
- **KEY DOCUMENTATION:**
  - ❑ Presenting Vital Signs (B/P, Pulse Rate, Respiratory Rate, SpO2, Temperature, EtCO2 (if available).
  - ❑ Ongoing repeat assessments: Blood Glucose, Cardiac Rhythm Changes, Pulse, Blood Pressure
  - ❑ Documentation of Sepsis Checklist.
  - ❑ Documentation of Blood Culture Acquisition with Time of Collection and Site.
  - ❑ Documentation of Antibiotics Administered – with Time of Administration, Dose, Antibiotic Name.
  - ❑ Any Adverse events following administration of medications.

ADULT MEDICAL

# Sepsis Checklist

**EMS EVALUATION AND TREATMENT OF SEPSIS – TOOL**

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

Evaluation for Sepsis:

1. Are any two of the following symptoms present AND new to the patient?
   - ❑ Hyperthermia (> 100.4 $^{o}$ F or 38 $^{o}$ C) or Hypothermia ( < 96.8 $^{o}$ F or 36 $^{o}$ C)
   - ❑ Heart Rate > 90 beats per minute
   - ❑ Respiratory Rate > 20 breaths per minute OR Mechanical Ventilation
   - ❑ Signs of poor perfusion (such as SBP < 90 mmHg)
2. Is the patient's presentation suggestive of any of the following infections?
   - ❑ Pneumonia (cough/thick sputum)
   - ❑ Urinary Tract Infection
   - ❑ Acutely AMS / change
   - ❑ Blood stream / Catheter related
   - ❑ Abdominal pain and/or diarrhea
   - ❑ Wound Infection
   - ❑ Skin / Soft Tissue Infection

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

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

**TREATMENT FOR SEPSIS**

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

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

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

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

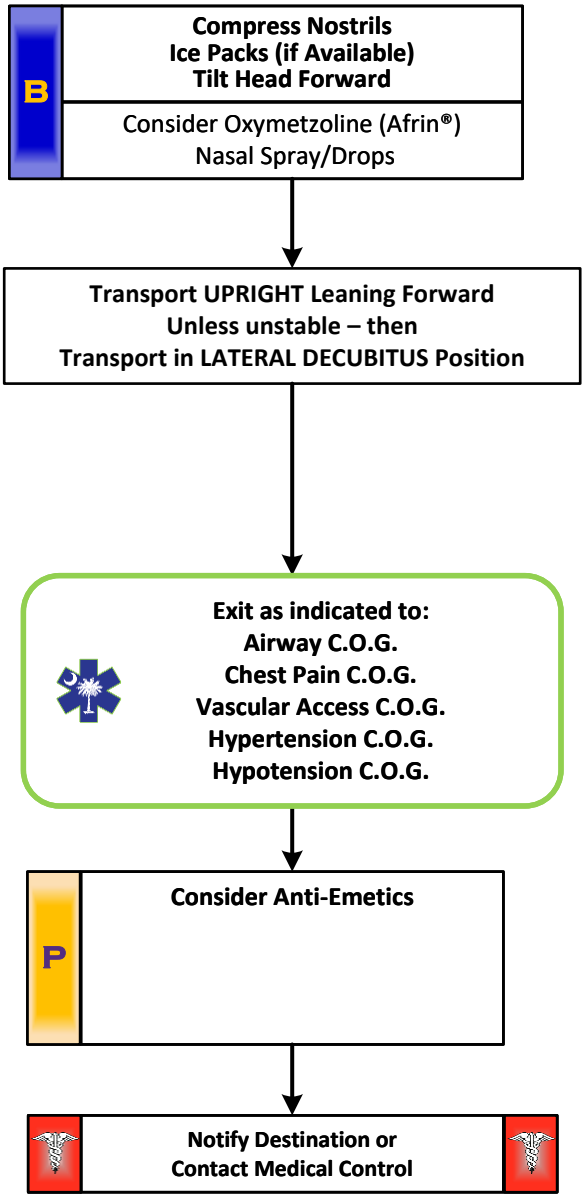
ADULT MEDICAL

# Epistaxis

**History**
- Age
- Past medical history
- Medications (HTN, anticoagulants, Aspirin, NSAIDS, Xarelto, Eliquis, Pradaxa, Plavix, Heparin, Lovenox, Aggrenox, Brilinta )
- Previous episodes of epistaxis
- Trauma
- Duration of bleeding
- Quantity of bleeding

**Signs and Symptoms**
- Bleeding from nasal passage
- Pain
- Nausea
- Vomiting

**Differential**
- **Trauma**
- **Infection (viral URI or Sinusitis)**
- **Allergic rhinitis**
- **Lesions (polyps, ulcers)**
- **Hypertension**




ADULT MEDICAL

# Epistaxis



**PEARLS**

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Neuro**
- **Past Medical History:**
- **Previous episodes of epistaxis**
- **History of Bleeding issues**
- **History of Atrial Fibrillation, Atrial Flutter, CHF**
- It is very difficult to quantify the amount of blood loss with epistaxis.
- Bleeding may also be occurring posteriorly. Evaluate for posterior blood loss by examining the posterior pharnyx.
- **Anticoagulants include** Aspirin, Coumadin, non-steroidal anti-inflammatory medications (Ibuprofen), and many over the counter headache relief powders.
  - » Warfarin (Coumadin) » Apixaban (Eliquis)
  - » Dabigatran (Pradaxa) » Rivaroxaban (Xarelto) » Heparin »Enoxaparin (Lovenox)
- **Antiplatelet Agents include:**
  - » Aspirin » Clopidogrel (Plavix) » Aspirin/Dipyridamole (Aggrenox) » Ticlopidine (Ticlid)
  - » Ticagrelor (Brilinta) » Ibuprofen (OTC) » Naproxen (OTC) » Other OTC Headache Powders and Preparations
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Vital Signs
  - ❑ History of bleeding/epistaxis
  - ❑ Medications taken by patient
  - ❑ Treatment administered

# Pain Control: Adult

**History**
- Age
- Location
- Duration
- Severity (1 - 10)
- Past medical history
- Medications
- Drug allergies

**Signs and Symptoms**
- Severity (pain scale)
- Quality (sharp, dull, etc.)
- Radiation
- Relation to movement,
- Respiration
- Increased with palpation of area

**Differential**
- **Per the specific protocol**
- **Musculoskeletal**
- **Visceral (abdominal)**
- **Cardiac**
- **Pleural / Respiratory**
- **Neurogenic**
- **Renal (colic)**

Patient care according to **C.O.G.** based on **Specific Complaint**

**Assess Pain Severity: Combination of Pain Scale, MOI, Circumstances, Injury, or Illness Severity**

**Pain Severity > 6 out of 10**
**OR**
**Indication for IV / IM Medication**

**NO** →

**B**
- Consider If Available: **Ibuprofen or Acetaminophen**
- Consider If Available: **Nitrous Oxide**

**YES**

**B** **Pulse Ox / EtCO2**

**Vascular Access C.O.G.**

**B**
- **Consider: Nitrous Oxide**
- Must reasssess patient at least **every 15 minutes** after sedative medication

**P**
- **Consider Ketorolac**
- Morphine or Fentanyl *
  *** ONLY these MAXIMUM doses may be administered PRIOR to OLMC contact**
- **Morphine* 0.1 mg/kg up to 5 mg.**
  **May repeat Q 5 minutes. Max Dose = 10 mg**
- **Fentanyl* 2 mcg/kg up to 100 mcg.**
  **May repeat Q 5 minutes. Max Dose = 200 mcg**
- Consider anti-emetics as needed
- Consider subdissociative Ketamine for Refractory Pain

**Notify Destination or Contact Medical Control**

**Morphine and Fentanyl Doses listed in this protocol may be used PRIOR to contact with OnLine Medical Control**

**Smaller doses of Narcotics MAY be utilized to achieve pain control. Repeat dosing of Narcotics is restricted to 5 minute intervals UNTIL the MAXIMUM dose is reached prior to OLMC Contact**

**Only ONE Narcotic agent may be utilized prior to OnLine Medical Direction**

**Relative Contraindications For IV Pain Control:**
- Severe Head Injury
- End-Stage Lung Disease
- Untreated Hypotension

**Relative Contraindications For Non-Steroidal Agents :**
- Active Bleeding
- Possible Surgery
- Renal Disease

ADULT MEDICAL

# Pain Control: Adult

ADULT MEDICAL

**PEARLS**

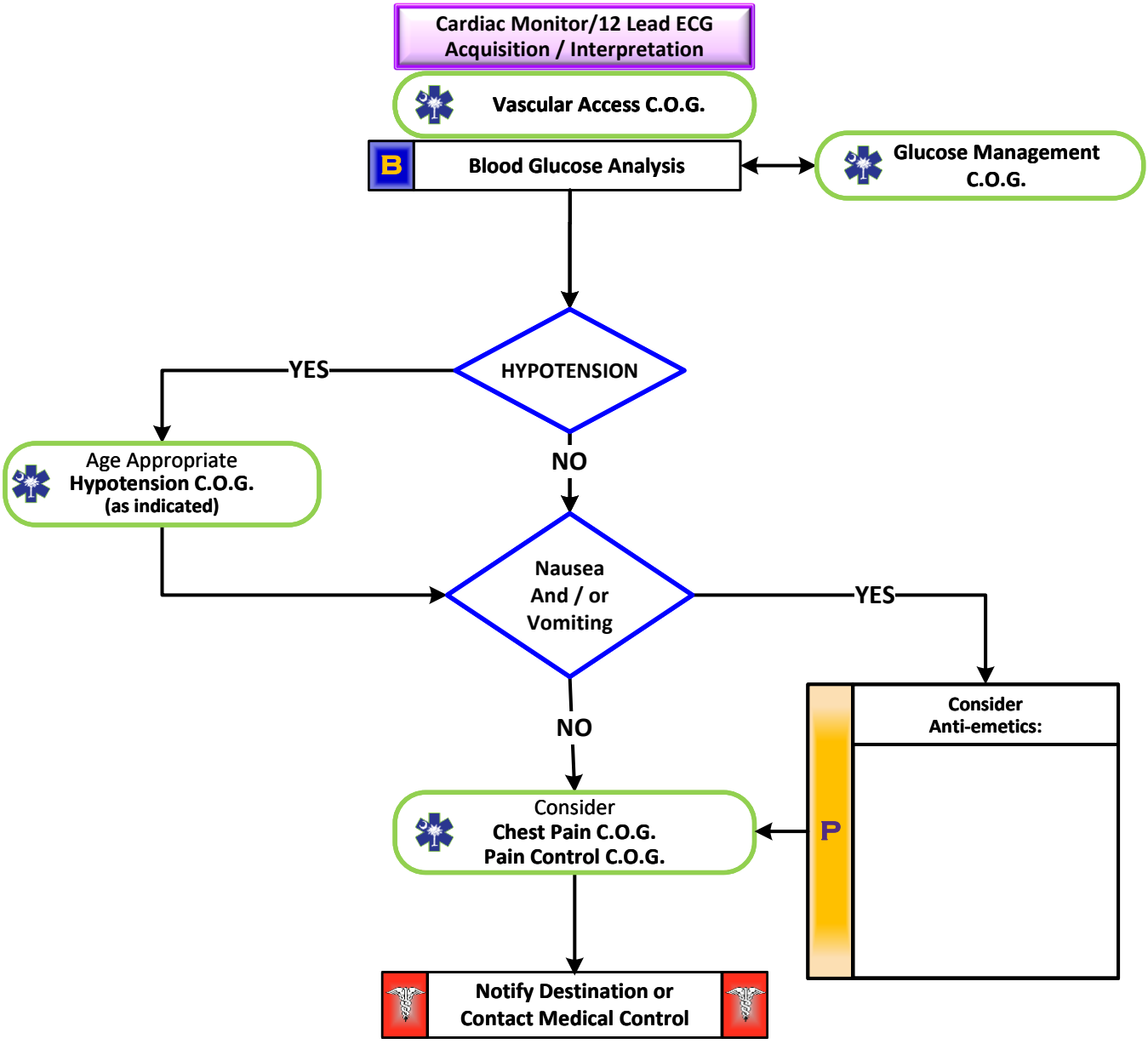
- **Recommended Exam: Mental Status, Area of Pain, Neuro**
- **Pain severity (0-10) is a vital sign to be recorded pre and post IV or IM medication delivery and at disposition.**
- **Vital signs should be obtained pre, 15 minutes post, and at disposition with all pain medications.**
- **Smaller doses of Narcotics may be utilized based upon Service Medical Control Physician instruction – i.e. LESS than 0.1 mg/kg Morphine or LESS than 2 mcg/kg Fentanyl. The narcotic dosing may be repeated ONLY at 5 minutes or greater intervals and ONLY until the MAXIMUM DOSE LISTED is reached until Online Medical Control is established.**
- Relative Contraindications to the use of a **narcotic** include hypotension, head injury, respiratory distress or severe Lung Disease.
  - **Be prepared and observe for respiratory depression with ANY administration of narcotic Analgesic, sedative, or anti-emetic agents – particularly if given in combination.**
  - Extra caution should be taken with patients under the influence of alcohol, drugs, or other sedative medications.
- **Consider alternatives in patients who have known drug allergies to NSAID's (non-steroidal anti-inflammatory medications), with active bleeding, or in patients who may need surgical intervention such as open fractures or fracture deformities.**
- All patients who receive IM or IV medications must be observed 15 minutes for drug reaction.
- **Ibuprofen** should not be given for headaches or abdominal pain, history of gastritis, stomach ulcers, fracture, or if patient will require sedation.
- Do not administer any PO medications for patients who may need surgical intervention such as open fractures or fracture deformities, headaches, or abdominal pain.
- See drug list for other contraindications for Narcotics, Acetaminophen, Nitrous Oxide, and Ibuprofen.
  - ***Only ONE NARCOTIC Agent may be used PRIOR TO OnLine Medical Control Direction. (i.e. May not "max out" one agent and then utilize a second agent prior to OnLine Medical Direction.)***
- **Ketamine: appropriate indications for pain control:**
  - **Patients who have developed opioid-tolerance. Sickle cell crisis patients with opioid-tolerance.**
  - **Patients who have obstructive sleep apnea.**
  - **May use in combination with opioids to limit total amount of opioid administration.**
- **Ketamine: caution when using for pain control:**
  - **Slow infusion or IV push over 10 minutes is associated with less side effects. Do not administer by rapid IV push.**
  - **Avoid in patients who have cardiac disease or uncontrolled hypertension.**
  - **Avoid in patients with increased intraocular pressure such as glaucoma.**
  - **Avoid use in combination with benzodiazepines due to decreased respiratory effort.**
- **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.**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Vital Signs (Pulse, Blood Pressure, Respiratory Rate, Neurologic Status) with Pulse Oximetry
  - ❑ Acquisition of Known Patient Allergies PRIOR to administration of any medications.
  - ❑ Documentation of Initial Patient Pain Scale Assessment
  - ❑ Documentation of medication administration with Correct Dose
  - ❑ Documentation of Patient Reassessment with repeat Vital Signs and Patient Pain Scale assessment.
  - ❑ Medical Control Signature on ePCR within 72 Hours.

# Abdominal Pain

**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)

**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 (hepatitis, CHF)
- Peptic ulcer disease / Gastritis
- Gallbladder
- Myocardial infarction
- Pancreatitis
- Kidney stone
- Abdominal aneurysm
- Appendicitis
- Bladder / Prostate disorder
- Pelvic (PID, Ectopic pregnancy, Ovarian cyst)
- Spleen enlargement
- Diverticulitis
- Bowel obstruction
- Gastroenteritis (infectious)




ADULT MEDICAL

# Abdominal Pain

ADULT MEDICAL

**PEARLS**

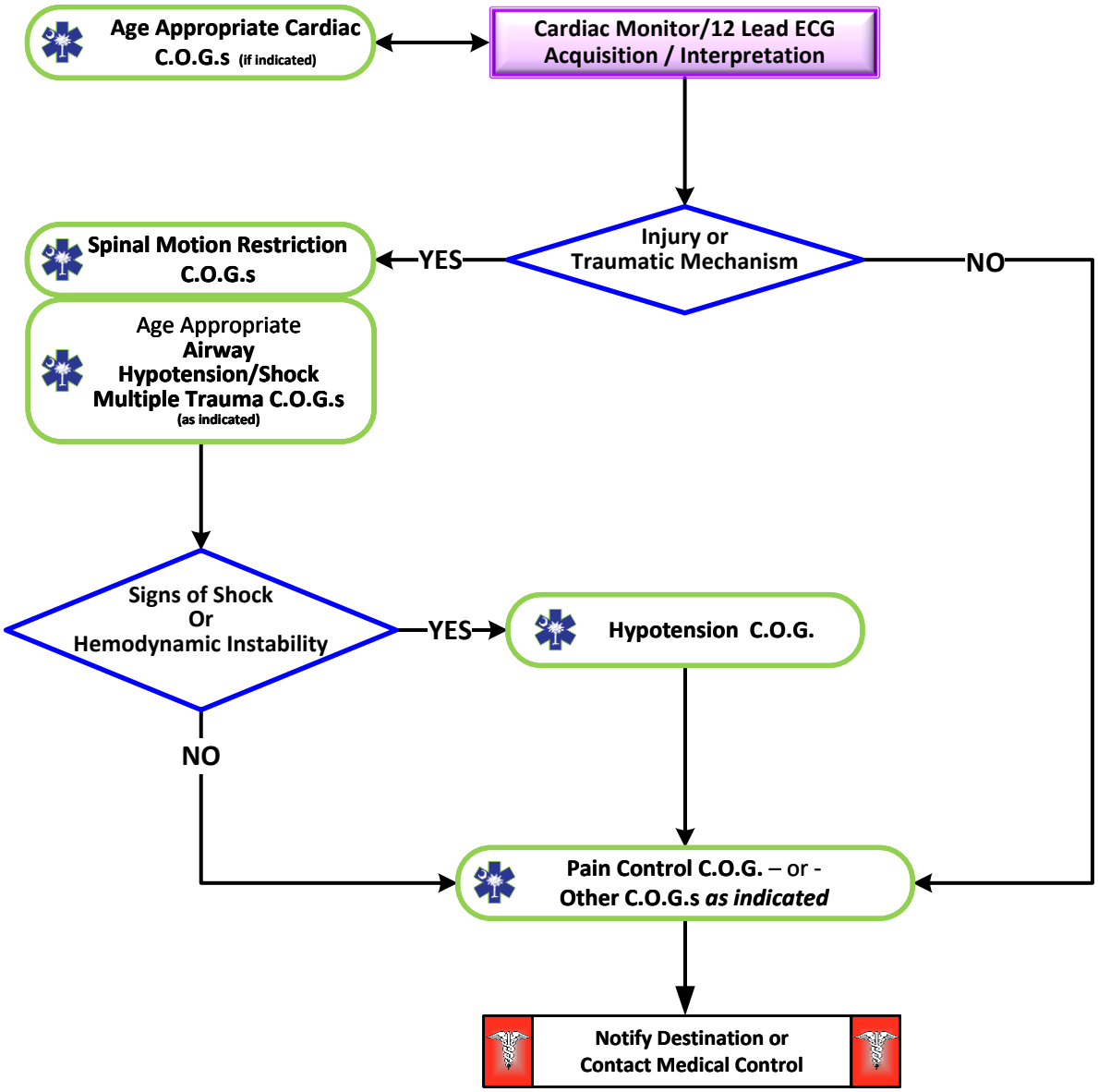
- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lung, Abdomen, Back, Extremities, Neuro**
- **Pertinent Assessment Findings:**
  - » Guarding » Rebound Tenderness » Abdominal Distension
  - » Abdominal Tympany to percussion » Presence of "pulsatile" abdominal mass
  - » Tenderness focal to a specific abdominal quadrant » Hyper or Hypothermia » Jaundice
- » »Absence of or significant inequality of femoral or LE pulses » Rectal Bleeding, hematemsis, vaginal bleeding
- Document the mental status and vital signs prior to administration of anti-emetics.
- Abdominal pain in women of childbearing age should be treated as an ectopic pregnancy until proven otherwise.
- ECG Monitoring/Interpretation should be strongly considered in patients > 40 years old – or in ANY patient with history of Cardiovascular Disease.
- **Consider cardiac etiology in patients > 40, diabetics and / or women especially with upper abdominal complaints.**
- The diagnosis of abdominal aneurysm dissection should be considered with abdominal pain in patients over 50.
- Repeat vital signs after each bolus.
- Appendicitis may present with vague, peri-umbilical pain which migrates to the RLQ over time
- **Heart Rate: One of the first clinical signs of dehydration - 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.**
- Pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures) all often present with vomiting.
- Document the mental status and vital signs prior to administration of any anti-emetic.
- Vomiting and diarrhea are common symptoms, but can be the symptoms of uncommon and serious pathology such as stroke, carbon monoxide poisoning, acute MI, new onset diabetes, diabetic ketoacidosis (DKA), and organophosphate poisoning. Maintain a high index of suspicion.
- **Promethazine (Phenergan) may cause sedative effects in pediatric patients and ages ≥ 60 and the debilitated, etc. When giving promethazine IV dilute with 10 mL of normal saline and administer slowly as it can also harm the veins.**
  - ***Infiltration of Promethazine can cause severe injury – even loss of the extremity – assure IV patency before administration.***
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Initial and repeat Vital Signs
  - ❑ Assessment of abdomen to include
    - ❑ Findings on palpation/percussion including the presence or absence of masses
    - ❑ Presence and nature of tenderness / pain
  - ❑ Treatment and Response to Treatment
  - ❑ Medications administered including dosage and timing

# Back Pain

**History**
- Age
- Past medical history
- Past surgical history
- Medications
- Onset of pain / injury
- Previous back injury
- Traumatic mechanism
- Location of pain
- Fever
- Improvement or worsening with activity

**Signs and Symptoms**
- Pain (paraspinous, spinous
- process)
- Swelling
- Pain with range of motion
- Extremity weakness
- Extremity numbness
- Shooting pain into an extremity
- Bowel / bladder dysfunction

**Differential**
- Muscle spasm / strain
- Herniated disc with nerve
- Compression
- Sciatica
- Spine fracture
- Kidney stone
- Pyelonephritis
- Aneurysm (AAA)
- Pneumonia
- Spinal Epidural Abscess
- Metastatic Cancer




ADULT MEDICAL

# Back Pain

ADULT MEDICAL

**PEARLS**

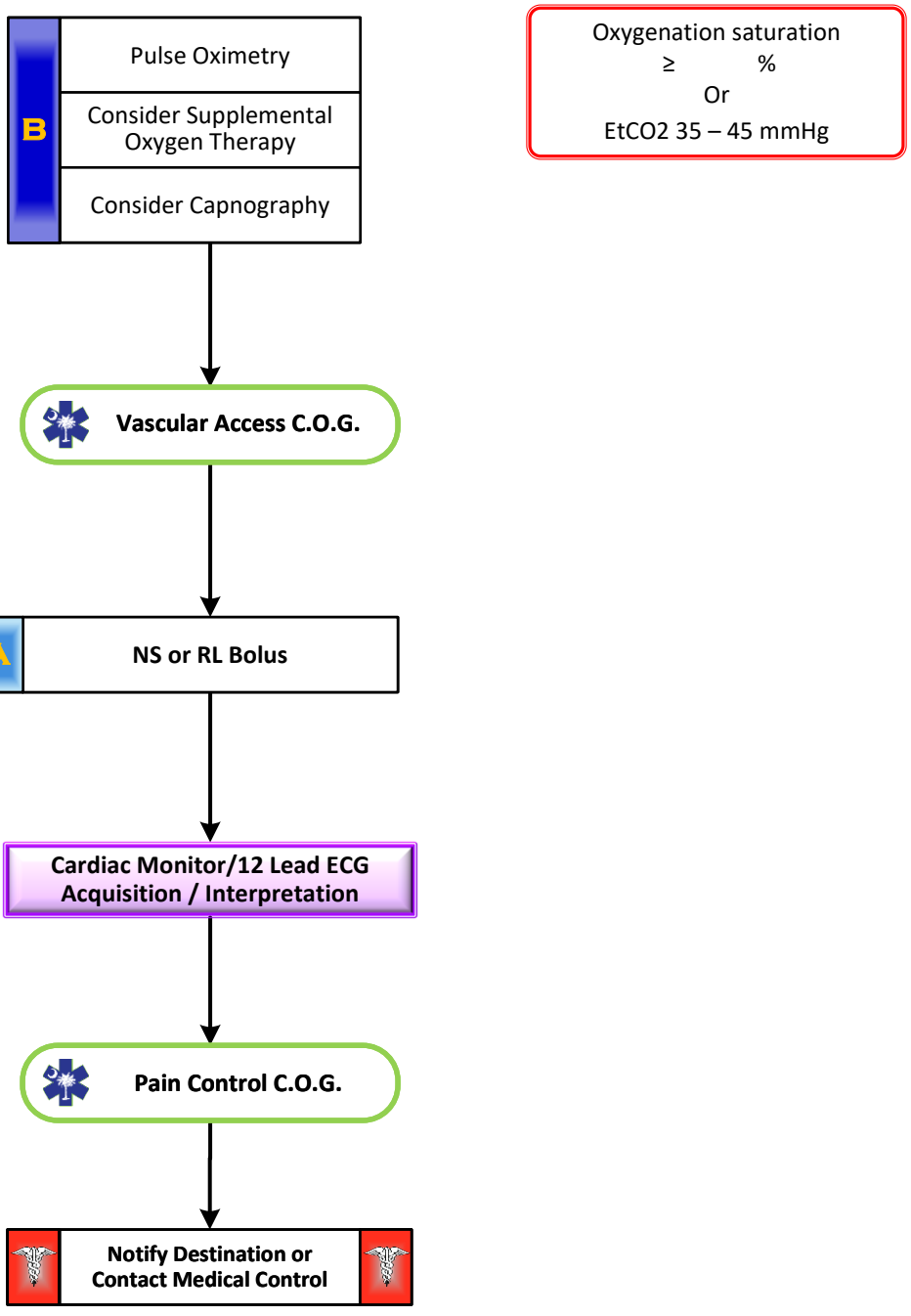
- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Neuro, Lower extremity perfusion**
- **Back pain is one of the most common complaints in medicine and effects more than 90 % of adults at some point in their life. Back pain is also common in the pediatric population. Most often it is a benign process but in some circumstances can be life or limb threatening.**
- **Consider pregnancy or ectopic pregnancy with abdominal or back pain in women of childbearing age.**
- **Consider abdominal aortic aneurysm with abdominal pain especially in patients over 50 and/or patients with shock/ poor perfusion. Patients may have abdominal pain and / or lower extremity pain with diminished pulses. Notify receiving facility early with suspected abdominal aneurysm.**
- **Consider cardiac etiology in patients > 50, diabetics and / or women especially with upper abdominal complaints.**
- **Red Flags which may signal more serious process associated with back pain:**
  - Age > 50 or < 18
  - Neurological deficit (leg weakness, urinary retention, or bowel incontinence)
  - IV Drug use
  - Fever
  - History of cancer, either current or remote
  - Nighttime pain in pediatric patients
- Cauda equina syndrome develops when the terminal nerves of spinal cord are being compressed (Symptoms include):.
  - Saddle anesthesia
  - Recent onset of bladder and bowel dysfunction. (Urine retention and bowel incontinence)
  - Severe or progressive neurological deficit in the lower extremity.
  - Motor weakness of thigh muscles or foot drop
- **Back pain associated with infection:**
  - Fever / chills.
  - IV Drug user (consider spinal epidural abscess)
  - Recent bacterial infection like pneumonia.
  - Immune suppression such as:
    - HIV or patients on chronic steroids like prednisone, recent chemotherapy or transplant.
  - Recent spinal surgery or procedures (e.g. epidural; lumbar puncture; pain management injections)
  - Meningitis.
- Spinal motion restriction in patients with underlying spinal deformity should be maintained in their functional position.
- Kidney stones typically present with an acute onset of flank pain which radiates around to the groin area.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Assessment of back and abdomen to include findings on palpation/percussion including presence or absence of masses and presence and nature of tenderness/pain.
  - ❑ Assessment of initial and changes in neurologic status
  - ❑ Assessment of initial and changes in perfusion/pulses.

# Sickle Cell Pain/Crisis

**History**
- PMH
- History of Complications:
- Acute Chest Syndrome
- Stroke
- Splenic Sequestration
- Severe Anemia
- Frequency of Crisis/Typical Pain Symptoms
- Medications
- Home Pain Control Regimen
- Fever

**Signs and Symptoms**
- Pain – Onset & Progression
- Chest Pain
- Dyspnea / Hypoxemia
- Pallor
- Abdominal Pain
- Stroke Like Symptoms
- Fever
- Hypertension
- Calf Pain / Swelling

**Differential**
- Vaso-occlusive Crisis
- Anemia
- Acute Chest Syndrome
- Septic Arthritis
- Bacteremia / Infection / Sepsis
- Priapism (Identified Males)




ADULT MEDICAL

# Sickle Cell Pain/Crisis



**PEARLS**

- **Recommended Exam: Vital Signs with Temperature and Oxygen Sats, Mental Status, HEENT, Chest, Cardiac, Abdominal, GU (Male), Neuro, Musculoskeletal**
- Assess for life-threatening complications of sickle cell disease. These patients have a significantly higher risk of complications – in addition to pain crises.
- **Fever is a significant finding.**
- These patients tolerate acute blood loss poorly due to baseline anemia.
- Provide appropriate treatment for pain, respiratory distress, and shock.
- These patients may have a markedly higher tolerance for narcotic medications if they are taking them on a regular basis.
  - ➢ Be sure to document the patient's home medications and last use of narcotics.
- Patients with sickle cell trait can have acute pain crises in extreme conditions (e.g. heat exhaustion, dehydration, and severe cold).
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Assess for Vital Signs – including Respiratory Status and Neuro Status and ability to move all joints.
  - ❑ Documentation of how this pain crisis compares with others in terms of location, severity, and triggers
  - ❑ Documentation of home medications – including home narcotics and last dose and time.

# Dialysis / Renal Failure

**History**
- Peritoneal or Hemodialysis
- Missed Dialysis Appointment/s
- Anemia
- Catheter access noted
- Shunt / Fistula access noted
- Hyperkalemia

**Signs and Symptoms**
- Hypotension
- Shortness of Breath
- Bleeding from Shunt or AV Fistula
- Fever
- Electrolyte imbalance (Abnormal EKG)
- Nausea and / or vomiting
- Altered Mental Status / Stroke /Weakness
- Seizure / Cramping
- Arrhythmia / Chest Pain / Shortness of Breath
- Dysequilibrium Syndrome

**Differential**
- Congestive heart failure
- Pericarditis
- Diabetic emergency
- Sepsis
- Cardiac tamponade

**Shunt / Fistula Bleeding** — YES → **B**
- **Apply firm finger tip pressure to bleeding site**
- Apply dressing but avoid bulky dressing
- Try to avoid compression of fistula / shunt as this will cause clotting of the shunt

NO

**CHF / Pulmonary Edema** — YES → **Exit to CHF / Pulmonary Edema C.O.G.**

NO

**Cardiac Arrest** — NO → **Serious Signs / symptoms** — NO → **Exit to Appropriate C.O.G.**

YES

**P** — Calcium Chloride or Calcium Gluconate

**P** — Sodium Bicarbonate

**Exit to Appropriate C.O.G.**

YES

**Airway C.O.G.** *(if indicated)*

**B** Blood Glucose Analysis ↔ **Glucose Management C.O.G.**

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

**Vascular Access C.O.G.**

**EKG Findings or Symptoms suggestive of HYPERkalemia** — NO → **Systolic Blood Pressure < 90 AND Dialysis within 8 hours**

YES

**P** — Calcium Chloride or Calcium Gluconate

**P** — Sodium Bicarbonate

**B** — Albuterol

YES

**A** — Consider 500 mL fluid bolus. May repeat once if no evidence of Pulmonary edema

**P** — If persistent hypotension – consider Pressors per Hypotension C.O.G.

NO

**Notify Destination or Contact Medical Control**

**Typical symptoms of HYPERKALEMIA:**
- Muscle weakness or paralysis – begins in legs and progresses to trunk and arms
- Cardiac Conduction abnormalities and dysrhythmias –
- Early on Tall Peaked T waves; Shortened QT Interval;
- Progressive – lengthening of the PR Interval and QRS Duration. P waves may disappear. QRS may become "sine wave".
- Conduction abnormalities include Bundle Branch Blocks (Right or Left or Bifasicular) advanced AV Block.
- Cardiac Arrhythmias include Sinus Bradycardia, Sinus Arrest, Slow Idioventricular Rhythms; V Tach, V Fib, Asystole.

ADULT MEDICAL

# Dialysis / Renal Failure



**PEARLS**

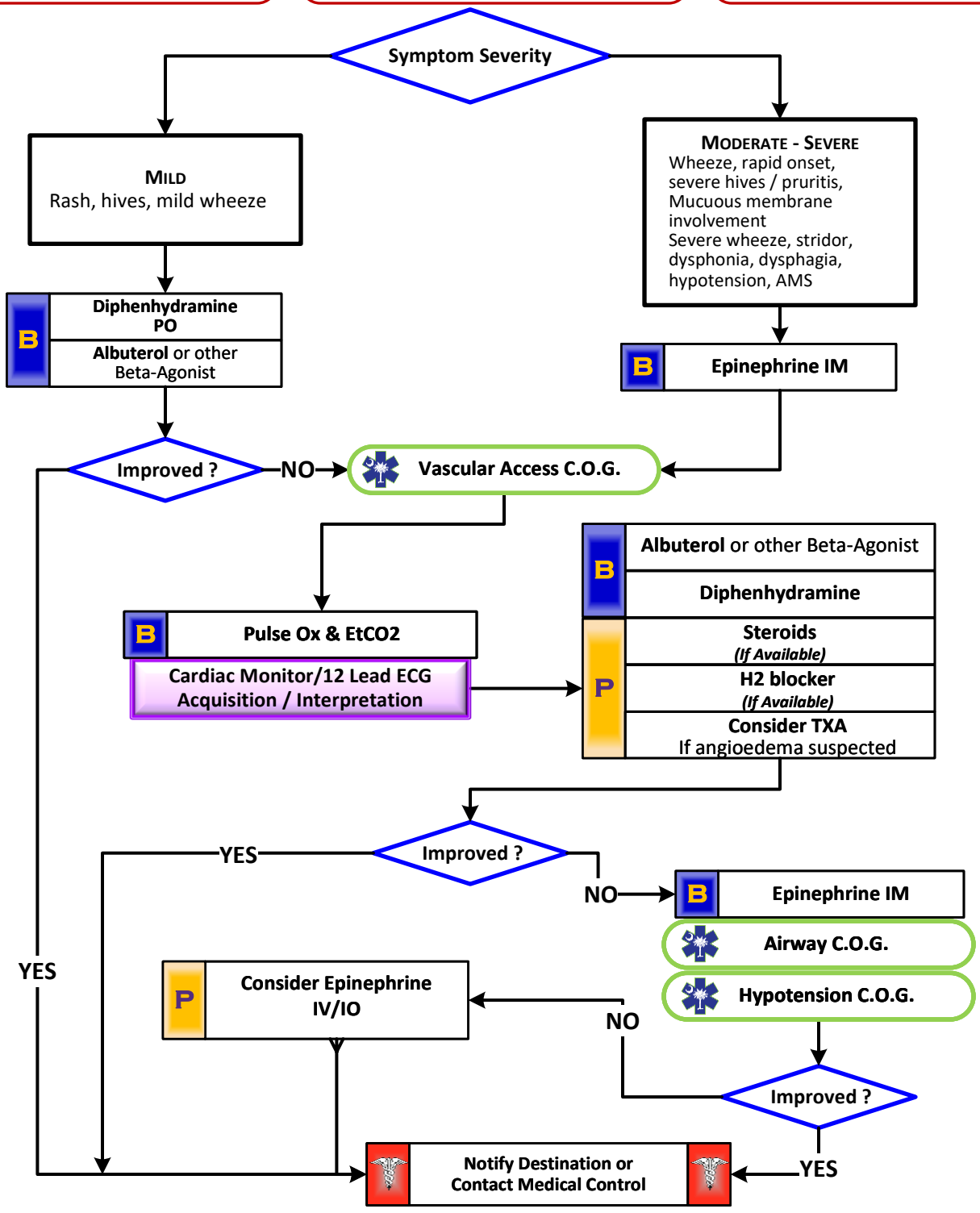
- **Recommended exam: Mental status. Neurological. Lungs. Heart.**
- **Do not take Blood Pressure or start IV in extremity which has a shunt / fistula in place.**
- **Access of shunt indicated in the peri-arrest or cardiac arrest patient only with no other available access. IO if available.**
- Always consider Hyperkalemia in all dialysis or renal failure patients.
- **Dialysis Disequilibrium Syndrome** is an uncommon but serious complication of hemodialysis:
  - Neurologic Symptoms include Headaches, disturbed consciousness, convulsions, coma
  - Fatigue, Nausea & Vomiting
  - More Common in elderly and pediatrics; Patients with pre-existing CNS lesions (Stroke or Head Trauma); Cerebral Edema (malignant hypertension, hyponatremia, hepatic encephalopathy); Severe Metabolic Acidosis.
- **Sodium Bicarbonate** and **Calcium Chloride / Gluconate** should not be mixed. Ideally give in separate lines.
- **End stage renal disease (ESRD) is increasing in the U.S. These patients demonstrate greater all-cause mortality, cardiovascular events, and hospitalization rates when compared to those with normal renal function.**
  - ESRD patients possess high risk for neurologic complications, cardiopulmonary pathology, infection, and access site complications.
  - Neurologic issues include uremic encephalopathy, seizures, and cerebrovascular pathology.
  - Cardiopulmonary complications include pericarditis, pericardial effusion/tamponade, acute coronary syndrome, sudden cardiac death, electrolyte abnormalities, pulmonary edema,
  - Infections are common with patients often presenting atypically. Access site infections must be treated aggressively. The most common complication of Continuous Ambulator Peritoneal Dialysis (CAPD) is peritonitis which occurs on an average once every 15-18 months.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Vital Signs (Blood Pressure, Pulse, Respiratory Rate, SpO2, Temperature)
  - ❑ Last Dialysis
  - ❑ Patient Medications
  - ❑ EKG if symptomatic or indicated.
  - ❑ Therapeutic Interventions and Response to Interventions

# Anaphylaxis / Allergic Reaction

**History**
- 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

**Signs and Symptoms**
- Itching or hives
- Coughing / wheezing or
- Respiratory distress
- Chest or throat constriction
- Difficulty swallowing
- Hypotension or shock
- Edema

**Differential**
- **Urticaria (rash only)**
- **Anaphylaxis (systemic effect)**
- **Shock (vascular effect)**
- **Angioedema (drug induced)**
- **Aspiration / Airway obstruction**
- **Vasovagal event**
- **Asthma or COPD**
- **CHF**




ADULT MEDICAL

# Anaphylaxis / Allergic Reaction

*** Anaphylaxis Epinephrine Kit should include the following recommended items:**

- **1 – Tuberculin Syringe – 1 mL**
- **2 – 20-22 gauge 1" – 1 ½" needles**
- **2 – Alcohol Prep Pads**
- **1 - Epinephrine Ampule or Vial 1:1,000 = 1 mg/1 mL**

***The Pediatric dosage should match the dose of a Pediatric Epinephrine Auto-Injector (0.15 mg).**

***The Adult dosage should match the dose of an Adult Epinephrine Auto-Injector (0.3 mg).**

*** If Patient has respiratory involvement, consider Albuterol per local Medical Control Option**

*** See Anaphylaxis Emergency Kit Procedures for further details for EMTs and AEMTs**

## 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 to Severe Symptoms.) IM Epinephrine should be administered in priority before or during attempts at IV or IO access.**
- **Anaphylaxis unresponsive to repeat doses of IM epinephrine may require IV epinephrine administration by IV push or epinephrine infusion. Contact Medical Control for appropriate dosing.**
- **Symptom Severity Classification:**
  - **Mild symptoms:**
    - **Flushing, hives, itching, erythema with normal blood pressure and perfusion.**
  - **Moderate to Severe symptoms:**
    - **Flushing, hives, itching, erythema PLUS symptomatic respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with normal blood pressure and perfusion.**
- **Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash / skin involvement.**
- **Typical findings for Angioedema include:**
  - Onset in minutes to hours and spontaneous resolution in hours to a few days
  - Involvement of face, lips, larynx, and bowels
  - Asymmetric distribution
  - Tendency to **not** involve gravitationally-dependent areas
  - Involvement of face, lips, larynx, and bowels
- **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 blood pressure medications(Angiotensin Converting Enzyme Inhibitors (ACE-I)) like Prinivil / Zestril (lisinopril)-typically end with "-il".**
- **Fluids and Medication titrated to maintain a SBP >70 + (age in years x 2) mmHg.**
- **EMT-B may administer Epinephrine IM and may administer from EMS supply.**
  - Agency Medical Director may require contact of medical control prior to administering any medication.
- **EMT-B may administer diphenhydramine by oral route only and may administer from EMS supply**. Agency Medical Director may require contact of medical control prior to EMT-B administering any medication.
- **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 symptoms to contact, the more severe the reaction.
- **Strongly recommend: Contact Medical Control** prior to administering epinephrine in patients who are >50 years of age, have a history of cardiac disease, or if the patient's heart rate is >150. Epinephrine may precipitate cardiac ischemia. These patients should generally receive a 12 lead ECG.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Medications administered
  - ❑ Dose and Concentration of epinephrine administered
  - ❑ Route of Epinephrine Administration
  - ❑ Time of Epinephrine Administration/s
  - ❑ Patient Signs & Symptoms
  - ❑ Vital Signs with Blood Pressure, Pulse Rate, Oxygen Saturations BEFORE and AFTER Epinephrine Administration
  - ❑ Airway management interventions

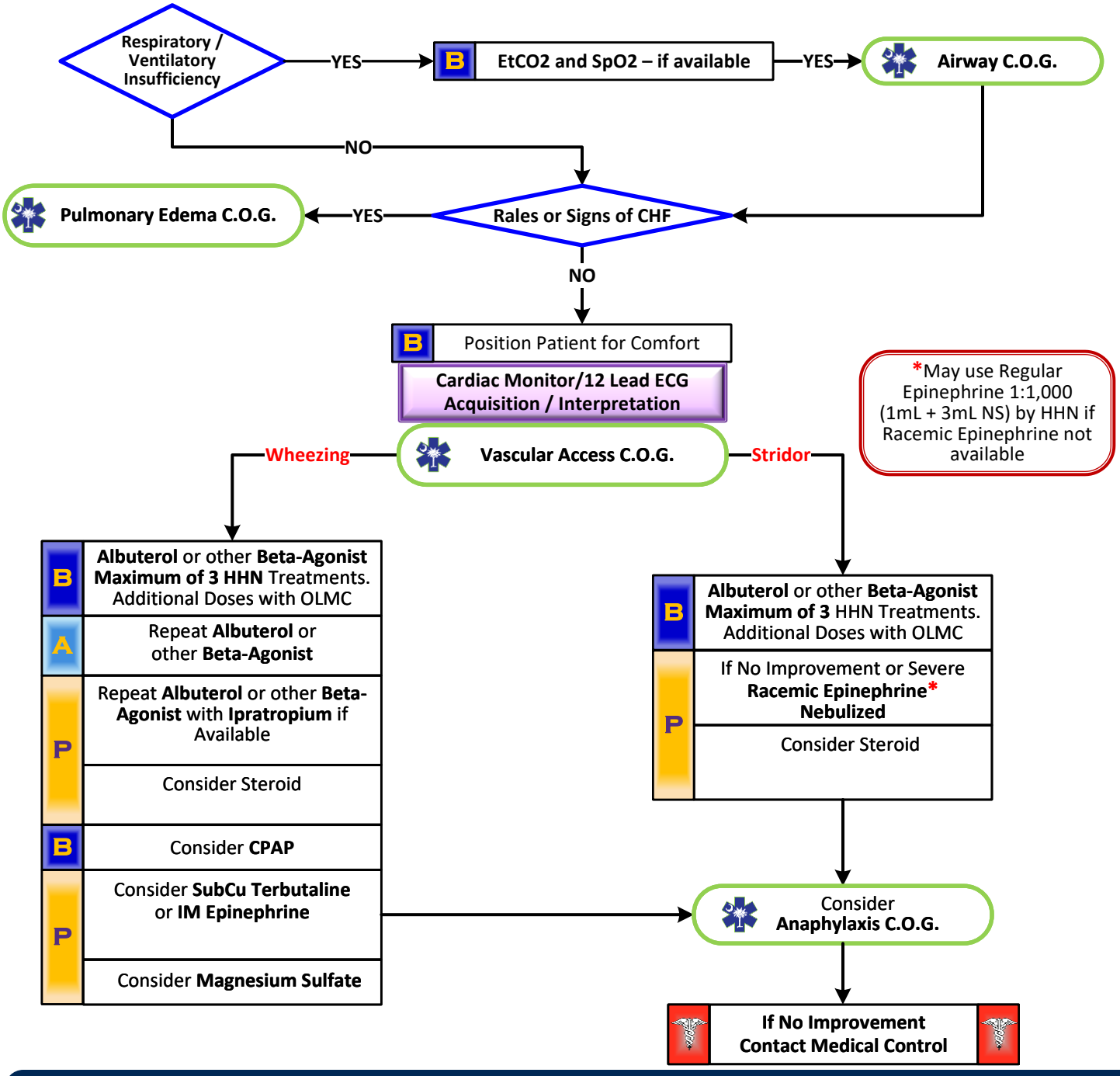
ADULT MEDICAL

# Respiratory Distress

**History**
- Asthma; COPD – chronic bronchitis, emphysema, congestive heart failure
- Home treatment (oxygen, nebulizer)
- Medications (theophylline, steroids, inhalers, Digoxin, Lasix, Bumex, Viagra, Sildenafil, Levitra/vardenafil, Cialis/tadalafil)
- 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

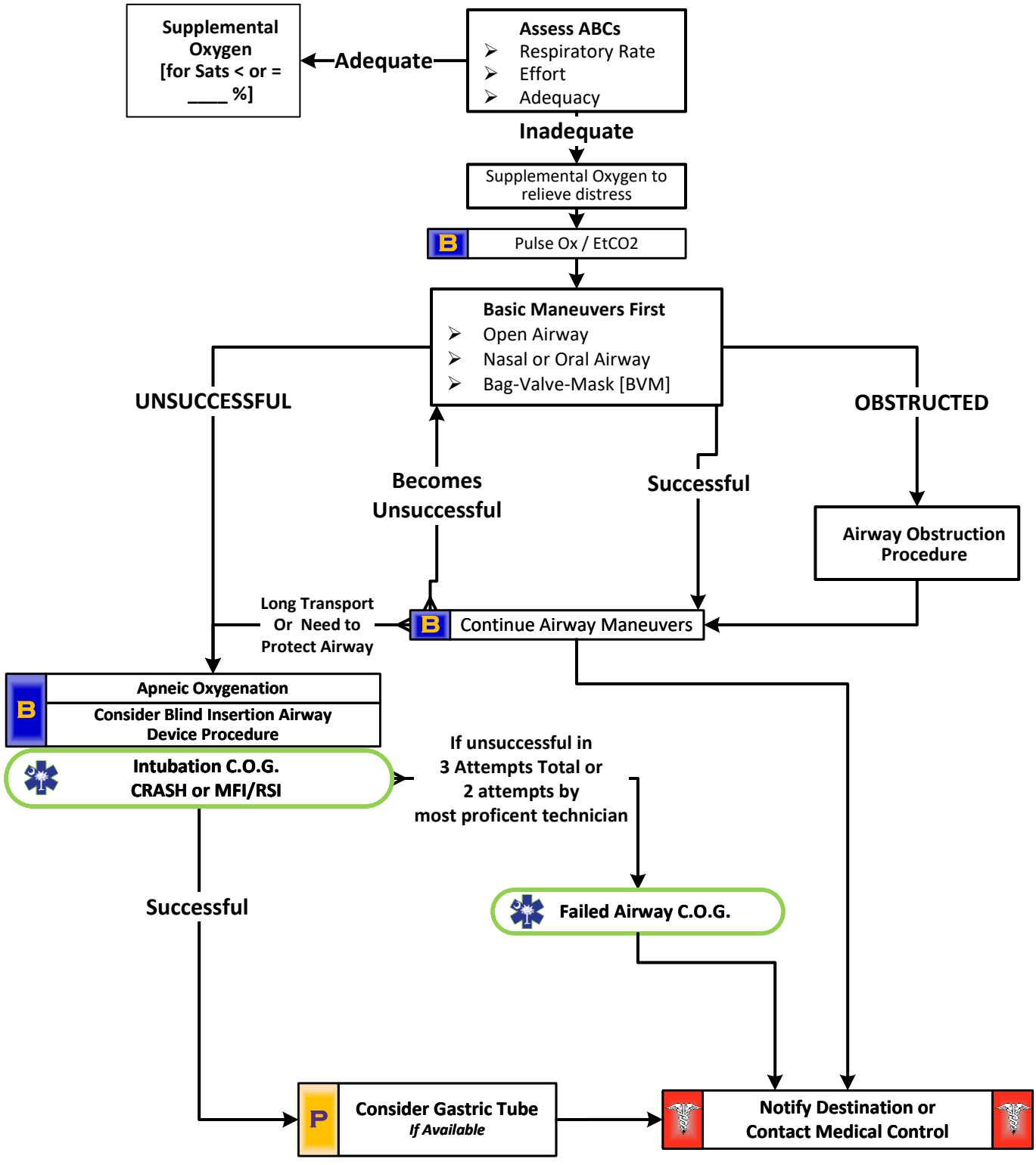
# Respiratory Distress



**PEARLS**

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- This COG includes all patients with respiratory distress, COPD, Asthma, Reactive Airway Disease, or Bronchospasm. Patients may also have wheezing and respiratory distress with viral upper respiratory tract infections and pneumonia.
- **A silent chest in respiratory distress is a pre-respiratory arrest sign.**
- **Combination nebulizers containing albuterol and ipratropium:**
  - Patients may receive up to 3 combination nebulizer treatments.
  - Following 3 combination nebulizers, it is acceptable to continue albuterol solely with subsequent treatments as there is no proven benefit to continual use of ipratropium.
- **Epinephrine:**
  - If severe allergic reaction or anaphylaxis is suspected, give immediately and repeat until improvement.
  - If allergic reaction is not suspected, administer with impending respiratory failure and no improvement.
  - May use Regular Epinephrine 1:1,000 if Racemic Epinephrine not available (Admixture: 1 mL + 3mL NS).
- Consider Magnesium Sulfate with impending respiratory failure and no improvement.
- Pulse oximetry should be monitored continuously if there is indication of respiratory distress or there is a decline in patients status despite normal pulse oximetry readings
- Consider End-tidal CO2 monitoring if available.
- **CPAP or Non-Invasive Positive Pressure Ventilation:**
  - May be used with COPD, Asthma, Allergic reactions, and CHF.
  - Consider early in treatment course.
  - Consider removal if SBP remains < 100 mmHg and not responding to other treatments.
- Pulmonary edema may present with wheezing as well as rales and rhonchi. Consider CHF/Pulmonary Edema protocol if not improving with respiratory treatments.
- **Strongly Recommend: Contact Medical Control** prior to administering epinephrine in patients who are > 50 years of age, have a history of cardiac disease, or if the patient's heart rate is >150. Epinephrine may precipitate cardiac ischemia. A 12-lead ECG should generally be performed on these patients.
- **Realtime Waveform Capnography is:**
  - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
  - **Strongly Recommended /Strongly Encouraged for all unstable patients**
  - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Initial key aspects of the physical examination and after each intervention.
  - ❑ Respiratory Rate
  - ❑ Oxygen Saturation
  - ❑ EtCO2 / Waveform shape
  - ❑ Endotracheal Tube Depth as marked at the Incisors or Lips. (If intubated.)
  - ❑ Breath Sounds and Quality
  - ❑ Use of Accessory Muscles
  - ❑ Mental Status
  - ❑ Response to Interventions

# Airway, Adult (General)




ADULT RESPIRATORY

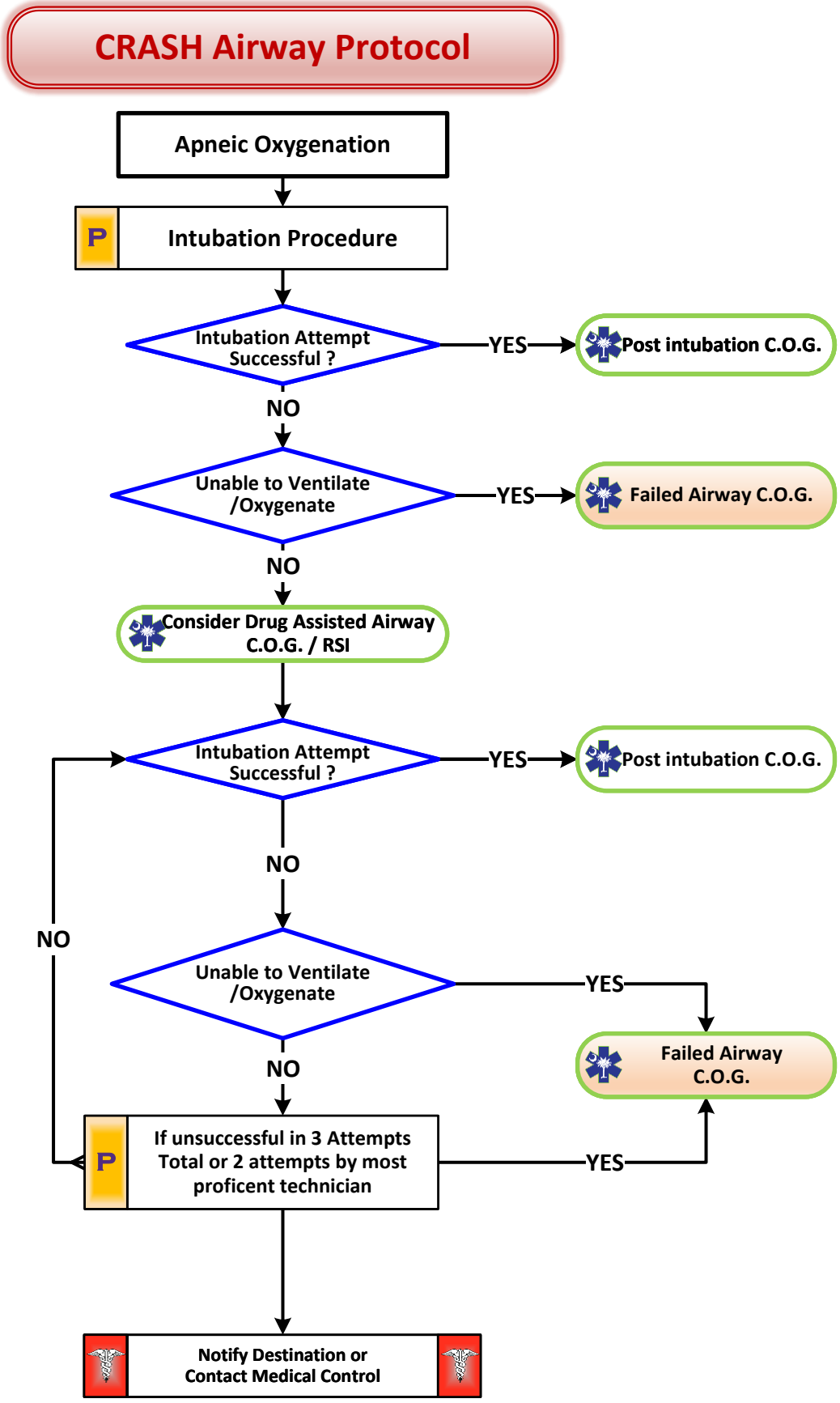
# Airway, Adult (General)



**PEARLS**

- **This protocol is only for use in ADULT patients.**
- **Capnometry (Color) or capnography is mandatory with all methods of intubation. Document results.**
- **Realtime Waveform Capnography is:**
  - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
  - **Strongly Recommended / Strongly Encouraged for all unstable patients**
  - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of > 95 % , it is acceptable to continue with basic airway measures instead of using a BIAD or Intubation.**
- **For the purposes of this protocol an adequate airway is when the patient is receiving appropriate oxygenation and ventilation – and not at an undue risk of aspiration or deterioration**
- **An Intubation Attempt is defined as passing the laryngoscope blade or endotracheal tube past the teeth or inserted into the nasal passage.**
- **Ventilatory rate should be sufficient to maintain a EtCO2 of 35-45. Avoid hyperventilation.**
- **It is strongly encouraged to complete an Airway Evaluation Form with any BIAD or Intubation procedure.**
- Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- Maintain C-spine motion restriction for patients with suspected spinal injury.
- Do not assume hyperventilation is psychogenic - use oxygen, not a paper bag.
- **BURP** maneuver may be used to assist with difficult intubations.
- Hyperventilation in deteriorating head trauma should only be done to maintain a EtCO2 of 30-35. Procedure may worsen outcome in some cases.
- Gastric tube placement should be considered in all intubated patients if available.
- It is important to secure the endotracheal tube well and consider c-collar to better maintain ETT placement.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Vital Signs and Appropriate Physical Examination
  - ❑ Efforts to maintain/improve airway
  - ❑ Indications for Advanced Airway Management
  - ❑ Occurrence of peri-intubation or post cricothyrotomy hypoxia (< 90% SpO2); bradycardia, hypotension, or cardiac arrest
    - ❑ **Peri-intubation / Cricothyrotomy period encompasses the time from administration of any sedative/paralyzing agent up to 10 minutes after the final airway procedure has been terminated.**
  - ❑ Post-intubation with advanced airway, EtCO2 value and capnograph should be documented immediately after airway placement, with each patient movement (e.g., into and out of ambulance), **and** at the time of patient transfer in the ED
  - ❑ Documentation of ALL attempts at intubation based upon definition.
  - ❑ Documentation of all times – including:
  - ❑ Initial Assessment
  - ❑ Drug Administration
  - ❑ Time of Advanced Airway Attempts
  - ❑ Time of Cricothyrotomy
  - ❑ Contact with Receiving Facility

# CRASH Airway




ADULT RESPIRATORY

# CRASH Airway

# Airway
## Drug Assisted Airway Management (DAAM)

**Indications for DAAM / MFI / RSI**
Failure to protect the airway
Unable to oxygenate
Unable to ventilate
Impending airway compromise

**DAAM: Drug Assisted Airway Management**
DSI: Delayed Sequence Intubation
MFI: Medication Facilitated Intubation
RSI: Rapid Sequence Intubation

B Preoxygenate 100% O2
A Manage Hypotension
Vascular Access C.O.G.

P **Assemble:**
Airway Equipment
Suction Equipment
Alternative Airway Device/s

**Dangerously Combative**

NO

B Apneic Oxygenation
P Etomidate 0.3 mg/kg IV / IO
or
Ketamine 2 mg/kg
IV / IO
May repeat x 1
Consider 3 minute pause to optimize oxygenation as indicated

RSI
DSI

P **Succinylcholine 1.5 mg / kg**
**IV/ IO**
**or**
**Rocuronium 1 mg / kg**
**(range 0.6-1.2 mg/kg)**
**IV / IO**
**May repeat x 1**

MFI

YES

RSI
P **Ketamine 4 mg/kg IM**
Consider 3 minute pause to optimize oxygenation as indicated
DSI
MFI

P **Intubation Procedure**
Verify Endotracheal Tube Placement
Long Acting Sedation: Benzodiazepine/Opiate/Ketamine

If unsuccessful in 3 Attempts Total or 2 attempts by most proficent technician → Adult Failed Airway C.O.G.

B Consider Restraints [Physical] Procedure
P Consider Gastric Tube Insertion Procedure

**Awakening or Moving After Intubation**

NO → Notify Destination or Contact Medical Control

YES

P Consider **Increased Sedation**
Consider **Long Acting Paralytic**

**At any point in this protocol where the patient is able to be intubated – intubation may proceed.**
**If paralytics omitted continue to follow MFI protocol.**

**Procedure will remove patient's protective airway reflexes and ability to ventilate.**

**You must be confident of your ability to obtain/ maintain ventilation before beginning this procedure.**

ADULT RESPIRATORY

# Airway

## Drug Assisted Airway Management (DAAM)

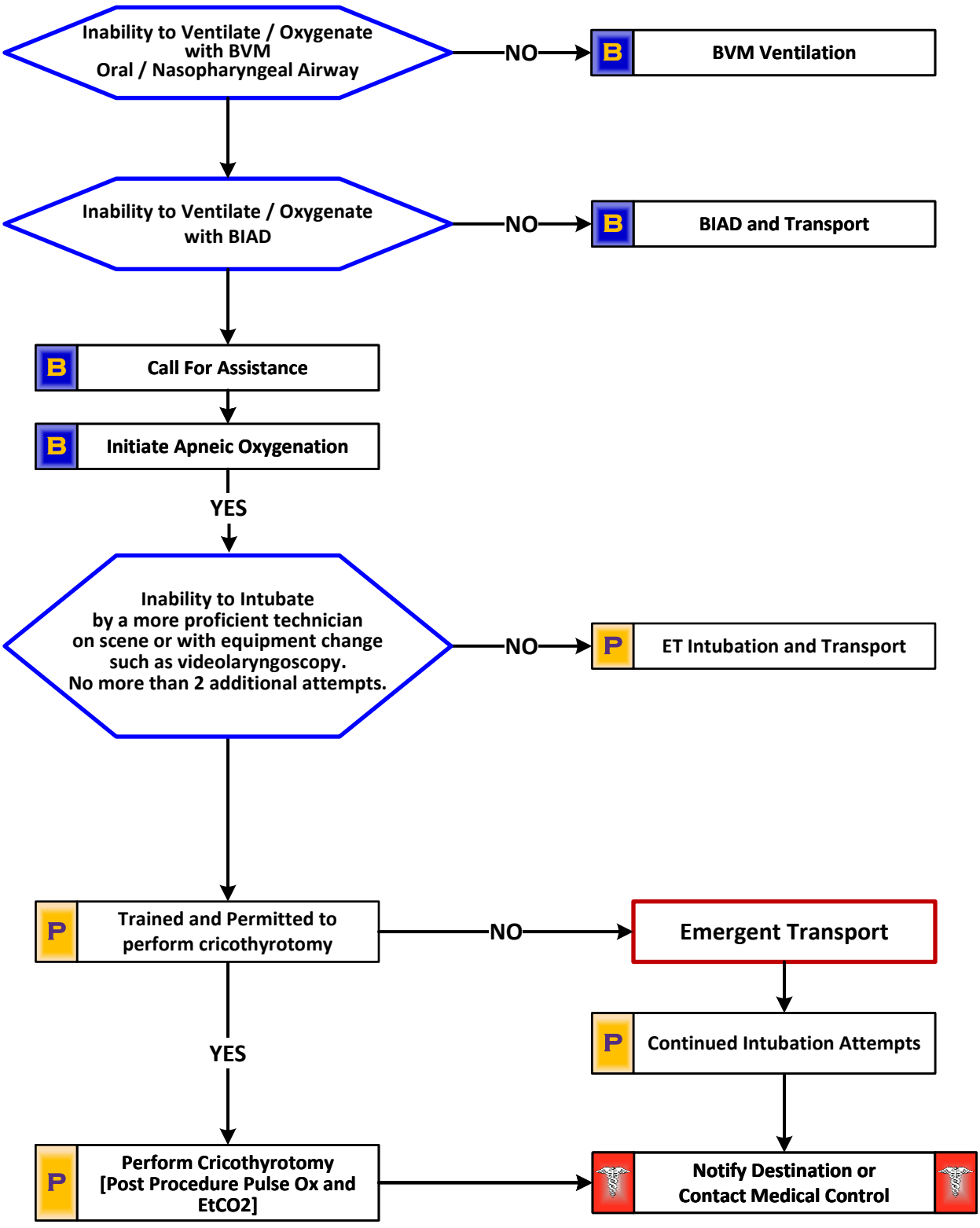
ADULT RESPIRATORY

### PEARLS

- **Agencies must maintain a separate Performance Improvement Program specific to Medication Facilitated and/or Rapid Sequence Intubation. 100% QA is required for all patients undergoing Drug Assisted Airway Management – DSI / MFI / RSI.**
- **This procedure requires at least 1 Paramedic and a second credentialed/licensed medical provider. Divide the workload – ventilate, suction, cricoid pressure, drugs, intubation.**
- **Patients with hypoxia and/or hypotension are at risk of cardiac arrest when a sedative and paralytic medication are administered. Hypoxia and hypotension require resuscitation and correction prior to use of these combined agents.**
- **This protocol is only for use in ADULT (non-pediatric) patients.**
- **Before administering any paralytic drug, screen for contraindications with a thorough history and neurologic exam.**
- **Realtime Waveform Capnography is:**
  - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
  - **Strongly Recommended / Strongly Encouraged for all unstable patients**
  - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- Consider Videolaryngoscopy on 1st attempt if available.
- **If First intubation attempt fails, make an adjustment and try again:**
  - Different laryngoscope blade
  - Change cricoid pressure; No longer routinely recommended and may worsen your view.
  - Different ETT size
  - Change head positioning - align external auditory canal with sternal notch / proper positioning if not contraindicated.
  - 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.
- RSI not recommended in urban setting (short transport) when able to maintain oxygen saturation ≥ _____ %.
- RSI is a well studied intervention that may reduce morbidity in patients requiring intubation but DSI may be indicated in patients who are hypoxic and resistive to correction prior to sedation and in who it is presumed the hypoxia can be corrected by non-invasive measures after sedation.
- Consider Naso or orogastric tube placement in all intubated patients to limit aspiration and decompress stomach if needed.
- **KEY DOCUMENTATION POINTS:**
  - ❑ Vital Signs and Appropriate Physical Examination
  - ❑ Efforts to maintain/improve airway
  - ❑ Indications for Advanced Airway Management
  - ❑ Occurrence of peri-intubation or post cricothyrotomy hypoxia (< 90% SpO2); bradycardia, hypotension, or cardiac arrest
    - ❑ **Peri-intubation / Cricothyrotomy period encompasses the time from administration of any sedative/paralyzing agent up to 10 minutes after the final airway procedure has been terminated.**
  - ❑ Post-intubation with advanced airway, EtCO2 value and capnograph should be documented immediately after airway placement, with each patient movement (e.g., into and out of ambulance), **and** at the time of patient transfer in the ED
  - ❑ Documentation of ALL attempts at intubation based upon definition.
  - ❑ Documentation of all times – including:
    - ❑ Initial Assessment
    - ❑ Drug Administration
    - ❑ Time of Advanced Airway Attempts
    - ❑ Time of Cricothyrotomy
    - ❑ Time of Successful Airway Placement
    - ❑ Contact with Receiving Facility

# Airway, Adult - Failed

Two (2) failed intubation attempts by most proficient technician on scene or anatomy inconsistent with intubation attempts. NO MORE THAN THREE (3) ATTEMPTS TOTAL




ADULT RESPIRATORY

# Airway, Adult - Failed



**PEARLS**

- EMS airway management must focus on rapid assessment and simultaneous interventions
- Optimize oxygenation and ventilation
- Minimize complications – either natural (aspiration) or iatrogenic (improper placement of device)
- Generally – the least invasive – and least time consuming method that achieves the goal of care is the desired path.
- If the patient can adequately oxygenate and ventilate on their own – then there is time for a more thorough evaluation and plan for course of action. Consider:
  - Improving positioning
  - Additional IV access
  - Better lighting
  - More assistance (personnel)
- Always have a back up plan – and back up equipment. Including a plan for failed airway immediately accessible.
- If a difficult airway is suspected (and potentially then a Failed Airway scenario) – call for additional assistance. It is unlikely that there will be too many assistants.

❖ **CRASH** Airway Management is indicated for:

- Full cardiac and/or Respiratory Arrest
- Agonal cardiorespiratory activity
- Ineffective respirations
- Pulseless rhythms (excepting patients with LVADs)

- If the patient appears to be lower risk for Difficult Airway – but needs a secure/managed airway – then move to intubation – with RSI being the preferred option.

❖ **Failed airway Protocol** is appropriate in situations where:

- There have been 3 unsuccessful attempts to intubate or 2 by the most proficient technician.
- Can't Intubate – Can't Oxygenate

- **Cricothyrotomy remains the final common pathway if other measures are unsuccessful or if the oxygenation status becomes untenable.**
- **Realtime Waveform Capnography is:**
  - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
  - **Strongly Recommended /Strongly Encouraged for all unstable patients**
  - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Vital Signs and Appropriate Physical Examination
  - ❑ Efforts to maintain/improve airway
  - ❑ Indications for Advanced Airway Management
  - ❑ Occurrence of peri-intubation or post cricothyrotomy hypoxia (< 90% SpO2); bradycardia, hypotension, or cardiac arrest
    - ❑ **Peri-intubation / Cricothyrotomy period** encompasses the time from administration of any sedative/paralyzing agent up to 10 minutes after the final airway procedure has been terminated.
  - ❑ Post-intubation with advanced airway, EtCO2 value and capnograph should be documented immediately after airway placement, with each patient movement (e.g., into and out of ambulance), and at the time of patient transfer in the ED
  - ❑ Documentation of ALL attempts at intubation based upon definition.
  - ❑ Documentation of all times – including:
    - ❑ Initial Assessment
    - ❑ Drug Administration
    - ❑ Time of Advanced Airway Attempts
    - ❑ Time of Cricothyrotomy
    - ❑ Time of Successful Airway Placement
    - ❑ Contact with Receiving Facility
  - ❑ Completion of Airway Management Form

# Post Intubation Management

**Successful Placement of Endotracheal Tube**

**P**
- Inflate ET cuff
- Confirm Bilateral Breath Sounds
- Document Tube Depth (from Incisors)
- Secure ET Tube

**B**
- Ventilation and Supplemental Oxygenation Manual or Mechanical
- Determine Continuous Waveform EtCO2 & Continuous SpO2 And Document
- Repeat Vital Signs ↔ Age Appropriate **Hypotension C.O.G.** **(as indicated)**

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

**P**
- Sedation & Analgesia *(as indicated)*
- Consider NG or OG Tube Placement

**P**
- Consider additional Paralytics (as indicated/necessary)
  - ❖ Ensure adequate Sedation & Analgesia prior to use of Paralytics.
  - ❖ Monitor to maintain adequate Sedation & Analgesia with Paralytics

**P**
- **Reconfirm Tube Placement after ANY movement of Patient**
  - ➢ Ground to Stretcher
  - ➢ Scene to Ambulance
  - ➢ Ambulance to Ground
  - ➢ Ambulance to ED
  - ➢ Stretcher to ED bed

**Notify Destination or Contact Medical Control**

ADULT RESPIRATORY

# Post Intubation Management

**PEARLS:**

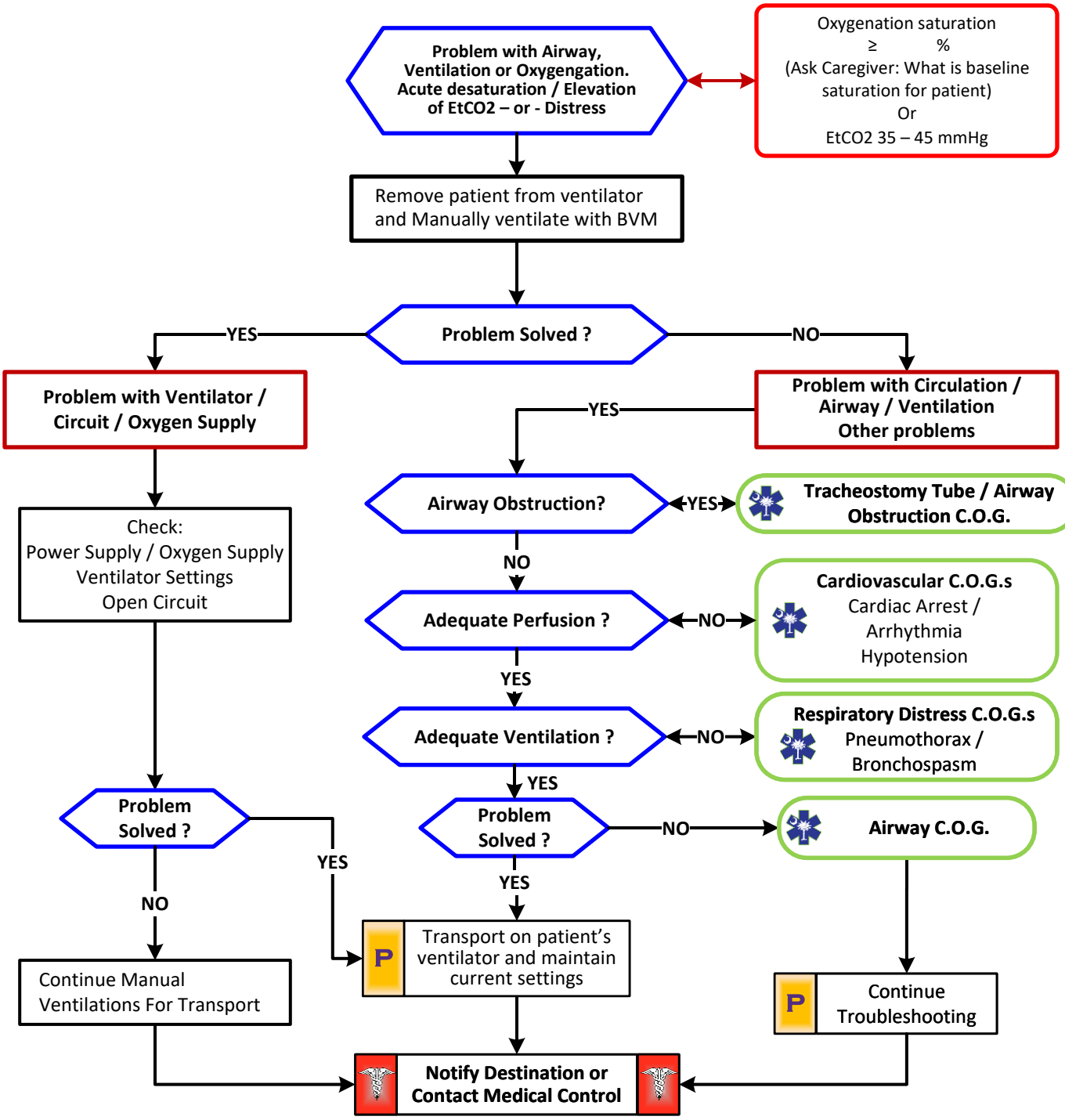
- **All intubated patients must have continuous waveform capnography and continuous SpO2 monitoring.**
- All intubated patients should be placed on EKG monitoring
- **For all intubated patients:**
  - Note tube size
  - Note depth of tube placement at the incisors
  - Confirm bilateral breath sounds
  - Confirm placement with EtCO2
  - Recheck vital signs immediately following intubation
  - Recheck pupillary response following intubation
  - Note number of attempts to intubate and performing clinician
- **Reconfirm Tube Placement after ANY movement of Patient (whether intubated by Paramedic – or intubated at other facility prior to transport)**
  - Ground to Stretcher; Scene to Ambulance
  - Ambulance to Ground; Ambulance to ED; Stretcher to ED bed
  - Hospital bed to stretcher; Hospital to Ambulance loading
- Post-Intubation maintain appropriate sedation and analgesia
- Document all ventilator settings
- Document any periods of hypoxemia, bradycardia, or hypotension.
- **Key Documentation Points:**
  - ❑ Vital Signs and Appropriate Physical Examination – to include Breath Sounds before and after Intubation.
  - ❑ Efforts to maintain/improve airway
  - ❑ Indications for Advanced Airway Management
  - ❑ Occurrence of peri-intubation or post cricothyrotomy hypoxia (< 90% SpO2); bradycardia, hypotension, or cardiac arrest
    - ❑ **Peri-intubation / Cricothyrotomy period** encompasses the time from administration of any sedative/ paralyzing agent up to 10 minutes after the final airway procedure has been terminated.
  - ❑ Post-intubation with advanced airway: EtCO2 value and capnograph should be documented immediately after airway placement, with each patient movement (e.g., into and out of ambulance), and at the time of patient transfer in the ED
  - ❑ Documentation of ALL attempts at intubation based upon definition.
  - ❑ Completion of Airway Management Form
  - ❑ Documentation of all times – including:
    - ❑ Initial Assessment
    - ❑ Drug Administration
    - ❑ Time of Advanced Airway Attempts
    - ❑ Time of Cricothyrotomy
    - ❑ Time of Successful Airway Placement
    - ❑ Contact with Receiving Facility

# Emergencies Involving Ventilators

**History**
- 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)

**Signs and Symptoms**
- Transport requiring maintenance of a mechanical ventilator
- Power or equipment failure at residence

**Differential**
- Disruption of oxygen source
- Dislodged or obstructed tracheostomy tube
- Detached or disrupted ventilator circuit
- Cardiac arrest
- Increased oxygen requirement / demand
- Ventilator failure




ADULT RESPIRATORY

# Emergencies Involving Ventilators



## PEARLS

- **Always talk to family / caregivers as they have specific knowledge and skills.**
- **If using the patient's ventilator – bring caregiver knowledgeable in ventilator operation during transport.**
- 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.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Vital Signs with SpO2 and EtCO2
  - ❑ Determination of Problem if Identified
  - ❑ All Interventions and response to interventions

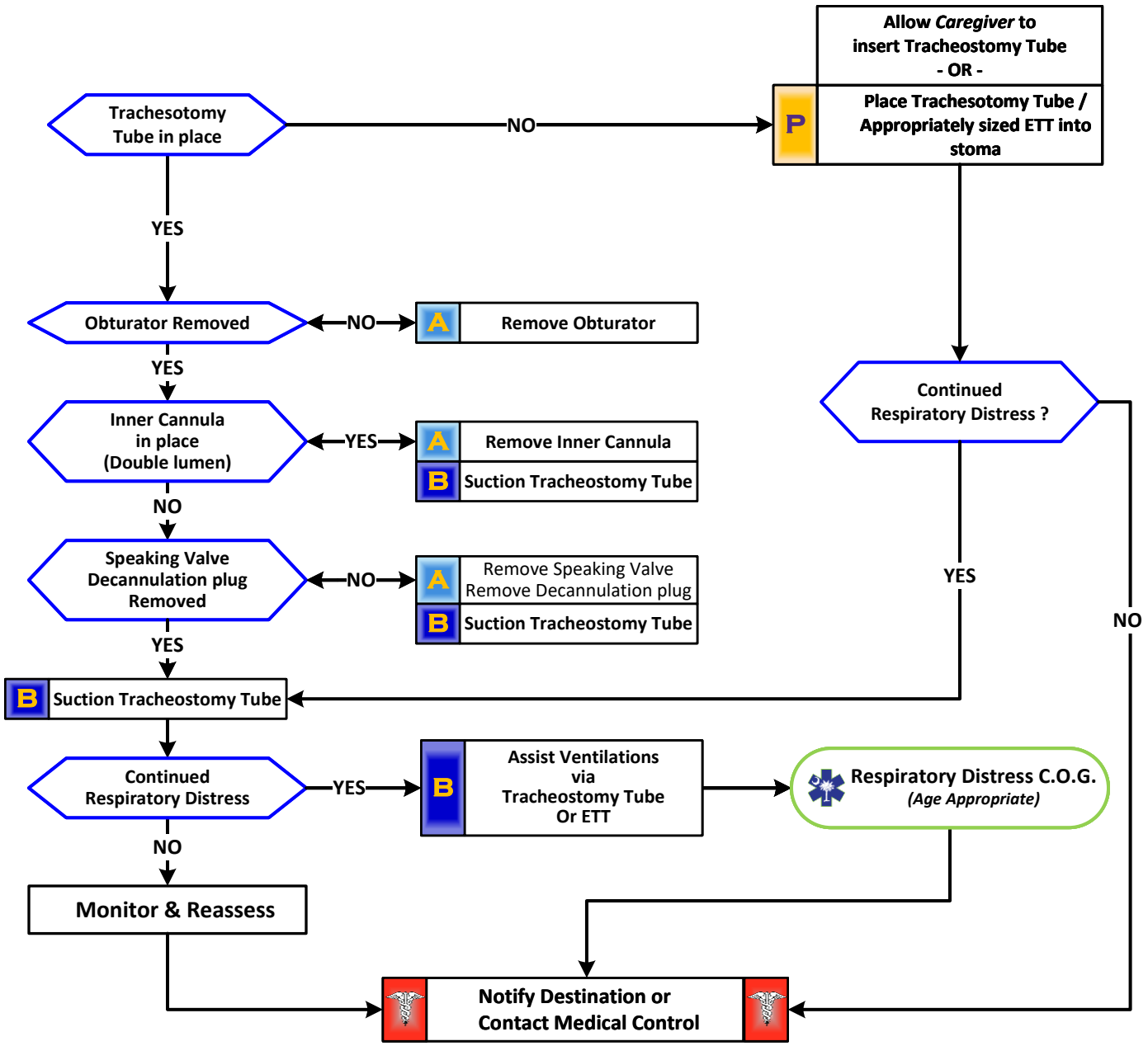
# Respiratory Distress
## With a Tracheostomy Tube

**History**
- 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)

**Signs and Symptoms**
- 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

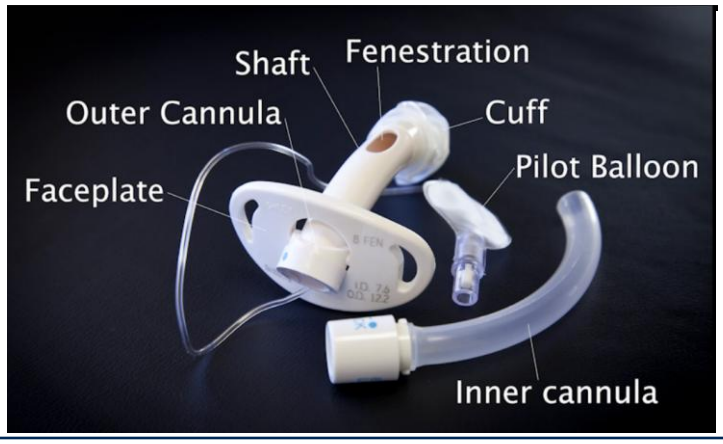
**Differential**
- Allergic reaction
- Asthma
- Aspiration
- Septicemia
- Foreign body
- Mucous Plug
- Infection
- Congenital heart disease
- Medication or toxin
- Trauma

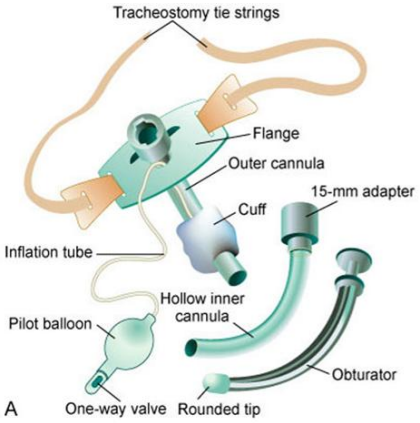
- **If Tracheostomy Tube unable to be Cleared and Patient is in extremis – Remove Tracheostomy Tube.**
- **EMERGENT SUCTIONING of Tracheostomy Tube may be performed by ALL Levels (when patient is unable to breathe adequately).**




ADULT RESPIRATORY

# Respiratory Distress
## With a Tracheostomy Tube




ADULT RESPIRATORY

**PEARLS**

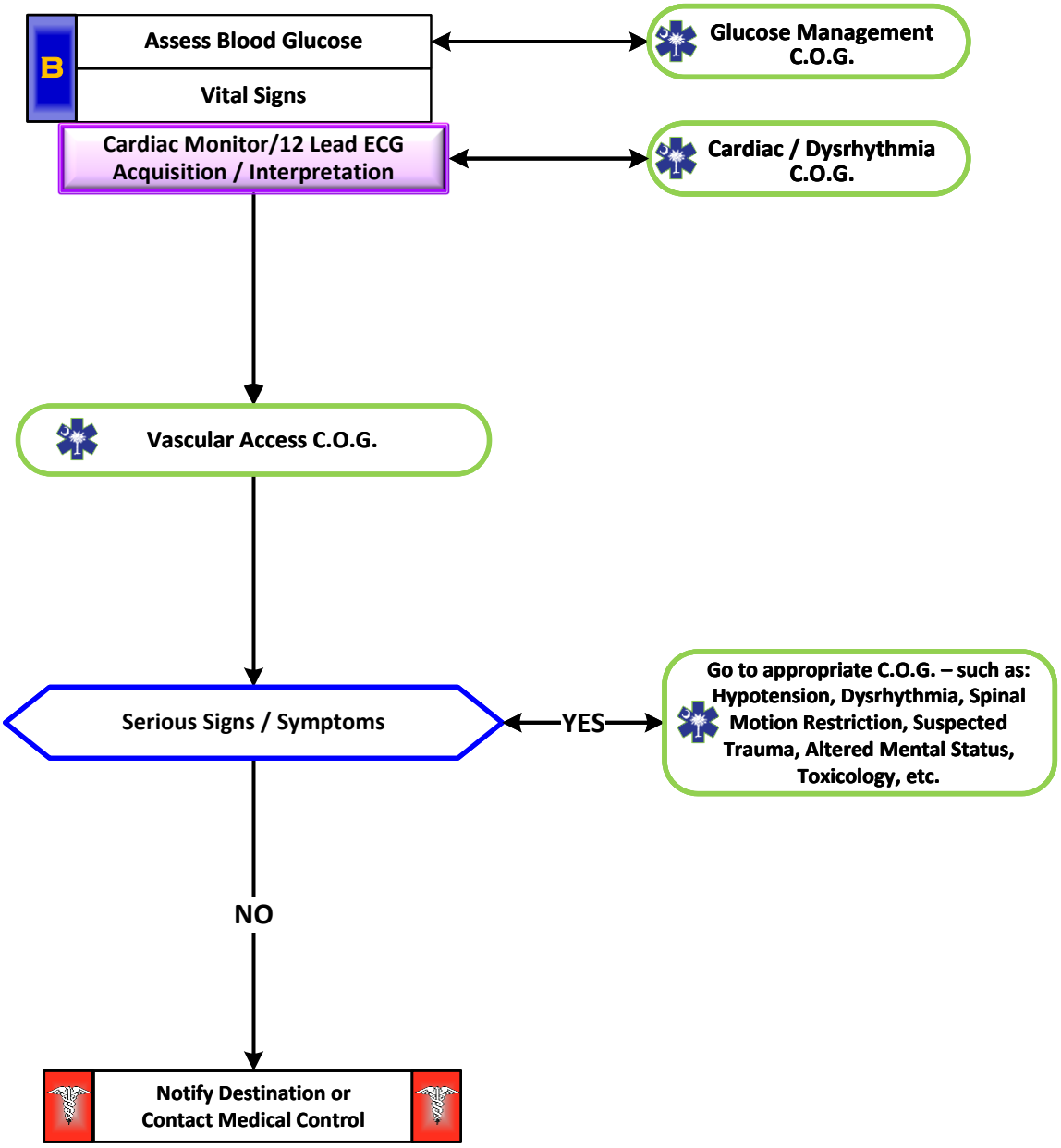
- **Always talk to family / caregivers as they have specific knowledge and skills.**
- **If Tracheostomy Tube unable to be Cleared and Patient is *in extremis* – Remove Tracheostomy Tube.**
- **EMERGENT SUCTIONING of Tracheostomy Tube may be performed by ALL Levels (when patient is unable to breathe adequately).**
- Use patients 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.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Findings on Arrival
  - ❑ Manipulations of Tracheostomy Tube – detailed.
  - ❑ Initial Vital Signs and Physical Examination
  - ❑ Interventions attempted including the method of airway intervention, the size of the equipment used, and the number of attempts to achieve successful result
  - ❑ Indications for advanced airway management
  - ❑ Subsequent/Repeat Vital Signs and Physical Examination following interventions
  - ❑ Occurrence of hypoxia (< 90% SpO2) at anytime, bradycardia (age based), hypotension, or cardiac or respiratory arrest.
  - ❑ Post manipulation EtCO2 and continuous waveform capnography
  - ❑ If patient is not transported – documentation as to reason for non-transport, patient safety determination, and signature of party accepting non-transport.

# Syncope

**History**
- Cardiac history, stroke, seizure
- Prodrome or Sudden
- Circumstances
- Occult blood loss (GI, ectopic)
- Females: LMP, vaginal bleeding
- Fluid loss: nausea, vomiting, diarrhea
- Past medical history
- Medications

**Signs and Symptoms**
- Loss of consciousness with recovery
- Lightheadedness, dizziness
- Palpitations, slow or rapid pulse
- Pulse irregularity
- Decreased blood pressure
- Consider Post-Ictal State
- Chest Pain
- Dyspnea
- Diaphoresis
- Trauma from fall

**Differential**
- Vasovagal
- Orthostatic hypotension
- Cardiac syncope
- Micturation / Defecation syncope
- Psychiatric
- Stroke
- Hypoglycemia
- Seizure
- Shock (see Shock Protocol)
- Toxicologic (Alcohol)
- Medication effect (hypotension)
- AAA
- PE




ADULT CARDIOVASCULAR

# Syncope



## PEARLS

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro, Skin.**
- Syncope is both loss of consciousness and loss of postural tone. Symptoms preceding the event are important in determining etiology.
- Syncope often is due to a benign process but can be an indication of serious underlying disease in both the adult and pediatric patient.
- Often patients with syncope are found normal on EMS evaluation. In general patients experiencing syncope require cardiac monitoring and emergency department evaluation.
- Abdominal / back 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, with or without back and / or lower extremity pain or diminished pulses, especially in patients over 50 and / or patients with shock/ poor perfusion. Notify receiving facility early with suspected abdominal aneurysm.
- Consider cardiac etiology in patients > 50, diabetics and / or women especially with upper abdominal complaints.
- Heart Rate: One of the first clinical signs of dehydration - 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.
- Syncope with no preceding symptoms or event may be associated with dysrhythmia.
- Assess for signs and symptoms of trauma if associated or questionable fall with syncope.
- Consider dysrhythmias, GI bleed, ectopic pregnancy, and seizure as possible causes of syncope.
- These patients should be transported. Patients who experience syncope associated with headache, neck pain, chest pain, abdominal pain, back pain, dyspnea, or dyspnea on exertion need prompt medical evaluation.
- More than 25% of geriatric syncope is cardiac dysrhythmia based.
- Differential should remain wide and include:

| | | | |
|---|---|---|---|
| Cardiac dysrhythmia | Neurological problem | Choking | Seizure |
| Pulmonary embolism | Hemorrhage | Stroke | Sepsis |
| Respiratory | Hypo or Hyperglycemia | GI Hemorrhage | |

- High-risk patients:

| | | |
|---|---|---|
| Age > 60 | Syncope with exertion | History of CHF |
| Syncope with chest pain | Abnormal ECG | Syncope with dyspnea |

- Age specific blood pressure

| | |
|---|---|
| 0 – 28 days > 60 mmHg | 1 month - 1 year > 70 mmHg |
| 1 - 10 years > 70 + (2 x age) mmHg | 11 years and older > 90 mmHg |

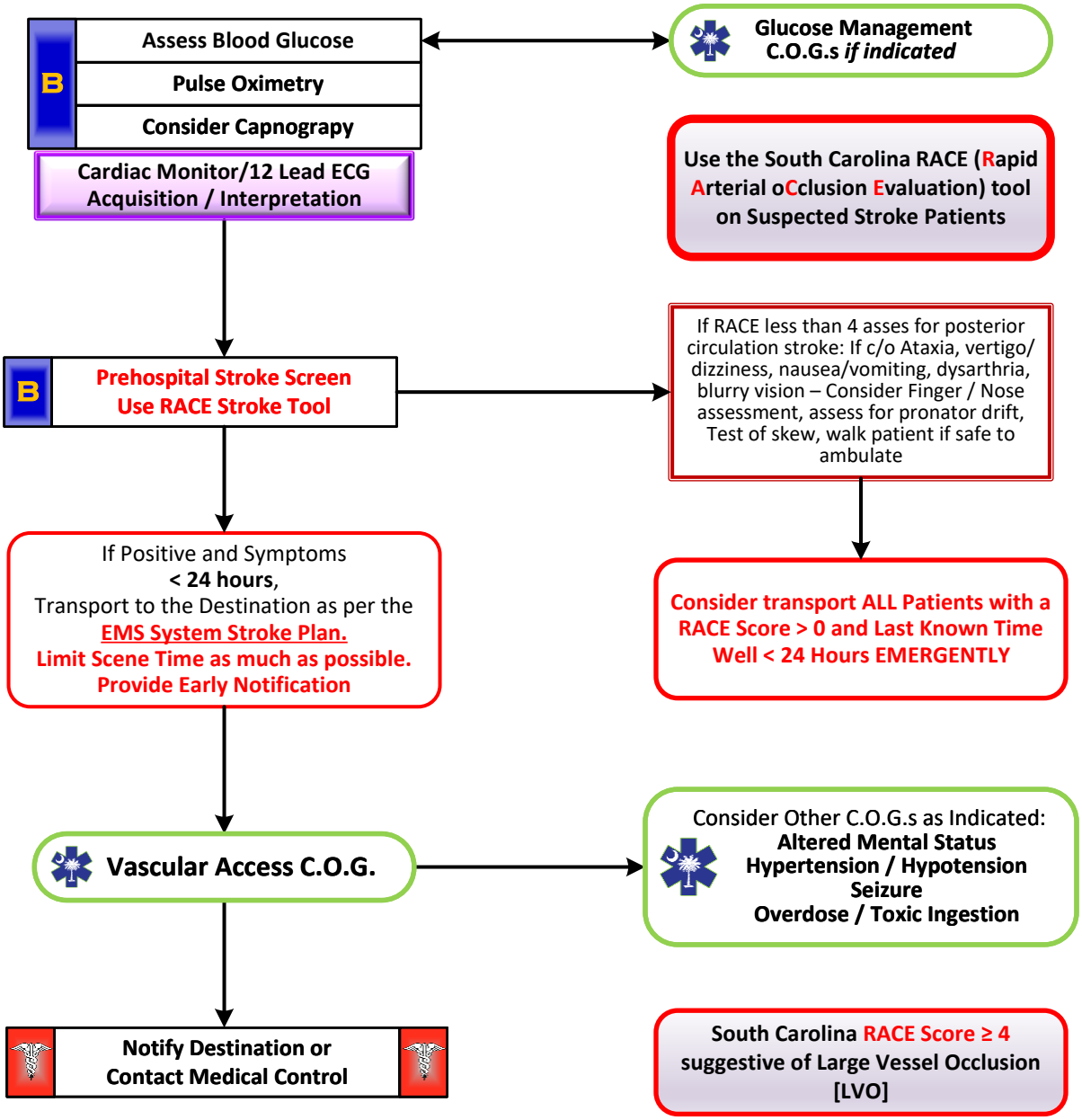
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Presenting Cardiac Rhythm (include ALL EKG Strips)
  - ❑ Cardiac Rhythm present when patient is symptomatic (include ALL EKG Strips)
  - ❑ Any Cardiac Rhythm Changes (include ALL EKG Strips)
  - ❑ Blood Pressure, Pulse, Respiratory Rate, SpO2
  - ❑ Blood Glucose Level
  - ❑ Symptoms immediately preceeding event
  - ❑ Patient status on EMS Arrival – recovered or still symptomatic

# Suspected Stroke

**History**
- Prior Stroke / TIA
- Previous cardiac / vascular surgery
- Associated diseases: diabetes, hypertension, 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
- Posterior Circulation
  - Loss of Balance
  - Loss of Coordination
  - Difficulty Walking
- Vomiting
- Headache
- Seizures
- Respiratory pattern change
- Hypertension / hypotension

**Differential**
- See Altered Mental Status
- TIA (Transient ischemic attack)
- Seizure
- Hypoglycemia
- Tumor
- Trauma




ADULT CARDIOVASCULAR

# Suspected Stroke



**PEARLS**

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **RACE is based on Acute Non-Traumatic Symptoms ONLY.**
- **ALL RACE SCORES > 0 are indicative of Stroke.**
- **RACE SCORE ≥ 4 is INDICATIVE of Large Vessel Occlusion (LVO) Stroke that may benefit from interventional procedures.**
- **The Reperfusion Checklist should be completed for any suspected stroke patient. With a duration of symptoms of less than 24 hours, scene times should be limited to 10 minutes, early destination notification/activation should be provided and transport times should be minimized based on the EMS System Stroke Plan.**
- **Onset of symptoms** is defined as the last witnessed time the patient was symptom free (i.e. awakening with stroke symptoms would be defined as an onset time of the previous night when patient was symptom free)
- The differential listed on the Altered Mental Status Protocol should also be considered.
- Consider the possibility of Posterior Circulation Stroke – Particularly in younger patients.
- If RACE less than 4 assess for posterior circulation stroke: If c/o Ataxia, vertigo/dizziness, nausea/vomiting, dysarthria, blurry vision – Consider Finger / Nose assessment, assess for pronator drift, Test of skew, walk patient if safe to ambulate
- Maintain Head of Bed elevation at 15 – 30 degrees.
- Elevated blood pressure is commonly present with stroke. Consider treatment per Hypertensive Protocol.
- Be alert for airway problems (swallowing difficulty, vomiting/aspiration).
- Hypoglycemia can present as a localized neurologic deficit.
- Document the Stroke Screen results in the ePCR.
- Document the 12 Lead ECG as a procedure in the ePCR.
- **KEY DOCUMENTATION ELEMENTS**
  - ❑ "Last known well" must be specific
  - ❑ If the patient was last known well prior to bedtime the night before, that time is the time to be documented (not time the patient woke up with symptoms present)
  - ❑ Blood glucose results
  - ❑ Specific validated stroke scale used and findings
  - ❑ *** R.A.C.E Scoring is mandatory for South Carolina EMS for Suspected Stroke Patients**
  - ❑ Time of notification to receiving hospital
- **KEY PERFORMANCE MEASURES**
  - ❑ Documentation of time "last known well"
  - ❑ Use of validated stroke scale
  - ❑ Blood glucose level obtained
  - ❑ Minimize EMS scene time
  - ❑ Hospital stroke team pre-arrival alert or activation occurred as early as possible after positive stroke assessment finding

# Suspected Stroke
## R. A. C. E. Score

### SC EMS R. A. C. E. Stroke Scale
**R**apid **A**rterial o**C**clusion **E**valuation Scale

| ITEM | Instruction | RESULT | SCORE |
|---|---|---|---|
| Facial Palsy | Ask Patient to show their teeth (Smile) | **Absent:** Symmetrical movement | **0** |
| | | **Mild:** Slightly Assymetrical | **1** |
| | | **Moderate To Severe:** Completely Assymetrical | **2** |
| Arm Motor Function | Extending the arm of the patient 90 deg(if sitting) or 45 deg (if supine) palms up | **Normal to Mild:** Limb upheld > 10 seconds | **0** |
| | | **Moderate:** Limb upheld < 10 seconds | **1** |
| | | **Severe:** Patient unable to raise arm against gravity | **2** |
| Leg Motor Function | Extending the leg of the patient 30 deg (in supine position) One Leg at a time | **Normal to Mild:** Limb upheld > 5 seconds | **0** |
| | | **Moderate:** Limb upheld < 5 seconds | **1** |
| | | **Severe:** Patient unable to raise leg against gravity | **2** |
| *Head & Gaze Deviation | Observe range of motion of eyes and look for head turning to one side | **Absent:** Normal Eye Movements ot both sides and no head deviation observed | **0** |
| | | **Present** (Eyes and/or head deviation to one side observed | **1** |
| *Aphasia (IF patient has RIGHT sided weakness) | As Patient to follow two simple commands: ***1. Close Your Eyes. 2. Make a Fist*** | **Normal:** Performs both tasks correctly | **0** |
| | | **Moderate:** Performs only 1 of 2 tasks correctly | **1** |
| | | **Severe:** Cannot perform either task | **2** |
| *Agnosia (If Patient has LEFT sided weakness) | Inability to recognize familiar objects. Ask patient: ***1. "Whose arm is this?"*** (while showing the affected arm). ***2. "Can you move your arm?"*** | **Normal:** Appropriate or correct answer | **0** |
| | | **Moderate:** Does not recognize limb or states that they can move it - but cannot | **1** |
| | | **Severe:** Does not recognize arm or is unaware of arm | **2** |
| *Head/Eye Gaze Deviation or if patient is mute and does not follow commands = HIGH Likelihood of Large Vessel Occlusion (LVO | | **RACE SCALE TOTAL = 9** | |
| | | **Maximum RACE Score = 9** | |
| | | **ANY Score > 0 is a "Stroke Alert"** | |
| | | **ANY Score > or = 4 is LIKELY LVO** | |
| **KEY CHECK POINTS:** | □ **Emergency Contact** | | |
| | □ **Last Known Well (Normal) Time** | | |
| | □ **Medication List** | | |

ADULT CARDIOVASCULAR

# Suspected Stroke



## REPERFUSION CHECKLIST

The Reperfusion Checklist is an important component in the initial evaluation, treatment, and transport of patients suffering from an acute ST-elevation myocardial infarction (STEMI) or acute Stroke. Both of these conditions can be successfully treated using fibrinolysis (thrombolytics) if the patient arrives at the appropriate hospital within the therapeutic window of time.

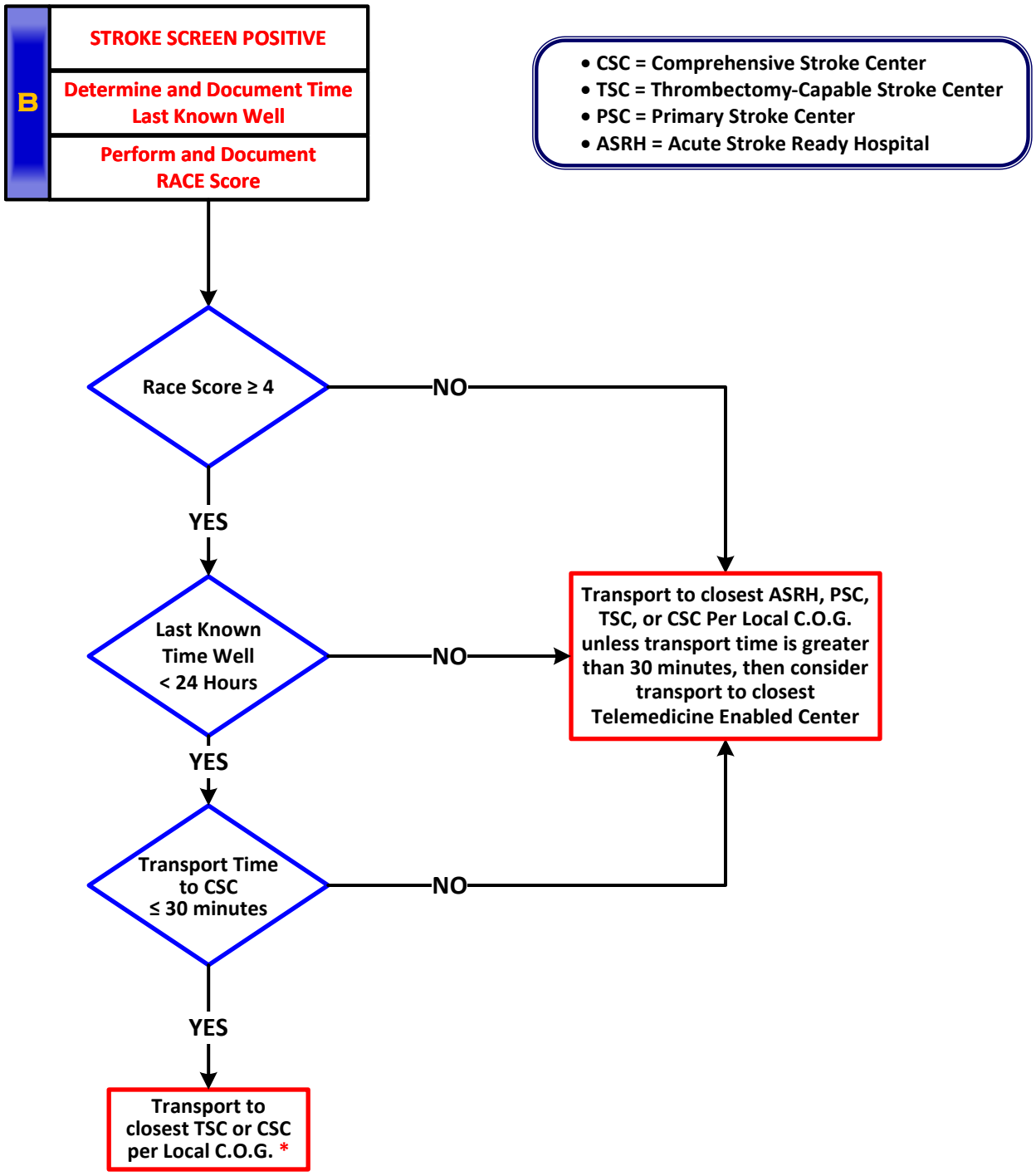
This form should be completed for all acute STEMI and acute Stroke patients.

| | | | |
|---|---|---|---|
| **Patient's Name** | | | |
| **ePCR Number:** | | | **Date:** |
| | | | |
| ☐ **YES** | ☐ **NO** | 1. **Has the patient experienced chest discomfort for greater than 15 minutes and less than 12 hours?** | |
| ☐ **YES** | ☐ **NO** | 2. **Has the patient developed a sudden neurologic deficit with a positive R.A.C.E. Stroke Screen?** | |
| 3. **Are there any contraindications to fibrinolysis** | | | |
| **If any of the following are checked "YES" – fibrinolysis MAY be contraindicated** | | | |
| ☐ **YES** | ☐ **NO** | Systolic Blood Pressure greater than 180 mm Hg | |
| ☐ **YES** | ☐ **NO** | Diastolic Blood Pressure greater than 110 mm Hg | |
| ☐ **YES** | ☐ **NO** | Right vs. Left Arm Systolic Blood Pressure difference of greater than 15 mm | |
| ☐ **YES** | ☐ **NO** | History of structural Central Nervous System disease (tumors, masses, hemorrhage, etc.) | |
| ☐ **YES** | ☐ **NO** | Significant closed head or facial trauma within the previous 3 months | |
| ☐ **YES** | ☐ **NO** | Recent (within 6 weeks) major trauma, surgery (including laser eye surgery), gastrointestinal bleeding, or severe genital-urinary bleeding | |
| ☐ **YES** | ☐ **NO** | Bleeding or clotting problem or on blood thinners | |
| ☐ **YES** | ☐ **NO** | CPR performed greater than 10 minutes | |
| ☐ **YES** | ☐ **NO** | Currently Pregnant | |
| ☐ **YES** | ☐ **NO** | Serious Systemic Disease such as advanced/terminal cancer or severe liver or kidney failure | |
| 4. **STEMI Patients Only – Does the patient have severe heart failure or cardiogenic shock?** | | | |
| These patients may benefit more from a percutaneous coronary intervention (PCI) capable hospital | | | |
| ☐ **YES** | ☐ **NO** | Presence of pulmonary edema (rales greater than halfway up lung fields) | |
| ☐ **YES** | ☐ **NO** | Systemic hypoperfusion (cool and clammy) | |

**<u>If any contraindication is checked as "Yes" and an acute Stroke is suspected by exam or a STEMI is confirmed by ECG, activate the EMS Stroke Plan or EMS STEMI Plan for fibrinolytic ineligible patients.</u>**

**This may require the EMS Agency, an Air Medical Service, or a Specialty Care Transport Service to transport directly to a specialty center capable of interventional care within the therapeutic**

# Stroke Patient Destination
## Determination by Stroke Center Capability




ADULT CARDIOVASCULAR

*** Local Medical Control**

**Acute Stroke Ready Hospital (ASRH), Primary Stroke Center (PSC), Thrombectomy-Capable Stroke Center (TSC) * Comprehensive Stroke Center (CSC) are universal terms used to designate a facility's capabilities in caring for an acute stroke patient.**

**It is incumbent upon local Medical Control Physicians to identify all facilities within their service area and to incorporate them within their own stroke patient destination guidelines.**

# Stroke Patient Destination
## Determination by Stroke Center Capability

Current Stroke Center Designations can be found at:
***https://scdhec.gov/health/diseases-conditions/heart-disease-stroke/stroke***

ADULT CARDIOVASCULAR

# Hypotension (Symptomatic)

**History**
- 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
- Cardiomyopathy
- Trauma

**Signs and Symptoms**
- Restlessness, confusion
- Weakness, dizziness
- Weak, rapid pulse
- Pale, cool, clammy skin
- Delayed capillary refill
- Coffee-ground emesis
- Tarry stools
- AMS,
- Decreased urine output and/or decreased po intake.
- Tachycardia out of proportion to temperature
  - Consider normal Heart Rate if on Beta Blockers

**Differential**
- **Shock**
  - **Hypovolemic**
  - **Cardiogenic**
  - **Septic**
  - **Neurogenic**
  - **Anaphylactic**
- **Ectopic pregnancy**
- **Dysrhythmias**
- **Pulmonary embolus**
- **Tension pneumothorax**
- **Medication effect / overdose**
- **Vasovagal**
- **Physiologic (pregnancy)**

**Vascular Access C.O.G.**

**Repeat Heart Rate, Blood Pressure, Mental Status after each bolus/ intervention.**
**Consider use of Capnography**

**Trauma**

**Trauma C.O.G.**
*As appropriate*

**A** Fluid Bolus to Maintain
**Systolic B/P >  mmHg**

**P** **Consider Vasopressor Infusion for Neurogenic Shock**

**Non-Cardiac / Non-Trauma**

**A** **Normal Saline Bolus**
**May Repeat To Total 30 mL/Kg**

**P** **Consider Vasopressor Infusion**

**Consider Sepsis C.O.G.**

**Cardiac**

**Cardiac C.O.G.**
As appropriate

**A** No rales present
Consider **Normal Saline Bolus**

**P** **Consider Vasopressor / Inotrope Infusion**

**Notify Destination or Contact Medical Control**

ADULT CARDIOVASCULAR

# Hypotension (Symptomatic)

| Epinephrine for Bolus Dosing |
|---|
| **INDICATIONS:** For use in patients with **unresponsive** hypotension. |
| **RELATIVE CONTRAINDICATIONS:** Age > 50; Known Heart Disease; Tachyarrhythmias |
| |
| **Admixture:** |
| Epinephrine **1:10,000** (Cardiac Epinephrine = 100 mcg/mL) |
| Draw 9 mL of Normal Saline into a Syringe |
| Draw 1 mL of Epinephrine 1:10,000 (100 mcg/mL) into the syringe with 9 mL of Normal Saline |
| Shake admixture well |
| **Yields:** 10 mL of Epinephrine at 10 mcg/mL (1:100,000). |
| LABEL SYRINGE |
| **Dose:** 0.5 – 2 mL (5 – 20 mcg) IV push Q 1 – 5 minutes |

| EPINEPHRINE INFUSION CALCULATIONS |
|---|
| Add 1 mg of epinephrine to 250 mL of Normal Saline or D5W |
| If 1 mg/mL strength epinephrine (may also be labeled 1:1000) use 1 mL to deliver 1 mg to bag |
| If 0.1 mg/mL strength epinephrine (may also be labeled 1:10,000) use 10 mL to deliver 1 mg to bag |
| This admixture yields a concentration of 4 mcg/mL |
| **Addition of 2 mg/mL Epinephrine to 250 mL will DOUBLE the Concentration and HALVE the volume (Drops) required (i.e. 8 mcg/mL)** |
| Start the epinephrine infusion at 0.1 microgram/kg/minute while continuously monitoring the patient's cardiac rhythm and blood pressure (ie, approximately 6 to 10 micrograms/minute in most adults). |
| |
| **Formula for calculation of infusion rate:** |
| Body Weight (Kg) x Dose (0.1 mcg/Kg/Minute) = Micrograms/Minute |
| **Using a microdrip set with 60 drops/mL calculate the rate of infusion based on:** |
| Concentration = mg of Epinephrine/mL of admixture = mg/mL |
| Concentration above x 1000 mcg/mg = Concentration in mcg/mL |
| (Standard Admixture = 4 mcg/mL) |
| Rate of Infusion (Drops/Minute) = Desired Dose x 60 / Drug Concentration in mcg/mL |

| EPINEPHRINE INFUSION CALCULATOR | | | |
|---|---|---|---|
| Adult Infusion Dose (@ 4 mcg/mL) | Administration Rate at 60 drops/mL | | |
| Micrograms (mcg) per Minute | Drops per minute | mL per Minute | ml per Hour |
| 1 | 15 | 0.25 | 15 |
| 2 | 30 | 0.5 | 30 |
| 3 | 45 | 0.75 | 45 |
| 4 | 60 | 1 | 60 |
| 5 | 75 | 1.25 | 75 |
| 6 | 90 | 1.5 | 90 |
| 7 | 105 | 1.75 | 105 |
| 8 | 120 | 2 | 120 |
| 9 | 135 | 2.25 | 135 |
| 10 | 150 | 2.5 | 150 |
| 11 | 165 | 2.75 | 165 |
| 12 | 180 | 3 | 180 |
| 13 | 195 | 3.25 | 195 |
| 14 | 210 | 3.5 | 210 |
| 15 | 225 | 3.75 | 225 |

## PEARLS:

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.**
- Hypotension can be 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 often may present with normal vital signs and may develop insidiously. Tachycardia may be the only manifestation.
- Fluid of up to 30 mL/kg of isotonic fluid (per Local Medical Control) by administering rapid, predetermined boluses (e.g., 500 mL) unless the MAP goal is achieved, or pulmonary edema develops.
  - If available, the administration of packed red blood cells, other blood components or whole blood may be indicated for hemorrhagic shock
  - Early, aggressive IV fluid administration is essential in the treatment of suspected septic shock
- Patients predisposed to shock:
  - Immunocompromised (patients undergoing chemotherapy or with a primary or acquired immunodeficiency)
  - Adrenal insufficiency (Addison's disease, congenital adrenal hyperplasia, chronic or recent steroid use)
  - History of a solid organ or bone marrow transplant
  - Elderly
- In most adults, tachycardia is the first sign of compensated shock, and may persist for hours, caution if patient on Beta Blockers
- Hypotension may indicate uncompensated shock, which may progress to cardiopulmonary failure within minutes.
- Repeat Vital Signs AFTER each Bolus or Change in Pharmacologic Therapy (Change in Dose or Agent).
- 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, 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.
- **Acute Adrenal Insufficiency:**
  - State where body cannot produce enough steroids (glucocorticoids/mineralocorticoids). May have primary adrenal disease or more commonly have stopped a steroid like prednisone. Usually hypotensive with nausea, vomiting, dehydration and/or abdominal pain.
    - **If suspected Paramedic should give Methylprednisolone 125 mg IM / IV / IO or Dexamethasone 10 mg IM / IV / IO. Use steroid agent specific to your drug list. May administer prescribed steroid carried by patient IM / IV / IO. Patient may have Hydrocortisone (Cortef or Solu-Cortef). Dose: < 1y.o. give 25 mg, 1-12 y.o. give 50 mg, and > 12 y.o. give 100 mg or dose specified by physician.**
    - May use steroid agent specific to your drug list.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Medications administered
  - ❑ Full vital signs (pulse, bloood pressure, respiratory rate, neurologic status) with reassessment at minimum Q 15 minutes or more frequently as appropriate.
  - ❑ Amount of Fluids Administered
  - ❑ Lactate Level if your service performs this.
  - ❑ Notification of receiving facility on Transport.

ADULT CARDIOVASCULAR

# Hypertensive Emergency / Urgency

**History**
- Documented hypertension
- Related diseases: diabetes, CVA, renal failure, cardiac
- Medications (compliance ?)
- Erectile dysfunction medication (Levitra/Cialis/Viagra)
- Pregnancy

**Signs and Symptoms**

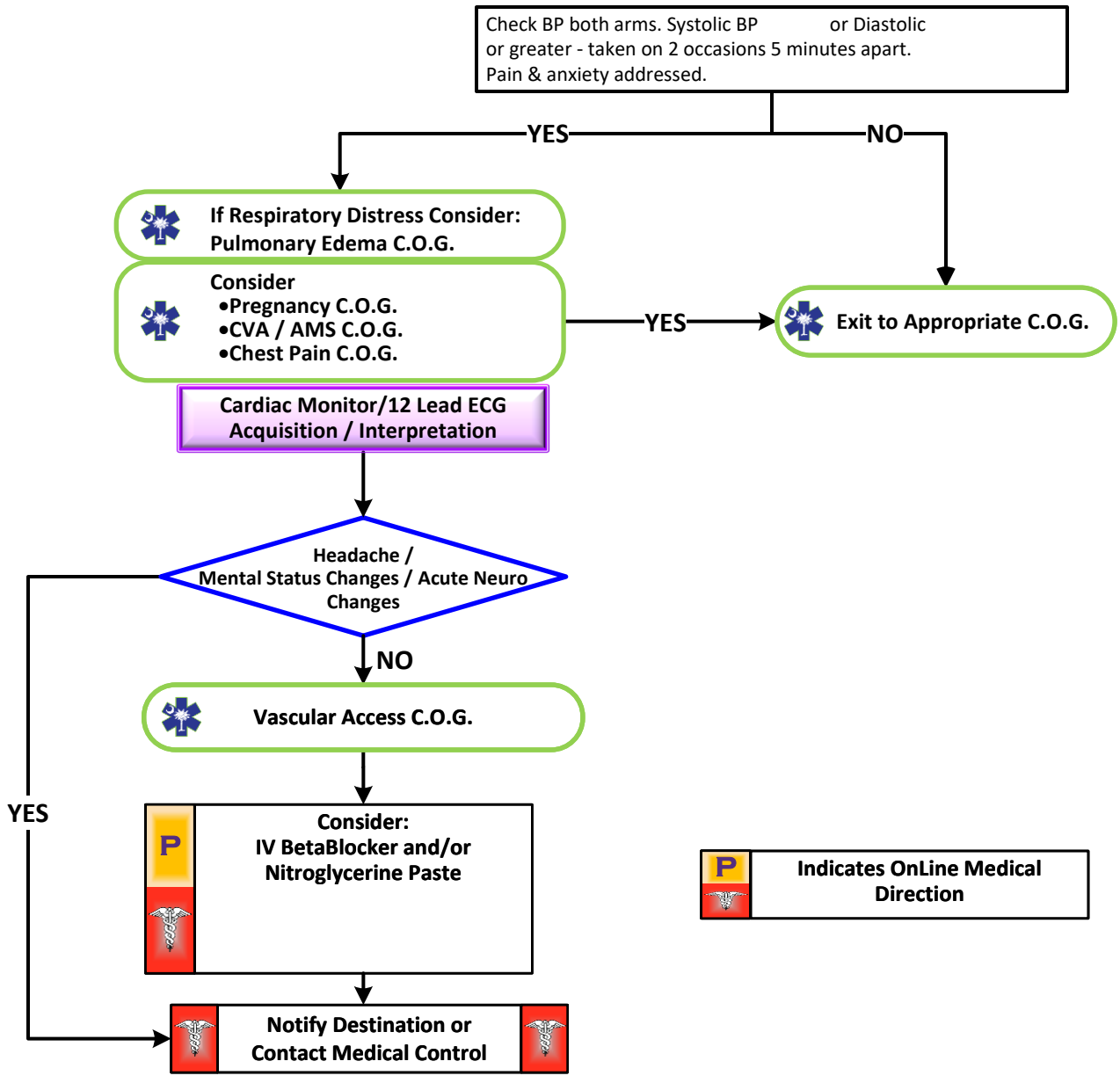
**One of these**
- Systolic BP 220 or greater
- Diastolic BP 120 or greater

**- AND -**

**At least one of these**
- Headache
- Nosebleed
- Blurred vision
- Dizziness
- Chest Pain
- SOB
- AMS
- Hematuria

**Differential**
- **Hypertensive encephalopathy**
- **Primary CNS Injury (Cushing's response = bradycardia with 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 specific protocols and consultation with Medical Control.**




ADULT CARDIOVASCULAR

# Hypertensive Emergency / Urgency



## PEARLS

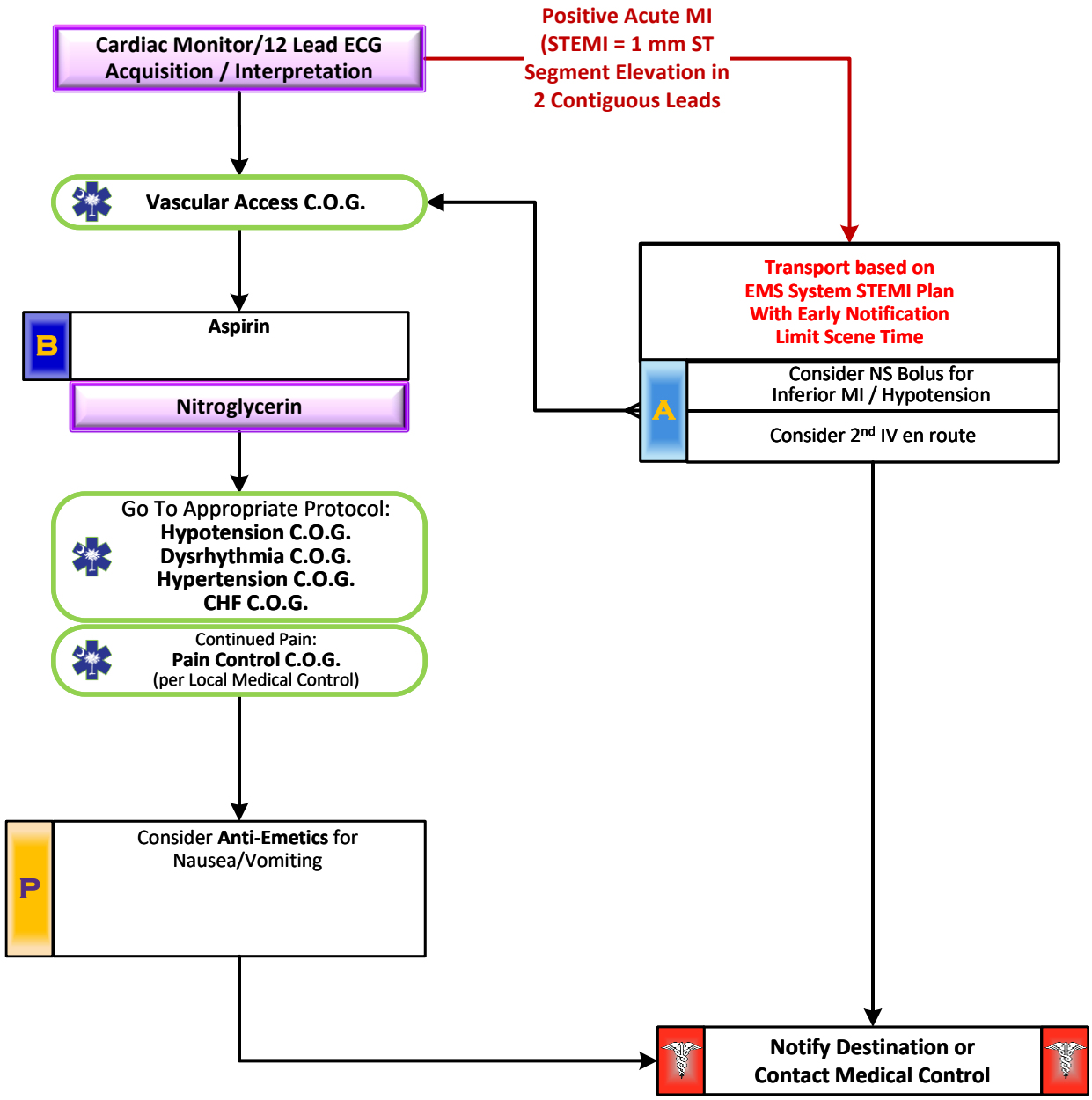
- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Extremities, Neuro**
- **Never treat elevated blood pressure based on one set of vital signs or on vital signs alone.**
- Symptomatic hypertension is typically revealed through end organ damage to the cardiac, CNS or renal systems.
- Ensure that the appropriate size blood pressure cuff is utilized for body habitus.
- Check blood pressure in both arms.
- All symptomatic patients with hypertension should be transported with their head elevated at 30 degrees.
- Consider aortic aneurysm if patient is experiencing severe or dull pain in the abdomen, chest, lower back or groin.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Blood pressure obtained in both arms
  - ❑ Blood pressure obtained every 10 minutes
  - ❑ Medication dose and timing, if administered

# Chest Pain: Cardiac and STEMI

**History**
- Age
- Medications
- **Erectile Dysfunction Medication**
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Allergies (Aspirin, Morphine, Lidocaine)
- 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)

**Signs and Symptoms**
- CP (pain, pressure, aching, vicelike tightness)
- Location (substernal, epigastric, arm, jaw, neck, shoulder)
- Radiation of pain
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting, dizziness
- **Time of Onset**

**Differential**
- **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 CARDIOVASCULAR

# Chest Pain: Cardiac and STEMI

| Killip Classification in Acute Myocardial Infarction | | | |
|---|---|---|---|
| **Killip Classification** | **PAO2 (on Room Air)** | **Clinical Description** | **Estimated Mortality** |
| | | | |
| **Class 1** | Normal | No clinical evidence of left ventricular (LV) failure | 6% |
| **Class 2** | Slightly Reduced | Findings consistent with mild to moderate heart failure (eg, S3 gallop, lung rales less than one-half way up the posterior lung fields, or jugular venous distension) | 17% |
| **Class 3** | Abnormal | Overt pulmonary edema | 38% |
| **Class 4** | Severely Abnormal | Cardiogenic shock | 67% |

ADULT CARDIOVASCULAR

**PEARLS:**

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Positive Acute MI (STEMI = cardiac symptoms > 15 minutes and < 12 hours AND ST segment elevation of ≥ 1 mm in 2 or more Anatomically Contiguous Leads OR Left Bundle Branch Block NOT KNOWN to be present in past)**
- ****_High Risk: Cardiogenic shock_** – inadequate tissue perfusion due to low cardiac output. Systolic Blood Pressure ≤ 90 mm Hg in setting of acute myocardial infarction. (Killip class ≥ III)
- Patients with STEMI (ST-Elevation Myocardial Infarction) or positive Reperfusion Checklist should be transported to the appropriate destination based on the EMS System STEMI Plan
- **Avoid Nitroglycerin (NTG) in patients who use erectile dysfunction medication (Viagra (Sildenafil) or Levitra (Vardenafil) < 24 hours; or Cialis (Tadalafil) < 36 hours) due to possible severe hypotension.**
- *_Travel Time_ defined with understanding that PCI can be completed within 90 minutes or less including transport time.
- Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (EMT-P)
- Nitroglycerin and Narcotics may be repeated per dosing guidelines
- If patient has taken NTG without relief, consider potency of medication.
- Monitor for hypotension after administration of NTG and/or Narcotics / Opiates
- Perform a patient interview, examination and treatment as simultaneously and expediently as possible, do not excessively delay treatment or transportation of this patient.
- Diabetics, female, and geriatric patients often have atypical pain or only generalized complaints.
- **Additional Information is appended in POLICY: STEMI.**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Time of Symptom Onset
  - ❑ Time of patient contact by EMS to the time of 12 lead EKG acquisition
  - ❑ Time Aspirin (ASA) administered – OR – Reason why not given
  - ❑ Time of STEMI notification
  - ❑ Medications Administered and Time
  - ❑ Initial and Subsequent 12 lead EKGs

# Chest Pain: Cardiac and STEMI



## REPERFUSION CHECKLIST

The Reperfusion Checklist is an important component in the initial evaluation, treatment, and transport of patients suffering from an acute ST-elevation myocardial infarction (STEMI) or acute Stroke. Both of these conditions can be successfully treated using fibrinolysis (thrombolytics) if the patient arrives at the appropriate hospital within the therapeutic window of time.

This form should be completed for all acute STEMI and acute Stroke patients.

| | | |
|---|---|---|
| **Patient's Name** | | |
| **ePCR Number:** | | **Date:** |

| | | |
|---|---|---|
| □ **YES** | □ **NO** | 1. **Has the patient experienced chest discomfort for greater than 15 minutes and less than 12 hours?** |
| □ **YES** | □ **NO** | 2. **Has the patient developed a sudden neurologic deficit with a positive R.A.C.E. Stroke Screen?** |

3. **Are there any contraindications to fibrinolysis**

**If any of the following are checked "YES" – fibrinolysis MAY be contraindicated**

| | | |
|---|---|---|
| □ **YES** | □ **NO** | Systolic Blood Pressure greater than 180 mm Hg |
| □ **YES** | □ **NO** | Diastolic Blood Pressure greater than 110 mm Hg |
| □ **YES** | □ **NO** | Right vs. Left Arm Systolic Blood Pressure difference of greater than 15 mm |
| □ **YES** | □ **NO** | History of structural Central Nervous System disease (tumors, masses, hemorrhage, etc.) |
| □ **YES** | □ **NO** | Significant closed head or facial trauma within the previous 3 months |
| □ **YES** | □ **NO** | Recent (within 6 weeks) major trauma, surgery (including laser eye surgery), gastrointestinal bleeding, or severe genital-urinary bleeding |
| □ **YES** | □ **NO** | Bleeding or clotting problem or on blood thinners |
| □ **YES** | □ **NO** | CPR performed greater than 10 minutes |
| □ **YES** | □ **NO** | Currently Pregnant |
| □ **YES** | □ **NO** | Serious Systemic Disease such as advanced/terminal cancer or severe liver or kidney failure |

4. **STEMI Patients Only – Does the patient have severe heart failure or cardiogenic shock?**

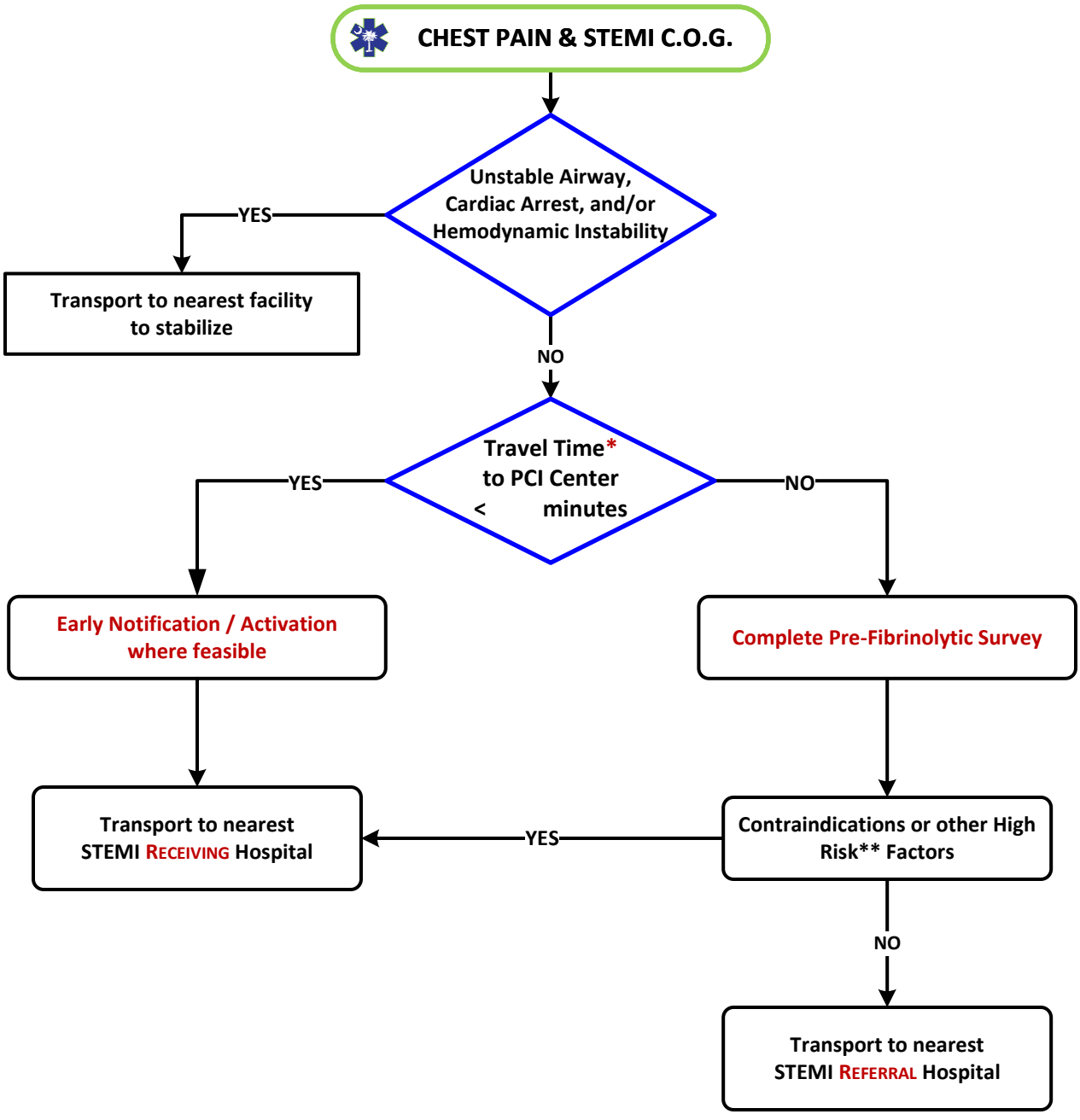
These patients may benefit more from a percutaneous coronary intervention (PCI) capable hospital

| | | |
|---|---|---|
| □ **YES** | □ **NO** | Presence of pulmonary edema (rales greater than halfway up lung fields) |
| □ **YES** | □ **NO** | Systemic hypoperfusion (cool and clammy) |

**<u>If any contraindication is checked as "Yes" and an acute Stroke is suspected by exam or a STEMI is confirmed by ECG, activate the EMS Stroke Plan or EMS STEMI Plan for fibrinolytic ineligible patients.</u>**

**This may require the EMS Agency, an Air Medical Service, or a Specialty Care Transport Service to transport directly to a specialty center capable of interventional care within the therapeutic**

# Chest Pain: STEMI Transport




*Consider Air Medical Activation if time to Cath Lab can be achieved in < minutes and is NOT ACHIEVABLE by Ground Transport

ADULT CARDIOVASCULAR

# Chest Pain: STEMI Transport

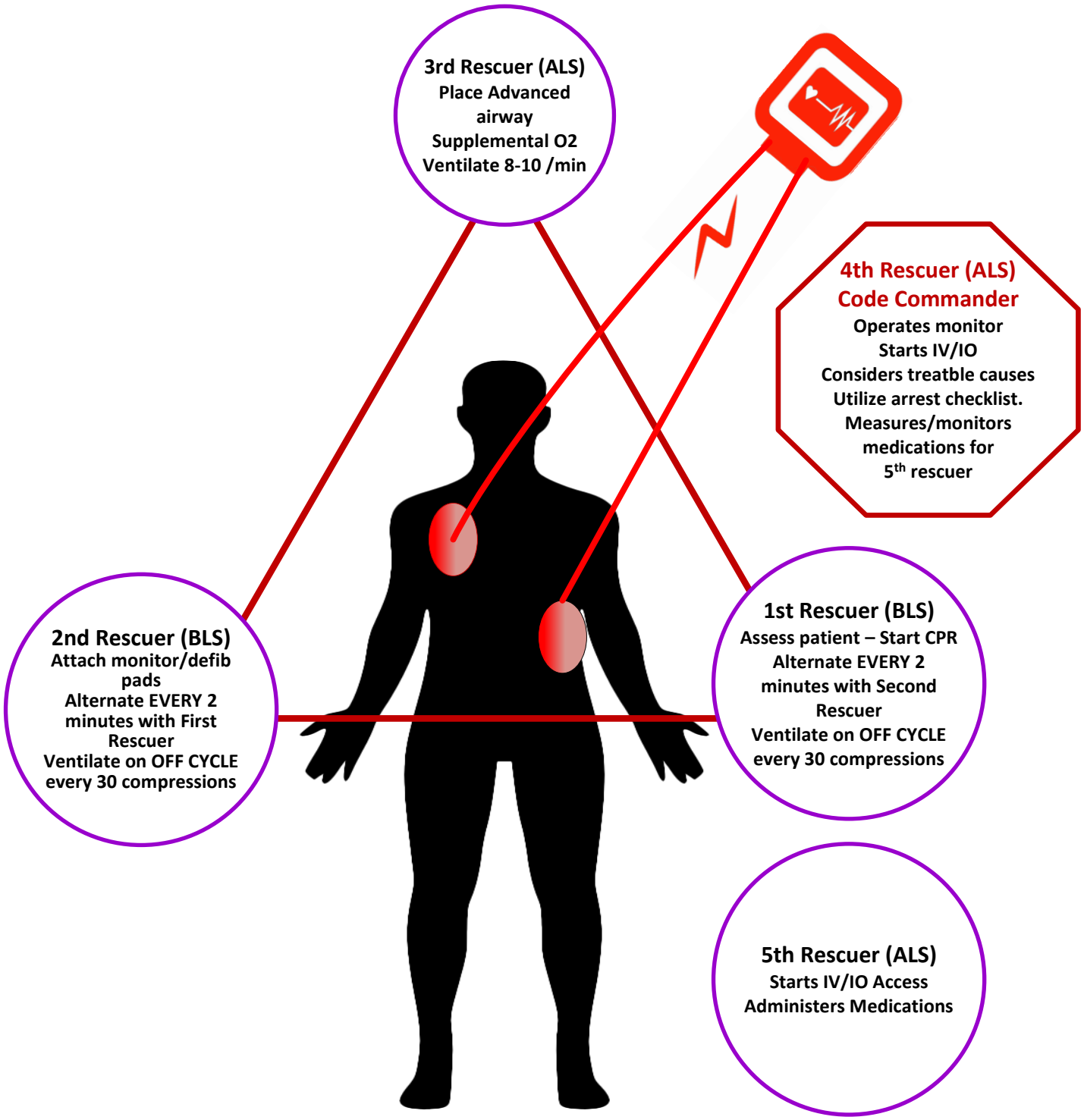
| Killip Classification in Acute Myocardial Infarction | | | |
|---|---|---|---|
| **Killip Classification** | **PAO2 (on Room Air)** | **Clinical Description** | **Estimated Mortality** |
| | | | |
| **Class 1** | Normal | No clinical evidence of left ventricular (LV) failure | 6% |
| **Class 2** | Slightly Reduced | Findings consistent with mild to moderate heart failure (eg, S3 gallop, lung rales less than one-half way up the posterior lung fields, or jugular venous distension) | 17% |
| **Class 3** | Abnormal | Overt pulmonary edema | 38% |
| **Class 4** | Severely Abnormal | Cardiogenic shock | 67% |

ADULT CARDIOVASCULAR

## PEARLS

- **Positive Acute MI (STEMI = cardiac symptoms > 15 minutes and < 12 hours AND ST segment elevation of ≥ 1 mm in 2 or more Anatomically Contiguous Leads OR Left Bundle Branch Block NOT KNOWN to be present in past)**
- ***High Risk:* *Cardiogenic shock* – inadequate tissue perfusion due to low cardiac output. Systolic Blood Pressure ≤ 90 mm Hg in setting of acute myocardial infarction. (Killip class ≥ III)
- Patients with STEMI (ST-Elevation Myocardial Infarction) or positive Reperfusion Checklist should be transported to the appropriate destination based on the EMS System STEMI Plan
- **Travel Time* defined with understanding that PCI can be completed within 90 minutes or less including transport time.
- **Additional Information is appended in POLICY: STEMI.**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Time of Symptom Onset
  - ❑ Time of patient contact by EMS to the time of 12 lead EKG acquisition
  - ❑ Time Aspirin (ASA) administered – OR – Reason why not given
  - ❑ Time of STEMI center notification
  - ❑ Medications Administered and Time
  - ❑ Initial and Subsequent 12 lead EKGs
  - ❑ Completion of Pre-Fibrinolytic Survey

# Team Focused CPR



# Team Focused CPR

Ensure Adequate Space To work

↓

The following is listed in the order of importance:
Each rescuer has a specific job during the Code

↓

| | | |
|---|---|---|
| 1st Crew on Scene | 1st Rescuer | Begin Continuous High Quality CPR Compressions. Push Hard [Adult: > 2 inches; Child > 1.5 inches] and Fast [100-120/min].<br>Change compressors EVERY 2 minutes (limit changes/pulse checks to <5 sec) during entire arrest |
| | 2nd Rescuer | Attach AED/Monitor and Defibrillate as necessary.<br>Provide Ventilations with BVM |
| | | 1st and 2nd Rescuers rotate EVERY 2 mins. |
| 2nd Crew on Scene | 3rd Rescuer | Assumes airway: Consider BIAD/ Intubation<br>Compressions should NOT BE STOPPED for intubation |
| | 4th Rescuer | Establish Team Leader/Code Commander. Utilize Cardiac Arrest Checklist |
| | 5th Rescuer | Initiate IV/IO and administer appropriate medications per Code Commander |
| **All Crews** | | Follow appropriate arrest Protocols |
| | 1st/2nd/3rd Rescuer | Once advanced airway is in place, ventilate every 6-8 seconds.<br>DO NOT Interrupt compressions except for changes/pulse checks |

**CODE COMMANDER**

- **Responsible for Patient Care**
- **Ensures High Quality Chest Compressions**
- **Ensures frequent Compressor Changes**
- **Responsible for Communication with Family**
- **Operates Monitor**
- **Utilizes the Event Button**
- **Measures and Calls For Medications by 5th Rescuer at Time of Administration**

ADULT CARDIOVASCULAR

**PEARLS**

- **Ensuring High Quality Chest Compressions with minimal interruptions takes PRIORITY.**
- Adequate compressions with timely defibrillation are the keys to success
- Monitor in "Paddles" Mode with Metronome on.
- Do NOT HYPERVENTILATE.
- IF Advanced Airway is NOT established – Compression to Breath Ration should be 30:2 for adult and 15:2 for child.
- Once Advanced airway is in place – ventilate at 8 – 10 breaths per minute.
- Each breath should be administered over 1 second with just enough air to notice chest rise.
- Continue compressions while monitor/AED is charging
- All Breaks in Compressions to be < 5 seconds.
- Consider possible CAUSE of the arrest early. Considerr traditional ACLS "Hs and Ts" for PEA.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Per Ventricular Fibrillation / PEA Protocol

# Cardiac Arrest

**History:**
- Events leading to arrest
- Estimated downtime
- Past medical history
- Medications
- Existence of terminal illness
- Signs of lividity, rigor mortis
- DNR/POST/MOST form

**Signs and Symptoms:**
- Unresponsive
- Apneic
- Pulseless

**Differential:**
- **Medical vs Trauma**
- **V. fib vs Pulseless V. tach**
- **Asystole**
- **Pulseless electrical activity (PEA)**

**Follow Team Focused CPR Protocol and Approach when possible**
**Utilize Cardiac Arrest Checklist**

**Criteria for Death / No Resuscitation**
**Review DNR / POST / MOST Form**

YES

**TYPICAL CRITERIA TO WITHHOLD:**
- Patients pulseless or apneic with a valid South Carolina EMS DNR order or POLST orders governing their care.
- Rigor mortis, dependent lividity, decomposition.
- Trauma incompatible with life such as decapitation, massive crush injury, incineration, or body frozen solid.
- Patients 18 years and older not known to be pregnant with documented pulseless down time exceeding 15 min without CPR and found to apneic, pulseless, with unresponsive pupils and in asystole without suspicion of hypothermia upon the arrival of EMS.
- Mass casualty victims triaged to be expired or expectant.

NO

**B** ***Begin Continuous High Quality Chest Compressions***
***Push Hard (≥ 2 inches)***
***Push Fast (100 - 120 / min)***
***Change Compressors every 2 minutes***
***(sooner if fatigued)***
***(Limit changes / pulse checks ≤ 10 seconds)***

**Ventilate 1 breath every 6 seconds**
**30:2 Compression:Ventilation if no Advanced Airway**
***Monitor EtCO2***
***if available***

**ALS Available**

NO → **B** AED Procedure *if available*

YES → **P** Cardiac Monitor Interpretation

**Shockable Rhythm**

YES → **VF / VT Protocol / Tachycardia C.O.G.s** *(as indicated)*

NO → **Asystole / PEA C.O.G.** *(as indicated)*

**Shockable Rhythm**

NO → **Asystole / PEA C.O.G.** *(as indicated)*

YES → **VF / VT Protocol / Tachycardia C.O.G.s** *(as indicated)*

**Arrest secondary to Opioid OD?**

YES → **B** Consider Naloxone

**Termination on Scene C.O.G.** *as indicated*

**Notify Destination or Contact Medical Control**

**AT ANY TIME**
**Return of Spontaneous Circulation**
↓
**Go to Post Resuscitation C.O.G.**

ADULT CARDIOVASCULAR

# Cardiac Arrest

ADULT CARDIOVASCULAR

**PEARLS**

- **Team Focused Approach / Pit-Crew Approach recommended; assign responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- **Reassess and document BIAD and / or endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.**
  - All Cardiac Arrest patients should have continuous waveform capnography applied
  - IV / IO access and drug delivery is secondary to high-quality chest compressions and early defibrillation.
  - IV access is preferred route. Follow IV or IO Access Protocol .
- **Defibrillation:**
  - Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
  - Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
  - Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO2 (EtCO2)**
  - If EtCO2 is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
  - If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**
  - **Maternal Arrest** - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
  - **Renal Dialysis / Renal Failure** - Refer to Dialysis / Renal Failure Protocol caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
  - **Opioid Overdose** - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
  - **Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike** – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Transcutaneous Pacing:**
  - Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- **Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Resuscitation attempted and all interventions performed
  - ❑ Arrest witnessed / Not-witnessed.
  - ❑ CPR Prior to EMS Arrival
  - ❑ First monitored rhythm
  - ❑ Outcome / Any ROSC
  - ❑ Presumed Etiology (Presumed Primary Cardiac; Trauma; Submersion; Respiratory; Other Non-Cardiac; Unknown)
  - ❑ Documentation of all acquired EKG Strips
  - ❑ Documentation of Termination of Resuscitation Efforts and reasons for Termination.
  - ❑ Reassess and document endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.

# Cardiac Arrest

**Typical Criteria to Withhold:**

- Patients pulseless or apneic with a valid South Carolina EMS DNR order or POLST orders governing their care.
- Patients found with rigor mortis, dependent lividity, decomposition.
- Trauma incompatible with life such as decapitation, massive crush injury, incineration, or body frozen solid.
- Blunt major trauma patients 18 years and older not known to be pregnant found to apneic, pulseless and without organized ECG activity upon the arrival of EMS.
- Penetrating trauma patients 18 years and older who are not known to be pregnant, found apneic, pulseless and asystolic with no spontaneous movement or pupillary reflex on EMS arrival.
- Patients 18 years and older not known to be pregnant with documented pulseless down time exceeding 15 min without CPR and found to apneic, pulseless, with unresponsive pupils and in asystole without suspicion of hypothermia upon the arrival of EMS.
- Mass casualty victims triaged to be expired or expectant.

**Typical Termination of Resuscitation Criteria**

- The physical environment becomes unsafe for providers and they are not able to take the patient enroute to an emergency department.
- Trauma patients 18 years and older not known to be pregnant with EMS witnessed cardiopulmonary arrest with greater than 15 min time of transport to an emergency department and no response to ALS resuscitative efforts of 15 min or more.
- Patients 18 years and older not known to be pregnant with asystole or wide complex PEA rate less than 30 (no shock advised for BLS), unresponsive pupils, $EtCO_2 < 10$ and who are not suspected to be hypothermic who are unresponsive to:
  - >> 10 or more min of BLS care followed by 10 min of ALS resuscitative efforts or
  - >> 20 min of ALS efforts or
  - >> 30 minutes of BLS care with no ALS available.

# Cardiac Arrest

| Typical Criteria for Withholding CPR | | |
|---|---|---|
| Local (+) | Local (-) | Criteria |
| | | Patient Pulseless or apneic with valid SC EMS DRN order, POST (MOST/POLST) form Governing their care |
| | | Patients found with Rigor Mortis |
| | | Patients found with Dependent Lividity |
| | | Patients found with Decomposition |
| | | Trauma incompatible with life: |
| | | Decapitation |
| | | Massive Crush Injury |
| | | Incineration |
| | | Body Frozen Solid |
| | | Major Blunt Trauma - Patient > 18 years of age - NOT known to be pregnant found: |
| | | Apneic |
| | | Pulseless |
| | | Without organized EKG Activity on EMS arrival |
| | | Penetrating Trauma Patients - > 18 years of age - NOT known to be pregnant found: |
| | | Apneic |
| | | Pulseless |
| | | Asystolic |
| | | No spontaneous movement on EMS Arrival |
| | | No pupillary reflex on EMS Arrival |
| | | Patients > 18 years of age NOT known to be pregnant found: |
| | | Documented Downtime > 15 minutes without CPR AND found: |
| | | Apneic |
| | | Pulseless |
| | | No pupillary reflex on EMS Arrival |
| | | Asystolic |
| | | No suspicions of hypothermia |
| | | Mass casualty victims triaged as expired or expectant |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

# Ventricular Fibrillation
# Pulseless Ventricular Tachycardia

**History**
- Estimated down time
- Past medical history
- Medications
- Events leading to arrest
- Renal failure / dialysis
- DNR or living will

**Signs and Symptoms**
- Unresponsive, apneic, pulseless
- Ventricular fibrillation or ventricular tachycardia on ECG

**Differential**
- Asystole
- Artifact / Device failure
- Cardiac
- Endocrine / Metabolic
- Drugs
- Pulmonary

**AT ANY TIME**
**Rhythm Changes to Nonshockable Rhythm**

**Go to Appropriate Protocol**

**AT ANY TIME**
**Return of Spontaneous Circulation**

**Go to Post Arrest Protocol**

**Cardiac Arrest C.O.G.**

P **Defibrillate x 1**

**Airway C.O.G.**

B **2 minutes of High Quality CPR**

**Vascular Access C.O.G.**

**Check Rhythm and Pulse**

**ROSC?** — YES → **Post-Arrest C.O.G.**

NO

P **Defibrillate x 1**
**Epinephrine**
**(May repeat Q 3 – 5 minutes)**

**After 2 minutes of CPR**
**Check Rhythm and Pulse**

**ROSC?** — YES → **Post-Arrest C.O.G.**

NO

P **Defibrillate x 1**
**Consider Anti-Arrhythmic:**

B **Continue CPR x 2 minutes**

P
**Consider Torsades?**
Magnesium Sulfate IV

**Consider Hyperkalemia?**
Calcium IV
Sodium Bicarbonate IV

If NO resolution with 3 Defib attempts – Consider Vector Change or Double Sequence Defib strategies

**ROSC?** — YES → **Post-Arrest C.O.G.**

NO

**5 doses of Epinephrine?** — NO → P **Defibrillate x 1** (Epinephrine)

YES

**Notify Destination Or Contact Medical Control**

ADULT CARDIOVASCULAR

# Ventricular Fibrillation
# Pulseless Ventricular Tachycardia



**PEARLS**

- **Recommended Exam: Mental Status, Cardiovascular, Pulses**
- Reassess and document endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.
- Calcium and sodium bicarbonate if hyperkalemia is suspected (renal failure, dialysis).
- **Treatment priorities are: uninterrupted High Quality chest compressions, defibrillation, then IV access and airway control.**
- Polymorphic V-Tach (Torsades de Pointes) may benefit from administration of magnesium sulfate if available.
- **If NO resolution with 3 Defib attempts – Consider Vector Change or Double Sequence Defib strategies**
- Do not stop CPR to check for placement of ET tube or to give medicines.
- If arrest not witnessed by EMS then 2 full minutes of High Quality CPR prior to 1st defibrillation.
- Effective CPR and prompt defibrillation are the keys to successful resuscitation.
- If BVM is ventilating the patient successfully, intubation should be deferred until rhythm has changed or 4 or 5 defibrillation sequences have been completed.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Resuscitation attempted and all interventions performed
  - ❑ Arrest witnessed / Not-witnessed.
  - ❑ CPR Prior to EMS Arrival
  - ❑ First monitored rhythm
  - ❑ Outcome / Any ROSC
  - ❑ Presumed Etiology (Presumed Primary Cardiac; Trauma; Submersion; Respiratory; Other Non-Cardiac; Unknown)
  - ❑ Documentation of all acquired EKG Strips
  - ❑ Documentation of Termination of Resuscitation Efforts and reasons for Termination.
  - ❑ Reassess and document endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.

# Asystole
# Pulseless Electrical Activity (PEA)

**HISTORY**
- Past medical history
- Medications
- Events leading to arrest
- End stage renal disease
- Estimated downtime
- Suspected hypothermia
- Suspected overdose
  - Tricyclics
  - Digitalis
  - Beta blockers
  - Calcium channel blockers
- DNR, POST, MOST, Advanced Directives form

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

**Differential**
- **H**ypovolemia (Trauma, AAA, other)
- **H**ypoxia
- **H**ydrogen Ion Excess – [Acidosis]
- **H**ypoglycemia
- **H**ypokalemia / **H**yperkalemia
- **H**ypothermia
- **T**amponade [Cardiac ]
- **T**ension pneumothorax
- **T**hrombosis [Massive myocardial infarction]
- **T**hrombosis [Pulmonary embolus]
- **T**oxins [Drug overdose (Tricyclics, Digitalis, Beta blockers, Calcium channel blockers)]

**Cardiac Arrest C.O.G.**

**Airway C.O.G.**

**Vascular Access C.O.G.**

**AT ANY TIME**
**Return of Spontaneous Circulation**
**Go to Post Resuscitation Protocol**

**Glucose Management C.O.G.**

| | |
|---|---|
| P | **Epinephrine** every 3 – 5 mins |
| A | **Normal Saline Bolus** |
| B | **Assess Blood Glucose** |
| P | Consider **Naloxone**[1] |
| | Consider **Glucagon**[2] |
| | Consider **Calcium Chloride / Calcium Gluconate**[3] |
| | Consider **Bicarbonate**[4] |
| | Consider **Inotrope Infusion** |
| | Consider **Chest Decompression**[5] |
| | Consider **Atropine** (Rate < 60) |

**1.** Naloxone for suspected opioid overdose.
**2.** Glucagon for suspected Beta Blocker or Calcium Channel Blocker Overdose.
**3.** Calcium for suspected Calcium Channel Blocker etiology or Hyperkalemia
**4.** Bicarbonate for Tricyclic Overdose, Hyperkalemia, Renal Failure
**5.** Chest Decompression for Tension Pneumothorax

**Criteria For Discontinuation?***

YES → **STOP RESUSCITATION**

NO → **Notify Destination Or Contact Medical Control**

ADULT CARDIOVASCULAR

# Asystole
# Pulseless Electrical Activity (PEA)

**TYPICAL CRITERIA FOR DISCONTINUATION OF RESUSCITATIVE MEAUSRES**

Discontinuation of CPR and ALS intervention for non-traumatic cardiac arrest patient may be implemented without Online Medical Control authorization in the following patients:

- Patient is 18 years of age or older.
- High quality CPR has been performed.
- Airway management with confirmed effective ventilations. Acceptable airway management techniques include
- blind insertion airway device (IGEL or King LT), orotracheal intubation, nasotracheal intubation.
- Waveform Capnography has been initiated, observed, and trended throughout management of arrest.
- IV or IO access achieved with rhythm appropriate medications administered.
- All providers involved in the patient's care agree that discontinuation is appropriate

**RHYTHM:**

- Persistent VF/VT (after 3 or more defibrillations)
  - Do not perform Termination of Resuscitation, initiate transport.
- Asystole or PEA
  - o If EtCO2 < 10mmHg, consider termination after 20 minutes.
  - o If EtCO2 ≥ 10mmHg, consider termination of resuscitation after 30 minutes.
  - o Times begin when chest compressions are started by a credentialed fire or EMS provider
- Traumatic arrests can be terminated on-scene without contacting Medical Control if at any point the patient presents with asystole or a wide complex PEA less than 30

**TYPICAL TERMINATION OF RESUSCITATION CRITERIA**

- The physical environment becomes unsafe for providers and they are not able to take the patient enroute to an emergency department.
- Trauma patients 18 years and older not known to be pregnant with EMS witnessed cardiopulmonary arrest with greater than 15 min time of transport to an emergency department and no response to ALS resuscitative efforts of 15 min or more.
- Patients 18 years and older not known to be pregnant with asystole or wide complex PEA rate less than 30 (no shock advised for BLS), unresponsive pupils, EtCO2 < 10 and who are not suspected to be hypothermic who are unresponsive to:
  - >> 10 or more min of BLS care followed by 10 min of ALS resuscitative efforts or
  - >> 20 min of ALS efforts or
  - >> 30 minutes of BLS care with no ALS available.

**PEARLS**

- **Recommended Exam: Mental Status, Cardiovascular, Pulse**
- Consider each possible cause listed in the differential: Survival is based on identifying and correcting the cause!
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.
- Consider differential diagnosis of arrest and potential benefit of ED intervention, particularly in younger otherwise healthy patients.
- If resuscitation is performed in a public setting or one felt to be inappropriate to terminate, work the arrest until the patient can be transferred to ambulance. Continue resuscitative efforts enroute to nearest appropriate emergency department.
- Consider contacting online medical control for field termination orders if appropriate.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Resuscitation attempted and all interventions performed
  - ❑ All Medications and Interventions with Time of Administration.
  - ❑ Arrest Witnessed/Non-Witnessed
  - ❑ Time Down if known
  - ❑ Location of Arrest
  - ❑ First Monitored Rhythm
  - ❑ CPR Prior to EMS Arrival
  - ❑ Any ROSC
  - ❑ Presumed Etiology:
    - ❑ » Primary Cardiac » Trauma » Submersion » Respiratory
    - ❑ » Drug Use »Other/Non-Cardiac » Unknown
  - ❑ Include all EKG Rhythm Strips

ADULT CARDIOVASCULAR

# Asystole
# Pulseless Electrical Activity (PEA)

| Typical Criteria for Terminating CPR | | |
|---|---|---|
| **Local (+)** | **Local (-)** | **Criteria** |
| | | Physical environment becomes unsafe for providers |
| | | EMS unable to take the patient enroute to Emergency Department |
| | | Trauma Patients > 18 years of age NOT Known to be pregnant with: |
| | | EMS witnessed Cardiopulmonary Arrest with > 15 minutes time transport to Emergency Department |
| | | EMS witnessed Cardiopulmonary Arrest with NO RESPONSE to ALS resuscitative measure for > 15 minutes |
| | | Patients > 18 years of age NOT Known to be pregnant with |
| | | Asystole or Wide Complex PEA rate < 30 |
| | | Unresponsive Pupils |
| | | EtCO2 <10 mmHg |
| | | Not suspected to be hypothermic |
| | | Unresponsive to: |
| | | 10 or more mins of BLS Care followed by > 10 mins of ALS resuscitative efforts - or |
| | | > 20 minutes of ALS efforts - or |
| | | > 30 minutes of BLS care with no ALS Available |
| | | High Quality CPR has been performed. |
| | | Airway management with confirmed effective ventilations. Acceptable airway management techniques include blind insertion airway device (IGEL or King LT), orotracheal intubation, nasotracheal intubation. |
| | | Waveform Capnography has been initiated, observed, and trended throughout management of arrest. |
| | | IV or IO access achieved with rhythm appropriate medications administered. |
| | | All providers involved in the patient's care agree that discontinuation is appropriate |
| | | |
| | | |
| | | |
| | | |

# Post Resuscitation [ROSC]

**History**
- Respiratory arrest
- Cardiac arrest

**Signs/Symptoms**
- Return of pulse

**Differential**
- **Continue to address specific differentials associated with the original dysrhythmia**

**Repeat Primary Assessment**

**B** **Continue ventilatory support**
- O2 Sats ≥ %
- EtCO2 ideally 35 – 45

**DO NOT HYPERVENTILATE**

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

**Vascular Access C.O.G.**

**Airway C.O.G.**

**Post Intubation C.O.G.**

**Glucose Management C.O.G.**

**STEMI C.O.G.**

**B** **Vital Signs / Check Blood Glucose**

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

Perform serial 12-lead EKGs to assess for evidence of reversible cause of arrest such as STEMI or electrolyte derangement (e.g., hyperkalemia)

**P** **Continue Anti-Arrhythmic if Return of Spontaneous Circulation (ROSC) was associated with its use.**

**Hypotension**
**SBP < 90 mmHg**
**Or MAP < 60**

**Tachydysrhythmia or Significant Ectopy**

**Bradycardia**

**Hypotension C.O.G.**

**Ventricular Tachycardia C.O.G.**

**Bradycardia C.O.G.**

If arrest reoccurs, revert to appropriate C.O.G. and/or initial successful treatment

**Dyshythmias are common and usually self limiting after ROSC If Dyshythmia Persists follow Rhythm Appropriate C.O.G.**

**Notify Destination or Contact Medical Control**

ADULT CARDIOVASCULAR

# Post Resuscitation [ROSC]

ADULT CARDIOVASCULAR

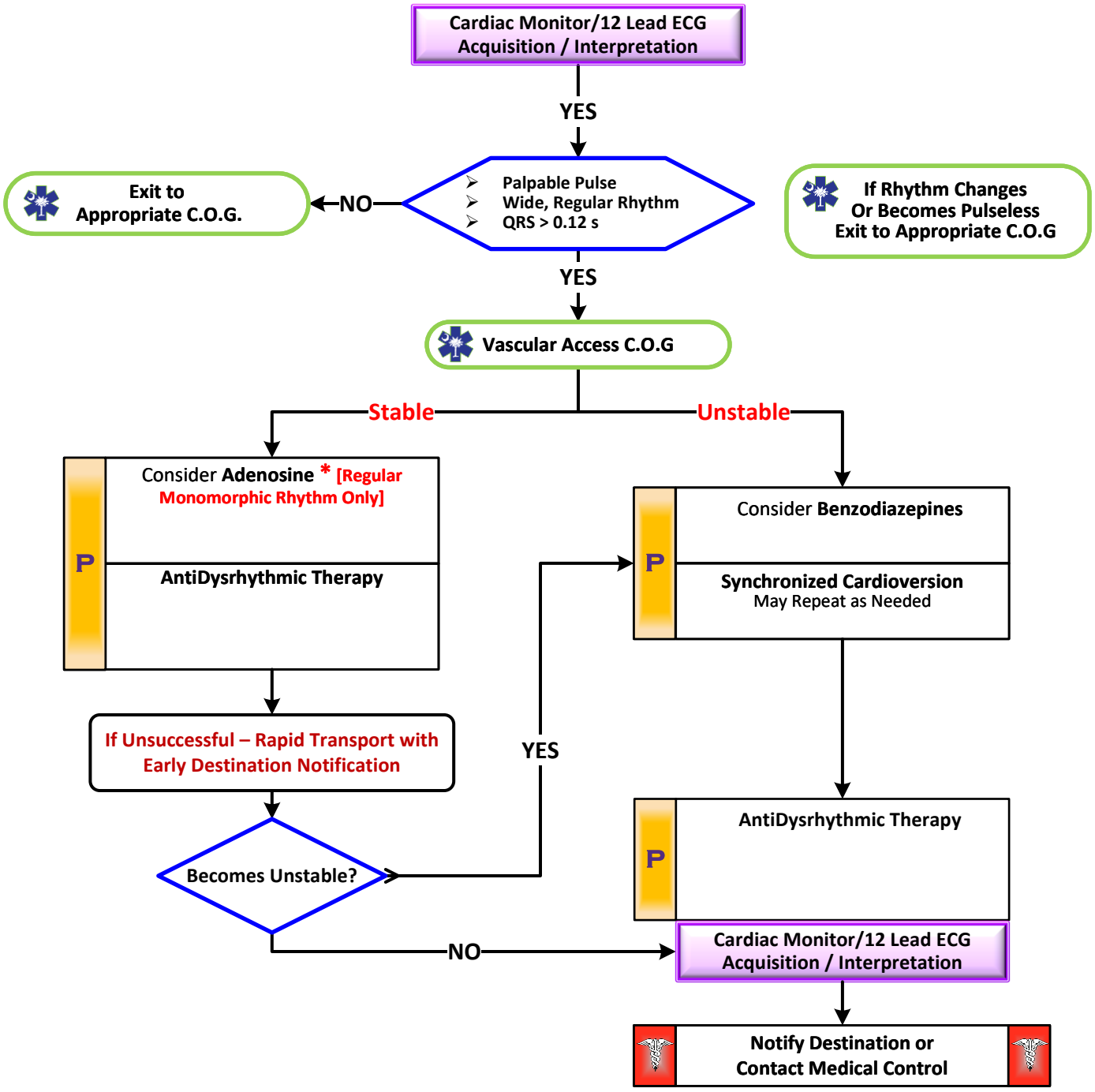
- **PEARLS**
- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, , Extremities, Neuro**
- **Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided at all costs. Titrate FiO2 to maintain SpO2 of >92%.**
- Most 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 best be planned in consultation with medical control.
- Common causes of post-resuscitation hypotension include hyperventilation, hypovolemia, pneumothorax, and medication reaction to ALS drugs.
- Titrate Pressor Agent to maintain a systolic blood pressure > 90 mmHg or a MAP of > 60. Ensure adequate fluid resuscitation is ongoing.
- **Realtime Waveform Capnography is:**
  - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
  - **Strongly Recommended /Strongly Encouraged for all unstable patients**
  - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **Pain/sedation:**
  - Patients requiring advanced airways and ventilation commonly experience pain and anxiety.
  - Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.
  - Ventilated patients cannot communicate pain / anxiety and providers are poor at recognizing pain / anxiety.
  - Vital signs such as tachycardia and / or hypertension can provide clues to inadequate sedation, however they both are not always reliable indicators of patient's lack of adequate sedation.
  - Pain must be addressed first, before anxiety. Opioids are typically the first line agents before benzodiazepines. Ketamine is also a reasonable first choice agent.
- **Ventilator / Ventilation strategies:**
  - Tailored to individual patient presentations. Medical Control can indicate different strategies above.
  - In general ventilation with BVM should cause chest rise. With mechanical ventilation a reasonable tidal volume should be about 6 mL/kg and peak pressures should be < 30 cmH20.
  - Continuous pulse oximetry and capnography should be maintained during transport for monitoring.
  - Head of bed should be maintained at least 10 – 20 degrees of elevation when possible to decrease aspiration risk.
- **EtCO2 Monitoring:**
  - Initial End tidal CO2 may be elevated immediately post-resuscitation, but will usually normalize.
  - Goal is 35 – 45 mmHg but avoid hyperventilation to achieve.
- Titrate fluid resuscitation and vasopressor administration to maintain SBP of 90 – 100 mmHg or Mean Arterial Pressure (MAP) of 65 – 80 mmHg.
- **STEMI (ST-Elevation Myocardial Infarction)**
  - Consider placing 2 IV sites in the left arm: Many PCI centers use the right radial artery for intervention.
  - Consider placing defibrillator pads on patient as a precaution.
  - Document and time-stamp facility STEMI notification and make notification as soon as possible.
  - Document the time of each of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (Paramedic).
- Consider transport to facility capable of managing the post-arrest patient including hypothermia therapy, cardiology / cardiac catheterization, intensive care service, and neurology services.
- **KEY DOCUMENTATION:**
  - ❑ Immediate post-arrest rhythms, vital signs (Pulse Rate, Blood Pressure, Respiratory Rate, Neurologic Status) and Oxygen Saturation.
  - ❑ Documentation of EndTidal CO2 measurements by Continuous Waveform Capnography.
  - ❑ Post-ROSC 12 lead EKG.

# Ventricular Tachycardia (With A Pulse)

**History**
- Past medical history / medications, diet, drugs.
- Syncope / near syncope
- CHF
- Palpitations
- Pacemaker
- Allergies: lidocaine / novacaine

**Signs and Symptoms**
- Ventricular tachycardia on ECG (Intermittent and symptomatic or sustained)
- Rapid pulse
- Chest pain, shortness of breath
- Dizziness
- Rate usually 150 - 180 bpm for sustained V-Tach
- **QRS > .12 Sec**

**Differential**
- Artifact / Device failure
- Cardiac
- Endocrine / Metabolic
- Drugs
- Pulmonary




ADULT CARDIOVASCULAR

# Ventricular Tachycardia
# (With A Pulse)

ADULT CARDIOVASCULAR

**PEARLS**

- **Recommended Exam: Mental Status, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- For witnessed / monitored ventricular tachycardia, try having patient cough.
- Polymorphic V-Tach (Torsades de Pointes) may benefit from the administration of **Magnesium Sulfate** if available.
- If presumed hyperkalemia (end-state renal disease, dialysis, etc.), administer **Sodium Bicarbonate**.
- * Adenosine should **NOT** be given for unstable or for irregular or for polymorphic wide-complex tachycardias as it may cause degeneration of the arrhythmia to Ventricular Fibrillation.
- Calcium Channel Blocker administered **ONLY** with Narrow Complex Tachydysrhythmia.
- Monitor for hypotension after administration of Antidysrhythmics.
- Monitor for respiratory depression and hypotension associated with Sedation.
- Continuous pulse oximetry is required for all Patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Initial rhythm and all rhythm changes
  - ❑ Time, Dose, and Response to medications given
  - ❑ Cardioversion times, Synchronization, Number of Attempts, Joules, and Response
  - ❑ Obtain monitor strips before, during, and after each intervention. Monitor strips should be appended to ePCR.
  - ❑ Patient Weight
  - ❑ Pediatric length based tape color (for pediatrics who fit on tape).
  - ❑ History of event supporting treatment of underlying causes.
  - ❑ Blood Sugar Obtained
  - ❑ Use of Sedation for responsive patients

# Supraventricular Tachycardia
# Atrial Fibrillation (QRS ≤ 120ms)

**History**
- Medications (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin, Ritalin, Adderall)
- Diet (caffeine, chocolate)
- Drugs (nicotine, cocaine)
- Past medical history
- History of palpitations / heart racing
- Syncope / near syncope

**Signs and Symptoms**
- HR > 150/Min
- **QRS < .12 Sec (if QRS >.12 sec, go to V-Tach C.O.G.**
- **If history of WPW, go to V-tach C.O.G.**
- Dizziness, CP, SOB
- Potential presenting rhythm
  - Atrial/Sinus tachycardia
  - Atrial fibrillation / flutter
  - Multifocal atrial tachycardia

**Differential**
- Heart disease (WPW, Valvular)
- Sick sinus syndrome
- Myocardial infarction
- Electrolyte imbalance
- Exertion, Pain, Emotional stress
- Fever
- Hypoxia
- Hypovolemia or Anemia
- Drug effect / Overdose (see HX)
- Hyperthyroidism
- Pulmonary embolus

**Exclusions:**
- Sinus Tachycardia
- WPW
- Wide QRS

**Vascular Access C.O.G.**

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

*** If patient is unstable and with NO current vascular access – initial therapy with synchronized electrical cardioversion is warranted**

**STABLE**

**B** **Blood Glucose Analysis** ↔ **Glucose Management C.O.G.**

**Rhythm Regular**

**YES**

**P** May attempt **Valsalva or other Approved Vagal Maneuver** initially and after each drug administration if indicated

**Adenosine**

**Persistent Tachydysrhythmia**

**YES**

**NO**

**If Rhythm Changes Exit to Appropriate C.O.G**

**Glucose Management C.O.G.**

**NO**

**Unstable/Altered Mental Status ***

**P** **Consider Adenosine**

**Synchronized Cardioversion** May Repeat as Needed

Consider **Sedation C.O.G.** for Cardioversion

If Rhythm Changes Exit to Appropriate C.O.G.

**P** Consider **Diltiazem**

Consider **Beta-Blocker**

Consider **Amiodarone**

**B** Repeat 12 Lead EKG **Acquisition**

**Blood Glucose Analysis**

**Notify Destination or Contact Medical Control**

ADULT CARDIOVASCULAR

# Supraventricular Tachycardia
# Atrial Fibrillation (QRS ≤ 120ms)

ADULT CARDIOVASCULAR

**PEARLS**

- **Recommended Exam: Mental Status, Neck, Lung, Heart (Pulses), Abdomen, Back, Extremities, Neuro, Skin.**
- If patient has history or 12 Lead ECG reveals Wolfe Parkinson White (WPW), DO NOT administer a Calcium Channel Blocker (e.g., Diltiazem) or Beta Blockers.
- Calcium Channel Blocker administered ONLY with Narrow Complex Tachydysrhythmia.
- Adenosine may not be effective in identifiable atrial flutter/fibrillation, yet is not harmful.
- Monitor for hypotension after administration of Calcium Channel Blocker or Beta Blockers.
- Monitor for respiratory depression and hypotension associated with sedation.
- Continuous pulse oximetry is required for all SVT Patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Initial rhythm and all rhythm changes
  - ❑ Time, Dose, and Response to medications given
  - ❑ Cardioversion times, Synchronization, Number of Attempts, Joules, and Response
  - ❑ Obtain monitor strips before, during, and after each intervention. Monitor strips should append to ePCR.
  - ❑ Patient Weight
  - ❑ Pediatric length based tape color (for pediatrics who fit on tape).
  - ❑ History of event supporting treatment of underlying causes.
  - ❑ Blood Sugar Obtained
  - ❑ Use of Sedation for responsive patients

# Bradycardia

**History**
- Past medical history
- Medications
  - Beta-Blockers
  - Calcium channel blockers
  - Clonidine
  - Digoxin
- Pacemaker

**Signs and Symptoms**
- HR < 60/min with hypotension, acute altered mental status, chest pain, acute Pulmonary Edema, seizures, syncope, or shock secondary to bradycardia
- Chest pain
- Respiratory distress
- Hypotension or Shock
- Altered mental status
- Syncope

**Differential**
- **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**
- **Hypokalemia**
- **Beta-Blocker**
- **Calcium Channel Blocker**

**Vascular Access C.O.G.**

**Glucose Management C.O.G.** ↔ **B** Blood Glucose Analysis

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

**HR < 60 / min with hypotension, acute altered mental status, chest pain, acute Pulmonary Edema, seizures, syncope, or shock secondary to bradycardia**

NO → Continue to Monitor and Reassess → **Exit to Appropriate C.O.G.**

YES

**P** **Atropine**

**Hypotension with No Evidence of Pulmonary Edema**

YES → **Hypotension C.O.G.**

NO

**P**
- Consider **Inotrope Infusion**
- **Consider External Pacing** early in the unstable patient (Especially in 2nd or 3rd Degree Heart Block) ↔ Consider **Sedation C.O.G.**
- **Consider Specific Therapies** Such as antidotal therapy, hyperkalemia, or rewarming ↔ **Exit to Appropriate C.O.G.**

**Notify Destination or Contact Medical Control**

**Reversible Causes**

**H**ypovolemia
**H**ypoxia
**H**ydrogen ion (acidosis)
**H**ypothermia
**H**ypo / **H**yperkalemia
**T**ension pneumothorax
**T**amponade; cardiac
**T**oxins
**T**hrombosis; pulmonary (PE)
**T**hrombosis; coronary (MI)

**If Suspected Beta-Blocker or Calcium Channel Blocker - Follow Overdose/ Toxic Ingestion C.O.G.**

ADULT CARDIOVASCULAR

# Bradycardia

**PEARLS**

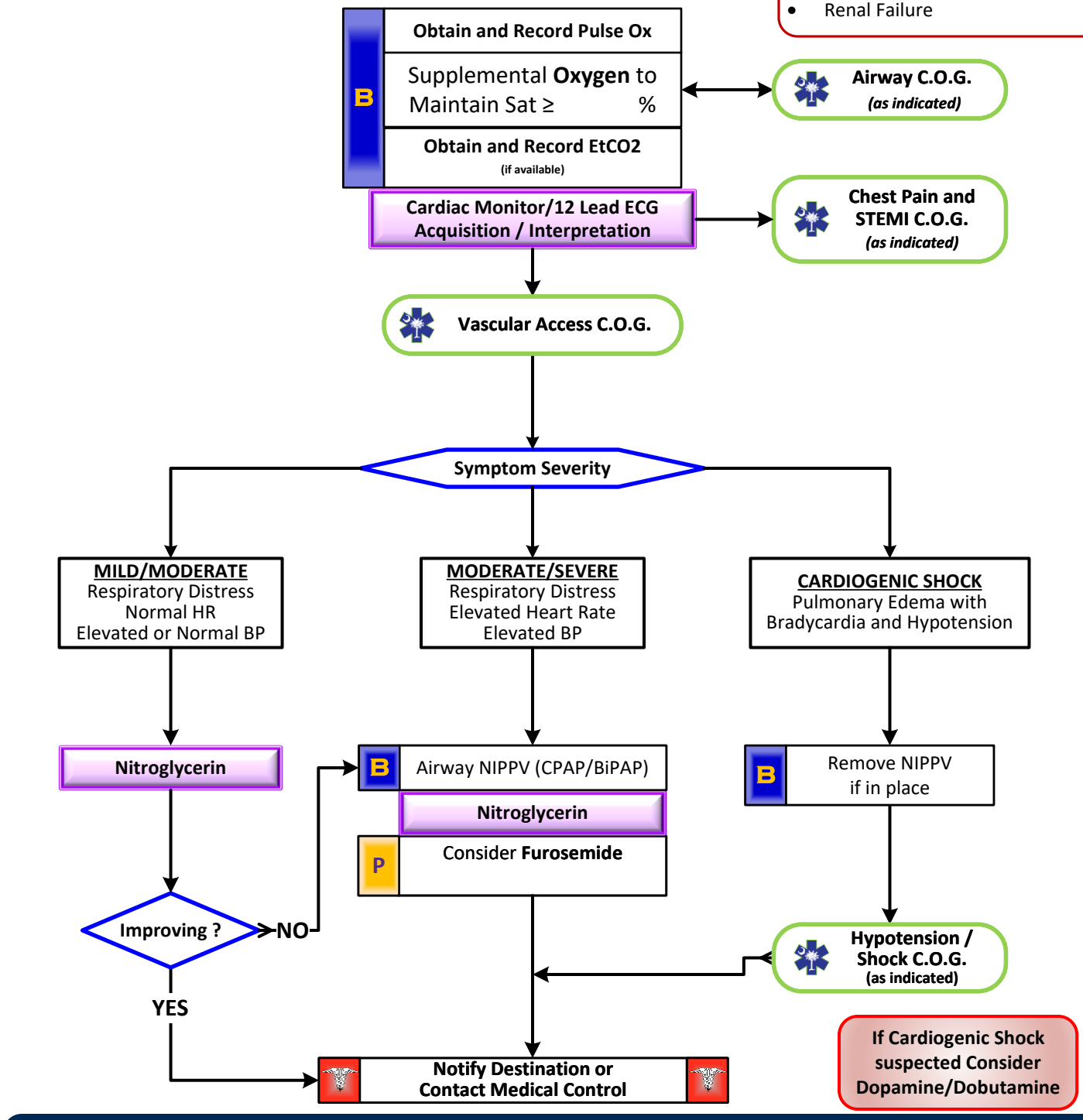
- **Recommended Exam: Mental Status, Neck, Heart, Pulses, Lungs, Neuro**
- The use of Antidysrhythmics, Beta Blockers, and Calcium Channel Blockers in heart block can worsen Bradycardia and lead to asystole and death.
- **Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount.**
- **Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic, otherwise monitor and reassess.**
- **Consider hyperkalemia with wide complex, bizarre appearance of QRS complex, and bradycardia. Give Calcium Chloride or Gluconate in addition to Sodium Bicarbonate if hyperkalemia suspected.**
- **12-Lead ECG:**
  - **12 Lead ECG not necessary to diagnose and treat**
  - **Obtain when patient is stable and/or following rhythm conversion.**
- **Hypoxemia is a common cause of bradycardia. Ensure oxygenation and support respiratory effort.**
- Pharmacological treatment of Bradycardia is based upon the presence or absence of symptoms. **If symptomatic treat. If asymptomatic - monitor only.**
- **Atropine:**
  - **Atropine is considered a first line agent in symptomatic bradycardia.**
  - **Ineffective and potentially harmful in cardiac transplantation. May cause paradoxical bradycardia.**
- **Symptomatic bradycardia causing shock or peri-arrest condition:**
  - **If no IV or IO access immediately available start Transcutaneous Pacing, establish IV / IO access, and then administer atropine and/or epinephrine.**
  - **Epinephrine or Dopamine may be considered if no response to Atropine.**
- **Symptomatic condition**
  - **Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.**
  - **Symptomatic bradycardia usually occurs at rates < 50 beats per minute.**
  - **Search for underlying causes such as hypoxia or impending respiratory failure.**
- **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.**
- **Transcutaneous Pacing Procedure (TCP)**
  - **Indicated with unstable bradycardia unresponsive to medical therapy.**
  - **If time allows transport to specialty center because transcutaneous pacing is a temporizing measure.**
  - **Transvenous / permanent pacemaker will probably be needed.**
  - **Immediate TCP with high-degree AV block (2d or 3d degree) with no IV / IO access.**
- Consider treatable causes for bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)
- **Remember:** The use of Atropine for PVCs in the presence of a MI may worsen heart damage.
- If vascular access is problematic and the patient is symptomatic, initial therapy with external pacing may be warranted.
- Consider treatable causes for Bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Initial Vital Signs and Blood Glucose
  - ❑ Cardiac Rhythm / Rate
  - ❑ Time, dose, and response to medications administered
  - ❑ Pacing:
    - ❑ Time started or discontinued
    - ❑ Rate, mA (milliamperes), Capture
    - ❑ Response Rate
    - ❑ Sedation utilized – dose and timing
  - ❑ Patient Weight
  - ❑ Pedaitric length based on tape color
  - ❑ History of event supporting treatment of underlying causes

# CHF/Pulmonary Edema

**History**
- Past medical history
- **PMH: Cardiac History: Previous CHF or Myocardial Infarction**
- Medications (Digoxin, Diuretics, Entresto)
- **Erectile Dysfunction Medication**

**Signs/Symptoms**
- Respiratory distress, bilateral rales
- Apprehension, orthopnea
- Jugular vein distention
- Pink, frothy sputum
- Peripheral edema, diaphoresis
- Hypertension
- Hypotension, shock
- Chest pain

**Differential**
- Myocardial infarction
- Congestive heart failure
- Asthma
- Anaphylaxis
- Aspiration
- COPD
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pericardial tamponade
- Toxic Exposure
- Fluid Overload
- Renal Failure




ADULT CARDIOVASCULAR

# CHF/Pulmonary Edema

| Nitroglycerin Bolus Dosing |
|---|
| **INDICATIONS:** For use in patients with systolic Blood Pressure > 160 mmHg or MAP > 120 mmHg who have marked dyspnea and signs of Congestive Heart Failure |
| **CONTRAINDICATIONS:** Aortic Stenosis; Hypertrophic Cardiomyopathy; Recent use of a PDE-5 inhibitor (Viagra, Cialis; Levitra) |
| |
| **ADMIXTURE:** |
| 10 mg of Nitroglycerin mixed with 10 mL of NS = 1000 mcg/mL |
| 5 mg of Nitroglycerine mixed with 10 mL of NS = 500 mcg/mL |
| **ADMINISTRATION:** |
| 1 mg Bolus Dosing Q 5 minutes (1000 mcg/5 minutes0 |
| 3 mg Total Maximum Dosing unless otherwise directed by OLMC |

| Killip Classification in Acute Myocardial Infarction | | | |
|---|---|---|---|
| **Killip Classification** | **PAO2 (on Room Air)** | **Clinical Description** | **Estimated Mortality** |
| | | | |
| **Class 1** | Normal | No clinical evidence of left ventricular (LV) failure | 6% |
| **Class 2** | Slightly Reduced | Findings consistent with mild to moderate heart failure (eg, S3 gallop, lung rales less than one-half way up the posterior lung fields, or jugular venous distension) | 17% |
| **Class 3** | Abnormal | Overt pulmonary edema | 38% |
| **Class 4** | Severely Abnormal | Cardiogenic shock | 67% |

ADULT CARDIOVASCULAR

## PEARLS

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Extremities, Neuro**
- Diuretics (furosemide) and opioids have NOT been shown to improve the outcomes of EMS patients with pulmonary edema. Even though this historically has been a mainstay of EMS treatment, it is no longer routinely recommended.
- **Nitroglycerin:**
  - 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.
  - Nitroglycerin may cause hypotension during any type myocardial infarction. It is NOT more likely to cause hypotension in an inferior MI and should NOT be avoided unless already hypotensive.
- **Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (Paramedic).**
- **Consider myocardial infarction in all these patients. Diabetics, geriatric and female patients often have atypical pain, or only generalized complaints.**
- **Cardiac related symptoms in men and women:**
  - Pressure, squeezing, fullness, or pain in the chest.
  - Pain or discomfort in one or both arms, the back, neck, jaw, or stomach.
  - Shortness of breath with or without chest pain.
  - Sweating, nausea, weakness, and/or lightheadedness.
  - Diabetic patients, females, and the elderly often experience only weakness, shortness of breath, nausea/ vomiting, and back or jaw pain – or atypical symptoms
- If patient has taken nitroglycerin without relief, consider potency of the medication.
- Monitor for hypotension after administration of nitroglycerin.
- Allow the patient to be in their position of comfort to maximize their breathing effort.
- Agency medical director may require Contact of Medical Control.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Initial Vital Signs including B/P, Pulse Rate, Respiratory Rate, SpO2, EtCO2,
  - ❑ Pertinent Exam: Cardiac Sounds, Chest Auscultation, Jugular Veins, Peripheral Edema, Accessory muscle use
  - ❑ Presenting Symptoms: Chest Pain, Dyspnea, Palpitations, Edema, etc.
  - ❑ EKG Evaluation and Strips.
  - ❑ Repeat Vital Signs as above + Repeat Physical Examination
  - ❑ Interventions and response to interventions

# Emergencies Involving LVADs

**History**
- Adult patient with Implantable Left Ventricular Assist Device
- Previous history of VAD malfunction

**Signs and Symptoms**
- Device Alarms
- Syncope
- Shock
- Pallor
- Diaphoresis
- Altered Mental Status
- Power or equipment failure at residence
- Auscultate for "hum" of device

**Differential**
- Low Batteries or Battery Failure
- Infection
- Stroke / Transient Ischemic Attack (TIA)
- Bleeding
- Arrhythmia
- Cardiac Tamponade
- Congestive Heart Failure
- Aortic Insufficiency

- Have patient stop all activity and assess for patient tolerance
- Assess pump and controller for alarms
- Auscultate for pump sound "hum"

- Change VAD batteries
- Change system controller if indicated
- Check all connections to system controller

**B** Airway

**A** IV Access

**Functioning VAD / Non-cardiovascular related problem**

Exit to Appropriate C.O.G.

**CARDIAC ARREST**

- CPR should not be performed if evidence the pump is functioning.
- CPR decision based on best clinical judgment
- CPR initiated ONLY where:
- Confirmed pump has stopped and troubleshooting efforts have failed

**-AND-**

- Patient is unresponsive without detectable signs of life

Exit to Appropriate C.O.G.

**VAD related complications – or cardiovascular problems,**

Expedite transport to the medical facility where VAD was placed if patient's clinical condition and time allows

- **Contact the patient's VAD-trained companion if possible**
- **Contact the patient's VAD coordinator using the phone number on the device**

**Signs of Hypoperfusion OR Low Flow Alarm**

NO

YES

**P**
- IV NS (30mL/Kg – Max 1 L) < 15 mins.
- Utilize "push-pull" method to rapidly infuse or Rapid Infuser Device
- May repeat up to 3 times – total fluid NOT to exceed 3 L

Cardiac Monitor/12 Lead ECG Acquisition / Interpretation

Consider Dyrhythmia Management - Exit to Appropriate C.O.G.

**Notify Destination or Contact Medical Control**

ADULT CARDIOVASCULAR

# Emergencies Involving LVADs

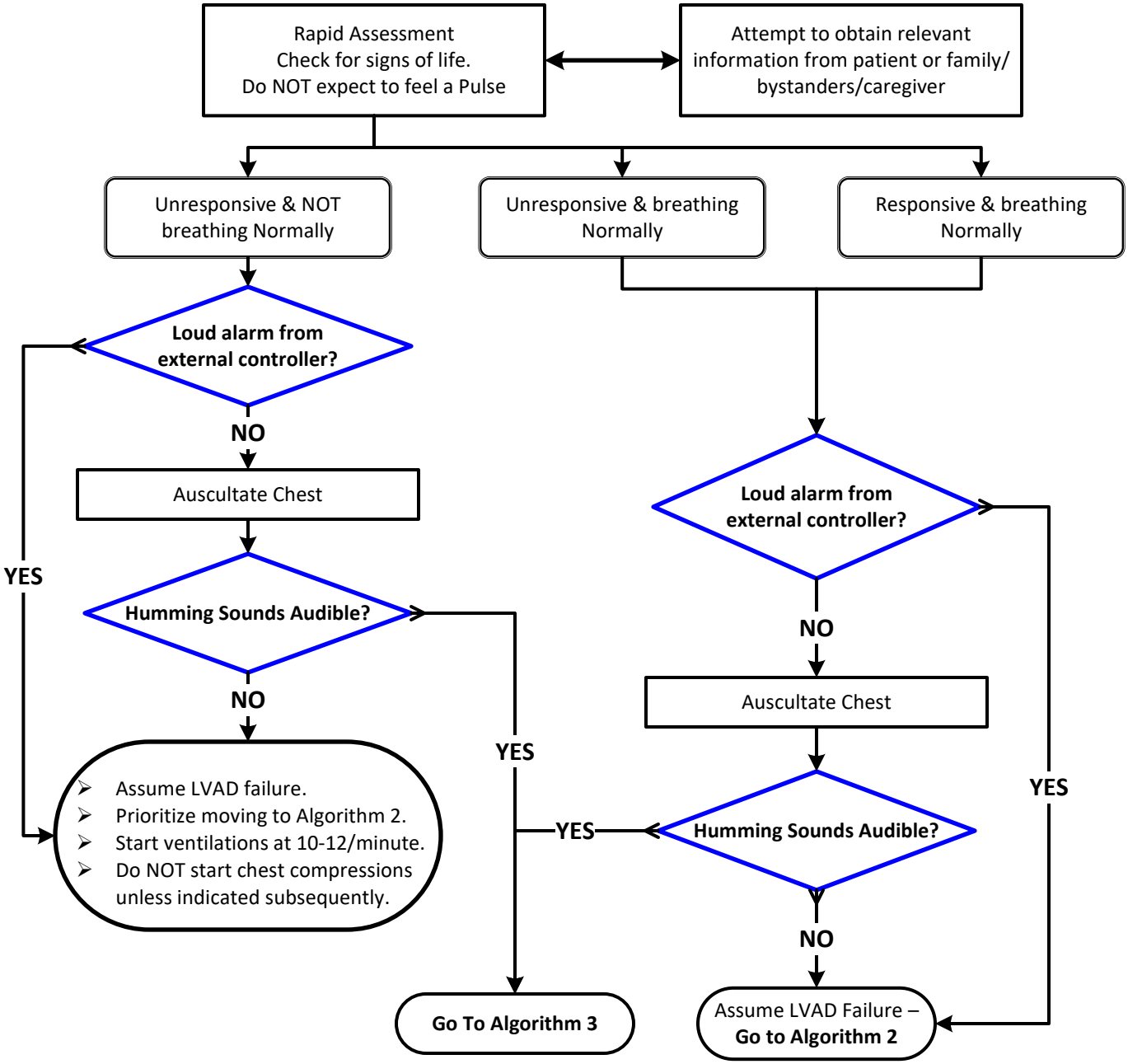
**Push-Pull IV Bolus Administration**

- With IV Line in place – Insert Syringe with Needle into IV Bag Port – or IV Line Port.
- Clamp IV Line Below (distal to) Needle insertion Point (prevents aspiration of blood from patient)
- Aspirate IV Fluid from IV Bag to fill syringe
- Clamp IV Line Above (proximal to) Needle insertion point. (prevents injection of fluid back into IV Bag)
- Release clamp distal to needle insertion point
- Push IV Fluid from syringe into IV Line (patient) while maintaining clamp on proximal portion of IV Line.

## PEARLS

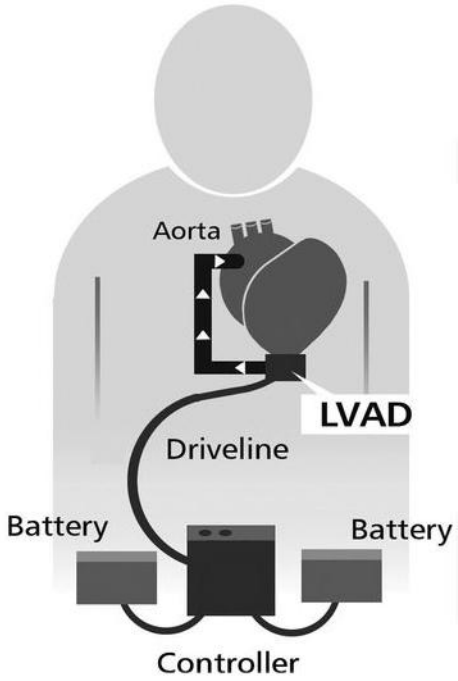
- **Always talk to family / caregivers as they have specific knowledge and skills.**
- Always use patient's equipment if available and functioning properly.
- You do not need to disconnect the controller or batteries to:
  - Defibrillate or cardiovert
  - Acquire a 12-lead EKG
- Automatic non-invasive cuff blood pressures may be difficult to obtain due to the narrow pulse pressure created by the continuous flow pump
- Although automatic non-invasive blood pressure cuffs are often ineffective in measuring systolic and diastolic pressure, if they do obtain a measurement, the MAP is usually accurate
- **Flow through many VAD devices is not pulsatile, and patients may not have a palpable pulse or accurate pulse oximetry**
- **The blood pressure, if measurable, may not be an accurate measure of perfusion**
- **Ventricular fibrillation, ventricular tachycardia, or asystole/PEA may be the patient's "normal" underlying rhythm.** Evaluate clinical condition and provide care in consultation with VAD coordinator
- The patient's travel bag should always accompany them with back-up controller and spare batteries
- If feasible, bring the patient's power module, cable, and display module to the hospital
- **The most common cause for VAD alarms is low batteries or battery failures**
- Other VAD complications:
  - Infection
  - Stroke/Transient ischemic attack (TIA)
  - Bleeding
  - Dysrhythmias
  - Cardiac tamponade
  - Congestive heart failure (CHF)
  - Aortic insufficiency
- Push-pull method involves the drawing up of the fluid in a syringe and pushing it through the IV
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Information gained from the VAD control box indicating any specific device malfunctions
  - ❑ Interventions performed to restore a malfunctioning VAD to normal function
  - ❑ Time of notification to and instructions from VAD-trained companion and/or VAD coordinator

# Emergencies Involving LVADs
## Algorithm 1




ADULT CARDIOVASCULAR

# Emergencies Involving LVADs
## Algorithm 2




No humming sound heard in chest

Loud Alarm from LVAD

↓

Assume LVAD NOT working.
Try to Restart

↓

Expose Controller, Power Source, and Driveline

↓

Ensure driveline is firmly attached to controller

↓

Ensure that all connections between the controller and a working power source (charged battery or mains power) are secure

↓

Assess battery charge by pressing charge indicator button on battery.
Replace discharged batteries with charged battery or mains power adaptor

↓

**LVAD Restarted? Humming sound audible**

**NO** → Attach a charged battery (or mains power) to spare controller. Detach driveline from old controller and connect it to new controller

↓

**LVAD Restarted? Humming sound audible**

**YES** → **Go To Algorithm 3**

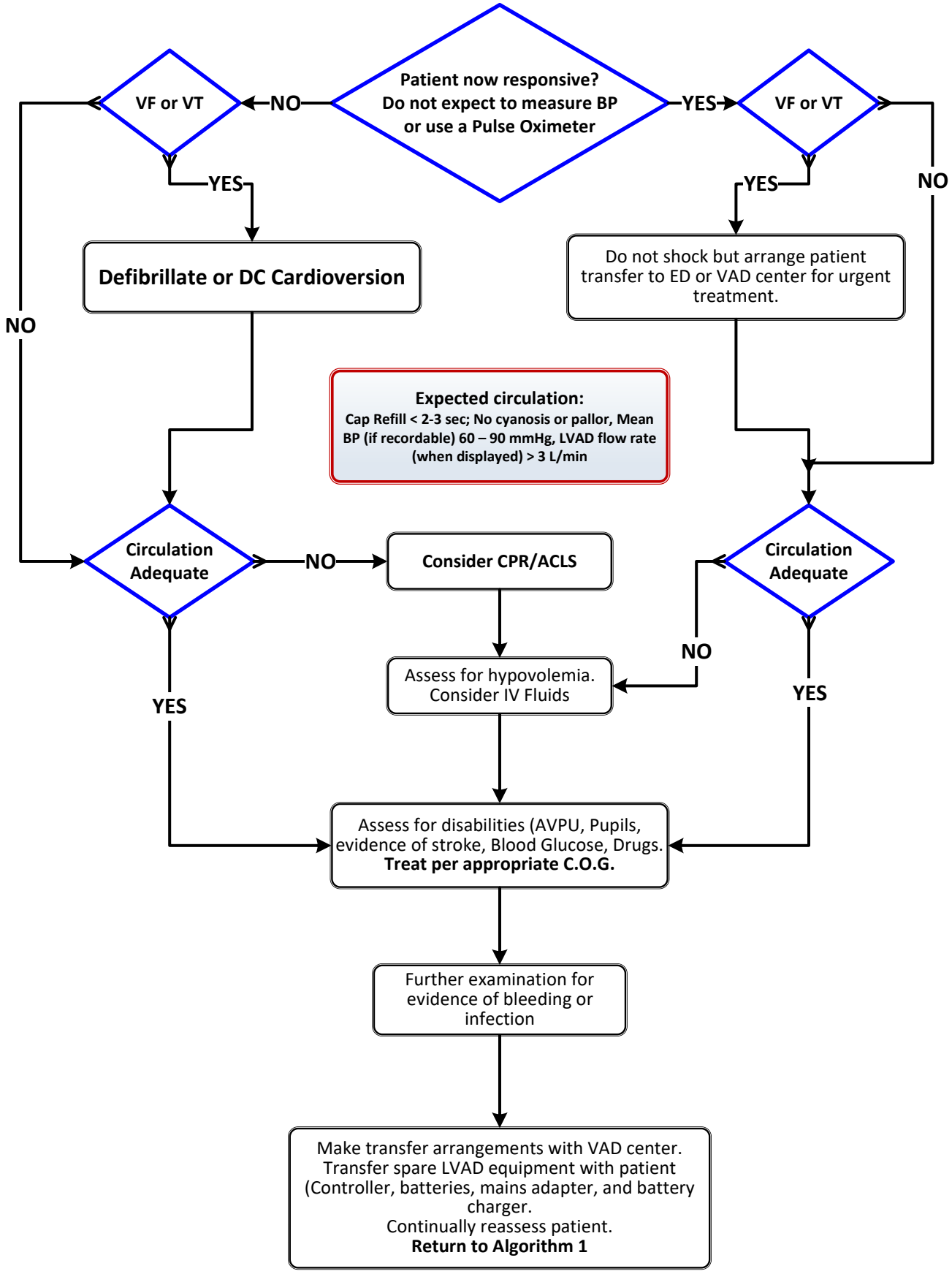
**NO** →

Consider cable fracture. Quickly but gently manipulate driveline to try to restore broken contact. If successful, stabilize driveline with tape.

→ **Go To Algorithm 3**

ADULT CARDIOVASCULAR

# Emergencies Involving LVADs
## Algorithm 3




ADULT CARDIOVASCULAR

# Field Triage and Bypass

## National Guideline for the Field Triage of Injured Patients

### RED CRITERIA
***High Risk for Serious Injury***

#### Injury Patterns

- Penetrating injuries to head, neck, torso, and proximal extremities
- Skull deformity, suspected skull fracture
- Suspected spinal injury with new motor or sensory loss
- Chest wall instability, deformity, or suspected flail chest
- Suspected pelvic fracture
- Suspected fracture of two or more proximal long bones
- Crushed, degloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Active bleeding requiring a tourniquet or wound packing with continuous pressure

#### Mental Status & Vital Signs

**All Patients**
- Unable to follow commands (motor GCS < 6)
- RR < 10 or > 29 breaths/min
- Respiratory distress or need for respiratory support
- Room-air pulse oximetry < 90%

**Age 0–9 years**
- SBP < 70mm Hg + (2 x age in years)

**Age 10–64 years**
- SBP < 90 mmHg or
- HR > SBP

**Age ≥ 65 years**
- SBP < 110 mmHg or
- HR > SBP

***Patients meeting any one of the above RED criteria should be transported to the highest-level trauma center available within the geographic constraints of the regional trauma system***

### YELLOW CRITERIA
***Moderate Risk for Serious Injury***

#### Mechanism of Injury

- High-Risk Auto Crash
  - Partial or complete ejection
  - Significant intrusion (including roof)
    - >12 inches occupant site OR
    - >18 inches any site OR
    - Need for extrication for entrapped patient
  - Death in passenger compartment
  - Child (age 0–9 years) unrestrained or in unsecured child safety seat
  - Vehicle telemetry data consistent with severe injury
- Rider separated from transport vehicle with significant impact (eg, motorcycle, ATV, horse, etc.)
- Pedestrian/bicycle rider thrown, run over, or with significant impact
- Fall from height > 10 feet (all ages)

#### EMS Judgment

**Consider risk factors, including:**

- Low-level falls in young children (age ≤ 5 years) or older adults (age ≥ 65 years) with significant head impact
- Anticoagulant use
- Suspicion of child abuse
- Special, high-resource healthcare needs
- Pregnancy > 20 weeks
- Burns in conjunction with trauma
- Children should be triaged preferentially to pediatric capable centers

**If concerned, take to a trauma center**

***Patients meeting any one of the YELLOW CRITERIA WHO DO NOT MEET RED CRITERIA should be preferentially transported to a trauma center, as available within the geographic constraints of the regional trauma system (need not be the highest-level trauma center)***

ADULT TRAUMA

# Field Triage and Bypass



**PEARLS**

- **EMS Service *must identify* - in their local protocols - appropriate hospitals when no trauma center is available.**
- **Transport Destination is chosen based on the EMS System Trauma Plan with EMS pre-arrival notification.**
- 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.
- **When significant Trauma coexists in the Burn Patient – initial transport should be to a BURN Center ONLY if the BURN Center has an appropriate Trauma Designation. IF the available burn center does not have the appropriate TRAUMA designation for the coexistent injuries, or the patient is unstable for the time required to arrive at the burn center, THEN transport should be to the nearest appropriate trauma center first**
- In prolonged extrications or serious trauma, consider air transportation for transport times and the ability to transfuse blood if urgently needed and not available otherwise.
- Scene times should not be delayed for procedures. Procedures should be performed en route when possible. Rapid transport of the unstable trauma patient is the goal.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Presence or Absence of defined criteria for transport decision / Reasoning for EMS judgement

# Major Trauma

**History**
- 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

**Signs and Symptoms**
- Pain, swelling
- Deformity, lesions, bleeding
- Altered mental status or unconscious
- Hypotension or shock
- Arrest

**Differential (Life threatening)**
- **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**

**Assessment of Serious Signs/ Symptoms / Dangerous Mechanism**
ABCD / Primary Survey

Consider potential causes of event: Stroke, Seizure, MI, etc.

**Spinal Motion Restriction C.O.G.**

**Airway C.O.G.** *(If indicated)*

**Hemorrhage Control C.O.G.** *(If indicated)*

**B** VS / Perfusion / GCS / RTS

**ABNORMAL**

**Rapid Transport**
to appropriate destination using
EMS System Trauma Plan
Limit Scene Time
Provide Early Notification

**B** Splint Suspected Fractures
Consider Pelvic Binding

**P** Consider **Chest Decompression**
Needle Procedure if indicated

**Vascular Access C.O.G.**

**Hypotension C.O.G**

**Head Injury C.O.G.** *if indicated*

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

**Pain Management C.O.G.**

**B** **Full Secondary Assessment**

**NORMAL**

**Full Secondary Assessment**

**B** Splint Suspected Fractures
Consider Pelvic Binding

**Vascular Access C.O.G.**

**Pain Management C.O.G.**

**Transport** to
appropriate destination using
EMS System Trauma Plan

**Monitor and Reassess**

**Notify Destination or Contact Medical Control**

ADULT TRAUMA

# Major Trauma

| REVISED TRAUMA SCORE | | | |
|---|---|---|---|
| RTS | GCS | SBP | RR |
| | | (mmHg) | Breaths/min |
| 4 | 13-15 | > 89 | 10-29 |
| 3 | 9-12 | 76-89 | >29 |
| 2 | 6-8 | 50-75 | 6-9 |
| 1 | 4-5 | 1-49 | 1-5 |
| 0 | 3 | 0 | 0 |

**RTS Formula**

**(0.9368)(GCS) + (0.7326)(SBP) + (0.2908) (RR) = RTS**

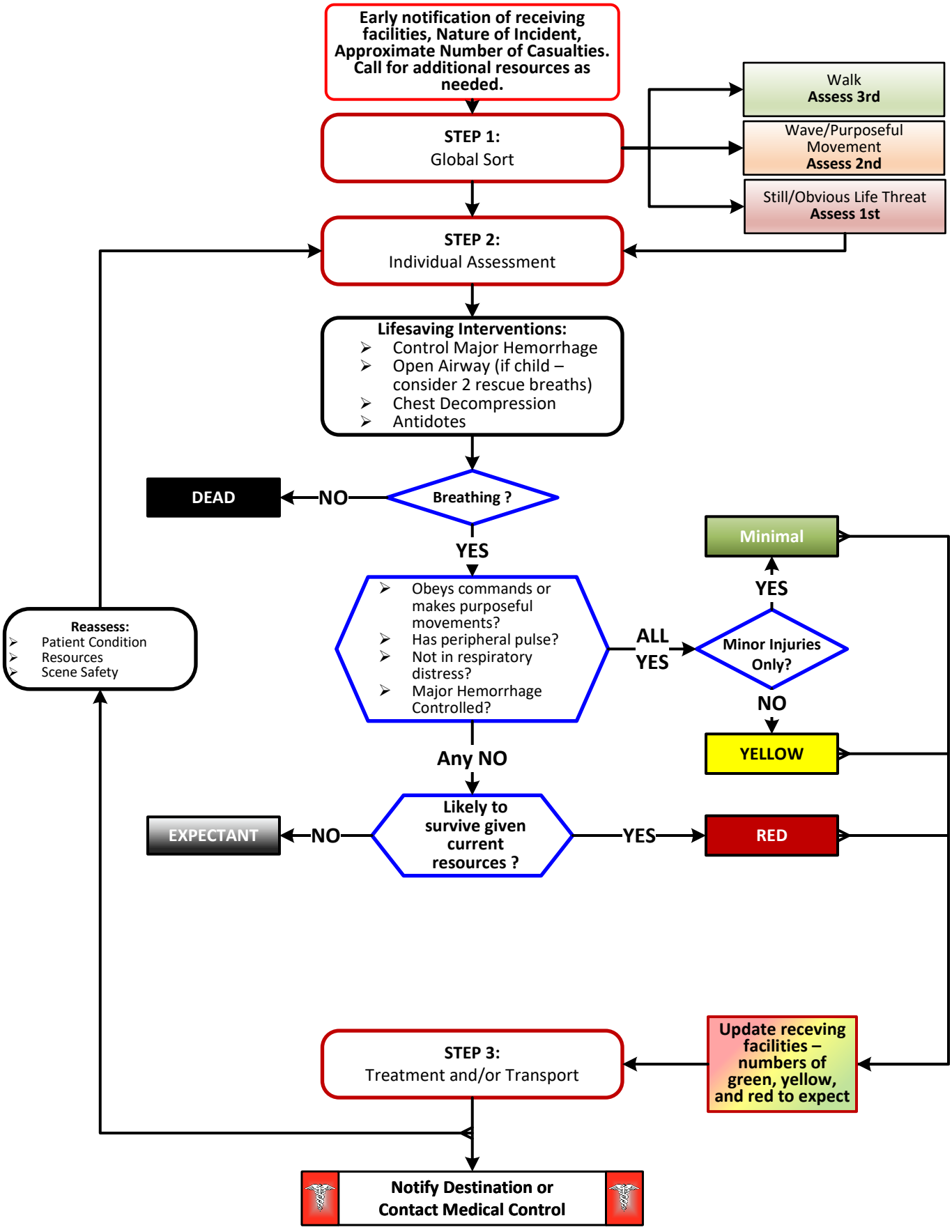
| Glasgow Coma Scale | | | |
|---|---|---|---|
| ADULT GLASGOW COMA SCALE | | PEDIATRIC GLASGOW COMA SCALE | |
| | SCORE | | SCORE |
| EYE OPENING (4) | | EYE OPENING (4) | |
| Spontaneous | 4 | Spontaneous | 4 |
| To Speech | 3 | To Speech | 3 |
| To Pain | 2 | To Pain | 2 |
| None | 1 | None | 1 |
| BEST MOTOR RESPONSE (6) | | BEST MOTOR RESPONSE (6) | |
| Obeys Commands | 6 | Spontaneous Movement | 6 |
| Localizes Pain | 5 | Withdraws to Touch | 5 |
| Withdraws from Pain | 4 | Withdraws from Pain | 4 |
| Abnormal Flexion | 3 | Abnormal Flexion | 3 |
| Abnormal Extension | 2 | Abnormal Extension | 2 |
| None | 1 | None | 1 |
| VERBAL RESPONSE (5) | | VERBAL REESPONSE (5) | |
| Oriented | 5 | Coos, Babbles | 5 |
| Confused | 4 | Irritable Cry | 4 |
| Inappropriate | 3 | Cries To Pain | 3 |
| Incomprehensible | 2 | Moans to Pain | 2 |
| None | 1 | None | 1 |
| TOTAL | | TOTAL | |

ADULT TRAUMA

## PEARLS

- **Recommended Exam: Mental Status, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro, Skin,**
- **Transport Destination is chosen based on the EMS System Trauma Plan with EMS pre-arrival notification.**
- 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.
- In prolonged extrications or serious trauma, consider air transportation for transport times and the ability to transfuse blood if urgently needed and not available otherwise.
- Do not overlook the possibility of associated domestic violence or abuse.
- Scene times should not be delayed for procedures. Procedures should be performed en route when possible. Rapid transport of the unstable trauma patient is the goal.
- Bag valve mask is an acceptable method of managing the airway if pulse oximetry can be maintained above 92%
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Mechanism of injury
  - ❑ Patient age and sex
  - ❑ Primary and secondary survey
  - ❑ Apparent injuries
  - ❑ Serial vital signs including neurologic status assessments
    - ❑ Some clinicians ask for the lowest blood pressure and highest pulse
    - ❑ Scene time
    - ❑ Procedures performed and patient response
  - ❑ Pre-arrival notification and preparation

# Mass Casualty Triage
# SALT




ADULT TRAUMA

# Mass Casualty Triage
# SALT

ADULT TRAUMA

**PEARLS**

- Capillary refill can be altered by many factors including skin temperature. Age-appropriate heart rate may also be used in triage decisions.

# Traumatic Arrest

**History**
- Traumatic Injury

**Signs and Symptoms**
- Unresponsive
- Pulseless
- Apneic
- No electrical activity on EKG
- Ventricular fibrillation/ ventricular
- tachycardia
- No auscultated heart tones

**Differential (Life threatening)**
- **Medical/trauma**
- Hypoxia/pulmonary
- Potassium (hypo/hyper)
- Drug overdose
- Acidosis
- Hypothermia
- Device error/artifact

**Does the patient meet criteria for Termination on Scene C.O.G.?**

YES → **On Scene Termination C.O.G.**

NO

**WITNESSED**

**Trauma Center < 20 minutes**

NO → Remain on Scene

**Rapid Transport**
to appropriate destination using
EMS System Trauma Plan
Limit Scene Time
Provide Early Notification

**NOT WITNESSED**

Remain on Scene

**Initiate Traumatic Arrest Treatment Bundle**

- **Hemorrhage Control C.O.G.**
- **Airway C.O.G**
- **Vascular Access C.O.G.**
- **Blood Administraton C.O.G.** ↔ **O+ Whole Blood may be administered**
- P — Consider **Chest Decompression** Needle Procedure *if indicated*
- **Cardiac Arrest C.O.G**
- B — Consider Pelvic Binding
- **Age Appropriate Major Trauma C.O.G.** *if indicated*

**AT ANY TIME**
**Return of Spontaneous Circulation**

**Go to Post Resuscitation C.O.G.**

**Notify Destination or Contact Medical Control**

ADULT TRAUMA

# Traumatic Arrest

| REVISED TRAUMA SCORE | | | |
|---|---|---|---|
| RTS | GCS | SBP | RR |
| | | (mmHg) | Breaths/min |
| 4 | 13-15 | > 89 | 10-29 |
| 3 | 9-12 | 76-89 | >29 |
| 2 | 6-8 | 50-75 | 6-9 |
| 1 | 4-5 | 1-49 | 1-5 |
| 0 | 3 | 0 | 0 |

**RTS Formula**

**(0.9368)(GCS) + (0.7326)(SBP) + (0.2908) (RR) = RTS**

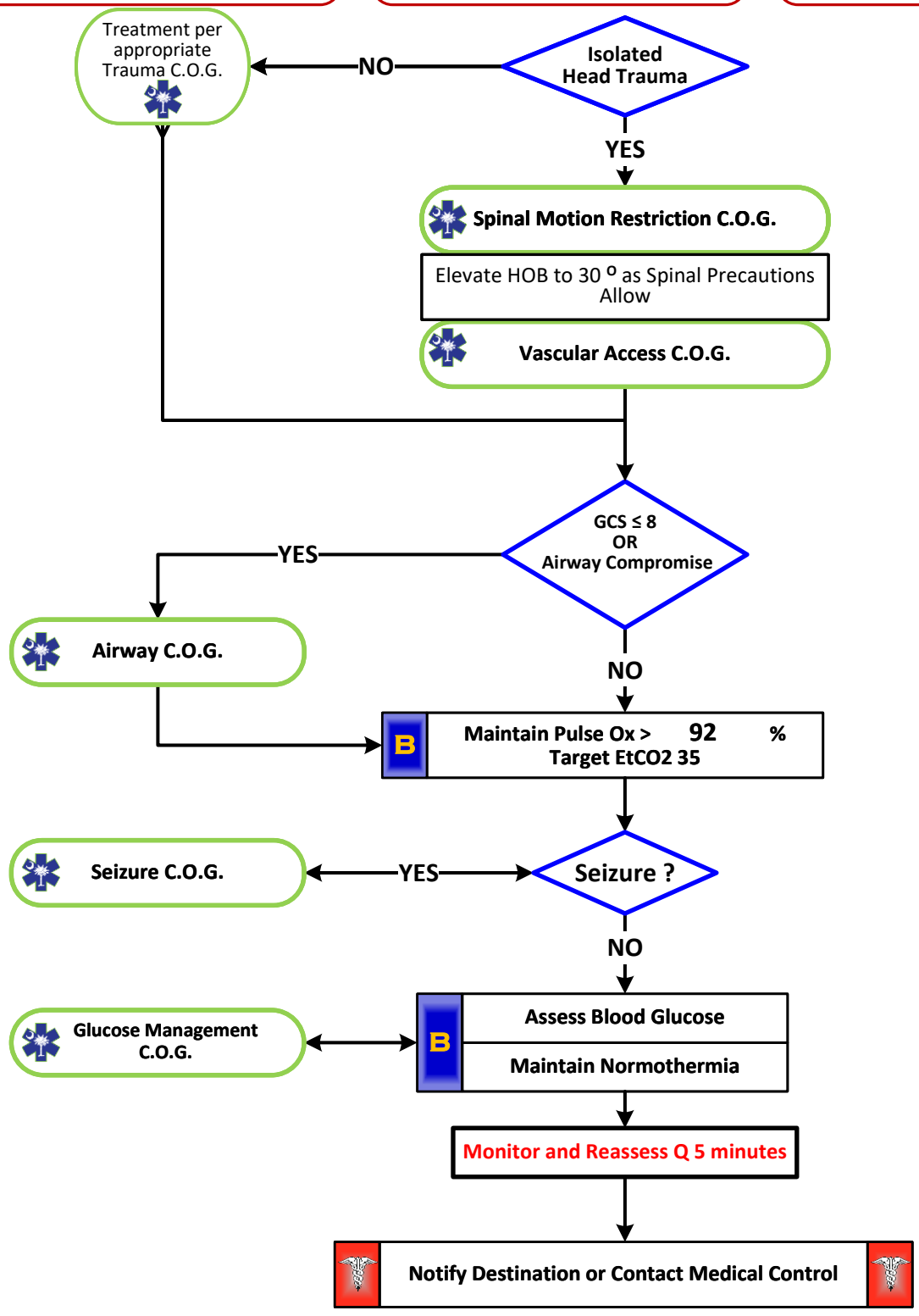
| Glasgow Coma Scale | | | |
|---|---|---|---|
| ADULT GLASGOW COMA SCALE | | PEDIATRIC GLASGOW COMA SCALE | |
| | SCORE | | SCORE |
| EYE OPENING (4) | | EYE OPENING (4) | |
| Spontaneous | 4 | Spontaneous | 4 |
| To Speech | 3 | To Speech | 3 |
| To Pain | 2 | To Pain | 2 |
| None | 1 | None | 1 |
| BEST MOTOR RESPONSE (6) | | BEST MOTOR RESPONSE (6) | |
| Obeys Commands | 6 | Spontaneous Movement | 6 |
| Localizes Pain | 5 | Withdraws to Touch | 5 |
| Withdraws from Pain | 4 | Withdraws from Pain | 4 |
| Abnormal Flexion | 3 | Abnormal Flexion | 3 |
| Abnormal Extension | 2 | Abnormal Extension | 2 |
| None | 1 | None | 1 |
| VERBAL RESPONSE (5) | | VERBAL REESPONSE (5) | |
| Oriented | 5 | Coos, Babbles | 5 |
| Confused | 4 | Irritable Cry | 4 |
| Inappropriate | 3 | Cries To Pain | 3 |
| Incomprehensible | 2 | Moans to Pain | 2 |
| None | 1 | None | 1 |
| TOTAL | | TOTAL | |

# Head Trauma

**History**
- Time of injury
- Mechanism (blunt vs. penetrating)
- Loss of consciousness
- Bleeding
- Past medical history
- Medications
- Evidence for multi-trauma

**Signs and Symptoms**
- Pain, swelling, bleeding
- Altered mental status
- Unconscious
- Respiratory distress / failure
- Vomiting
- Major traumatic mechanism of injury
- Seizure

**Differential**
- Skull fracture
- Brain injury (Concussion, Contusion, Hemorrhage or Laceration)
- Epidural hematoma
- Subdural hematoma
- Subarachnoid hemorrhage
- Spinal injury
- Abuse




ADULT TRAUMA

# Head Trauma

ADULT TRAUMA

**PEARLS**

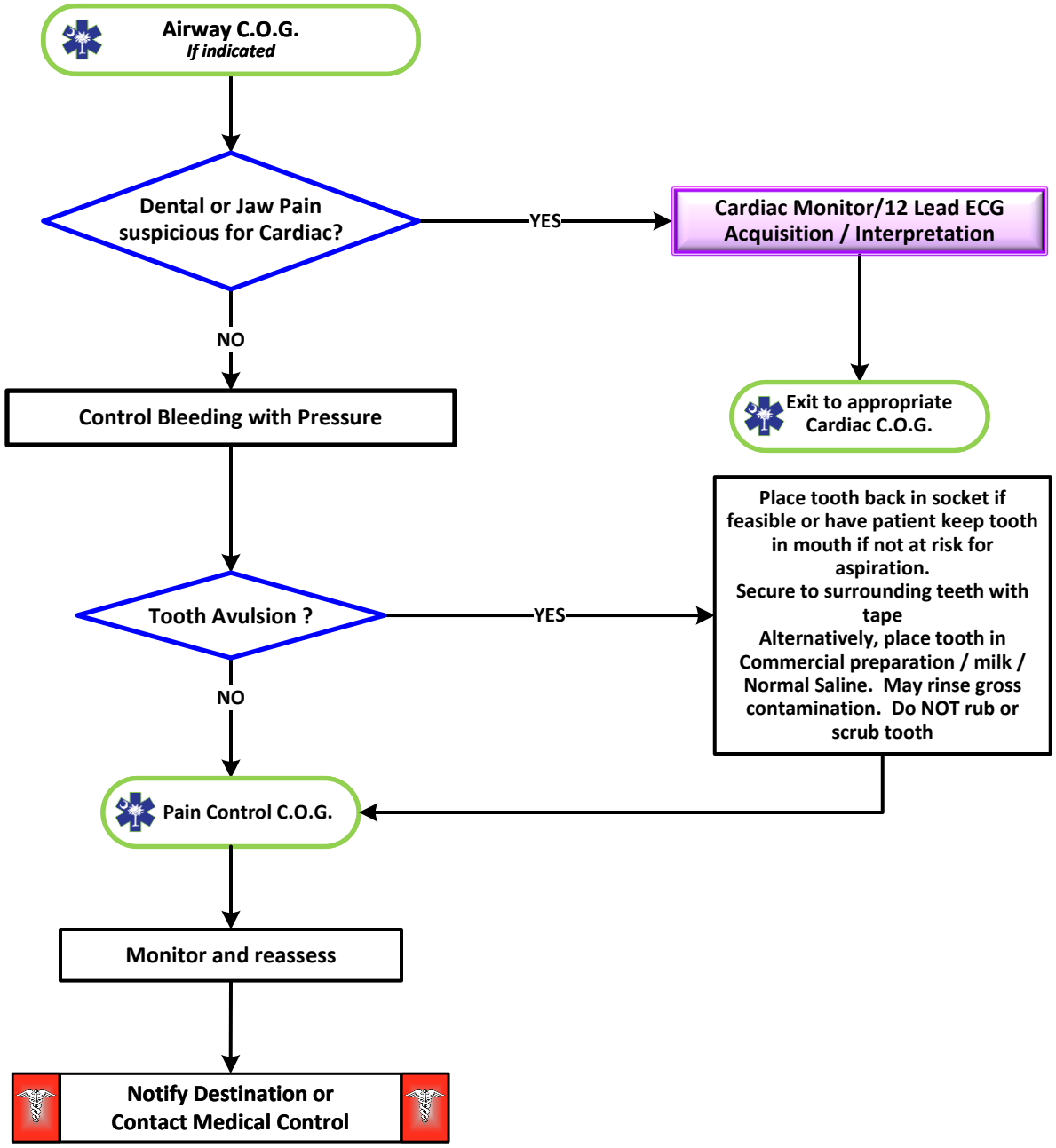
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro**
- If GCS < 12 consider air / rapid transport
- In the absence of Capnography, hyperventilate the patient (adult: 20 breaths/min, child: 30, infant: 35) only if ongoing evidence of brain herniation (blown pupil, decorticate or decerebrate posturing, or bradycardia)
- 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.
- The most important item to monitor and document is a change in the level of consciousness.
- Consider Restraints/Sedation if necessary for patient's and/or personnel's protection per the Restraint Procedure.
- Limit IV fluids unless patient is hypotensive.
- Concussions are periods of confusion or LOC associated with trauma which may have resolved by the time EMS arrives. Any prolonged confusion or mental status abnormality which does not return to normal within 15 minutes or any documented loss of consciousness should be evaluated by a physician ASAP.
- In areas with short transport times, RSI/Drug-Assisted Intubation is not recommended for patients who are spontaneously breathing and who have oxygen saturations of greater than 92% with supplemental oxygen
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ High-flow oxygen with non-rebreather (NRB) mask
  - ❑ Airway status and management
  - ❑ EtCO2 monitored and documented for all traumatic brain injury (TBI) patients with advanced airway and strict avoidance of hyperventilation, overventilation, and hypocapnia
  - ❑ Neurological status with vitals: AVPU, GCS
  - ❑ Exams: Neurological and Mental Status Assessment pre- and post-treatment
- **KEY PERFORMANCE MEASURES:**
  - ❑ No oxygen desaturation less than 92%
  - ❑ No hypotension:
    - ❑ Adults: less than 110 mmHg
    - ❑ Pediatrics:
      - ❑ Age less than 1 month: less than 60 mmHg
      - ❑ Age 1–12 months: less than 70 mmHg
      - ❑ Age 1–10 years: less than 70 + 2x age in years
  - ❑ Assess the patient's blood pressure prior to the administration of any medication that may cause hypotension.
  - ❑ EtCO2 target 40 mmHg (range 35–45 mmHg). Meticulous prevention of hypocapnia in all patients
  - ❑ Triage to the appropriate level hospital within the local trauma system

# Dental Problems

**History**
- Age
- Past medical history
- Medications
- Onset of pain / injury
- Trauma with "knocked out" tooth
- Location of tooth
- Whole vs. partial tooth injury

**Signs and Symptoms**
- Bleeding
- Pain
- Fever
- Swelling
- Tooth missing or fractured

**Differential**
- Decay
- Infection
- Fracture
- Avulsion
- Abscess
- Facial cellulitis
- Impacted tooth (wisdom)
- TMJ syndrome




ADULT TRAUMA

# Dental Problems



**PEARLS**

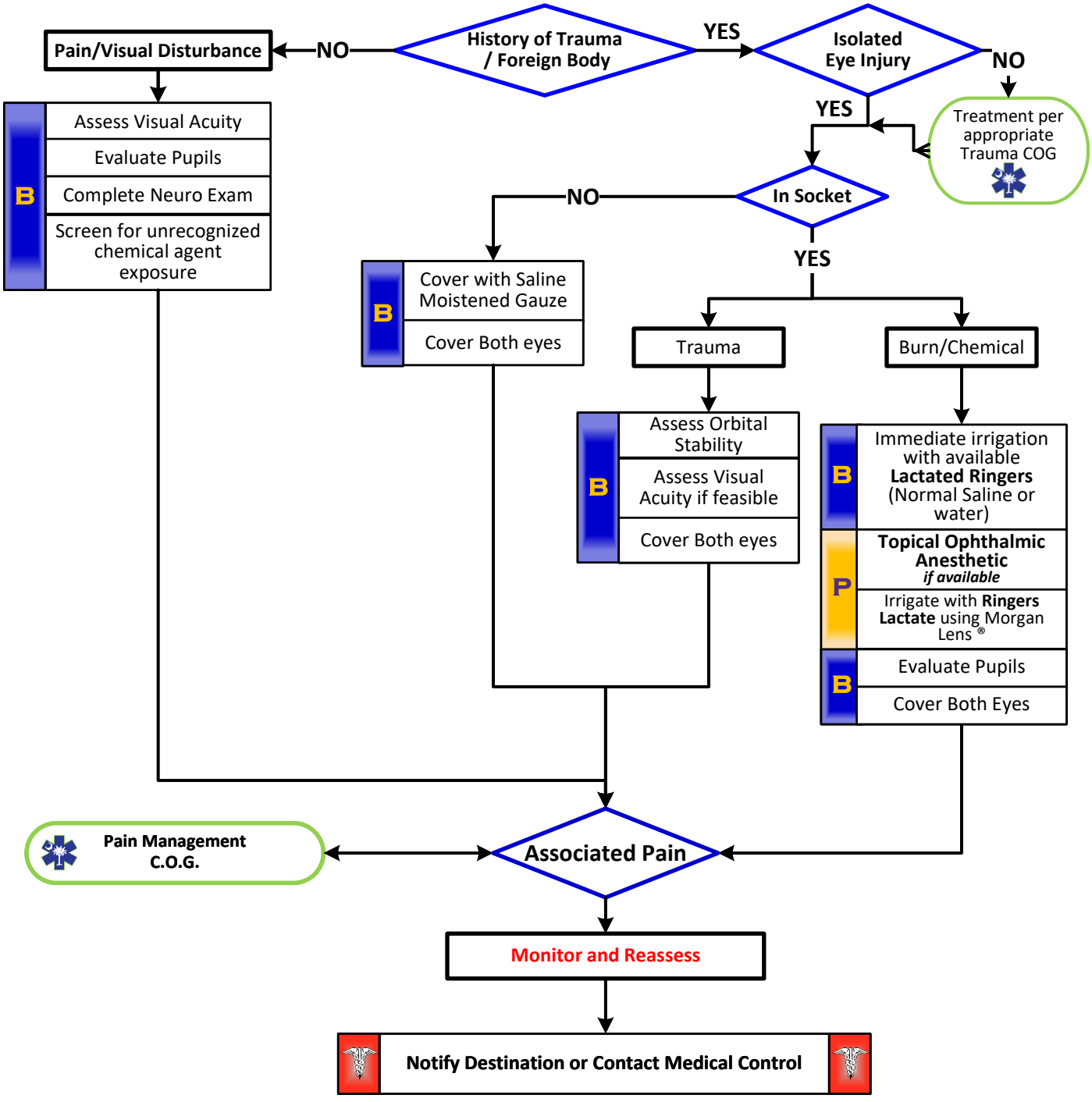
- **Recommended Exam: Mental Status, HEENT, Neck, Chest, Lungs, Neuro**
- Nontraumatic significant soft tissue swelling to the face or oral cavity can represent a cellulitis or abscess.
- Scene and transport times should be minimized in complete tooth avulsions. Reimplantation is possible within 4 hours if the tooth is properly cared for.
- All tooth disorders typically need antibiotic coverage in addition to pain control.
- Cardiac chest pain can radiate to the jaw.
- All pain associated with teeth should be associated with a tooth which is tender to tapping or touch (or sensitivity to cold or hot).
- DO NOT replace tooth if:
  - Obtunded patient
  - At risk for Aspiration
  - Spinal Immobilization
  - AMS
  - Multiple Teeth missing
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Airway patency and reassessment
  - ❑ Degree and location of hemorrhage
  - ❑ Mental status (GCS or AVPU)
  - ❑ Technique used to transport tissue or teeth
  - ❑ Eye exam documented, when applicable
  - ❑ Assessment and management of cervical spine
  - ❑ Patient use of anticoagulant medications
- **KEY PERFORMANCE MEASURES:**
  - ❑ Appropriate airway management and satisfactory oxygenation

# Eye Injuries / Complaint

**History**
- Time of injury/onset
- Mechanism (blunt/penetrating/ chemical)
- Open vs Closed Injury
- Wound contamination
- Medical history
- Involved Chemicals + MSDS Sheets
- Baseline Visual Acuity (Prior to event)

**Signs and Symptoms**
- Pain, swelling, bleeding
- Deformity / contusion
- Visual Deficit
- Leaking aqueous/vitreous humor
- Limited Extraocular Movements
- "Shooting" / "streaking" Light
- Visible contaminants
- Rust Ring
- Lacrimation
- Redness
- Photophobia
- Hyphema

**Differential**
- Abrasion / Laceration
- Globe Rupture
- Hyphema
- Retinal detachment/damage
- Optic Nerve Damage
- Orbital fracture
- Orbital compartment syndrome
- Neurological Event
- Acute Glaucoma
- Retinal Artery Occlusion
- Chemical/Thermal burn/Agent of Terrror
- Infection / Iritis




ADULT TRAUMA

# Eye Injuries / Complaint

ADULT TRAUMA

**PEARLS**

- **Recommended Exam: Mental Status, HEENT, Neuro**
- Normal visual acuity can be present even with severe eye injury.
- Remove contact lens whenever possible. (If no evidence of globe rupture)
- 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.
- Use shields, not pads, for physical trauma to eyes. Pads are okay for unaffected eye.
- Do not remove impaled objects.
- Suspected globe rupture or compartment syndromes require emergent in-facility intervention.
- Patient should be placed in Fowlers position with any suspected globe injury.
- Lactated Ringer's vs Normal Saline for ocular irrigation:
  - Lactated Ringer's Solution is recommended for ocular irrigation
    - pH closer to that of tears
      - pH (Tears): ~ 7.1
      - pH (Lactated Ringers): ~ 6.0 – 7.5
      - pH (Normal Saline): ~ 4.5 – 7.0
    - Increased patient tolerance. Normal Saline may cause discomfort
    - Buffering capacity: LR returns pH to normal more quickly with either acidic or basic contaminants.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Vital Signs + Visual Acuity each eye (where possible)
  - ❑ Time of Injury
  - ❑ Type of Injury / Exposure
  - ❑ Treatment provided
  - ❑ Material Safety Data Sheets where known/suspected Chemical Exposure – if possible to obtain.
  - ❑ Airway status and management
  - ❑ Neurological status with vitals: AVPU, GCS

# Extremity Trauma

**History**
- Type of injury
- Mechanism: crush / penetrating / amputation
- Time of injury
- Open vs. closed wound / fracture
- Wound contamination
- Medical history
- Medications
- Medication Allergies

**Signs and Symptoms**
- Pain, swelling
- Deformity
- Altered sensation / motor function
- Diminished pulse / capillary refill
- Decreased extremity temperature

**Differential**
- **Abrasion**
- **Contusion**
- **Laceration**
- **Sprain**
- **Dislocation**
- **Fracture**
- **Amputation**

B — Assess for Pulse, sensory, and motor function

**Hemorrhage Control C.O.G.**

Consider **Vascular Access C.O.G.**

Consider **Pain Control C.O.G.**

**Fracture / Dislocation**

B — If extremity is pulseless, attempt gentle manipulation to place in normal anatomic position to restore circulation and immobilize/splint in that position. Otherwise immoblize/splint in position of comfort

Hip fracture/dislocation may be stablized with the use of a scoop stretcher if full spinal motion restriction is not required.

Suspected Fracture with an Open Wound

YES

NO

**Amputation**

B — Gently Clean amputated part

Wrap part in sterile dressing soaked in Normal Saline and place in air tight container (sealed bag)

Place container on ice if available

Documented or reported PCN or cephalosporin Allergy

YES

NO

P — **Based upon Local Protocol.** Broad Spectrum Antibiotics

**Penetrating Trauma**

B — If extremity is pulseless, attempt gentle manipulation to place in normal anatomic position to restore circulation and immobilize/splint in that position. Otherwise immoblize/splint in position of comfort

Suspected Fracture with Penetrating Trauma or Foreign Body

YES

NO

**Consider Mechanism of Injury and Potential for other trauma**
**Consider full Secondary Survey**

**Notify Destination or Contact Medical Control**

ADULT TRAUMA

# Extremity Trauma



**PEARLS**

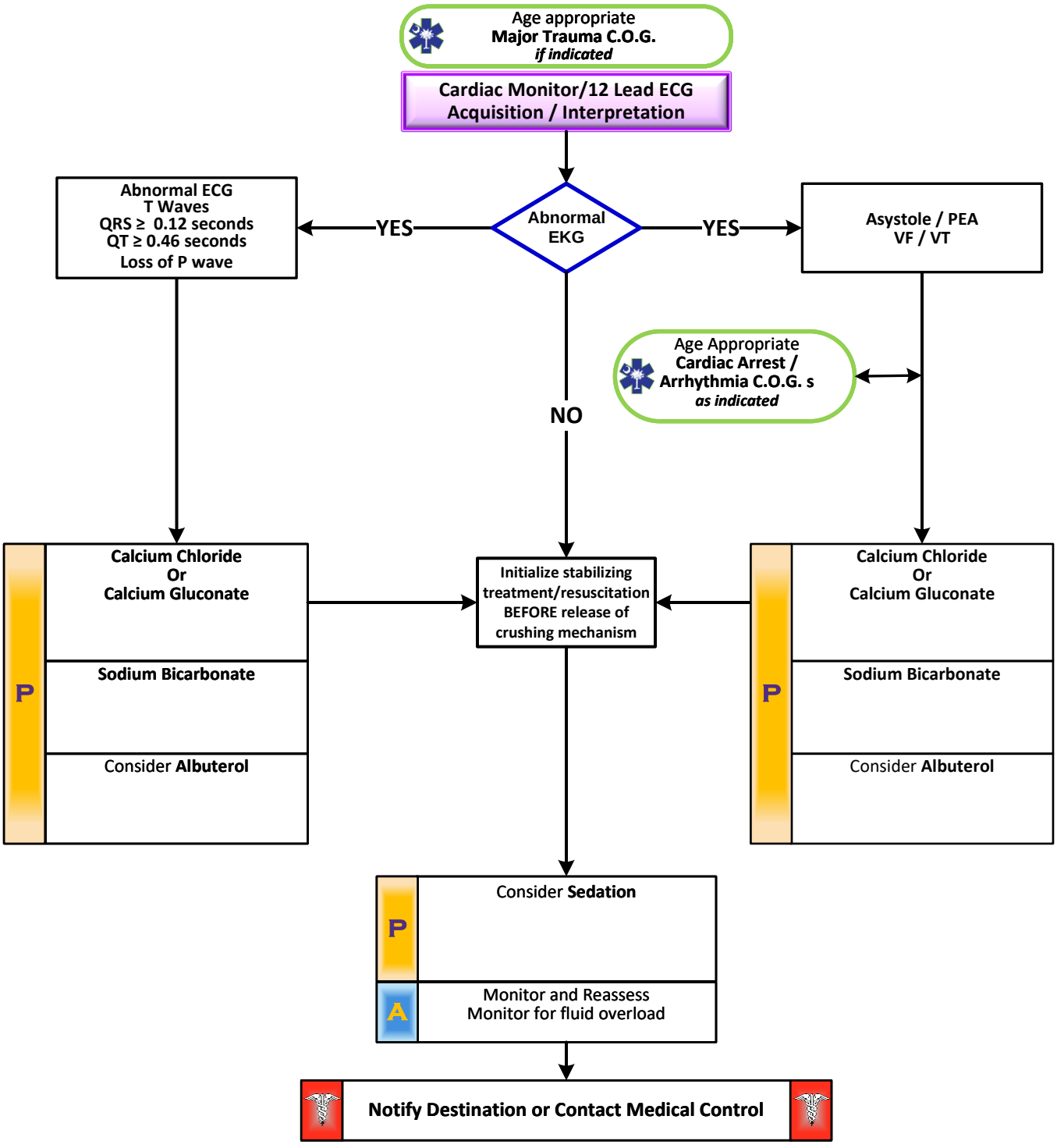
- **Recommended Exam: Mental Status, Extremity, Neuro**
- **It is STRONGLY RECOMMENDED that EMS Services use Tourniquets and Hemostatic Agents that are listed based on evaluation by the Committee on Tactical Combat Casualty Care.**
- Peripheral neurovascular status is important.
- In amputations, time is critical. Transport and notify medical control immediately, so that the appropriate destination can be determined.
- Hip dislocations and knee and elbow fracture / dislocations have a high incidence of vascular compromise.
- Urgently transport any injury with vascular compromise.
- Blood loss may be concealed or not apparent with extremity injuries.
- Cooling of amputated tissue/parts is beneficial – but do not allow to freeze.
- Multiple Casualty Incident: Tourniquet Procedure may be considered 1st instead of direct pressure.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Vital signs and vascular status of extremity after placement of tourniquet, pressure dressing, packing, and/or splint
  - ❑ Time of tourniquet placement
  - ❑ Documentation of signs/symptoms of possible compartment syndrome
  - ❑ Documentation of any amputated parts, condition, and disposition
  - ❑ Documentation of notification of receiving facility of Tourniquet placement and time.
- **PERFORMANCE MEASURES:**
  - ❑ Proper placement of tourniquet (location, cessation of bleeding)
  - ❑ Proper marking and timing of tourniquet placement and notification of tourniquet placement to subsequent EMS clinicians and ED personnel
  - ❑ Appropriate splinting and padding of fractures

# Crush Syndrome Trauma

**History**
- Entrapped and crushed under heavy load > 30 minutes
- Extremity / body crushed
- Building collapse, trench collapse, industrial accident, pinned under heavy equipment

**Signs and Symptoms**
- Hypotension
- Hypothermia
- Abnormal ECG findings
- Pain
- Anxiety

**Differential**
- Entrapment without crush syndrome
- Entrapment without significant crush
- Altered mental status




ADULT TRAUMA

# Crush Syndrome Trauma



**PEARLS**

- **Recommended exam: Mental Status, Musculoskeletal, Neuro**
- **Scene safety is of paramount importance as typical scenes pose hazards to rescuers. Call for appropriate resources.**
- Avoid Ringers Lactate IV Solution due to potassium and potential worsening hyperkalemia
- Hyperkalemia from crush syndrome can produce ECG changes described in COG, but may also see a bizarre, wide complex rhythm. Wide complex rhythms should also be treated using the Ventricular Tachycardia with a Pulse COG.
- Patients may become hypothermic even in warm environments.
- If the Crush Injury is isolated to an extremity/extremities – application of a proximal venous tourniquet prior to release of the compression may be considered based upon Local COG
- Be prepared for decompensation when releasing the crushing force.
- Hyperkalemia may be a delayed factor with release of prolonged or severe crush but hemodynamic instability may occur immediately.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Time of tourniquet application, if applied
  - ❑ Neurovascular status of any crushed extremity
  - ❑ EKG findings consistent with hyperkalemia
  - ❑ Amount of IV fluid administered
- **KEY PERFORMANCE MEASURES:**
  - ❑ Initiation of fluid resuscitation prior to extrication
  - ❑ EKG/monitor to monitor for dysrhythmias or changes related to hyperkalemia
  - ❑ Treatment of hyperkalemia if evidence is noted on EKG

# Blast Injury / Incident

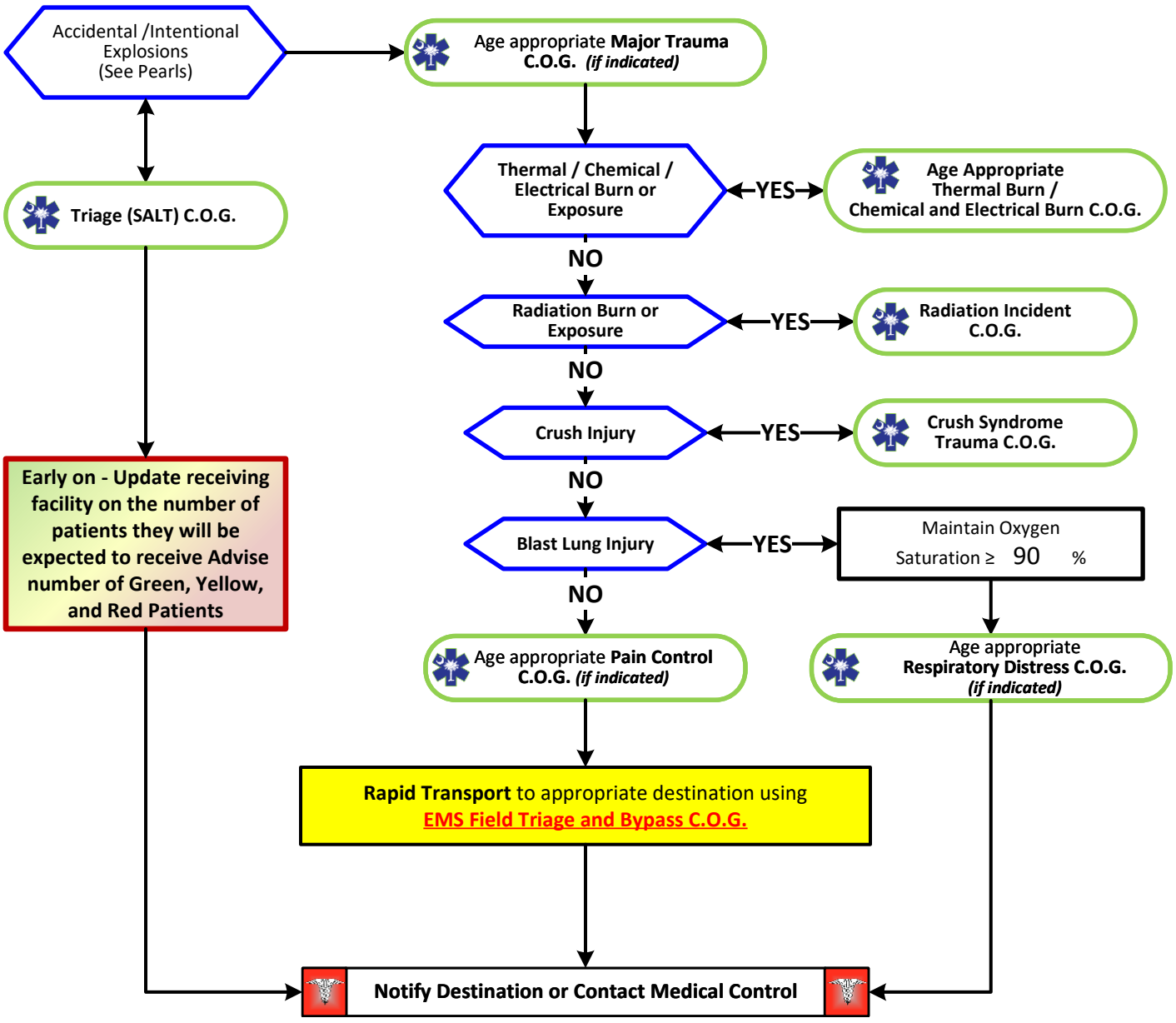
**History**
- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history /Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

**Signs and Symptoms**
- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Loss of hearing, Otorrhea
- Hypotension/shock
- Airway compromise/distress could be indicated by hoarseness/wheezing / Hypotension

**Differential**
- 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
- Blunt / Penetrating / Baro - trauma

**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 / Consider Possibility of Secondary Devices, Need for Shielded Communications, Need for Patient Decontamination / Need for HAZMAT Gear**



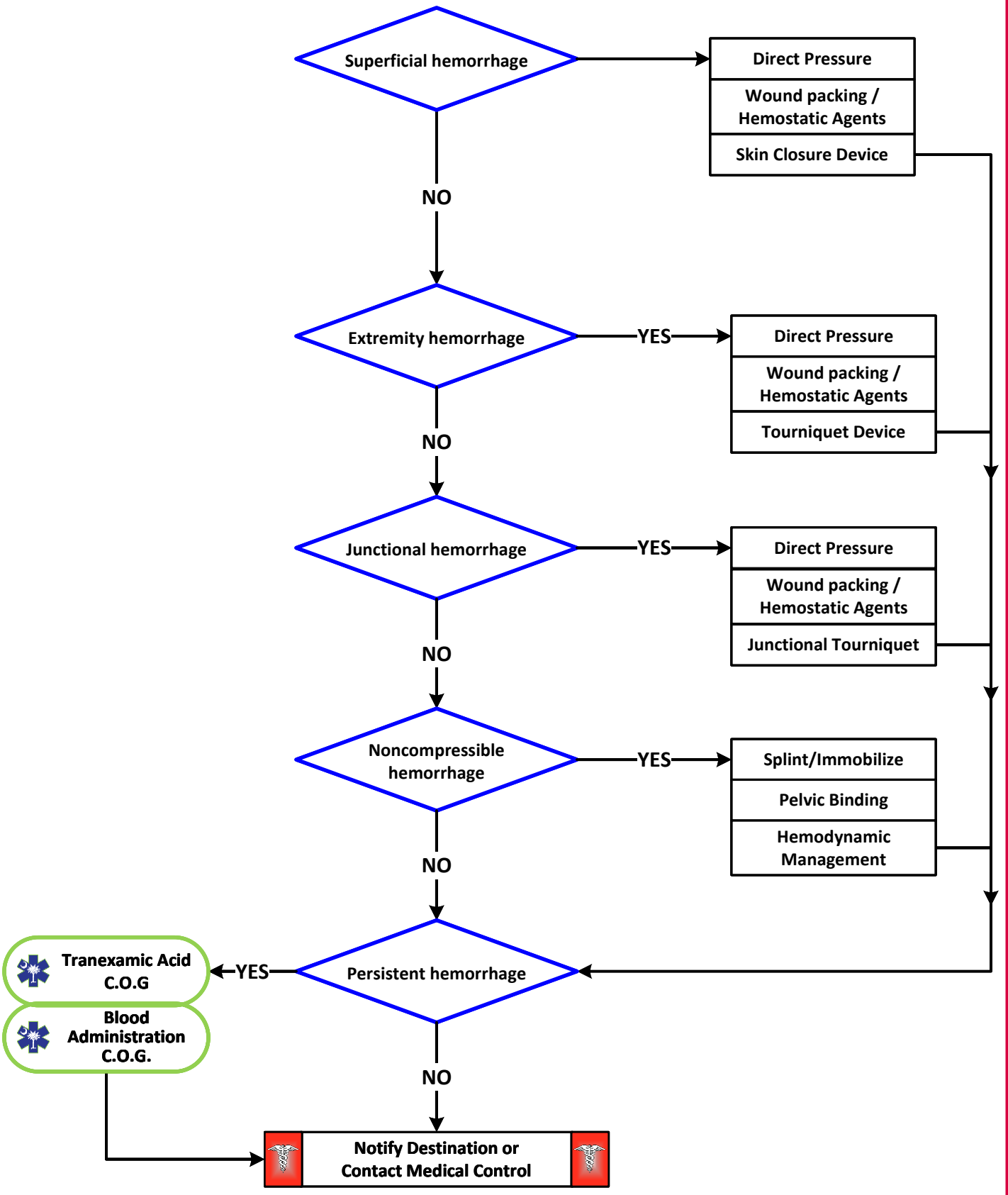

ADULT TRAUMA

# Blast Injury / Incident

## 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
- **Care of Blast Injury Patients:**
  - Blast Injury Patients with Burn Injuries Must be cared for using the Thermal / Chemical / Electrical Burn C.O.G.
  - Use Lactated Ringers (if available) for all Critical or Serious 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.
  - Air embolism should be considered and patient transported prone and in slight left-lateral decubitus position.
  - Blast Lung Injury patients may require early intubation but positive pressure ventilation may exacerbate the injury, avoid hyperventilation.
  - 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.
- **Accident Explosions:**
  - Attempt to determine source of the blast to include any potential threat for distribution of hazardous materials/ particles.
  - Evaluate scene safety to include the source of the blast that may continue to spill explosive liquids or gases.
  - Consider structural collapse / Environmental hazards / Fire.·
  - Conditions that led to the initial explosion may be redeveloping 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.
- **Intentional Explosions:**
  - Attempt to determine source of the blast to include any potential threat for dissemination of particles of hazardous materials.
  - **Greatest concern is potential threat for a secondary device.**
  - Evaluate surroundings for suspicious items; unattended back packs or packages, or unattended vehicles.
    - **If patient is unconscious or there is(are) fatality(fatalities) and you are evaluating patient(s) for signs of life: Before moving note if there are wires coming from the patient(s), or it appears the patient(s) is(are) lying on a package/pack, or bulky item, do not move the patient(s), quickly back away and immediately notify a law enforcement officer.**
    - If no indications the patient is connected to a triggering mechanism for a secondary device, expeditiously remove the patient(s) from the scene and begin transport to the hospital.
  - Protect the airway and cervical spine, however, beyond the primary survey, care and a more detailed assessment should be deferred until the patient is moved to a secured environment
  - If there are signs the patient was carrying the source of the blast, notify law enforcement immediately and most likely, a law enforcement officer will accompany patient to the hospital.
  - Consider the threat of structural collapse, contaminated particles and / or fire hazards.
  - Take care to minimize disruption of scene, avoid movement of the obviously expired and preserve clothing/debris/ evidence, minimize traffic through the scene as allowed by proper patient management
- **Key Documentation Elements**
  - ❑ Airway status and intervention
  - ❑ Breathing status:
  - ❑ Quality of breath sounds (equal bilaterally)
  - ❑ Adequacy of respiratory effort
  - ❑ Oxygenation
  - ❑ Documentation of burns, including Total Burn Surface Area (TBSA) [See Burns Guideline]
  - ❑ Documentation of possible toxic chemical contamination
- **Key Performance Measures**
  - ❑ Airway assessment and early and aggressive management
  - ❑ Appropriate IV fluid management
  - ❑ Transport to trauma or burn center
  - ❑ In Multi-Patient events – notification of receiving facility/facilities of numbers of patients to be expected and categorization by Green, Yellow, and Red designations.

# HEMORRHAGE CONTROL




ADULT TRAUMA

# HEMORRHAGE CONTROL

Recommended Devices & Adjuncts (Tourniquets & Hemostatic Agents)

### TOURNIQUETS, LIMB NON-PNEUMATIC

| Common Name / Brand Name | DLA Nomenclature | NSN |
|---|---|---|
| Combat Application Tourniquet (CAT) Gen 7 | Tourniquet Nonpneumatic Combat Application One-Handed 37.5" LG 1 | 6515-01-521-7976 |
| Combat Application Tourniquet (CAT) Gen 6 | Tourniquet Nonpneumatic Combat Application One-Handed 37.5" LG 1 | Until Replaced by Gen7 |
| Ratcheting Medical Tourniquet (RMT) Tactical | Tourniquet, One Handed Burke Device Tactical | 6515-01-527-3841 |
| SAM Extremity Tourniquet (SAM-XT) | Tourniquet Nonpneumatic 25S | 6515-01-670-2240 |
| SOF-Tactical Tourniquet-Wide (SOFTT-W) | Tourniquet Nonpneumatic Nylon Strap 1.5" Wide Nylon Strap for Br | 6515-01-587-9943 |
| Tactical Mechanical Tourniquet (TMT) | Tourniquet Nonpneumatic Tactical Mechanical Tourniquet | 6515-01-656-6191 |
| TX2 Tourniquet (TX2) | Tourniquet Nonpneumatic TX2 Ratcheting One-Hand Coyote | 6515-01-667-6027 |
| TX3 Tourniquet (TX3) | Tourniquet Nonpneumatic TX3 Ratcheting OD Green One Hand | 6515-01-667-6208 |

(Alphabetical)

### TOURNIQUETS, LIMB PNEUMATIC

| Common Name / Brand Name | DLA Nomenclature | NSN |
|---|---|---|
| Emergency Medical Tourniquet (EMT) | Tourniquet Pneumatic Single-hand application fits upper and lower | 6515-01-580-1645 |
| Tactical Pneumatic Tourniquet 2" (TPT2) | Tourniquet Pneumatic Slide Fastener | 6515-01-656-4831 |

### HEMOSTATIC DRESSINGS/DEVICES

| Common Name / Brand Name | DLA Nomenclature | NSN |
|---|---|---|
| Combat Gauze (CG) Z-Fold | Bandage Gauze Impregnated 3" W X 4 YDS L Kaolin Hemostatic Quik | 6510-01-562-3325 |
| Celox Gauze, Z-fold 5' | Dressing Hemostatic Celox Gauze 3"X5' Z-folded | 6510-01-623-9910 |
| ChitoGauze | Dressing Hemostatic 144" length 3" width coated with Chitosan | 6510-01-591-7740 |
| X-Stat, Single Applicator | Applicator Hemostatic Sponges and Dispenser Xstat-30 Each | 6510-01-644-7335 |
| iTClamp | Clamp Hemorrhage Control Sterile Medical Grade Polycarbonate | 6515-01-629-7044 |

ADULT TRAUMA

**PEARLS**

- **Recommended Exam: Mental Status, Extremity, Neuro**
- **It is STRONGLY RECOMMENDED that EMS Services use Tourniquets and Hemostatic Agents that are listed based on evaluation by the Committee on Tactical Combat Casualty Care.**
- Peripheral neurovascular status is important.
- Pressure point use has been de-emphasized – but may remain an effective adjunct for hemorrhage control in certain circumstances
- Significant blood loss may be concealed or not apparent.
- Multiple Casualty Incident: Tourniquet Procedure may be considered 1st instead of direct pressure.
- Use of tourniquet for hemorrhage is strongly recommended if sustained direct pressure or hemostatic agent/wound packing is ineffective or impractical;
- Use a commercially produced, windlass, pneumatic, or ratcheting device, which has been demonstrated to occlude arterial flow and avoid narrow, elastic, or bungee-type devices;
  - Utilize improvised tourniquets only if no commercial device is available;
- Do not release a properly applied tourniquet until the patient reaches definitive care
- Apply a topical hemostatic agent, in combination with direct pressure, for wounds in anatomic areas where tourniquets cannot be applied and sustained direct pressure alone is ineffective or impractical;
  - Topical hemostatic agents in a gauze format that support wound packing are strongly preferred over granulated/gel/liquid formulations;
  - Only utilize topical hemostatic agents which have been determined to be effective and safe in a standardized laboratory injury model
- **KEY DOCUMENTATION ELEMENTS**
  - ❑ Vital signs and vascular status of extremity after placement of tourniquet, pressure dressing, packing, and/or splint
  - ❑ Time of tourniquet placement
  - ❑ Documentation of signs/symptoms of possible compartment syndrome
  - ❑ Documentation of notification of receiving facility of Tourniquet placement and time.
- **KEY PERFORMANCE MEASURES**
  - ❑ Proper placement of tourniquet (location, cessation of bleeding)
  - ❑ Proper marking and timing of tourniquet placement and notification of tourniquet placement to subsequent EMS clinicians and ED personnel
  - ❑ Proper utilization of TXA and Blood Product Administration C.O.Gs

# Burns: Thermal

**History**
- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history and Medications
- Other trauma
- Loss of Consciousness

**Signs and Symptoms**
- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress
- Singed facial or nasal hair
- Hoarseness / wheezing

**Differential**
- **Superficial (1st Degree)** red and painful
- **Partial Thickness (2nd Degree)** blistering
- **Full Thickness (3rd Degree)** painless/ charred or leathery skin
- **Thermal**
- **Chemical**
- **Electrical**
- **Radiation**

## STOP THE BURN !

**When significant Trauma coexists in the Burn Patient – initial transport should be to a BURN Center ONLY if the BURN Center has an appropriate Trauma Designation.**
**IF the available burn center does not have the appropriate TRAUMA designation for the coexistent injuries, or the patient is unstable for the time required to arrive at the burn center, THEN transport should be to the nearest appropriate trauma center first**

Consider CO / Cyanide Poisoning ←YES→ Carbon Monoxide / Cyanide Poisoning C.O.G.

↓

Airway C.O.G.

↓

Remove rings, bracelets, and other constricting items

Cover burn with dry sterile sheet or dressing

Maintain Normothermia

↓

Vascular Access C.O.G.

↓

A — IV LR/(or Plasmalyte) (WGT in Kg /4) x (% TBSA of 2nd/3rd Degree Burns) = mL/ Hr for first 8 Hrs.

**DO NOT BOLUS with crystalloid unless hypotensive**

↓

Pain Control C.O.G.

↓

**Notify Destination or Contact Medical Control**

ADULT TRAUMA

# Burns: Thermal

***1. The IV solution should be changed to Lactated Ringers if it is available. It is preferred over Normal Saline.***

***2. If > 1-2 hours from Burn Center starting IV Fluid Rate: (2 x wgt in Kg x%TBSA) / 16***

- **Critical or Serious Burns**
- ***> 5-15% total body surface area (TBSA); 2nd or 3rd degree burns, or***
- ***3rd degree burns > 5% TBSA for any age group, or***
- ***circumferential burns of extremities, or***
- ***electrical or lightning injuries, or***
- ***suspicion of abuse or neglect, or***
- ***inhalation injury, or***
- ***chemical burns, or***
- ***burns of face, hands, perineum, or feet, or***
- ***any burn requiring hospitalization.***

(These burns will require direct transport to a burn center, or transfer once seen at a local facility where the patient can be stabilized with interventions such as airway management or pain relief if this is not available in the field or the distance to a Burn Center is significant.)

**Critical (Red)**

**>15% TBSA 2nd/3rd Degree Burn**
**Burns with Multiple Trauma**
**Burns with definite airway compromise**
**(Transport to a Burn Center when reasonable or reasonably accessible. Less than 30 minutes is a reasonable distance, at Service discretion for further distances.**
**If not accessible, Burn Center does not have appropriate trauma designation, or patient unstable, transport to nearest Level 1 Trauma Center.)**

**Serious (Yellow)**

**5-15% TBSA 2nd/3rd Degree Burn**
**Suspected Inhalation injury, Hypotension or GCS < 14**
**(Transport to a Burn Center when reasonable or reasonably accessible. Less than 30 minutes is a reasonable distance, at Service discretion for further distances.**
**If not accessible or patient unstable, transport to nearest Level 1 Trauma Center.)**

**Minor (Green)**

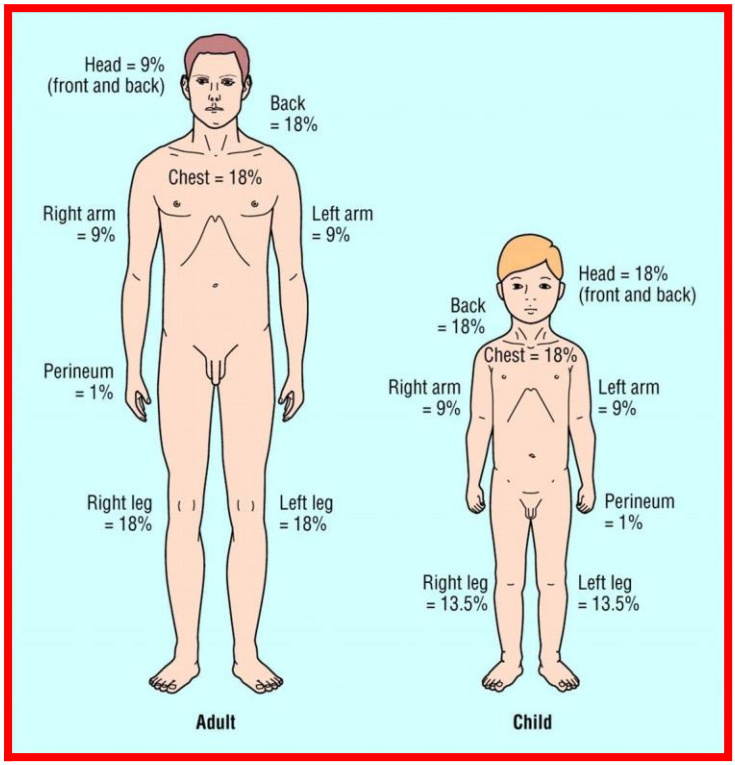
**< 5% TBSA 2nd/3rd Degree Burn**
**No inhalation injury, Not Intubated,**
**Normotensive**
**GCS>14**
**(If within 30 minutes of a burn center by ground, transport directly to burn center. If further, transport to the Local Hospital)**

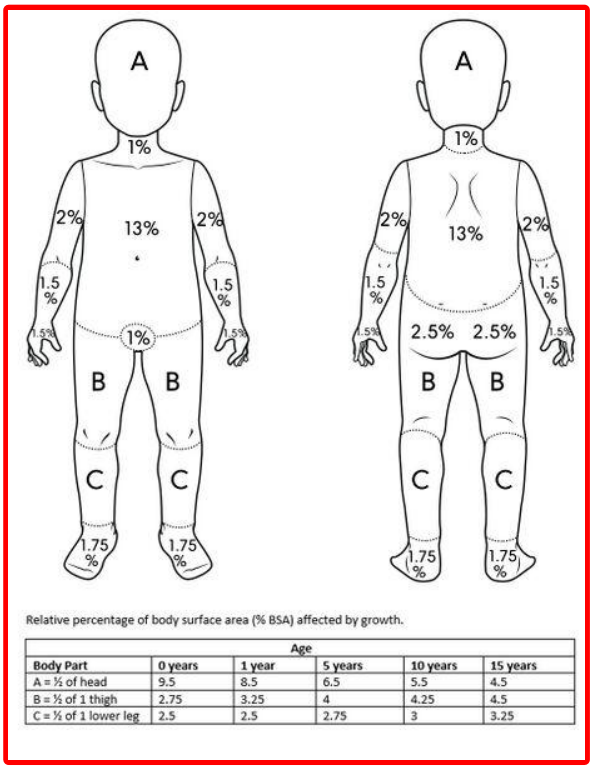
ADULT TRAUMA

**PEARLS**

- **Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- Burn patients are Trauma Patients, evaluate for multisystem trauma.
  - **When Trauma coexists in the Burn Patient – initial transport to a verified Trauma Center based on the Trauma Triage and Bypass Protocol is warranted.**
- Ensure 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. Symptoms such as dyspnea, hypoxia, tachypnea and accessory muscle use are indications for intubation. Deep 3rd degree facial burns and coughing up copious black carbonaceous sputum are more specific indicators of inhalation burns. If in doubt – intubate. Flash burns to face and smoking on oxygen , singed nasal hair, 2nd degree burns to face, mild amounts of soot present do not usually require intubation..
- Potential CO exposure should be treated with 100% oxygen. (For patients suffering from CO inhalation, transport to a hospital equipped with a hyperbaric chamber is indicated [when reasonably accessible.]. For patients with > 5-15% TBSA proceed to burn center on 100% FiO2.)
- 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 burns, must maintain normal body temperature.
- Evaluate the possibility of child abuse with children and burn injuries.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Initial airway status
  - ❑ Total volume of fluid administered
  - ❑ Body surface area of second- and third-degree burns (TBSA)
  - ❑ Pulse and capillary refill exam distally on any circumferentially burned extremity
  - ❑ Pain scale documentation and pain management

# Burns: Thermal




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

| | Age | | | | |
|---|---|---|---|---|---|
| **Body Part** | **0 years** | **1 year** | **5 years** | **10 years** | **15 years** |
| A = ½ of head | 9.5 | 8.5 | 6.5 | 5.5 | 4.5 |
| B = ½ of 1 thigh | 2.75 | 3.25 | 4 | 4.25 | 4.5 |
| C = ½ of 1 lower leg | 2.5 | 2.5 | 2.75 | 3 | 3.25 |

ADULT TRAUMA

# Tranexamic Acid (TXA)

**This Protocol addresses treatment of the ADULT patient ≥ 16 years of age who presents with traumatic, life-threatening, non-compressible bleeding with any of the following, or alternatively for angioedema per C.O.G.**

- Systolic Blood Pressure < 90 mmHg
- Heart Rate > 120 beats per minute
- Bleeding or presumed bleeding that is NOT controllable by direct pressure, wound packing, or tourniquet application
- Ongoing significant Blood Loss (> 500 mL)

**Services wishing to utilize TXA must have predefined letter of agreement or Memorandum of Understanding from the Trauma Center to which that service will transport these patients.**

**Vascular Access C.O.G.**

↓

**Hypotension C.O.G.**

↓

**P**

**TRANEXAMIC ACID (TXA)**

**1* Gram mixed into 50 or 100 mL NS over 10 minutes IV/IO**

**(*Method of Administration of TXA will be determined by Local Medical Control Physician in consultation with the Trauma Center)**

**[***An alternative method of administration by slow IV Push of 1 GM TXA over 10 minutes may also be utilized – but is less preferred**]**

**(May be administered in conjunction with Fluid Resuscitation)**

**A direct oral report must be provided to the Emergency Department Physician and/or the Trauma Surgeon as to the ADMINISTRATION of TXA in the Prehospital setting**

ADULT TRAUMA

# Tranexamic Acid (TXA)

ADULT TRAUMA

**PEARLS:**

- **DO NOT ADMINISTER Tranexamic Acid (TXA) if ANY** of the following are present:
  - Time of injury is > 3 hours prior
  - Patient has an active (within the last 24 hours) thromboembolic event (active stroke, myocardial infarction, or pulmonary embolism)
  - Traumatic Arrest > 5 minutes
  - Any patient with a known allergy to Tranexamic Acid (TXA)
  - Penetrating Cranial injury
  - Traumatic Brain Injury (TBI) with exposed brain matter
  - Isolated hanging or drowning victims
  - Cervical Cord Injury with motor deficits
- In the bleeding patient, hemorrhage control and appropriate resuscitation remain the priority.
- **Prehospital TXA use should NEVER supersede** field bleeding control needs, prompt transport or the administration of blood/plasma products.
- MAP = [SBP + (2xDBP)] / 3
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Indications for utilization of TXA
  - ❑ Vital Signs
  - ❑ Dosage of TXA Administered
  - ❑ How TXA is Administered
    - ❑ IV Infusion
    - ❑ Slow (>10 minutes) IV Push
  - ❑ Documentation of patient Identification as having received TXA
  - ❑ Documentation of appropriate notification of receiving facility personnel at time of hand-off that patient has received TXA.

# Tranexamic Acid (TXA)

## TXA ADMINISTRATION GUIDELINES

Date _____ ePCR # _____

Patient Name _____

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

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

**AND** the addition of one or more of the following:

- ☐ SBP < 90 mmHg
- ☐ HR > 120 bpm (sustained)
- ☐ Bleeding not controlled with other measures
- ☐ Ongoing significant estimated blood loss of > 500 ml

**ALTERNATIVELY**

- ☐ May be used for treatment of angioedema if criteria per C.O.G. are met

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

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

Time of Administration:_____

ADULT TRAUMA

# Blood Administration

**Mechanism of Injury / Nature of Illness**
**Patients age > 5 years with:**

- Signs of massive hemorrhage
- Traumatic injury (Penetrating or Blunt)
- Suspected dissecting / rupturing aneurysm (Abdominal or Thoracic)
- GI Bleeding
- Signs of intra-abdominal bleeding

**Physiological Parameters:**

- Systolic (SBP) < 90 mmHg
- HR > 120 bpm
- Shock Index (SI) > 0.9
- Pediatric Patients: Parameters may be determined by Local Medical Direction

**DEFINITIONS:**

- Shock Index (SI): HR divided by SBP = SI

**REQUIRED DOCUMENTATION:**

- In Flowchart and ePCR document Rh type, amount, unit lot number, and expiration date for EVERY unit administered to patient.

**If patient with Mechanism of Injury / Nature of Illness + 2 Physiological Parameters**

**Vascular Access C.O.G.**

**Age Appropriate Hypotension C.O.G.**

In cases of extreme blood loss, proceed directly to blood product administration concurrent with crystalloid administration

**Services wishing to utilize blood transfusion must have predefined letter of agreement or Memorandum of Understanding from the Trauma Center to which that service will transport these patients.**

Set up Blood Warmer. All blood products MUST be warmed during administration

**Continously monitor during transport for changes**

**For NON-TRAUMA Patients: You MUST have a direct physician's order to administer O postive blood product to a female under 50 years of age,**

**P**

**Administer whole blood or PRBC 1 unit, if providing PRBC may also administer FFP at a ratio of 1:1 if possible.**
**May repeat x1 if hypotension is NOT corrected.**

**Pediatric patients*: Administer 10 mL/Kg of whole blood or PRBC, if providing PRBC may also administer FFP at a ratio of 1:1 if possible.**
**May repeat x1 if hypotension is NOT corrected.**

**TRANSFUSION REACTION**

**NO** → **Continuously Monitor patient through all phases of transport**

**YES** → **STOP INFUSION!** Follow Anaphylaxis Guideline

**Blood Administration in the Pediatric patient may be authorized by Local Medical Director based on clearly defined criteria and parameters.**

**A direct oral report must be provided to the Emergency Department Physician and/or the Trauma Surgeon as to the Quantity and TYPE of Blood Administered in the Prehospital setting**

ADULT TRAUMA

# Blood Administration

**PEARLS:**

- **If administering O postive blood product to a female under 50 years of age for NON-TRAUMA related incident (i.e GI Bleed), you MUST have a DIRECT physician's order! No Standing Order or Protocol is acceptable.**
- **Services wishing to utilize blood transfusion must have predefined letter of agreement or Memorandum of Understanding from the Trauma Center to which that service will transport these patients.**
- Prime blood tubing and warmer. Tubing should be changed after 2 Units if possible, or as manufacturer recommends. Care should be taken to prevent hypothermia.
- Monitor patients for signs and symptoms of transfusion reaction and adverse effects, including temperature at time of infusion and 15 minutes after start.
- **For any reaction, STOP the infusion,** remove all tubing and product from the patient and save all equipment. Flush IV line.
- Consider any fluid overload issues such as CHF or patient weight (pediatrics) , and monitor for signs and symptoms appropriately.
- **Allergic reaction** (onset <15 min) –
  - Minor/Mild: Mild skin itching or hives < 25% body,
  - Moderate: Temp 38C (100.4F) or change of >1C (>1.8F) from pre-transfusion value, chills, and hives/rash >25% body
- **Febrile transfusion reactions:** -
  - Temp 38C (100.4F) or change of >1C (>1.8F) from pre-transfusion value, chills, headache, facial flushing, palpitations, cough, chest tightness, increased pulse rate and/or flank pain
- **Hemolytic transfusion reaction:** -
  - Immediate lysis of transfused blood can result in fever and/or tachycardia.
  - Other symptoms can include chills, back/flank pain, nausea/vomiting, dyspnea, flushing, bleeding, and/or hypotension.
  - Begin aggressive NS 0.9% treatment
- **Dilutional thrombocytopenia** - Generally not seen with infusion of 1 – 2 units, unless patient has pre-existing thrombocytopenia or disseminated intravascular coagulation.
- **Potassium intoxication (hyperkalemia)** - Symptoms can include flaccidity, muscle twitching, bradycardia, EKG changes (tall peaked T waves, prolonged P -R interval, absent P waves, prolonged QRS) and/or cardiac arrest.
- **Hypocalcemia: (from citrate toxicity that binds Ca)** - Symptoms can include arrhythmias, hypotension, muscle cramping, nausea, vomiting, seizure activity, and/or tingling sensation in the fingers. Patient with acute or chronic hepatic insufficiency are at relatively higher risk of citrate toxicity. To avoid, administer PRBC no faster than 1 unit every 5 minutes. Treatment with Calcium Gluconate 1 gm infused slowly in a different IV/IO line.
- Contact Medical Control for additional boluses as necessary
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ **Pre-transfusion:**
    - ❑ Reason for transfusion, including relevant clinical data.
    - ❑ Vital Signs and Clinical History
    - ❑ The components to be transfused and their dose/volume and rate.
  - ❑ **During transfusion:**
    - ❑ Identification of Paramedic starting the transfusion.
    - ❑ Date and time transfusion started and completed.
    - ❑ Donation number of the blood component.
    - ❑ Record of observations made before, during and after transfusion.
  - ❑ **Post-transfusion:**
    - ❑ Management and outcome of any transfusion reactions or other adverse events.
    - ❑ Whether the transfusion achieved the desired outcome (e.g. improvement in symptoms, improvement in Vital Signs, etc.).
    - ❑ Provide any completed blood product containers to receiving facility on patient transfer
  - ❑ **OTHER:**
    - ❑ **If administering O postive blood product to a female under 50 years of age for NON-TRAUMA related incident (i.e GI Bleed), you MUST have a DIRECT physician's order! You must obtain that physician's name and signature while in the Emergency Department.**
    - ❑ **A direct oral report must be provided to the Emergency Department Physician and/or the Trauma Surgeon as to the Quantity and TYPE of Blood Administered in the Prehospital setting**
    - ❑ Blood Administration in the **Pediatric Patient** may be authorized by Local Medical Director based upon clearly defined parameters and criteria

ADULT TRAUMA

# Blood Administration

**Clinical Indications:**

- Any patient where Blood Product Administration is indicated in the blood administration guideline, or where as ordered by a Physician.
- **Blood products are NOT to be administered to patients in Non-Traumatic Cardiac Arrest**
- **Pediatric Administration of Blood Products may be authorized by Local Medical Director based upon clearly defined criteria and parameters.**

**Procedure:**

- Large bore IV access available. Separate IV sites are needed for FFP and PRBC products
- Normal Saline IV fluid initiated
- Remove Units from storage to be administered. **TWO** providers much cross check and confirm transfusion is required prior to administration
  - Verify Correct patient
  - Verify Blood Component is correct (Correct type, Correct component)
  - Verify Expiration Date
  - Confirm Temperature monitor in each unit is appropriate (not out of range/red)
  - Check for discoloration or gas bubbles present
  - **Check and document patient temperature**
- If patient has apparent capacity and condition allows, discuss the procedure with the patient
- Prime the tubing set and blood warmer if applicable
  - EMS provided blood and blood products must be warmed during administration
  - Interfacility blood administration does not have to be warmed
- Initiate blood product administration and set appropriate rate
- Monitor for transfusion reactions during the next 15 minutes
  - Second temperature must be taken at this time (i.e 15 minutes into transfusion).
  - If a reaction occurs, **STOP** infusion and follow appropriate guideline. Retain all blood product and tubing for source testing
- Document the procedure, time, and results
  - **Blood product type, expiration date, and lot number MUST be documented for EACH blood product unit administered**
  - **Patient temperature must be documented prior to and 15 minutes after initiation of blood product administration**
  - Blood bank paperwork must be completed with the appropriate form given to the receiving staff at transfer of patient care
  - Always keep a copy of transfusion documents for records.

❖ **If administering O postive blood product to a female under 50 years of age for NON-TRAUMA related incident (i.e GI Bleed), you MUST have a DIRECT physician's order!**

ADULT TRAUMA

# Obstetrical Emergency

**History**
- Past medical history
- Hypertension meds
- Prenatal care
- Prior pregnancies / births
- Gravida / Para

**Signs and Symptoms**
- Vaginal bleeding
- Abdominal pain
- Seizures
- Hypertension
- Severe headache
- Visual changes
- Edema of hands and face

**Differential**
- Pre-eclampsia / Eclampsia
- Placenta previa
- Placenta abruptio
- Spontaneous abortion
- Ectopic Pregnancy

Known or Suspected Pregnancy
Missed Period
Vaginal Bleeding
Abdominal Pain

NO → **Exit to Appropriate SC COG**

**B**
- Left Lateral Recumbent Position
- Blood Glucose Analysis ↔ **Glucose Management COG**

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

- **Abdominal Pain COG** *If Indicated*
- **Vomiting / Diarrhea COG** *If Indicated*
- **Hypotension / Shock COG** *If Indicated*
- **Vascular Access COG**

Uncontrolled Vaginal Hemorrhage with Signs of Shock *Regardless of Prenancy Status*

YES → **Tranexamic Acid COG**

**Childbirth/Labor COG** *If Indicated*

Field Delivery

YES → **Newly Born COG** *If Indicated*

YES → **P** Oxytocin

Seizure Acitivity

YES → **P** Benzodiazepine / Magnesium Sulfate

**Notify Destination or Contact Medical Control**

OB – GYN - NEWBORN

# Obstetrical Emergency



## PEARLS

- **Recommended Exam: Mental Status, Abdomen, Heart, Lungs, Neuro**
- **With active seizure activity, benzodiazepine is a priority over magnesium sulfate.**
- **Midazolam 5 – 10 mg IM is effective in termination of seizures. Do not delay IM administration with difficult or no IV or IO access.**
- **Magnesium Sulfate should be administered as quickly as possible. May cause hypotension and decreased respiratory drive, but more likely in doses higher than 6 gm.**
- Pregnant patients with complaints of any abdominal trauma or with previously undiagnosed abdominal pain, vaginal bleeding or leakage of vaginal fluids should be transported for evaluation regardless of gestational age.
  - Patients greater than or equal to 20 weeks estimated gestational age with MVC, fall, or generalized trauma – even if not directly involving the abdomen should be transported based on history alone even in the absence of any signs or symptoms.
  - Generally require fetal monitoring. DO NOT suggest the patient needs an ultrasound but emphasize patient needs evaluation and fetal monitoring.
  - Pregnancy complicating any trauma may be considered a factor in determining a destination based on the Field Triage and Bypass COG
- After delivery, massaging the uterus (lower abdomen) will promote uterine contraction and help to control post-partum bleeding (apply uterine massage only after placenta delivery).
- **Postpartum or Vaginal hemorrhage:**
  - **Pitocin (Oxytocin):**
    - Following field delivery, where available, administer 10 IU IM to promote uterine contraction and decrease postpartum hemorrhage.
    - Agencies may administer via IV or IO route per local agency medical director.
  - **Tranexamic Acid (TXA):**
    - Administer when postpartum hemorrhage is associated with signs and symptoms of shock.
    - TXA per TXA COG
    - CONTRAINDICATED where birth occurs > 3 hours prior to EMS arrival.
    - Vaginal hemorrhage unrelated to pregnancy, administer with signs and symptoms of shock.
- **Ectopic pregnancy:**
  - Implantation of fertilized egg outside the uterus, commonly in or on the fallopian tube. As fetus grows, rupture may occur. Vaginal bleeding may or may not be present. Many women with ectopic pregnancy do not know they are pregnant. Usually occurs within 5 to 10 weeks of implantation. Maintain high index of suspicion with women of childbearing age experiencing abdominal pain.
- **Preeclampsia:**
  - Occurs in about 6% of pregnancies. Defined by hypertension and protein in the urine. RUQ pain, epigastric pain, N/V, visual disturbances, headache, and hyperreflexia are common symptoms.
  - In the setting of pregnancy, hypertension is defined as a BP > 140 systolic or > 90 diastolic mmHg, or a relative increase of 30 systolic and 20 diastolic from the patient's normal (pre-pregnancy) blood pressure.
  - Risk factors: < 20 years of age, first pregnancy, multi-gestational pregnancy, gestational diabetes, obesity, personal or family history of gestational hypertension.
- **Eclampsia:**
  - Seizures occurring in the context of preeclampsia. Remember, women may not have been diagnosed with preeclampsia.
- If > 20 weeks EGA transport patient in a left lateral position, right side up 10 - 20° to minimize risk of supine hypotensive syndrome.
- Ask patient to quantify bleeding - number of pads used per hour.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Document all times:
    - ❑ Contraction onset, contraction duration (length) and frequency,
    - ❑ Delivery
    - ❑ APGAR at 1 and 5 minutes,
    - ❑ Placenta delivery
  - ❑ Interventions / Medications
  - ❑ Estimated Gestational Age

# Childbirth / Labor

**History**
- Due date
- Time contractions started / how often
- Rupture of membranes
- Time / amount of any vaginal bleeding
- Sensation of fetal activity
- Past medical and delivery history
- Medications
- Gravida/Para Status
- High Risk pregnancy
- Illicit Drug Use

**Signs and Symptoms**
- Spasmodic pain
- Vaginal discharge or bleeding
- Crowning or urge to push
- Meconium

**Differential**
- Abnormal presentation
  - Buttock
  - Foot
  - Hand
- Prolapsed cord
- Placenta previa
- Abruptio placenta

Inspect Perineum
(No digital Vaginal Exam)

**No Crowning**

**B**
- Left Lateral Position
- Monitor & Reassess
- Document frequency and duration of contractions

**Vascular Access COG**

**Crowning**

**Abnormal Presentation** — YES → **See Page 2**

NO

**Vascular Access COG**

**B**
- Position mother to allow room for child to deliver without fall
- Control delivery of head
  - Most common presentation – occiput anterior head will turn to one side with delivery
- Assess for nuchal cord. May be multiple loops.
  - Slip over head to release if possible or
  - Clamp in 2 locations and cut cord between clamps
  - Delivery must proceed rapidly if cord is cut
- Deliver anterior shoulder
- Deliver posterior shoulder
- Delivery will complete rapidly – USE CARE TO NOT DROP THE CHILD.
- Keep child at or below the level of the perineum until cord is clamped
  - May clamp in 2 locations and cut cord between clamps – but it is not necessary to cut cord in the field.
- Assess for adequate CardioPulmonary status / Assess APGAR
- Newly Born COG or Neonatal Resuscitation COG for infant
- Delivery of placenta – DO NOT PULL
- Uterine Massage following delivery

**P** **Oxytocin**

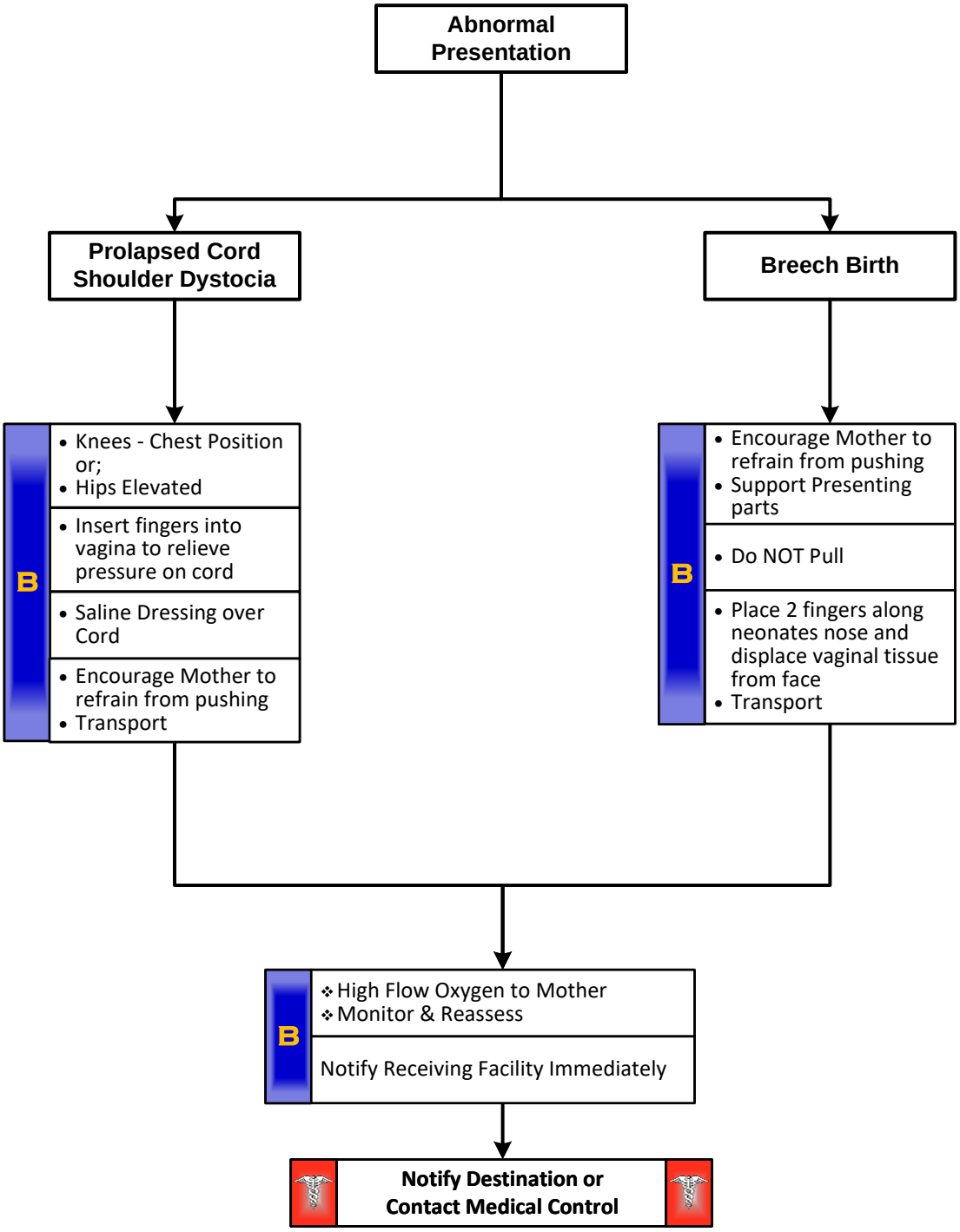
**Tranexamic Acid COG**
*If Indicated*

**Notify Destination or Contact Medical Control**

OB – GYN - NEWBORN

# Childbirth / Labor

**Complicated or Complex Delivery**
< 36 weeks Gestation;
Abnormal Presentation;
Severe Vaginal Bleeding;
Multiple gestation
**Expedite Transport for In Hospital Delivery if Possible**



# Childbirth / Labor

| Projected Pulse Oximetry in Infants Over Time | |
|---|---|
| Time Since Birth (Minutes) | Projected Increase in Pulse Oximeter Over Time |
| 1 minute | 60-65% |
| 2 minutes | 65-70% |
| 3 minutes | 70-75% |
| 4 minutes | 75-80% |
| 5 minutes | 80-85% |
| 10 minutes | 85-90% |

| APGAR Score | | | |
|---|---|---|---|
| **Sign** | **0** | **1** | **2** |
| **Appearance** | Blue, Pale | Body pink, Extremities Blue | Completely pink |
| **Pulse** | Absent | Slow (< 100) | > or = 100 |
| **Grimace** | No Response | Grimace | Cough or Sneeze |
| **Activity** | Limp | Some Flexion | Active Motion of Extremities |
| **Respirations** | Absent | Slow, Irregular | Good, Crying |

## PEARLS

- **Recommended Exam (of Mother): Mental Status, Heart, Lungs, Abdomen / Perineum**
- **Record APGAR at 1 minute and 5 minutes after birth. Do not delay resuscitation to obtain APGAR.**
- **If neonate requiring resuscitation, move quickly to Newly Born COG**
- After delivery, massaging the uterus (lower abdomen) will promote uterine contraction and help to control post-partum bleeding (apply uterine massage only after placenta delivery).
- **Postpartum hemorrhage:**
  - **Pitocin (Oxytocin):**
    - Following field delivery, where available, administer oxytocin to promote uterine contraction and decrease postpartum hemorrhage.
    - Agencies may administer via IV or IO route per local agency medical director.
  - **Tranexamic Acid (TXA):**
    - Administer when postpartum hemorrhage is associated with signs and symptoms of shock.
    - TXA per TXA COG
    - CONTRAINDICATED where birth occurs > 3 hours prior to EMS arrival.
    - Vaginal hemorrhage unrelated to pregnancy, administer with signs and symptoms of shock.
- **Transport or Delivery?**
  - Decision to transport versus remain and deliver is multifactorial and difficult. Generally it is preferable to transport.
  - Factors that will impact decision include: number of previous deliveries; length of previous labors; frequency of contractions; urge to push; and presence of crowning.
- **Maternal positioning for uncomplicated labor:**
  - Supine with head flat or elevated per mother's choice. Maintain flexion of both knees and hips. Elevated buttocks slightly with towel. If delivery not imminent, place mother in the left, lateral recumbent position with right side up about 10 – 20°.
- **Umbilical cord clamping and cutting:**
  - Place first clamp about 10 cm from infant's abdomen and second clamp about 5 cm further away from first clamp.
  - Once clamped, it is not necessary to cut cord prior to arrival at ED, but may cut between clamps for convenience using sterile instrument.
- **Multiple Births:**
  - Twins occur about 1/90 births. Typically manage the same as single gestation. If imminent delivery call for additional resources, if needed.
  - Most twins deliver at about 34 weeks so lower birth weight and hypothermia are common.
  - Twins may share a placenta so clamp umbilical cord after first delivery.
- Notify receiving facility immediately.
- If maternal seizures occur, refer to the Obstetrical Emergencies COG.
- Some perineal bleeding is normal with any childbirth. Large quantities of blood or free bleeding are abnormal
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Document all times:
  - ❑ Contraction onset, contraction duration (length) and frequency,
  - ❑ Delivery
  - ❑ APGAR at 1 and 5 minutes
  - ❑ Placenta delivery
  - ❑ Interventions / Medications
  - ❑ Any conditions complicating pregnancy or delivery

# Newly Born Care

**History**
- Due date and gestational age
- Multiple gestation (twins etc.)
- Meconium
- Delivery difficulties
- Congenital disease
- Medications (maternal)
- Maternal risk factors
  - substance abuse
  - smoking

**Signs and Symptoms**
- Respiratory distress
- Peripheral cyanosis or mottling (normal)
- Central cyanosis (abnormal)
- Altered level of responsiveness
- Bradycardia

**Differential**
- Airway failure
  - Secretions
  - Respiratory drive
- Infection
- Maternal medication effect
- Hypovolemia
- Hypoglycemia
- Congenital heart disease
- Hypothermia

**Breathing or Crying? Term Gestation? Good Muscle Tone?**

ALL YES →
- **B**
  - Warm, Dry, and Stimulate Infant
  - Infant with Mother if possible (skin-to-skin)
  - Maintain Normal Temperature
  - Bulb suction airway only if needed
  - Monitor and Reassess
  - May allow to breast feed if mother desires
- **Notify Destination or Contact Medical Control**

ANY NO ↓
- **B** Warm, Dry, and Stimulate Infant
  Bulb Suction airway if needed

**Agonal Breathing or Apnea OR Labored Breathing / Persistent Cyanosis**
**If not breathing within 30 seconds move to BVM**

YES →
- **B**
  - Position and Clear airway if needed
  - BVM Ventilations with or without $O_2$
  - Ventilation Rate: 40-60 breaths/min
  - Pulse Oximetry (Right Hand)

NO ↓

**Heart Rate < 60 After 30-60 secs of Ventilatory Support**

YES →
- **B**
  - Begin Chest Compressions
- **Age Appropriate Airway C.O.G.**
- **Vascular Access C.O.G.**

NO ↓

**Heart Rate 60 - 100**

YES →
- **B**
  - Check Chest movement
  - Change airway position
  - Change BVM Technique
  - Add $O_2$ if not already providing
- **Age Appropriate Airway C.O.G.**

NO ↓
- **B** Supplemental Oxygen
  **Maintain Warmth**
  **Monitor & Reassess**

YES ←

**Heart Rate > 100**

NO →
- **P**
  - Epinephrine 1:10,000
  - 0.01 mg/Kg IV / IO
  - Every 3-5 minutes as needed
- **A**
  - Normal Saline Bolus
  - 10 mL/Kg IV/IO
  - If not responding to Epinephrine
  - May Repeat x 1
- **B**
  - Blood Glucose Analysis
- **Glucose Management C.O.G.**

- **Notify Destination or Contact Medical Control**

OB – GYN - NEWBORN

# Newly Born Care

## PEARLS

- **Recommended Exam: Quality of Cry, Muscle tone, Respirations, Heart Rate, Pulse Oximetry, and Gestational Age**
- Majority of newborns do not require resuscitation, only warming, drying, stimulating, and cord clamping.
  - With term gestation, strong cry/ breathing, and good muscle tone, generally will not need resuscitation.
  - If no resuscitation needed, skin-to-skin contact with the mother is best way to maintain warmth of infant.
  - Maintain warmth of infant following delivery adjuncts; cap/ hat, plastic wrap, thermal mattress, radiant heat.
  - Most important vital signs in the newly born are heart rate, respirations, and respiratory effort.
  - About 10% of newborns need assistance to help them start breathing after birth.
  - About 1% of newborns require intensive resuscitation to restore/ support cardiorespiratory functions.
- **Airway:**
  - Positive Pressure Ventilations with BVM is the most important treatment in a newborn with poor respirations and/ or persistent bradycardia (HR < 100 BPM).
  - When BVM is needed, ventilation rate is 40 – 60 breaths per minute.
  - Adequacy of ventilation is measured mainly by increase in heart rate as well as chest rise.
  - If heart rate or respirations are not improving after 30 to 60 seconds of resuscitation, place BIAD or endotracheal tube.
  - BIAD is routinely recommended for first choice.
  - Routine suctioning is no longer recommended, bulb suction only if needed.
- **Breathing:**
  - Oxygen is not necessary initially, but if infant is not responding with increased heart rate or adequate breathing, add oxygen to the BVM.
- **Circulation/ Compressions:**
  - Heart rate is critical during first few moments of life and is best monitored by 3 or 4 lead ECG, as pulse assessment is difficult in the neonate. Heart Rate is best tool for gauging resuscitation success.
  - If heart rate remains < 60 BPM after 30 to 60 seconds of BVM/ resuscitation, begin compressions.
  - With BIAD or ETT in place, compressions and ventilation should be coordinated with compression, compression, compression, then ventilation. (3:1 ratio with all events totaling 120 per minute)
  - 2-thumbs encircling chest and supporting the back is recommended. Limit interruptions of chest compressions.
- **If infant not responding to BVM, compressions, and/ or epinephrine, consider hypovolemia, pneumothorax, and/ or hypoglycemia (< 40 mg/dL).**
- Hypothermia is common in newborns and worsens outcomes of nearly all post-natal complications.
  - Ensure heat retention by drying the infant thoroughly, covering the head.
  - When possible allow "kangaroo care" - i.e. placing the infant skin-to-skin directly against mother's chest and wrapping them together – for an effective warming technique.
  - Hypothermia may lead to hypoglycemia, hypoxia, and lethargy.
  - Aggressive warming techniques should be initiated and include drying, swaddling, and warm blankets covering body and head.
  - When available, radiant warmers or other warming adjuncts are suggested for babies who require resuscitation – especially pre-term babies.
- Low Birth Weight infants are at high-risk for hypothermia.
- **Document 1 and 5 minute APGAR in PCR or ePCR. DO NOT delay or interrupt resuscitation to obtain an APGAR score.**
- **Meconium staining:**
  - Infant born through meconium staining who is NOT vigorous:
  - Bulb suction mouth and nose and provide positive pressure ventilation.
  - Direct endotracheal suctioning is no longer recommended.
- Pulse oximetry should be applied to the right upper arm, wrist, or palm.
- **Cord clamping:**
  - Recommended to delay for 1 minute, unless infant requires resuscitation.
- Maternal sedation or narcotics will sedate infant (Naloxone NO LONGER recommended, use supportive care only).
- **D10 = D50 diluted (1 ml of D50 with 4 ml of Normal Saline) or D10 solution at 2 mL/kg IV / IO.**
- **In the NEONATE, D10 is administered at 2 mL/kg.**

# Newly Born Care

| Projected Pulse Oximetry in Infants Over Time | |
|---|---|
| Time Since Birth (Minutes) | Projected Increase in Pulse Oximeter Over Time |
| 1 minute | 60-65% |
| 2 minutes | 65-70% |
| 3 minutes | 70-75% |
| 4 minutes | 75-80% |
| 5 minutes | 80-85% |
| 10 minutes | 85-90% |

| APGAR Score | | | |
|---|---|---|---|
| **Sign** | **0** | **1** | **2** |
| **Appearance** | Blue, Pale | Body pink, Extremities Blue | Completely pink |
| **Pulse** | Absent | Slow (< 100) | > or = 100 |
| **Grimace** | No Response | Grimace | Cough or Sneeze |
| **Activity** | Limp | Some Flexion | Active Motion of Extremities |
| **Respirations** | Absent | Slow, Irregular | Good, Crying |

| | | Intervention Indicated | | | |
|---|---|---|---|---|---|
| | | **Blow-by Oxygen** | **Bag-Mask Ventilation with Room Air** | **Bag-Mask-Ventilation (BVM) with Oxygen** | **BVM and Chest Compressions** |
| **Assessment** | **Heart Rate** | >100 | <100 | 60-100 | <60 |
| | **Respiratory Distress / Apnea** | NO | NO | YES | |
| | **Central Cyanosis Present** | YES | YES | Yes/No | |

**Formula for calculating a 0.5 G/Kg dose of IV Dextrose:**

50 / (_____% Concentration of Glucose) = Fluid Dose (_____mL/Kg)

| Desired Dose (G/Kg) | Fluid Type | mL of Fluid Dose |
|---|---|---|
| | 50% Dextrose (D50W) | 1 mL/Kg |
| 0.5 G/Kg | 25% Dextrose (D25W) | 2 mL/Kg |
| | 10% Dextrose (D10W) | 5 mL/Kg |
| | 5% Dextrose (D5W) | 10 mL/Kg |
| | 50% Dextrose (D50W) | 2mL/Kg |
| 1 G/Kg | 25% Dextrose (D25W) | 4 mL/Kg |
| | 10% Dextrose (D10W) | 10 mL/Kg |
| | 5% Dextrose (D5W) | 20 mL/Kg |

- **KEY DOCUMENTATION ELEMENTS**
  - ❑ **APGAR Scores at 1 and 5 minutes**
  - ❑ **Interventions and Medications**
  - ❑ Prehospital on-scene time
- **KEY PERFORMANCE MEASURES**
  - ❑ Call time for additional resources
  - ❑ Arrival time of additional unit/s
  - ❑ Time to initiation of interventions
  - ❑ Use of Oxygen during resuscitation
  - ❑ Hypoglycemia evaluated and treated.
  - ❑ Hypothermia on arrival to ED
  - ❑ Number of advanced airway attempts and success.
  - ❑ Mortality

OB – GYN - NEWBORN

# Approach to Eclamptic Seizure

**B**

Provide supportive care:

- Place the mother in left lateral position
- Maintain an open airway
- Raise and pad bedrails to provide protection from trauma

**P**

- Use airway devices, as needed
- Provide supplemental oxygen (8 to 10 L/min)
- Establish IV access when possible, if not already present
- Treat Severe Hypertension if present

**Seizure Resolves within 5 minutes**

YES → **P**

- Administer magnesium sulfate as soon as feasible
- Loading dose 4-6 G IV over 15 – 20 minutes
- Maintenance dose 2 G/Hour IV

NO → **P**

- Administer lorazepam 4 mg IV at a maxium rate of 2 mg/minute.
- May repeat at 3-5 minutes if the seizure continues
- If IV access has not ben established – Midazolam 10 mg IM
- Establish IV Access (at least 2 lines) as soon as possible

**Seizure Resolves**

YES → Does second seizure occur following treatment or while on maintenance therapy?

NO → Does second seizure occur following treatment or while on maintenance therapy?

YES → **P**

- Consider rebolus with Magnesium Sulfate 4 G IV over 5 minutes
- Consider Increased maintenance dose at 3 G/Hour IV

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

NO → **Notify Destination or Contact Medical Control**

OB – GYN - NEWBORN

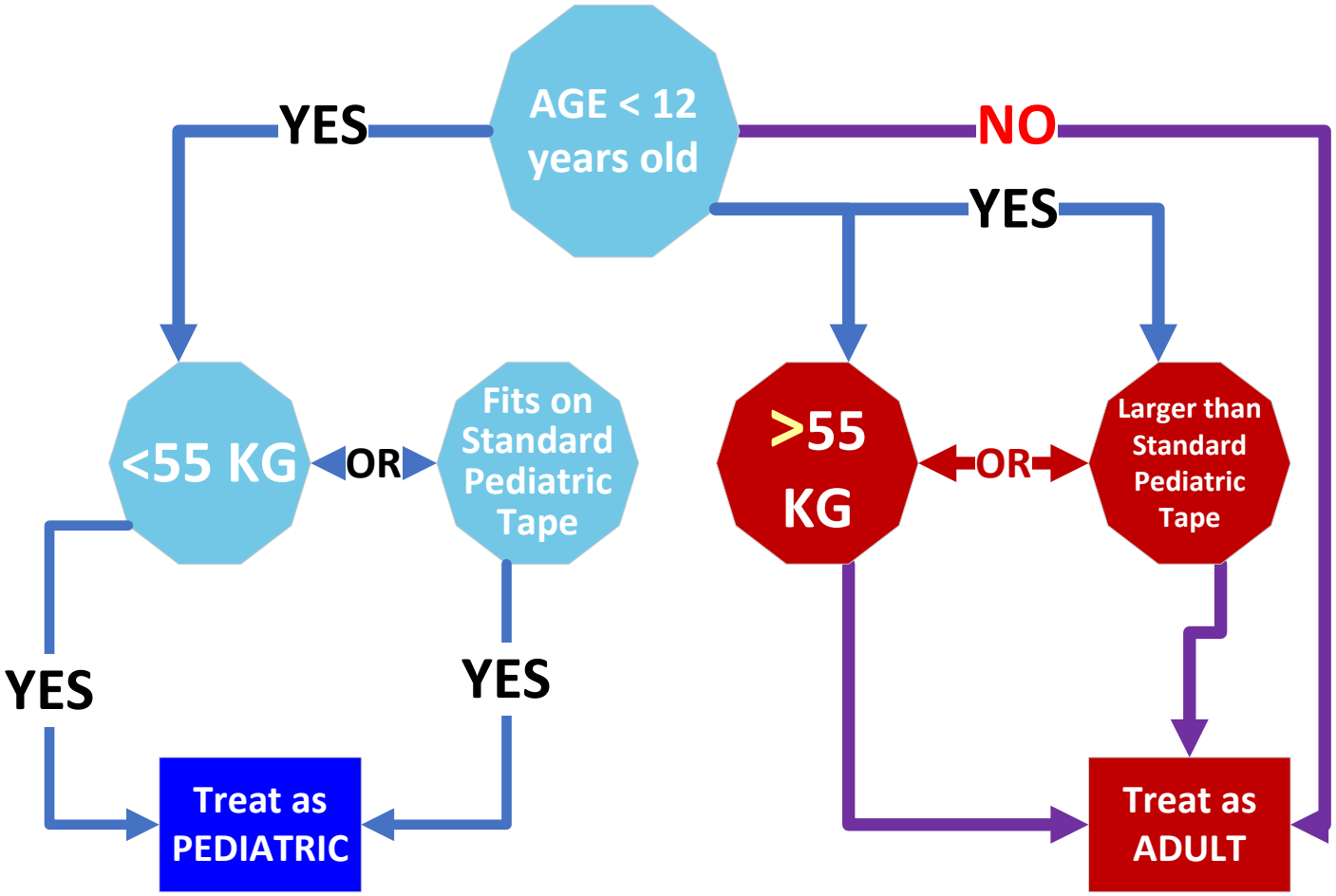
# Approach to Eclamptic Seizure



## PEARLS

- **Recommended Exam: Mental Status, Abdomen, Heart, Lungs, Neuro**
- **With active seizure activity, benzodiazepine is a priority over magnesium sulfate.**
- **Midazolam 5 – 10 mg IM is effective in termination of seizures. Do not delay IM administration with difficult or no IV or IO access.**
- **Magnesium Sulfate should be administered as quickly as possible. May cause hypotension and decreased respiratory drive, but more likely in doses higher than 6 gm.**
- **Preeclampsia:**
  - Occurs in about 6% of pregnancies. Defined by hypertension and protein in the urine. RUQ pain, epigastric pain, N/V, visual disturbances, headache, and hyperreflexia are common symptoms.
  - In the setting of pregnancy, hypertension is defined as a BP > 140 systolic or > 90 diastolic mmHg, or a relative increase of 30 systolic and 20 diastolic from the patient's normal (pre-pregnancy) blood pressure.
  - Risk factors: < 20 years of age, first pregnancy, multi-gestational pregnancy, gestational diabetes, obesity, personal or family history of gestational hypertension.
- **Eclampsia:**
  - Seizures occurring in the context of preeclampsia. Remember, women may not have been diagnosed with preeclampsia.
- If > 20 weeks EGA transport patient in a left lateral position, right side up 10 - 20° to minimize risk of supine hypotensive syndrome.
- Loss of Deep Tendon Reflexes is the first manifestation of symptomatic HYPERmagnesemia.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Document all times:
    - ❑ Contraction onset, contraction duration (length) and frequency,
    - ❑ Delivery
    - ❑ APGAR at 1 and 5 minutes,
    - ❑ Placenta delivery
    - ❑ Seizure onset, duration, recurrence
  - ❑ Interventions / Medications
  - ❑ All medications administered and dosages
  - ❑ Estimated Gestational Age

# DEFINITION OF PEDIATRIC PATIENT




**Except as may be noted within a specific C.O.G. The following schema should be used to determine Adult vs Pediatric Patients**

# Pain Control: Pediatric

**History**
- Age
- Location
- Duration
- Severity (1 - 10)
- Past medical history
- Medications
- Drug allergies

**Signs and Symptoms**
- Severity (pain scale)
- Quality (sharp, dull, etc.)
- Radiation
- Relation to movement,
- Respiration
- Increased with palpation of area

**Differential**
- **Per the specific protocol**
- **Musculoskeletal**
- **Visceral (abdominal)**
- **Cardiac**
- **Pleural / Respiratory**
- **Neurogenic**
- **Renal (colic)**

Patient care according to **C.O.G.** based on **Specific Complaint**

**Assess Pain Severity: Combination of Pain Scale, MOI, Circumstances, Injury, or Illness Severity**

**Pain Severity > 6 out of 10 OR Indication for IV / IM Medication**

NO → **B**
- Consider If Available: **Ibuprofen or Acetaminophen**
- Consider If Available: **Nitrous Oxide ϕ**

YES

**B** **Pulse Ox / EtCO2**

**Vascular Access C.O.G.**

**B**
- **Consider: Nitrous Oxide**
- Must reasssess patient at least **every 15 minutes** after sedative medication

**P**
- **Consider Ketorolac**
- Morphine or Fentanyl *
  *** ONLY these MAXIMUM doses may be administered PRIOR to OLMC contact**
- **Morphine* 0.1 mg/kg up to 5 mg.**
  **May repeat Q 5 minutes. Max Dose = 10 mg**
  **Fentanyl* 2 mcg/kg up to 100 mcg.**
  **May repeat Q 5 minutes. Max Dose = 200 mcg**
- Consider anti-emetics as needed
- Consider subdissociative Ketamine for Refractory Pain

**Notify Destination or Contact Medical Control**

**Morphine and Fentanyl Doses listed in this protocol may be used PRIOR to contact with OnLine Medical Control**

**ϕ USE of NITROUS OXIDE in a Pediatric Patient requires the patient to be old enough to be able to engage in self-administration**

**Smaller doses of Narcotics MAY be utilized to achieve pain control. Repeat dosing of Narcotics is restricted to 5 minute intervals UNTIL the MAXIMUM dose is reached prior to OLMC Contact**

**Only ONE Narcotic agent may be utilized prior to OnLine Medical Direction**

**Relative Contraindications For IV Pain Control:**
- Severe Head Injury
- End-Stage Lung Disease
- Untreated Hypotension

**Relative Contraindications For Non-Steroidal Agents :**
- Active Bleeding
- Possible Surgery
- Renal Disease

PEDIATRIC: Pain Control

# Pain Control: Pediatric



**PEARLS**

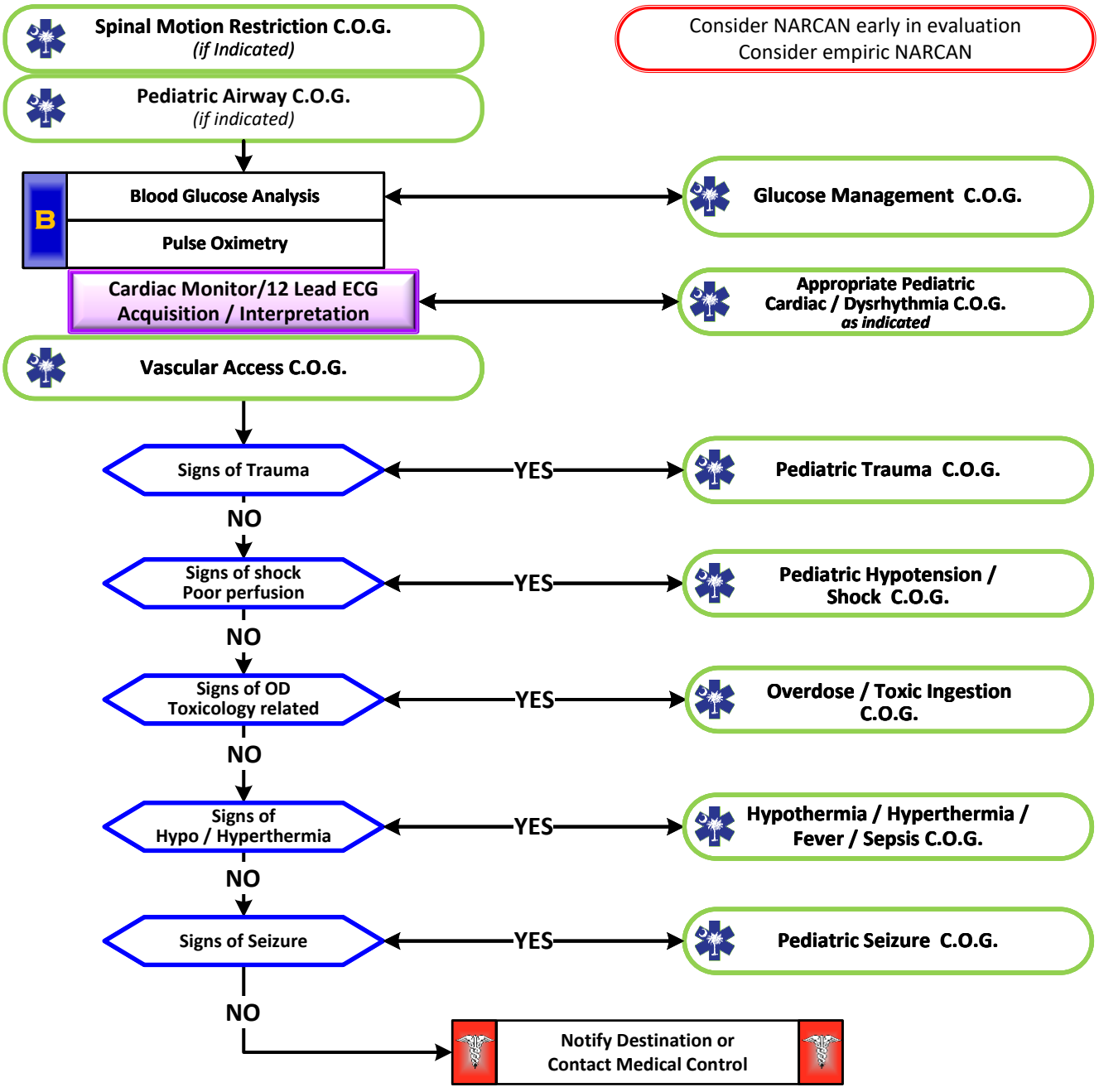
- **Recommended Exam: Mental Status, Area of Pain, Neuro**
- **Pain severity (0-10) is a vital sign to be recorded pre and post IV or IM medication delivery and at disposition.**
- **Vital signs should be obtained pre, 15 minutes post, and at disposition with all pain medications.**
- **Smaller doses of Narcotics may be utilized based upon Service Medical Control Physician instruction – i.e. LESS than 0.1 mg/kg Morphine or LESS than 2 mcg/kg Fentanyl. The narcotic dosing may be repeated ONLY at 5 minutes or greater intervals and ONLY until the MAXIMUM DOSE LISTED is reached until Online Medical Control is established.**
- Relative Contraindications to the use of a **narcotic** include hypotension, head injury, respiratory distress or severe Lung Disease.
  - **Be prepared and observe for respiratory depression with ANY administration of narcotic Analgesic, sedative, or anti-emetic agents – particularly if given in combination.**
  - Extra caution should be taken with patients under the influence of alcohol, drugs, or other sedative medications.
- **Consider alternatives in patients who have known drug allergies to NSAID's (non-steroidal anti-inflammatory medications), with active bleeding, or in patients who may need surgical intervention such as open fractures or fracture deformities.**
- All patients who receive IM or IV medications must be observed 15 minutes for drug reaction.
- **Ibuprofen** should not be given for headaches or abdominal pain, history of gastritis, stomach ulcers, fracture, or if patient will require sedation.
- Do not administer any PO medications for patients who may need surgical intervention such as open fractures or fracture deformities, headaches, or abdominal pain.
- See drug list for other contraindications for Narcotics, Acetaminophen, Nitrous Oxide, and Ibuprofen.
  - ***Only ONE NARCOTIC Agent may be used PRIOR TO OnLine Medical Control Direction. (i.e. May not "max out" one agent and then utilize a second agent prior to OnLine Medical Direction.)***
- **Ketamine: appropriate indications for pain control:**
  - **Patients who have developed opioid-tolerance. Sickle cell crisis patients with opioid-tolerance.**
  - **Patients who have obstructive sleep apnea.**
  - **May use in combination with opioids to limit total amount of opioid administration.**
- **Ketamine: caution when using for pain control:**
  - **Slow infusion or IV push over 10 minutes is associated with less side effects. Do not administer by rapid IV push.**
  - **Avoid in patients who have cardiac disease or uncontrolled hypertension.**
  - **Avoid in patients with increased intraocular pressure such as glaucoma.**
  - **Avoid use in combination with benzodiazepines due to decreased respiratory effort.**
- **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.**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Vital Signs (Pulse, Blood Pressure, Respiratory Rate, Neurologic Status) with Pulse Oximetry
  - ❑ Acquisition of Known Patient Allergies PRIOR to administration of any medications.
  - ❑ Documentation of Initial Patient Pain Scale Assessment
  - ❑ Documentation of medication administration with Correct Dose
  - ❑ Documentation of Patient Reassessment with repeat Vital Signs and Patient Pain Scale assessment.
  - ❑ Medical Control Signature on ePCR within 72 Hours.

# Pediatric Altered Mental Status

**History**
- Past medical history
- Medications
- Recent illness
- Irritability
- Lethargy
- Changes in feeding / sleeping
- Diabetes
- Potential ingestion
- Trauma
- History of exposure to drugs

**Signs and Symptoms**
- 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
- Fever

**Differential**
- 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
- Infection




PEDIATRIC MEDICAL

# Pediatric Altered Mental Status



**PEARLS**

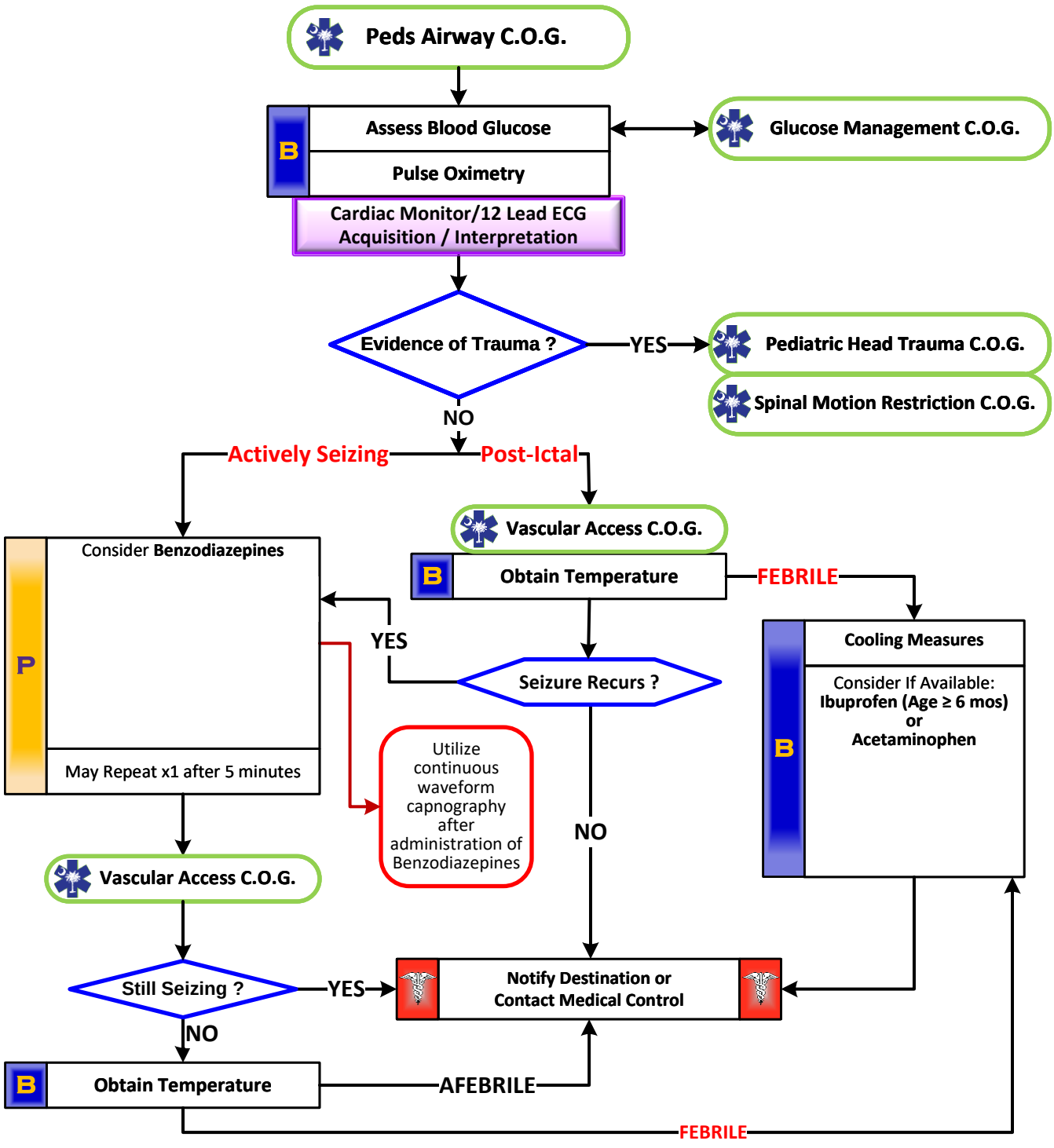
- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.**
- **AMS may present as a sign of an environmental toxin or Haz-Mat exposure - protect personal safety.**
- **General:**
  - **The patient with AMS poses one of the most significant challenges.**
  - **A careful assessment of the patient, the scene and the circumstances should be undertaken.**
  - **Assume the patient has a life threatening cause of their AMS until proven otherwise.**
  - **Pay careful attention to the head exam for signs of bruising or other injury.**
  - **Information found at the scene must be communicated to the receiving facility.**
- Naloxone may be given by EMTs or AEMTs by either auto-injector or nasal spray only per local medical control option.
- Empiric NARCAN in the altered pediatric patient should be considered.
- Do not let alcohol confuse the clinical picture. Patients who routinely consume alcohol frequently develop hypoglycemia and may have unrecognized injuries.
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.
- **Substance misuse:**
  - Patients ingesting substances can pose a great challenge.
  - DO NOT assume recreational drug use and / or alcohol are the sole reasons for AMS.
  - Misuse of alcohol may lead to hypoglycemia.
  - More serious underlying medical and trauma conditions may be the cause.
- **Behavioral health:**
  - The behavioral health patient may present a great challenge in forming a differential.
  - DO NOT assume AMS is the result solely of an underlying psychiatric etiology.
  - Often an underlying medial or trauma condition precipitates a deterioration of a patients underlying disease.
- **Spinal Motion Restriction / Trauma:**
  - Only utilize spinal immobilization if the situation warrants.
  - The patient with AMS may worsen with increased agitation when immobilized.
- **It is safer to assume hypoglycemia than hyperglycemia if doubt exists. Recheck blood glucose after Dextrose or Glucagon**
- **KEY DOCUMENTATION:**
  - ❑ Glasgow Coma Score (GCS) or AVPU description
  - ❑ Baseline developmental status and change from baseline.
  - ❑ Known / Suspected Alcohol or Drug use
  - ❑ Vital signs to include: Temperature – when able. SpO2.
  - ❑ Consideration of Sepsis as etiology
  - ❑ Pupil and Neck Examination
  - ❑ IV Fluids administered for poor perfusion / hypotension – Fluid Type and Volume administered.
  - ❑ Blood Glucose Level
  - ❑ Naloxone used as therapeutic intervention – not diagnostic tool
  - ❑ CO Detector used when available.

# Pediatric Seizure

**History**
- Fever
- Prior history of seizures
- Seizure medications
- Reported seizure activity
- History of recent head trauma
- Congenital abnormality
- Consider pregnancy in teenage female
- Hypertension in teenagers
- Family history of seizure
- Substance Abuse

**Signs and Symptoms**
- Observed seizure activity
- Altered mental status
- Hot, dry skin or elevated body temperature
- Loss of Bowel or Bladder continence
- Tongue biting

**Differential**
- Fever
- Infection
- New onset Epilepsy
- Head trauma
- Medication or Toxin
- Hypoxia or Respiratory failure
- Hypoglycemia
- Metabolic abnormality / acidosis
- Tumor




PEDIATRIC MEDICAL

# Pediatric Seizure

| Formula for calculating dose of IV Dextrose: | | |
|---|---|---|
| **Desired Dose (G/Kg)** | **Fluid Type** | **mL of Fluid Dose** |
| **0.5 G/Kg** | 50% Dextrose (D50W) | 1 mL/Kg |
| | 25% Dextrose (D25W | 2 mL/Kg |
| | 10% Dextrose (D10W) | 5 mL/Kg |
| | 5% Dextrose (D5W) | 10 mL/Kg |
| **1 G/Kg** | 50% Dextrose (D50W) | 2mL/Kg |
| | 25% Dextrose (D25W) | 4 mL/Kg |
| | 10% Dextrose (D10W) | 10 mL/Kg |
| | 5% Dextrose (D5W) | 20 mL/Kg |
| **Maximum Dose = 25 Gms Dextrose / Dose** | | |

| Recommended Treatment Regimen For Pediatric Seizure | | | |
|---|---|---|---|
| Drug | Route | Dosage | Maximum |
| Midazolam | IM (IN) | 0.2 mg/Kg | 10 mg* |
| Midazolam | IV / IO | 0.1 mg/Kg | 4 mg |
| Lorazepam | IV / IO | 0.1 mg/Kg | 4 mg |
| Diazepam | IV / IO | 0.2 mg/Kg | 10 mg |
| *Midazolam IM / IN for no vascular access | | | |

**PEARLS**

- **Recommended Exam: Vital Signs (including Temperature), Mental Status, HEENT, Heart, Lungs, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care**
- **Consider Spinal Motion Restriction.**
- **Maintain SpO2 > or = [ 94% ].**
- **Φ For Blood Glucose Level of < or = 60 – TREAT for hypoglycemia.**
- Assess possibility of occult trauma and substance exposure or abuse.
- **Addressing the ABCs and verifying blood glucose is more important than stopping the seizure**
- **Avoiding hypoxemia is extremely important**
- **Status Epilepticus** is defined as two or more successive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid treatment and transport and possibly airway control,.
- **Grand mal seizures (generalized)** are associated with loss of consciousness, incontinence, and tongue trauma.
- **Focal seizures (petit mal)** effect only a part of the body and do not usually result in a loss of consciousness.
- **Jacksonian seizures** are seizures which start as a focal seizure and become generalized.
- Be prepared for airway problems and continued seizures.
- If evidence or suspicion of trauma, spine should be immobilized.
- In an infant, a seizure may be the only evidence of a closed head injury.
- Be prepared to assist ventilations especially if diazepam or midazolam is used.
- Medication Administration:
  - IM route is preferred over IV or IO if IV not already established.
  - IN route as an alternative.
  - **Midazolam IM preferred if no access.** Dosages per local medical control.
  - **Diazepam** (Valium) is not effective due to erratic absorption when administered IM. It should be given IV or Rectally.
    - **Rectal Diazepam/Lorazepam:** Draw drug dose up in a 3 ml syringe. Remove needle from syringe and attached syringe to an IV extension tube. Cut off the distal end of the extension tube leaving about 3 or 4 inches of length. Insert tube in rectum and inject drug. Flush extension tube with 3 ml of air and remove.
- **Obtain continuous waveform capnography after Benzodiazepine administration.**
- *** D10 used in Newborn/Infant and D25 used in Pediatric**
- Hypoglycemic patients who are treated in the field for seizure should be transported to hospital, regardless of whether they return to baseline mental status after treatment
  - Maximum of 25 G Dextrose per dose.
- **For actively seizing patients on EMS arrival, (i.e. no IV) consider IM VERSED (Midazolam) prior to establishing IV access.**
- For new onset seizures or seizures that are refractory to treatment, consider other potential causes including, but not limited to, trauma, stroke, electrolyte abnormality, toxic ingestion, hyperthermia, toxin exposure.
- **KEY DOCUMENTATION:**
  - ❑ Actively seizing during transport and time of seizure onset/cessation
  - ❑ Onset, focality, direction of eye deviation
  - ❑ Concurrent symptoms of apnea, cyanosis, vomiting, bowel/bladder incontinence, or fever
  - ❑ Medication amounts/routes given by bystanders or prehospital clinicians
  - ❑ Neurologic status (GCS, nystagmus, pupil size, focal neurologic deficit, or signs of stroke)
  - ❑ Blood glucose level

PEDIATRIC MEDICAL

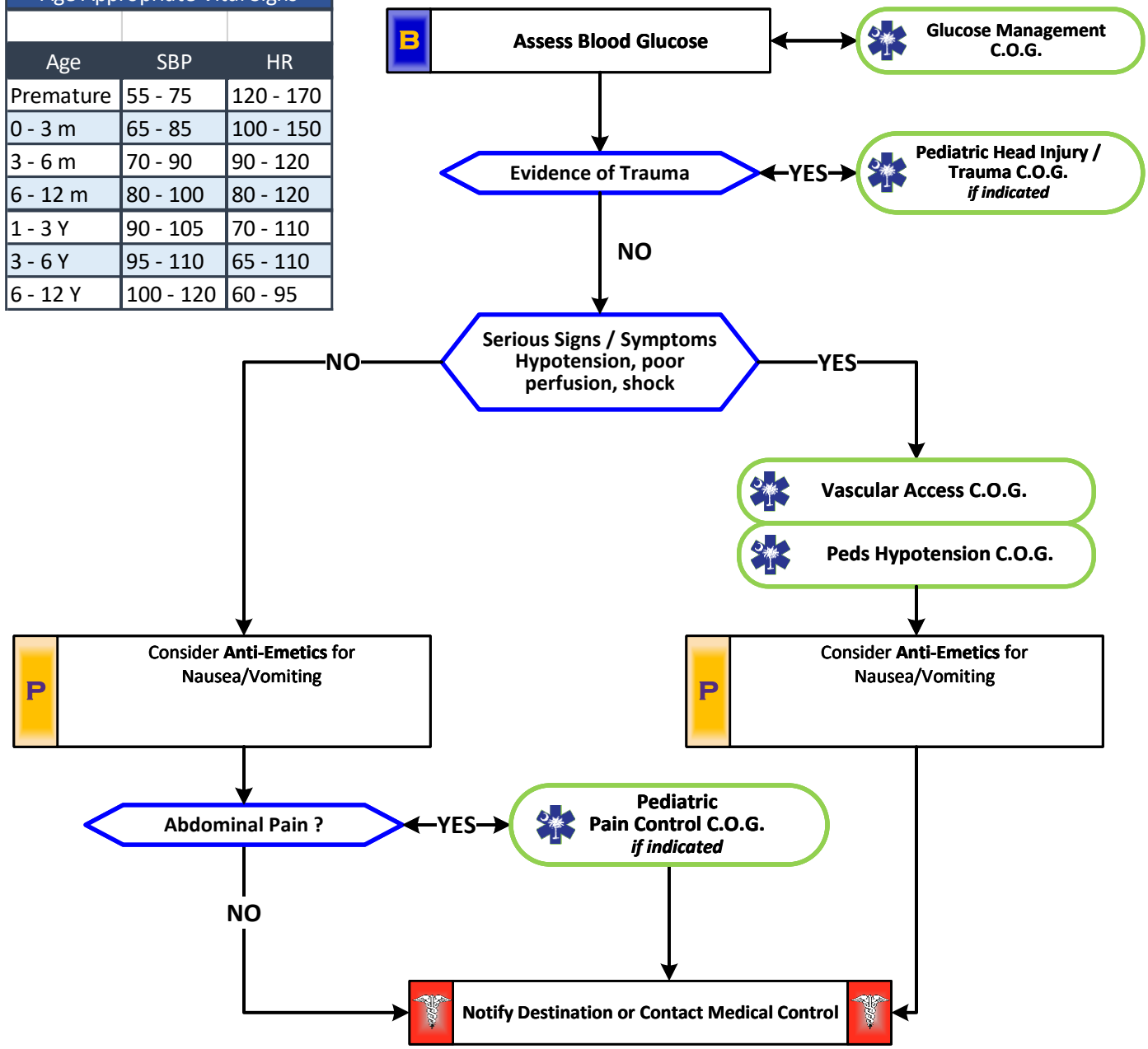
# Pediatric Vomiting / Diarrhea

**History**
- 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

**Signs and Symptoms**
- Pain
- Distension
- Constipation
- Diarrhea
- Anorexia
- Fever
- Cough,
- Dysuria

**Differential**
- CNS (Increased pressure, headache, tumor, trauma or hemorrhage)
- Drugs
- Appendicitis
- Gastroenteritis
- GI or Renal disorders
- Diabetic Ketoacidosis
- Infections (pneumonia, influenza)
- Electrolyte abnormalities

| Age Appropriate Vital Signs | | |
|---|---|---|
| Age | SBP | HR |
| Premature | 55 - 75 | 120 - 170 |
| 0 - 3 m | 65 - 85 | 100 - 150 |
| 3 - 6 m | 70 - 90 | 90 - 120 |
| 6 - 12 m | 80 - 100 | 80 - 120 |
| 1 - 3 Y | 90 - 105 | 70 - 110 |
| 3 - 6 Y | 95 - 110 | 65 - 110 |
| 6 - 12 Y | 100 - 120 | 60 - 95 |




PEDIATRIC MEDICAL

# Pediatric Vomiting / Diarrhea

| Recommended Treatment Regimen For Pediatric Nausea/Vomiting | | | |
|---|---|---|---|
| **Drug** | **Route** | **Dosage** | **Maximum** |
| Ondansetron | IV / PO | 0.15 mg/Kg | 4 mg * |
| Prochlorperazine | IV / IM | 0.1 mg/Kg | 10 mg ^ |
| Diphenhydramine | IV / IM | 0.1mg/Kg | 25 mg ^ |
| * 6 m - 14 Y old | | | |
| ^ ONLY > 2 years and > 12 Kg | | | |

**PEARLS**

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Heart Rate: One of the first clinical signs of dehydration, 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.**
- Beware of vomiting only in children. Pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures) all often present with vomiting.
- Document the mental status and vital signs prior to administration of antiemetic medications.
- Vomiting and diarrhea are common symptoms, but can be the symptoms of uncommon and serious pathology such as carbon monoxide poisoning, new onset diabetes, diabetic ketoacidosis (DKA), and organophosphate poisoning. Maintain a high index of suspicion.
- **Zofran (Ondansetron) is preferred anti-emetic for children.**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Patient Age, Weight and/or Length based weight measure for pediatric patients
  - ❑ Blood Glucose Level
  - ❑ Medications Given Including: Time, Dose, Dose Units, Route, Response, and Complications or Adverse Events
  - ❑ Vital Signs – Before AND After medication administration AND After each fluid bolus
  - ❑ History and Physical regarding etiology of Nausea, Vomiting, and/or Diarrhea.

# Pediatric Respiratory Distress

**History**
- Time of onset
- Possibility of foreign body
- Medical history
- Medications
- Fever or respiratory infection
- Other sick siblings / contacts
- History of trauma

**Signs and Symptoms**
- Wheezing or stridor
- Respiratory retractions
- Increased Respiratory Rate
- Increased heart rate
- Altered level of consciousness
- Nasal flaring / tripoding
- Anxious appearance

**Differential**
- Allergic Reaction
- Asthma
- Aspiration
- Foreign body
- Infection
  - Pneumonia
  - Croup
  - Epiglotitis
  - RSV
- Congenital heart disease
- Medication or Toxin
- Trauma

**Pediatric Airway C.O.G.** *(if indicated)*

YES

**Respiratory / Ventilatory Insufficiency**

OLMC* = Online Medical Control

NO

B — Position Patient for Comfort
B — Pulse Oximetry
B — Capnography if Available

**Consider Pediatric CHF C.O.G.**

**Wheezing**

B — **Albuterol** or Other **Beta Agonist**

**Vascular Access C.O.G.**
If SpO2 [< %] after 1st Treatment

B — If No Improvement – Repeat **Albuterol** (or other **Beta Agonist**) x 2-3

P — If no significant improvement after 3 HHN Treatments – Contact **OLMC***
P — Consider Addition of **Ipratropium** to Nebulizer (if Available)
P — If Available: **Steroids**

B — **Consider CPAP / BiPAP**

**Stridor**

B — **Normal Saline *Nebulized***

P — If NO Improvement or Severe **Racemic Epinephrine *Nebulized***

**Vascular Access C.O.G.**
If SpO2 [< %] after 1st Treatment

P — If Available: **Steroids**

**Notify Destination or Contact Medical Control**

**OLMC***

B — Consider Repeat **Albuterol** or Other **Beta Agonist**

P — Consider **Magnesium Sulfate**
P — Consider **Epinephrine**

**Consider Anaphylaxis C.O.G.**

**OLMC***

P — If NO Improvement Repeat **Racemic Epinephrine *Nebulized***
P — If NO Improvement Consider **Epinephrine**

**Consider Anaphylaxis C.O.G.**

PEDIATRIC RESPIRATORY

# Pediatric Respiratory Distress

| Endotracheal Tube Sizes | | |
|---|---|---|
| **Age** | **Size (mm) Uncuffed** | **Size (mm) Cuffed *** |
| Premature | 2.5 | |
| Term to 3 m | 3.0 | |
| 3 - 7 m | 3.5 | 3.0 |
| 7 - 15 m | 4.0 | 3.5 |
| 15 - 24 m | 4.5 | 3.5 |
| 2 - 15 Y | [age(yrs)/4] +4 | [age(yrs)/4]+3.5 |
| > 15 Y | | 7.5 female - 8.0 male |
| **(* Cuffed tubes preferred in pediatrics)** | | |

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

**ESTIMATION OF ENDOTRACHEAL TUBE DEPTH FOR PEDIATRICS**

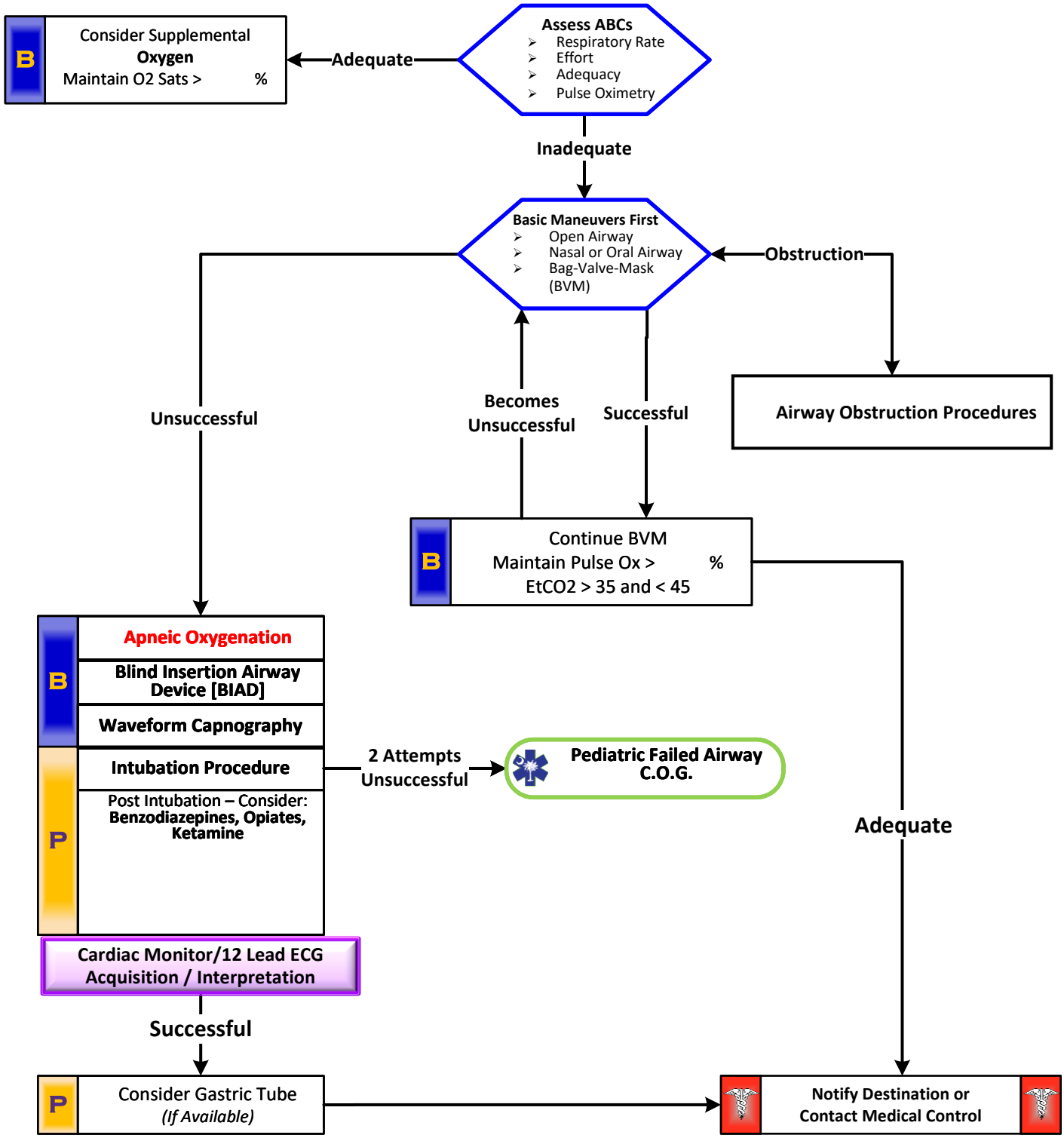
**Estimated D (depth) [in cms] = 4 + (0.1 x Height in Centimeters)**

## PEARLS

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care.**
- Do not force a child into a position. 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 ≤6 years old, with a peak incidence between six months to three years of age; it is uncommon in children >6 years old. It is viral, possible fever, gradual onset, drooling is rarely noted.
- **Epiglottitis** typically affects children > 2 years of age.
  - Young children (<5 years of age) with H. influenzae type b (Hib) epiglottitis may present with respiratory distress, anxiety, and the characteristic "tripod" or "sniffing" posture in which they assume a sitting position with the trunk leaning forward, neck hyperextended, and chin thrust forward in an effort to maximize the diameter of the obstructed airway. They may be reluctant to lie down. The presentation may be subtle.
  - Drooling is often present.
  - Cough is typically absent.
  - IF bacterial, with fever, rapid onset, possible stridor, patient wants to sit up to keep airway open, drooling is common.
  - Airway manipulation may worsen the condition.
  - Avoid direct laryngoscopy unless intubation is imminent.
- This protocol includes all patients with respiratory distress including, Asthma, Reactive Airway Disease, Bronchospasm, Viral URI, Pneumonia, CHF, and Airway Foreign Body.
- **Combination nebulizers containing albuterol and ipratropium:**
  - Patients may receive more than 3 nebulizer treatments, treatments should continue until improvement.
  - Following 3 combination nebulizers, it is acceptable to continue albuterol solely with subsequent treatments as there is no proven benefit to continual use of ipratropium.
- **Epinephrine:**
  - If allergic reaction or anaphylaxis is suspected, give immediately and repeat until improvement.
  - If allergic reaction is not suspected, administer with impending respiratory failure and no improvement.
  - May use Regular Epinephrine 1:1,000 if Racemic Epinephrine not available (Admixture: 1 mL + 3mL NS).
- Consider Magnesium Sulfate with impending respiratory failure and no improvement.
- Pulse oximetry should be monitored continuously if initial saturation is < or = 94%, or there is a decline in patients status despite normal pulse oximetry readings and consider End-tidal CO2 monitoring if available.
- **CPAP or Non-Invasive Positive Pressure Ventilation:**
  - May be used with COPD, Asthma, Allergic reactions, and CHF.
  - Consider early in treatment course.
  - Consider removal if SBP remains < 100 mmHg and not responding to other treatments.
- A silent chest in respiratory distress is a pre-respiratory arrest sign.
- Contact Medical Control prior to administering epinephrine in patients who have a history of cardiac disease or if the patient's heart rate is >150 (or age adjusted normals). Epinephrine may precipitate cardiac ischemia. A 12-lead ECG should be performed on these patients.
- **Capnography is:**
  - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
  - **Strongly Recommended /Strongly Encouraged for all unstable patients**
  - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **KEY DOCUMENTATION:**
  - ❑ Initial key aspects of the physical examination and after each intervention.
  - ❑ Respiratory Rate
  - ❑ Oxygen Saturation
  - ❑ EtCO2 / Waveform shape
  - ❑ Breath Sounds and Quality
  - ❑ Use of Accessory Muscles
  - ❑ Mental Status
  - ❑ Response to Interventions

PEDIATRIC RESPIRATORY

# Airway, Pediatric




PEDIATRIC RESPIRATORY

# Airway, Pediatric

| Endotracheal Tube Sizes | | |
|---|---|---|
| **Age** | **Size (mm) Uncuffed** | **Size (mm) Cuffed *** |
| Premature | 2.5 | |
| Term to 3 m | 3.0 | |
| 3 - 7 m | 3.5 | 3.0 |
| 7 - 15 m | 4.0 | 3.5 |
| 15 - 24 m | 4.5 | 3.5 |
| 2 - 15 Y | [age(yrs)/4] +4 | [age(yrs)/4]+3.5 |
| > 15 Y | | 7.5 female - 8.0 male |
| **(* Cuffed tubes preferred in pediatrics)** | | |
| **Estimation of Endotracheal Tube Depth for Pediatrics** | | |
| **Estimated D (depth) [in cms] = 4 + (0.1 x Height in Centimeters)** | | |

## PEARLS

- **For this protocol, pediatric is defined as: < 12 years old AND [a] < 55 Kg -or- [b] Fits on Standardized Pediatric Length Based Tape**
- **Capnography is:**
  - **Required for ALL Intubated Patients***
  - **Recommended / Encouraged for all unstable patients**
  - **Recommended / Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of > [ %] , it is acceptable to continue with basic airway measures instead of using a BIAD or Intubation.**
- **For the purposes of this protocol an adequate airway is when the patient is receiving appropriate oxygenation and ventilation without undue risk of aspiration or worsening airway pathology.**
- **An Intubation Attempt is defined as passing the laryngoscope blade or endotracheal tube past the teeth or inserted into the nasal passage.**
- **Ventilatory rate are typically about 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 12 per minute. Maintain a EtCO2 between 35 and 45 and avoid hyperventilation.**
- **It is strongly encouraged to complete an Airway Evaluation Form with any BIAD or Intubation procedure.**
- Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- Maintain C-spine immobilization for patients with suspected spinal injury.
- Do not assume hyperventilation is psychogenic - use oxygen, not a paper bag.
- **BURP** maneuver (**B**ackward, **U**pward, **R**ightward, **P**osterior pressure on larynx) should be used to assist with difficult intubations. [Sellick's maneuver no longer recommended by AHA.]
- Hyperventilation in deteriorating head trauma should only be done to maintain a EtCO2 (pCO2) of 30-35.
- Gastric tube placement should be considered in all intubated patients.
- It is important to secure the endotracheal tube well. Manual stabilization of the endotracheal tube should be used during all patient moves/transfers.
- **KEY DOCUMENTATION POINTS:**
  - ❑ Vital Signs and Appropriate Physical Examination
  - ❑ Efforts to maintain/improve airway
  - ❑ Indications for Advanced Airway Management
  - ❑ Occurrence of peri-intubation hypoxia (< 90% SpO2); bradycardia, hypotension, or cardiac arrest
    - ❑ **Peri-intubation period encompasses the time from administration of any sedative/paralyzing agent or initiation of intubation up to 10 minutes after the final airway procedure has been terminated.**
    - ❑ Post-intubation with advanced airway, EtCO2 value and capnograph should be documented immediately after airway placement, with each patient movement (e.g., into and out of ambulance), **and** at the time of patient transfer in the ED
    - ❑ Documentation of ALL attempts at intubation based upon definition.
    - ❑ Documentation of all times – including:
    - ❑ Initial Assessment
    - ❑ Drug Administration
    - ❑ Time of Advanced Airway Attempts
    - ❑ Contact with Receiving Facility

# Pediatric Hypotension / Shock

**History**
- Blood loss
- Fluid loss
  - Vomiting
  - Diarrhea
  - Fever
- Infection
- Congenital Defects
- Birth Complications

**Signs and Symptoms**
- Restlessness, confusion, weakness
- Dizziness
- Increased HR, rapid pulse
- Decreased BP
- Pale, cool, clammy skin
- Delayed capillary refill

**Differential**
- Trauma
- Infection
- Dehydration
  - Vomiting
  - Diarrhea
  - Fever
- Congenital heart disease
- Medication or Toxin
- Allergic reaction

**Use Age Appropriate Vital Signs**

**Vascular Access C.O.G.**

**Consider NARCAN early**

**Evidence or History of Trauma ?**

YES → **Pediatric Multiple Trauma C.O.G.**

**Consider Blood Administration if available and if blood loss / trauma and if patient meets all criteria**

NO

**Glucose Management C.O.G.**

**B** — **Assess Blood Glucose**

**A** — **Normal Saline Bolus (#1) 20 mL/Kg**

**A** — **Consider Repeating: Normal Saline Bolus (#2) 20 mL/Kg***
*Consider Congenital Heart Disease Prior to 2nd Bolus

**A** — **Consider Repeating: Normal Saline Bolus (#3) 20 mL/Kg** → **Maximum Total Boluses 60cc/Kg**

**P** — **Consider: Steroids**
**Consider: Pressor Infusion**

**Consider OD / Toxic C.O.G.**

**Notify Destination or Contact Medical Control**

**Age Appropriate Vital Signs**

| Age | SBP | HR |
|---|---|---|
| Premature | 55 - 75 | 120 - 170 |
| 0 - 3 m | 65 - 85 | 100 - 150 |
| 3 - 6 m | 70 - 90 | 90 - 120 |
| 6 - 12 m | 80 - 100 | 80 - 120 |
| 1 - 3 Y | 90 - 105 | 70 - 110 |
| 3 - 6 Y | 95 - 110 | 65 - 110 |
| 6 - 12 Y | 100 - 120 | 60 - 95 |

# Pediatric Hypotension / Shock

**Vasopressor medications (in order of preference)**

1. Epinephrine IV drip 0.02–0.2 mcg/kg/min titrated to a MAP greater than 65 mmHg

**OR**

2. Epinephrine by push dose (dilute boluses):
   - ❖ prepare 10 mcg/mL by adding 1 mL of 0.1 mg/mL epinephrine to 9 mL of normal saline, then administer 10–20 mcg boluses (1–2 mL) q 2 minutes titrated MAP greater than 65 mmHg

**OR**

3. Norepinephrine 0.02–0.4 mcg/kg/minute IV titrated to a MAP greater than 65 mmHg

## PEARLS

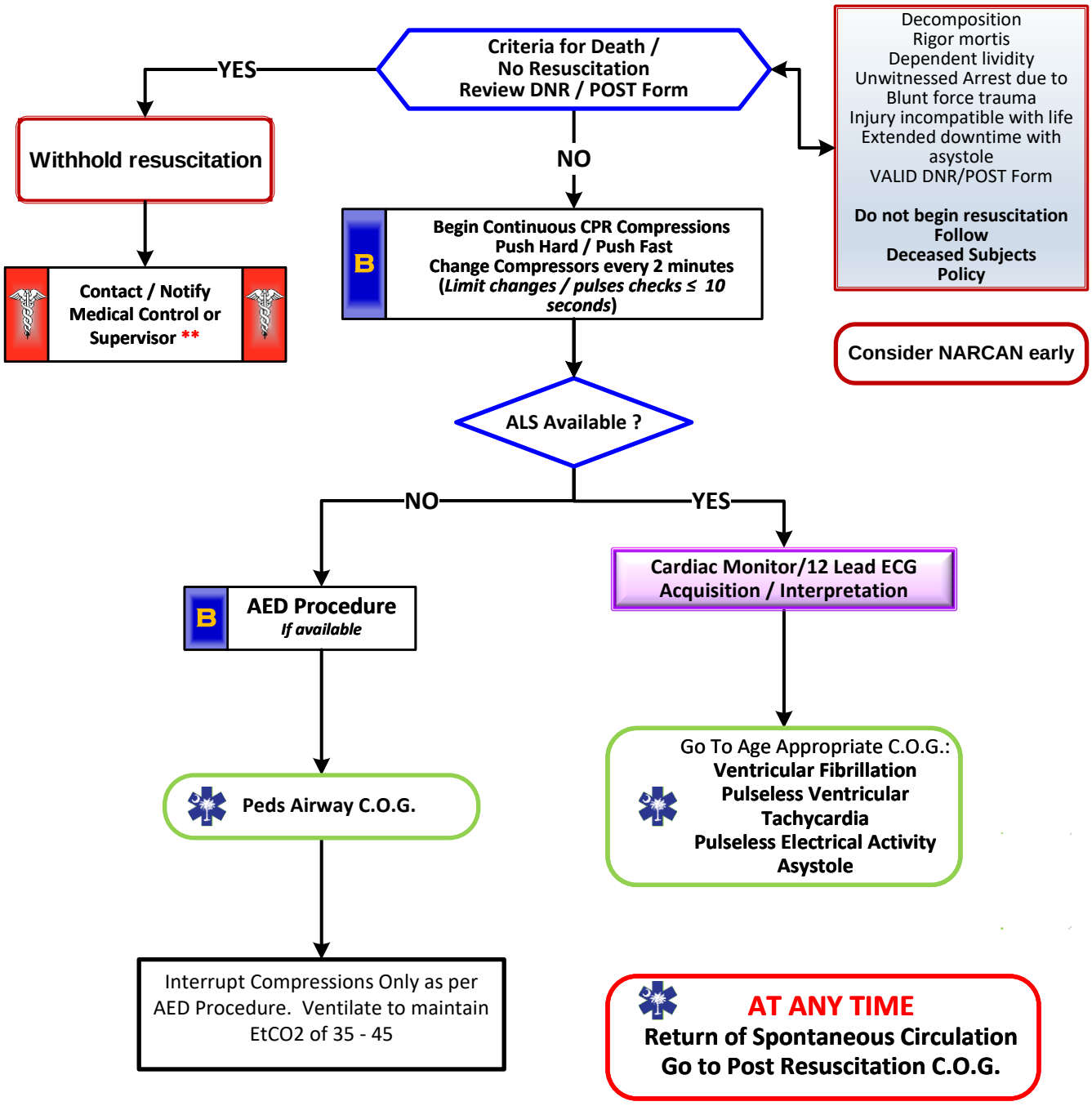
- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro**
- Hypotension can be defined as a systolic blood pressure of less than the age appropriate Systolic BP. This is not always reliable and should be interpreted in context and patient's typical BP if known.Consider all possible causes of shock and treat per appropriate protocol.
- Decreasing heart rate and hypotension occur late in children and are signs of imminent cardiac arrest.
- Most maternal medications pass through breast milk to the infant. Examples: Narcotics, Benzodiazepines.
- Consider possible allergic reaction or early anaphylaxis.
- Consider sepsis as possible etiology and measure a body temperature as part of vital signs.
- If patient has a history of cardiac disease, (prematurity) chronic lung disease, or renal disease limit Normal Saline bolus to 10 ml/kg unless otherwise directed by Medical Control Physician
- Shock often may present with normal vital signs and may develop insidiously. Tachycardia may be the only manifestation.
- Fluid of up to 20 mL/kg of isotonic fluid (Local Medical Control) by administering rapid, predetermined boluses unless the MAP goal is achieved, or pulmonary edema develops.
  - ➢ Consideration of Congenital Heart Disease should be entertained prior to 2nd IV Bolus.
  - ➢ If available, the administration of packed red blood cells, other blood components or whole blood may be indicated for hemorrhagic shock
  - ➢ Early, aggressive IV fluid administration is essential in the treatment of suspected septic shock
- Patients predisposed to shock:
  - ➢ Immunocompromised (patients undergoing chemotherapy or with a primary or acquired immunodeficiency)
  - ➢ Adrenal insufficiency (Addison's disease, congenital adrenal hyperplasia, chronic or recent steroid use)
  - ➢ History of a solid organ or bone marrow transplant
- Hypotension indicates uncompensated shock, which may progress to cardiopulmonary failure within minutes.
- Repeat Vital Signs AFTER each Bolus or Change in Pharmacologic Therapy (Change in Dose or Agent).
- Consider all possible causes of shock and treat per appropriate protocol:
- **Hypovolemic Shock:**
  - ○ Hemorrhage, trauma, GI bleeding, dehydration, or pregnancy related bleeding.
- **Cardiogenic Shock:**
  - ○ Heart failure, MI, Cardiomyopathy, Congenital Heart Disease, 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.
- **Acute Adrenal Insufficiency:**
  - ○ State where body cannot produce enough steroids (glucocorticoids/mineralocorticoids). May have primary adrenal disease or more commonly have stopped a steroid like prednisone. Usually hypotensive with nausea, vomiting, dehydration and/or abdominal pain.
    - ➢ **If suspected Paramedic should give Methylprednisolone [2mg/Kg to max of 125 mg IM / IV / IO] or Dexamethasone [0.6 mg/Kg to max of 10 mg IM / IV / IO]. May administer prescribed steroid carried by patient IM / IV / IO. Patient may have Hydrocortisone (Cortef or Solu-Cortef). Dose: < 1y.o. give 25 mg, 1-12 y.o. give 50 mg, and > 12 y.o. give 100 mg or dose specified by physician.**
    - ➢ May use steroid agent specific to your local drug list.
- **KEY DOCUMENTATION:**
  - ❑ Medications administered
  - ❑ Full vital signs (pulse, bloood pressure, respiratory rate, neurologic status) with reassessment at minimum Q 15 minutes or more frequently as appropriate.
  - ❑ Amount of Fluids Administered
  - ❑ Notification of receiving facility on Transport.

# Pediatric Cardiac Arrest

**History**
- Time of arrest
- Medical history
- Medications
- Possibility of Airway foreign body / obstruction
- Hypothermia

**Signs and Symptoms**
- Unresponsive
- Cardiac arrest

**Differential**
- **Respiratory failure**
  - **Foreign body, Secretions, Infection (croup, epiglotitis)**
- **Hypovolemia (dehydration)**
- **Congenital heart disease**
- **Trauma**
- **Tension pneumothorax, cardiac tamponade, pulmonary embolism**
- **Hypothermia**
- **Toxin or medication**
- **Electrolyte abnormalities (Glucose, K)**
- **Acidosis**




PEDIATRIC CARDIOVASCULAR

# Pediatric Cardiac Arrest



**PEARLS**

- **Recommended Exam: Mental Status, Heart, Lungs**
- In order to be successful in pediatric arrests, a cause must be identified and corrected.
- Airway and Ventilation is the most important intervention in Pediatric Cardiac Arrest. This should be accomplished immediately. Patient survival is often dependent on airway management success.
- ****Contact Supervisor Based on Local Policy and Written Protocol to Withhold Resuscitation.**
- **Team Focused Approach / Pit-Crew Approach recommended; assign responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- ***Consider the use of an appropriately sized SGA if BVM (with OPA/NPA) alone is not effective in maintaining oxygenation and/ or ventilation. This is especially important in children as Endotracheal Intubation has not been shown to improve outcomes over prehospital BVM or (BIAD) SGA***
- **Reassess and document BIAD and / or endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.**
  - All Cardiac Arrest patients should have continuous waveform capnography applied
  - IV / IO access and drug delivery is secondary to high-quality chest compressions and early defibrillation.
  - IV access is preferred route. Follow IV or IO Access Protocol .
- **Defibrillation:**
  - Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
  - Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
  - Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO2 (EtCO2)**
  - If EtCO2 is < 10 mmHg, improve chest compressions.
  - Goal EtCO2 = 35-45 mmHg
  - If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations:**
  - **Opioid Overdose** - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
  - **Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike** – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Key Documentation:**
  - ❑ Resuscitation attempted and all interventions performed
  - ❑ Arrest witnessed / Not-witnessed.
  - ❑ CPR Prior to EMS Arrival
  - ❑ First monitored rhythm
  - ❑ Outcome / Any ROSC
  - ❑ Presumed Etiology (Presumed Primary Cardiac; Trauma; Submersion; Respiratory; Other Non-Cardiac; Unknown)
  - ❑ Documentation of all acquired EKG Strips
  - ❑ Documentation of Termination of Resuscitation Efforts and reasons for Termination.
  - ❑ Reassess and document endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.

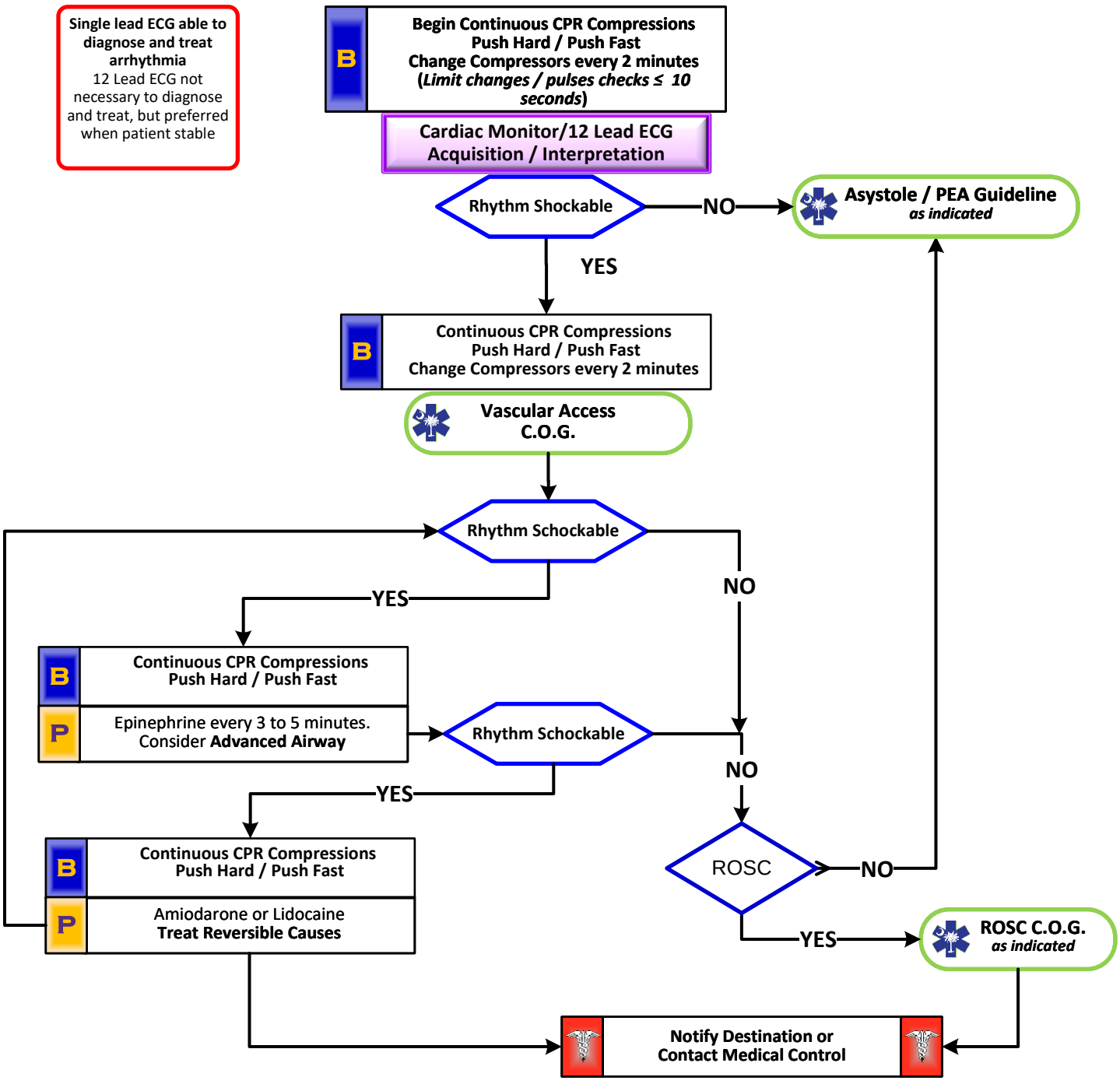
# Pediatric Pulseless
## Ventricular Tachycardia / Ventricular Fibrillation

**History**
- Past medical history
- Medications or Toxic Ingestion
- (Aminophylline, Diet pills, Thyroid supplements, Decongestants)
- Drugs (nicotine, cocaine)
- Congenital Heart Disease
- Respiratory Distress
- Syncope or Near Syncope

**Signs and Symptoms**
- Heart Rate:
  - Child > 180/bpm
  - Infant > 220/bpm
- Pale or Cyanosis
- Diaphoresis
- Tachypnea
- Vomiting
- Hypotension
- Altered Level of Consciousness
- Pulmonary Congestion
- Syncope

**Differential**
- Heart disease (Congenital)
- Hypo / Hyperthermia
- Hypovolemia or Anemia
- Electrolyte imbalance
- Anxiety / Pain / Emotional stress
- Fever / Infection / Sepsis
- Hypoxia
- Hypoglycemia
- Medication / Toxin / Drugs (see HX)
- Pulmonary embolus
- Trauma
- Tension Pneumothorax

**Single lead ECG able to diagnose and treat arrhythmia**
12 Lead ECG not necessary to diagnose and treat, but preferred when patient stable




PEDIATRIC CARDIOVASCULAR

# Pediatric Pulseless
## Ventricular Tachycardia / Ventricular Fibrillation

**PEARLS**

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Wide Complex Tachycardia (> 0.08 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 Ventricular Fibrillation / Asystole..
- Monitor for hypotension after administration of Antiarrhythmics.
- Monitor for respiratory depression and hypotension associated with Benzodiazepines.
- Continuous pulse oximetry is required for all Patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **KEY DOCUMENTATION:**
  - ❑ Initial rhythm and all rhythm changes
  - ❑ Time, Dose, and Response to medications given
  - ❑ Cardioversion times, Synchronization, Number of Attempts, Joules, and Response
  - ❑ Obtain monitor strips after each intervention
  - ❑ Patient Weight
  - ❑ Pediatric length based tape color (for pediatrics who fit on tape).
  - ❑ History of event supporting treatment of underlying causes.
  - ❑ Blood Sugar Obtained
  - ❑ Use of Sedation for responsive patients

# Pediatric Asystole / PEA

**History**
- Events leading to arrest
- Estimated downtime
- Past medical history
- Medications
- Existence of terminal illness
- Airway obstruction
- Hypothermia
- Suspected abuse; shaken baby syndrome, Pediatric Abusive Head Trauma pattern of injuries
- SIDS

**Signs and Symptoms**
- Unresponsive
- Cardiac Arrest
- Signs of lividity or rigor

**Differential**
- Respiratory failure
- Foreign body
- Hyperkalemia
- Infection (croup, epiglotitis)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Tension pneumothorax
- Hypothermia
- Toxin or medication
- Consider NARCAN early
- Hypoglycemia
- Acidosis

Criteria for Death / No Resuscitation
Review DNR / POST Form

YES → Withhold resuscitation

Withhold resuscitation → Contact / Notify Medical Control or Supervisor **

NO

**B** Begin Continuous CPR Compressions
Push Hard / Push Fast
Change Compressors every 2 minutes
(*Limit changes / pulses checks ≤ 10 seconds*)

Peds Airway C.O.G.

Peds Hypotension C.O.G.

**P** Epinephrine 1:10,000
0.01 mg/kg IV/IO (max 1mg)
Repeat every 3 – 5 minutes

Search for Reversible Causes
Utilize Appropriate C.O.G.

**REVERSIBLE CAUSES:**

**Hypovolemia**
Hypotension Protocol – Fluid Bolus

**Hypoxia**
Airway Protocol – Obstruction? Increase ventilation, Supplemental Oxygen

**Hydrogen ion (acidosis)**
Increase ventilation, Bicarbonate

**Hypothermia**
Hypothermia Protocol, Rewarming

**Hyperkalemia**
Dialysis / Renal Failure Protocol – Calcium, Bicarbonate, Albuterol

**Hypoglycemia**
Hypoglycemia Protocol – Dextrose, Glucagon

**Tension pneumothorax**
Chest Decompression

**Tamponade; cardiac**
Rapid Transport – Early Notification

**Toxins**
OD / Toxic Ingestion Protocol; Specific Antidote

**Thrombosis; pulmonary (PE)**
Fluid Bolus.
Rapid Transport – Early Notification

**Thrombosis; coronary (MI)**
Rapid Transport – Early Notification

**AT ANY TIME**
Return of Spontaneous Circulation
Go to
Post Resuscitation C.O.G.

Glucose Management C.O.G. ↔

**B** Blood Glucose Analysis

**P** Consider Pressors – Epinephrine

Consider External Pacing

Notify Destination or Contact Medical Control

**CRITERIA TO WITHOLD RESUSCITATION**
- Decomposition
- Rigor mortis
- Dependent lividity
- Unwitnessed Arrest due to Blunt force trauma
- Injury incompatible with life
- Extended downtime with asystole
- VALID DNR/POST Form

**Do not begin resuscitation Follow Deceased Subjects Policy**

**AT ANY TIME**
If rhythm changes:
Go to
Appropriate C.O.G.

PEDIATRIC CARDIOVASCULAR

# Pediatric Asystole / PEA

**PEARLS**

- **Recommended Exam: Mental Status, Heart, Lungs**
- **In order to be successful in pediatric arrests, a cause must be identified and corrected.**
- **Airway and Ventilation is the most important intervention in Pediatric Cardiac Arrest. This should be accomplished immediately. Patient survival is often dependent on airway management success.**
- ****Contact Supervisor Based on Local Policy and Written Protocol to Withhold Resuscitation.**
- **Team Focused Approach / Pit-Crew Approach recommended; assign responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- **Reassess and document BIAD and / or endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.**
  - All Cardiac Arrest patients should have continuous waveform capnography applied
  - IV / IO access and drug delivery is secondary to high-quality chest compressions and early defibrillation.
  - IV access is preferred route. Follow IV or IO Access Protocol .
- **Defibrillation:**
  - Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
  - Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
  - Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO2 (EtCO2)**
  - If EtCO2 is < 10 mmHg, improve chest compressions.
  - Goal EtCO2 = 35-45 mmHg
  - If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations:**
  - **Opioid Overdose** - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
  - **Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike** – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **KEY DOCUMENTATION:**
  - ❑ Resuscitation attempted and all interventions performed
  - ❑ Arrest witnessed / Not-witnessed.
  - ❑ CPR Prior to EMS Arrival
  - ❑ First monitored rhythm
  - ❑ Outcome / Any ROSC
  - ❑ Presumed Etiology (Presumed Primary Cardiac; Trauma; Submersion; Respiratory; Other Non-Cardiac; Unknown)
  - ❑ Documentation of all acquired EKG Strips
  - ❑ Documentation of Termination of Resuscitation Efforts and reasons for Termination.
  - ❑ Reassess and document endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.

# Pediatric Post Resuscitation

**History**
- Respiratory arrest
- Cardiac arrest

**Signs/Symptoms**
- Return of pulse

**Differential**
- Continue to address specific differentials associated with the original dysrhythmia

| Age Appropriate Vital Signs | | |
|---|---|---|
| Age | SBP | HR |
| Premature | 55 - 75 | 120 - 170 |
| 0 - 3 m | 65 - 85 | 100 - 150 |
| 3 - 6 m | 70 - 90 | 90 - 120 |
| 6 - 12 m | 80 - 100 | 80 - 120 |
| 1 - 3 Y | 90 - 105 | 70 - 110 |
| 3 - 6 Y | 95 - 110 | 65 - 110 |
| 6 - 12 Y | 100 - 120 | 60 - 95 |

Arrhythmias are common and usually self limiting after ROSC

If Arrhythmia Persists follow Rhythm Appropriate C.O.G.

Cardiac Monitor/12 Lead ECG Acquisition / Interpretation

B Repeat Primary Assessment

B Optimize Ventilation and Oxygenation Maintain SpO2 [≥ %]

Pediatric Airway C.O.G.

B EtCO2: 35 – 45 mmHg
DO NOT HYPERVENTILATE
Monitor Vital Signs / Reassess

↔ Peds Respiratory Distress C.O.G. (if Respiratory Distress)

Vascular Access C.O.G.

Hypotension Age based ?

YES → Hypotension C.O.G.

NO

B Blood Glucose Assessment ↔ Glucose Management C.O.G.

Symptomatic Bradycardia ?

YES → Pediatric Bradycardia C.O.G.

NO

Symptomatic Tachycardia ?

YES → Pediatric Tachycardia C.O.G.

NO

Antiarrhythmic utilized for ROSC

YES → P Continue **Antiarrhythmic** Utilized

NO

P Consider Sedation / Paralysis

Notify Destination or Contact Medical Control

PEDIATRIC CARDIOVASCULAR

# Pediatric Post Resuscitation



**PEARLS**

- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro**
- Hyperventilation is a significant cause of hypotension / recurrence of cardiac arrest in post resuscitation phase and must be avoided.
- Appropriate post-resuscitation management may best be planned in consultation with medical control.
- Most patients immediately post resuscitation will require ventilatory assistance.
- The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring.
- Common causes of post-resuscitation hypotension include hyperventilation, hypovolemia, pneumothorax, and medication reaction to ALS drugs.
- Titrate Pressor Agent to maintain a systolic blood pressure > 90 mmHg or a MAP of > 60. Ensure adequate fluid resuscitation is ongoing.
- **Pain/sedation:**
  - Patients requiring advanced airways and ventilation commonly experience pain and anxiety.
  - Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.
  - Ventilated patients cannot communicate pain / anxiety and providers are poor at recognizing pain / anxiety.
  - Vital signs such has tachycardia and / or hypertension can provide clues to inadequate sedation, however they both are not always reliable indicators of patient's lack of adequate sedation.
  - Pain must be addressed first, before anxiety. Opioids are typically the first line agents before benzodiazepines. Ketamine is also a reasonable first choice agent.
- **Ventilator / Ventilation strategies:**
  - Tailored to individual patient presentations. Medical Control can indicate different strategies above.
  - In general ventilation with BVM should cause chest rise. With mechanical ventilation a reasonable tidal volume should be about 6 mL/kg and peak pressures should be < 30 cmH20.
  - Continuous pulse oximetry and capnography should be maintained during transport for monitoring.
  - Head of bed should be maintained at least 10 – 20 degrees of elevation when possible to decrease aspiration risk.
- **EtCO2 Monitoring:**
  - Initial End tidal CO2 may be elevated immediately post-resuscitation, but will usually normalize.
  - Goal is 35 – 45 mmHg but avoid hyperventilation to achieve.
- Consider transport to facility capable of managing the post-arrest patient including cardiology / cardiac catheterization, intensive care service, and neurology services.
- The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring.
- **KEY DOCUMENTATION:**
  - ❑ Immediate post-arrest rhythms, vital signs (Pulse Rate, Blood Pressure, Respiratory Rate, Neurologic Status) and Oxygen Saturation.
  - ❑ Documentation of EndTidal CO2 measurements by Continuous Waveform Capnography.
  - ❑ Post-ROSC 12 lead EKG.

# Pediatric Tachycardias (With A Pulse)

**History**
- Past medical history
- Medications or Toxic Ingestion
- (Aminophylline, Diet pills, Thyroid supplements, Decongestants)
- Drugs (nicotine, cocaine)
- Congenital Heart Disease
- Respiratory Distress
- Syncope or Near Syncope

**Signs and Symptoms**
- Heart Rate:
  - Child > 180/bpm
  - Infant > 220/bpm
- Pale or Cyanosis
- Diaphoresis
- Tachypnea
- Vomiting
- Hypotension
- Altered Level of Consciousness
- Pulmonary Congestion
- Syncope

**Differential**
- Heart disease (Congenital)
- Hypo / Hyperthermia
- Hypovolemia or Anemia
- Electrolyte imbalance
- Anxiety / Pain / Emotional stress
- Fever / Infection / Sepsis
- Hypoxia
- Hypoglycemia
- Medication / Toxin / Drugs (see HX)
- Pulmonary embolus
- Trauma
- Tension Pneumothorax

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

**Vascular Access C.O.G.**

**Unstable / Serious Signs & Symptoms**
- YES → P **Cardioversion Procedure**; Consider **Pre-Shock Benzodiazepines**
- NO ↓

**QRS > 0.08 secs ?**
- YES → P **Consider Adenosine* [Regular Monomorphic Rhythm Only]**
- NO ↓

**HR < 220 Infant**
**HR < 180 Child**
**P wave Present**
**HR Variable**

- YES → **Probable Sinus Tachycardia** → Identify & Treat Underlying Cause → **Exit to: Appropriate C.O.G.**
- NO → **Probable SVT** → P **Vagal Maneuvers**; Consider **Adenosine**

P **Consider Antiarrhythmics**

**Notify Destination or Contact Medical Control**

**AT ANY TIME**
**Pulseless**
Go To Pediatric Cardiac Arrest C.O.G.

**Single lead ECG able to diagnose and treat arrhythmia**
12 Lead ECG not necessary to diagnose and treat, but preferred when patient stable

PEDIATRIC CARDIOVASCULAR

# Pediatric Tachycardias
## (With A Pulse)

**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.**
  - **AMS**
  - **Sudden collapse with rapid, weak pulse**
- **Narrow Complex Tachycardia (≤ 0.08 seconds):**
  - 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 (≤0.08 seconds.) P waves absent or abnormal. R-R waves not variable. Usually abrupt onset. Infants usually > 220 beats / minute. Children usually > 180 beats / minute.
  - Atrial Flutter / Fibrillation
- **Wide Complex Tachycardia (> 0.08 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 Ventricular Fibrillation / Asystole..
- **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 paddles should be used in children < 10 kg or Broselow-Luten color Purple if available.
- Generally, the maximum sinus tachycardia rate is 220 – the patient's age in years.
- *** Adenosine should NOT be given for unstable or for irregular or for polymorphic wide-complex tachycardias as it may cause degeneration of the arrhythmia to Ventricular Fibrillation.**
- Monitor for hypotension after administration of Antiarrhythmics.
- Monitor for respiratory depression and hypotension associated with Benzodiazepines.
- Continuous pulse oximetry is required for all Patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **KEY DOCUMENTATION:**
  - ❑ Initial rhythm and all rhythm changes
  - ❑ Time, Dose, and Response to medications given
  - ❑ Cardioversion times, Synchronization, Number of Attempts, Joules, and Response
  - ❑ Obtain monitor strips after each intervention
  - ❑ Patient Weight
  - ❑ Pediatric length based tape color (for pediatrics who fit on tape).
  - ❑ History of event supporting treatment of underlying causes.
  - ❑ Blood Sugar Obtained
  - ❑ Use of Sedation for responsive patients

# Pediatric Bradycardia

**History**
- Past medical history
- Foreign body exposure/swallowed
- Respiratory distress or arrest
- Apnea
- Possible toxic or poison exposure
- Congenital disease
- Medication (maternal or infant)

**Signs and Symptoms**
- Decreased heart rate
- Delayed capillary refill or cyanosis
- Mottled, cool skin
- Hypotension or arrest
- Altered level of consciousness

**Differential**
- Respiratory failure
  - Foreign body
  - Secretions
  - Infection (croup, epiglotitis)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Tension pneumothorax
- Hypothermia
- Toxin or medication
- Hypoglycemia
- Acidosis

**AT ANY TIME**
**Pulseless**
Go To Pediatric Cardiac Arrest C.O.G.

**Pediatric Airway C.O.G.**

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

**Poor Perfusion / Decreased Blood Pressure Respiratory Insufficiency**

NO → **Monitor & Reassess**

YES

**Vascular Access C.O.G.**

**Hypotension C.O.G.**

**Respiratory Distress C.O.G.**

**B** Heart Rate < 60 in Infant **CPR**

**P** **Epinephrine 1:10,000**

**P** **Atropine**

**Consider Reversible Causes**

**REVERSIBLE CAUSES:**

**Hypovolemia**
Hypotension Protocol – Fluid Bolus

**Hypoxia**
Airway Protocol – Obstruction? Increase ventilation, Supplemental Oxygen

**Hydrogen ion (acidosis)**
Increase ventilation, Bicarbonate

**Hypothermia**
Hypothermia Protocol, Rewarming

**Hyperkalemia**
Dialysis / Renal Failure Protocol – Calcium, Bicarbonate, Albuterol

**Hypoglycemia**
Hypoglycemia Protocol – Dextrose, Glucagon

**Tension pneumothorax**
Chest Decompression

**Tamponade; cardiac**
Rapid Transport – Early Notification

**Toxins**
OD / Toxic Ingestion Protocol; Specific Antidote

**Thrombosis; pulmonary (PE)**
Fluid Bolus.
Rapid Transport – Early Notification

**Thrombosis; coronary (MI)**
Rapid Transport – Early Notification

**P** **Consider Pressor Agents**

**P** **Consider External Pacing**

**Monitor & Reassess**

**Notify Destination or Contact Medical Control**

PEDIATRIC CARDIOVASCULAR

# Pediatric Bradycardia

## PEARLS

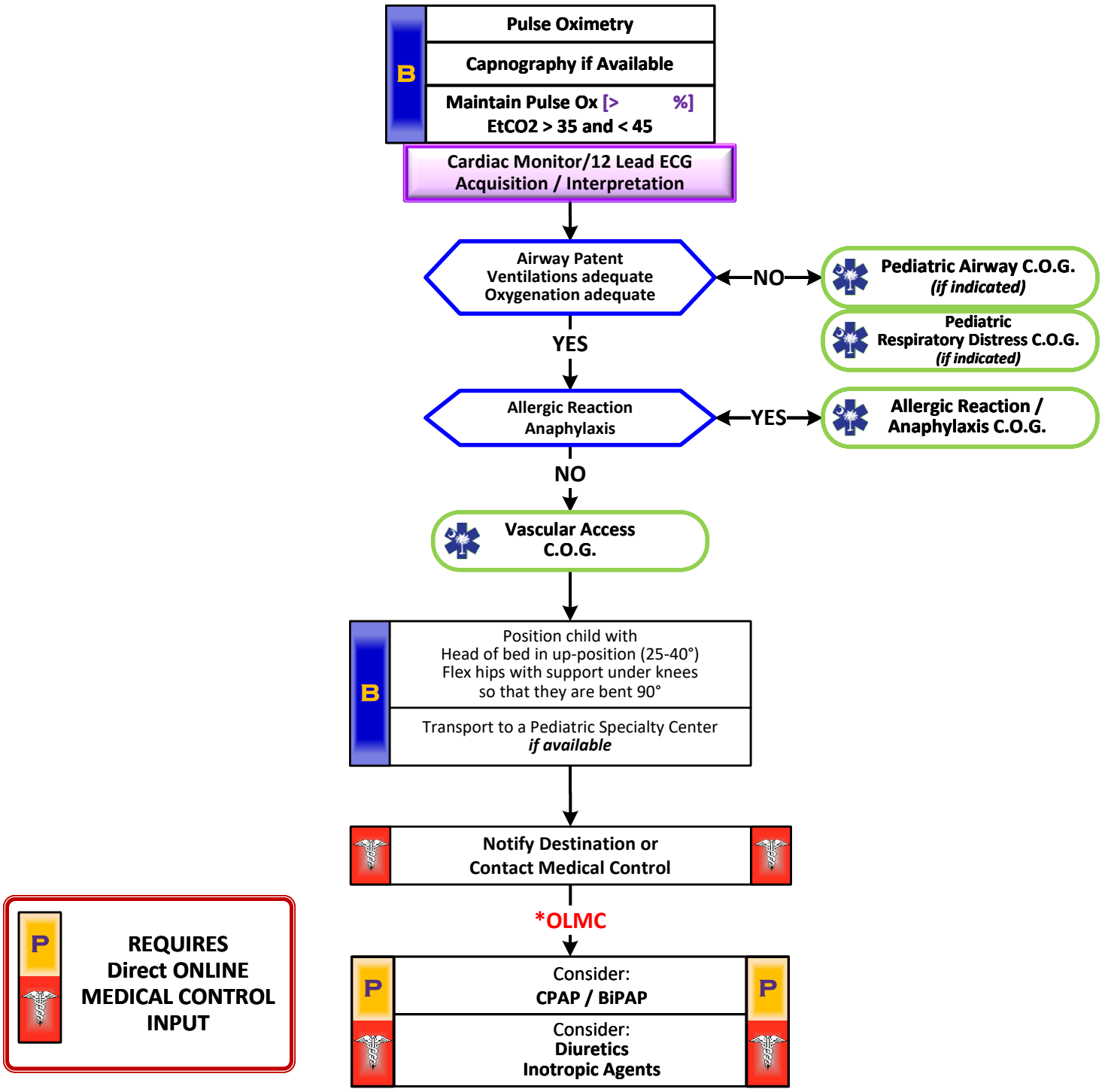
- **Recommended Exam: Mental Status, Neck, Heart, Lungs, Neuro**
- **Age/Weight/Length based system to accurately calculate drug dosages and equipment**
- Infant = < 1 year of age
- The majority of pediatric arrests are due to airway problems.
- **Hypoxemia is a common cause of bradycardia. Ensure oxygenation and support respiratory effort.**
- Most maternal medications pass through breast milk to the infant.
- Hypoglycemia, severe dehydration and narcotic effects may produce bradycardia.
- Pediatric patients requiring external transcutaneous pacing require the use of pads appropriate for pediatric patients per the manufacturers guidelines.
- Minimum Atropine dose is 0.1 mg IV.
- **Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount.**
- **Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic, otherwise monitor and reassess.**
- **Consider hyperkalemia with wide complex, bizarre appearance of QRS complex, and bradycardia.**
  - **Give Calcium Chloride or Gluconate in addition to Sodium Bicarbonate if hyperkalemia suspected.**
  - **Consider high dose albuterol nebulizer if hyperkalemia suspected.**
- **12-Lead ECG:**
  - **12 Lead ECG not necessary to diagnose and treat**
  - **Obtain when patient is stable and/or following rhythm conversion.**
- Pharmacological treatment of Bradycardia is based upon the presence or absence of symptoms. **If symptomatic treat, if asymptomatic, monitor only.**
- **Atropine:**
  - Atropine is considered a first line agent in symptomatic bradycardia.
  - Ineffective and potentially harmful in cardiac transplantation. May cause paradoxical bradycardia.
- **Symptomatic bradycardia causing shock or peri-arrest condition:**
  - If no IV or IO access immediately available start Transcutaneous Pacing, establish IV / IO access, and then administer atropine and/or epinephrine.
  - Epinephrine or Dopamine may be considered if no response to Atropine.
- **Symptomatic condition**
  - Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.
  - Symptomatic bradycardia usually occurs at rates < 50 beats per minute.
  - Search for underlying causes such as hypoxia or impending respiratory failure.
- **Serious Signs / Symptoms:**
  - Hypotension. Acutely altered mental status. Signs of shock / poor perfusion.
  - Acute CHF.
- **Transcutaneous Pacing Procedure (TCP)**
  - Indicated with unstable bradycardia unresponsive to medical therapy.
  - If time allows transport to specialty center because transcutaneous pacing is a temporizing measure.
  - Transvenous / permanent pacemaker will probably be needed.
  - Immediate TCP with high-degree AV block (2d or 3d degree) with no IV / IO access.
- Consider treatable causes for Bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)
- If vascular access is problematic and the patient is symptomatic, initial therapy with external pacing may be warranted.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Initial Vital Signs and Blood Glucose
  - ❑ Cardiac Rhythm / Rate
  - ❑ Time, dose, and response to medications administered
  - ❑ Pacing:
    - ❑ Time started or discontinued
    - ❑ Rate, Joules, Capture
    - ❑ Response Rate
    - ❑ Sedation utilized – dose and timing
    - ❑ Patient Weight
    - ❑ Pedaitric length based on tape color
    - ❑ History of event supporting treatment of underlying causes

# Pediatric Pulmonary Edema / CHF

**History**
- Congenital Heart Disease
- Chronic Lung Disease
- Congestive heart failure
- Past medical history

**Signs/Symptoms**
- Infant: Respiratory distress, poor feeding, lethargy, weight gain, +/- cyanosis
- Child/Adolescent: Respiratory distress, bilateral rales, apprehension, orthopnea, jugular vein distention (rare), pink, frothy sputum, peripheral edema, diaphoresis, chest pain
- Hypotension, shock

**Differential**
- Congestive heart failure
- Asthma
- Anaphylaxis
- Aspiration
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pericardial tamponade
- Toxic Exposure




PEDIATRIC CARDIOVASCULAR

# Pediatric Pulmonary Edema / CHF



**PEARLS**

- **Recommended exam: Mental status, Respiratory, Cardiac, Skin, Neuro**
- **Contact Medical Control early in the care of the pediatric cardiac patient.**
- **Most children with CHF have a congenital heart defect, obtain a precise past medical history.**
- **Congenital heart disease varies by age:**
  - < 1 month: Tetralogy of Fallot, Transposition of the great arteries, Coarctation of the aorta.
  - 2 – 6 months: Ventricular septal defects (VSD), Atrioseptal defects (ASD).
- **Any age:** Myocarditis, Pericarditis, SVT, heart blocks.
- **Treatment of Congestive Heart Failure / Pulmonary edema may vary depending on the underlying cause and should include consultation with Medical Control:**
- Do not assume all wheezing is pulmonary, especially in a cardiac child: avoid albuterol unless strong history of recurrent wheezing secondary to pulmonary etiology (discuss with Medical Control)
- **KEY DOCUMENTATION:**
  - ❑ Initial Vital Signs including B/P, Pulse Rate, Respiratory Rate, SpO2, EtCO2,
  - ❑ Pertinent Exam: Cardiac Sounds, Chest Auscultation, Jugular Veins, Peripheral Edema, Accessory muscle use
  - ❑ Presenting Symptoms: Chest Pain, Dyspnea, Palpitations, Edema, etc.
  - ❑ EKG Evaluation and Strips.
  - ❑ Repeat Vital Signs as above + Repeat Physical Examination
  - ❑ Interventions and response to interventions

# Pediatric Trauma Triage & Transport

**Assessment for Serious Signs / Symptoms / Mechanism**

*This protocol applies to patients a prudent provider should consider as having a mechanism/event consistent with significant/major trauma and is not meant to be inclusive of all minor injuries*

**Patient < 16 years old**

- **NO** → Follow Adult Trauma Triage and Transport Guidelines !

- **YES** → 1

**1**

- Inability to manage or secure airway/oxygenation/ ventilation
- Unmanageable signs/symptoms of shock
- Uncontrolled bleeding

- **YES** → **Transport to the closest Trauma Center or closest Emergency Department as identified by Service Medical Director**
- **NO** → 2

**2**

- Pediatric Glasgow Coma Scale PGCS ≤ 13
- Decreased Level of Responsiveness (See AVPU Scale)
- Penetrating trauma to head, neck, torso, or extremities proximal to knee or elbow
- Proximal Long bone fractures - crushed, mangled, or degloved extremity - Amputation proximal to the wrist or ankle - Pelvic fractures
- Open or depressed skull fractures
- Indications of significant closed head injury
- Paralysis
- Ejection of patient
- Indications of significant Chest or Abdominal Trauma
- Auto vs. Pedestrian >20 mph
- **Burns**

- **YES** → Designated Pediatric Trauma Center * if within minutes by ground
  - **YES** → **Transport to DESIGNATED PEDIATRIC TRAUMA CENTER ***
  - **NO** → Transport to Closest Trauma Center
- **NO** → 3

**3**

- Fall > 10 feet or 2-3 times the height of a child
- MVA with Intrusion >12 inches roof; > 18 inches passenger compartment (as outlined in 2011 CDC guideline)
- Ejection from the vehicle (other occupant)
- Death in same vehicle
- Mechanism consistent with high risk of injury
- Inadequately restrained
- Another occupant of the same vehicle is transported to a high level trauma center
- Motorcycle or motorized recreational vehicle

- **YES** → Designated Pediatric Trauma Center * if within minutes by ground
  - **YES** → **Transport to DESIGNATED PEDIATRIC TRAUMA CENTER ***
  - **NO** → Transport to Closest Trauma Center
- **NO** → 4

**4**

**SPECIAL CIRCUMSTANCES**
**Pregnancy > 20 Weeks**

- Without other trauma mechanism: triage to appropriate facility
- With trauma mechanism: triage to trauma center

- **NO** → ***Any Injury not mentioned above shall be triaged and transported based on the EMS provider judgement – preferably with online medical direction – and according to local C.O.G.s***

*** Designated Pediatric Trauma Center is defined as those with ACS Designated Pediatric Trauma Center Status – or as identified by DHEC as Adult Trauma Center that includes Pediatrics**

PEDIATRIC TRAUMA

# Pediatric Trauma Triage & Transport

| PEDIATRIC GLASGOW COMA SCALE (PGCS) | | | | |
|---|---|---|---|---|
| **ACTION** | **AGE > 1 year** | **AGE < 1 YEAR** | | **SCORE** |
| **EYE Opening** | Spontaneously | Spontaneously | | **4** |
| | To Verbal Command | To Shout | | **3** |
| | To Pain | To Pain | | **2** |
| | No Response | No Response | | **1** |
| **MOTOR Response** | Obeys | Spontaneously | | **6** |
| | Localizes Pain | Localizes Pain | | **5** |
| | Flexion - Withdrawal | Flexion - Withdrawal | | **4** |
| | Flexion - Abnormal (Decorticate Rigidity) | Flexion - Abnormal (Decorticate Rigidity) | | **3** |
| | Extension (Decerebrate Rigidity) | Extension (Decerebrate Rigidity) | | **2** |
| | No Response | No Response | | **1** |
| | **> 5 years** | **2 - 5 Years** | **0 - 23 Months** | |
| **VERBAL Response** | Oriented | Appropriate words/pharases | Smiles/coos appropriately | **5** |
| | Disoriented/Confused | Inappropriate words | Cries and IS Consolable | **4** |
| | Inappropriate words | Persistent cries and screams | Persistent inappropriate crying and/or screaming | **3** |
| | Incomprehensible sounds | Grunts | Grunts, agitated, and restless | **2** |
| | No Response | No Response | No Response | **1** |
| **Total Pediatric Glascow Coma Score (3-15)** | | | | |

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

| AVPU Scale | |
|---|---|
| **A** | Patient **A**lert |
| **V** | Patient Responds to **V**oice |
| **P** | Patient Responds to **P**ain |
| **U** | Patient **U**nresponsive |

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

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

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

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

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

**KEY DOCUMENTATION ELEMENTS:**

- ❑ Mechanism of injury
- ❑ Patient age and sex
- ❑ Primary and secondary survey
- ❑ Apparent injuries
- ❑ Serial vital signs including neurologic status assessments
- ❑ Some clinicians ask for the lowest blood pressure and highest pulse
- ❑ Scene time
- ❑ Procedures performed and patient response
- ❑ Pre-arrival notification and preparation

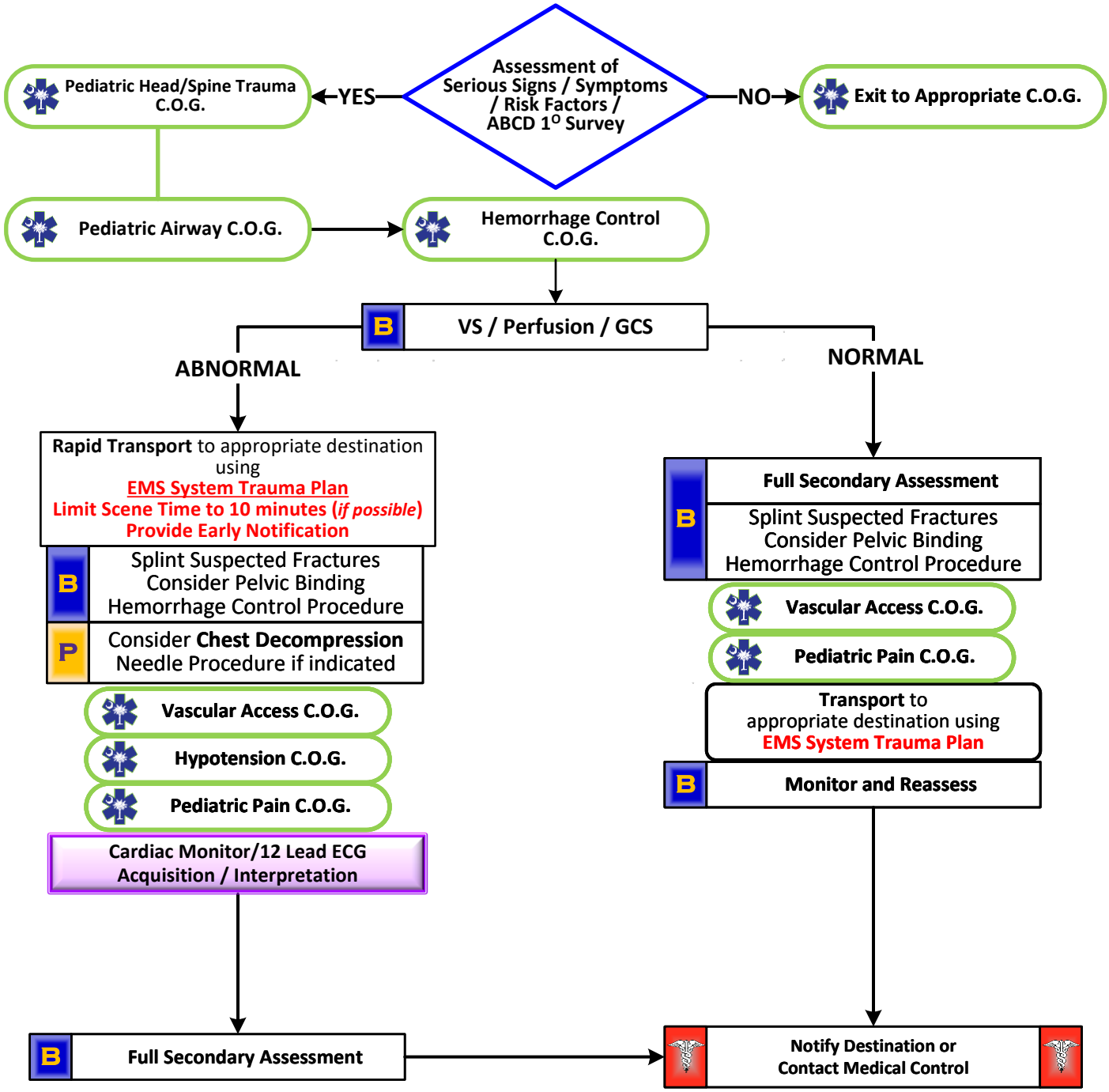
PEDIATRIC TRAUMA

# Pediatric Major Trauma

**History**
- Time and mechanism of injury
- Height of any fall
- Damage to structure or vehicle
- Location in structure or vehicle
- Others injured or dead
- Any Loss of Consciousness
- Speed and details of MVC
- Restraints / Protective equipment
  Car Seat / Helmet / Pads / Ejection
- Past medical history
- Medications

**Signs and Symptoms**
- Pain, swelling
- Deformity, lesions, bleeding
- Altered mental status
- Unconscious
- Hypotension or shock
- Cardiac/Respiratory Arrest

**Differential (Life Threatening)**
- 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




PEDIATRIC TRAUMA

# Pediatric Major Trauma



**PEARLS**

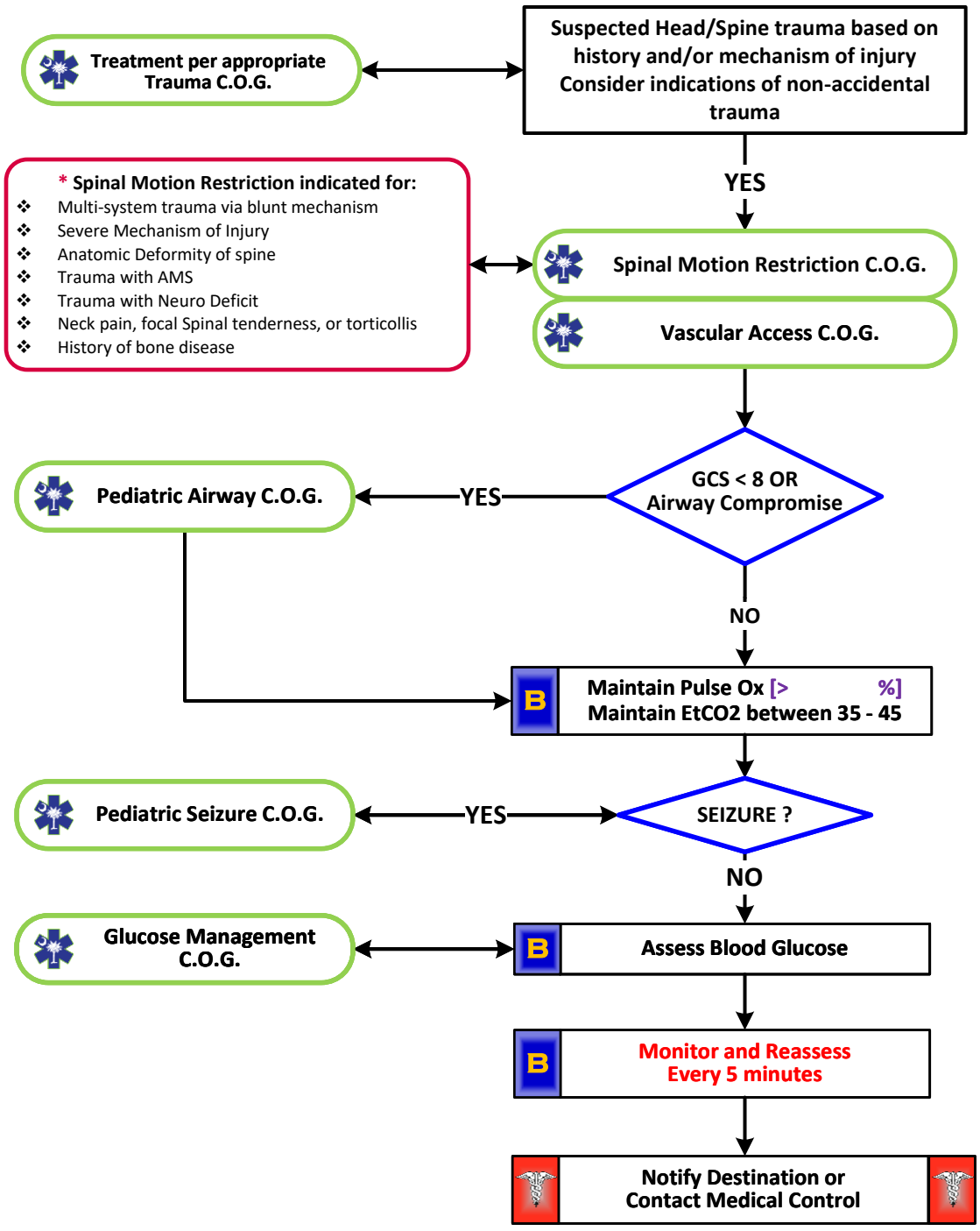
- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro**
- **Transport Destination is chosen based on the EMS System Trauma Plan with EMS pre-arrival notification.**
- Examine all restraints / protective equipment for damage.
- In prolonged extrications or serious trauma consider air transportation for extended transport times.
- Do not overlook the possibility for child abuse.
- Consider non-accidental trauma in situations where injuries are inconsistent with mechanism, unexplained injuires exist, or there are conflicting reports of injury
- See considerations for Non-accidental trauma in Pediatric Head/Spine Trauma Protocol
- Scene times should not be delayed for procedures. These should be performed en route when possible.
- Bag valve mask is an acceptable method of managing the airway if pulse oximetry can be maintained above 90%.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Mechanism of injury
  - ❑ Patient age and sex
  - ❑ Primary and secondary survey
  - ❑ Apparent injuries
  - ❑ Serial vital signs including neurologic status assessments
    - ❑ Some clinicians ask for the lowest blood pressure and highest pulse
  - ❑ Scene time
  - ❑ Procedures performed and patient response
  - ❑ Pre-arrival notification and preparation

# Pediatric Head Trauma

**History**
- Time of injury
- Mechanism (blunt vs. penetrating)
- Loss of consciousness
- Bleeding
- Past medical history
- Medications
- Evidence for multi-trauma
- Evidence of abuse

**Signs and Symptoms**
- Pain, swelling, bleeding
- Altered mental status
- Unconscious
- Respiratory distress / failure
- Vomiting
- Major traumatic mechanism of injury
- Seizure
- Gait Disturbance

**Differential**
- Skull fracture
- Brain injury (Concussion, Contusion, Hemorrhage or Laceration)
- Epidural hematoma
- Subdural hematoma
- Subarachnoid hemorrhage
- Spinal injury
- Abuse



# Pediatric Head Trauma

- **Considerations for Non-Accidental Trauma:**
  - Injuries inconsistent with mechanism or history
  - Conflicting historical reports of injury
  - Unexplained or underexplained injury
- **Severe Mechanism Events:**
  - Fall greater than 10 feet or 2-3 x height of child
  - High risk auto crash (MVA with>12 inches intrusion of roof, or >18 inches of passenger compartment, ejection, death of other occupant in vehicle) OR Auto-vs-Pedestrian
  - Axial load injuries (i.e. diving)
  - High velocity blunt trauma
- **Altered Mental Status:**
  - Inconsolable infant/child, extreme agitation
  - Decreased LOC (AVPU scale) or Pediatric GCS <15
- **Focal Neurological findings:**
  - Asymmetric movement of extremities
  - Abnormal gait/tone or abrupt change in ability to walk/stand
- **Special Considerations**
  - Spinal Motion Restriction – appropriately sized cervical collar + Spinal stabilization with head, neck, and torso in alignment. Methods of accomplishing spinal motion restriction might include a pediatric immobilization device, long backboard, scoop stretcher, vacuum mattress, or ambulance cot.
  - There is generally no role for spinal motion restriction in penetrating trauma
  - In determining method of spinal motion restriction, consider patient age, associated injuries, and ability to cooperate with motion restriction efforts
  - Appropriately sized cervical collar is critical: Chin is flush with the chin piece, collar is snug but not touching trachea.
  - If an appropriately sized cervical collar is not available or not tolerated, consider foam immobilization device or towel rolls
  - When warranted, use approved pediatric immobilization devices
  - If adult or pediatric long spine boards are used to maintain motion restriction, ensure appropriate padding for voids
  - In young children, particularly under the age of 3, variation of head size to body ratio there is significant concern in the spinal motion restriction process. It is critical to avoid flexion of the upper cervical spine. Special attention to appropriate neutral in-line positioning of the head while supine is warranted and should include attention to appropriate patient positioning and use of appropriate padding of the shoulders/torso. Failure to do so may result in unintended movement of the cervical spine or potential airway compromise.

**PEARLS**

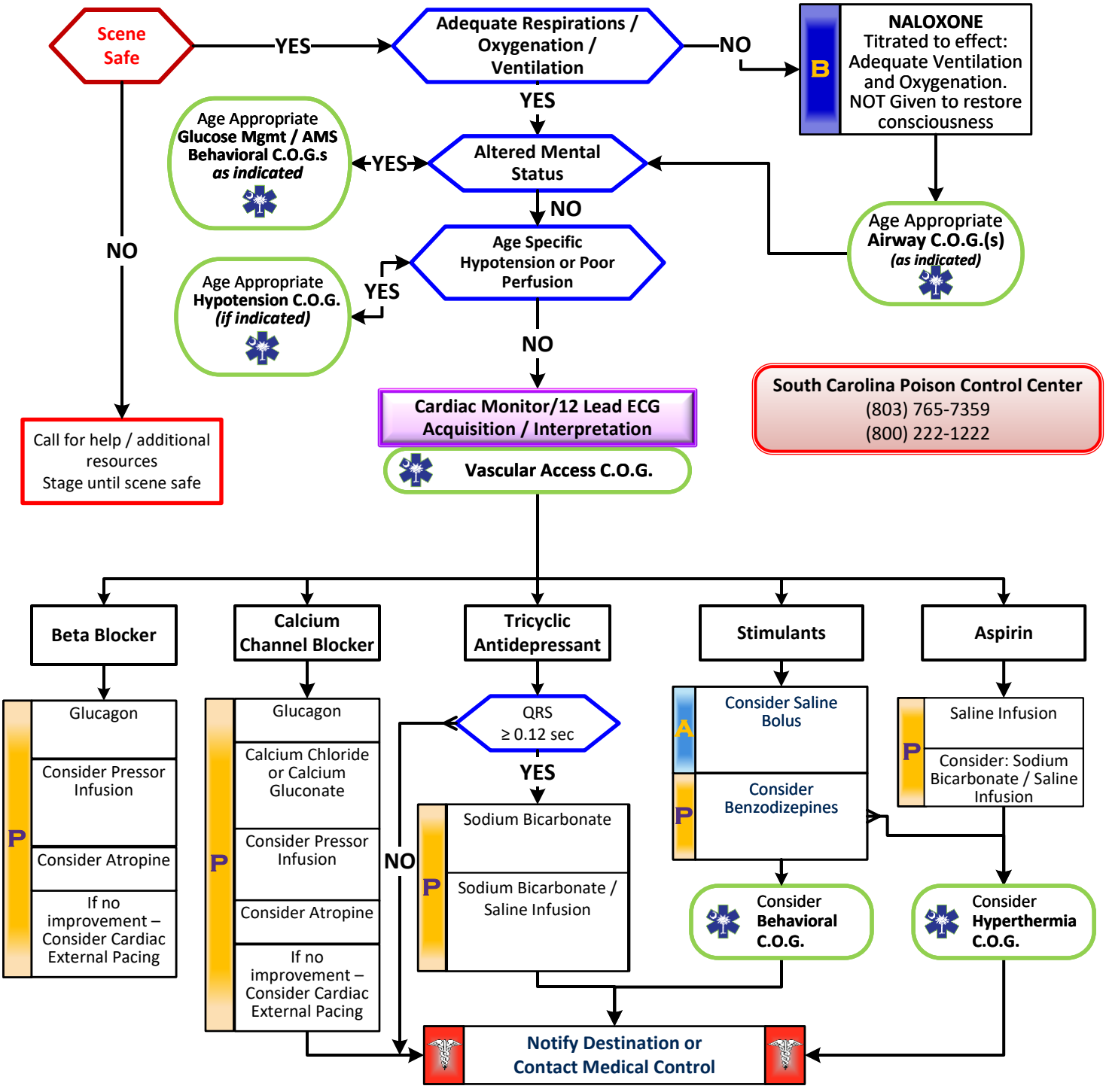
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro**
- Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Response).
- Hypotension usually indicates injury or shock unrelated to the head injury.
- The most important item to monitor and document is a change in the level of consciousness.
- Concussions are periods of confusion or LOC associated with trauma which may have resolved by the time EMS arrives. Any prolonged confusion or mental status abnormality which does not return to normal within 15 minutes or any documented loss of consciousness should be evaluated by a physician ASAP.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Airway status and management
  - ❑ EtCO2 monitored and documented for all traumatic brain injury (TBI) patients with advanced airway and strict avoidance of hyperventilation, overventilation, and hypocapnia)
  - ❑ Neurological status with vitals: AVPU, GCS
  - ❑ Exams: Neurological and Mental Status Assessment pre- and post-treatment
  - ❑ Triage to the appropriate level hospital within the local trauma system

# Overdose / Toxic Ingestion

**History**
- Ingestion or suspected exposure/ ingestion of a potentially toxic substance
- Substance exposed to, route, quantity
- Time of exposure/ingestion
- Reason (suicidal, accidental, criminal)
- Available medications in home
- Past medical history, medications

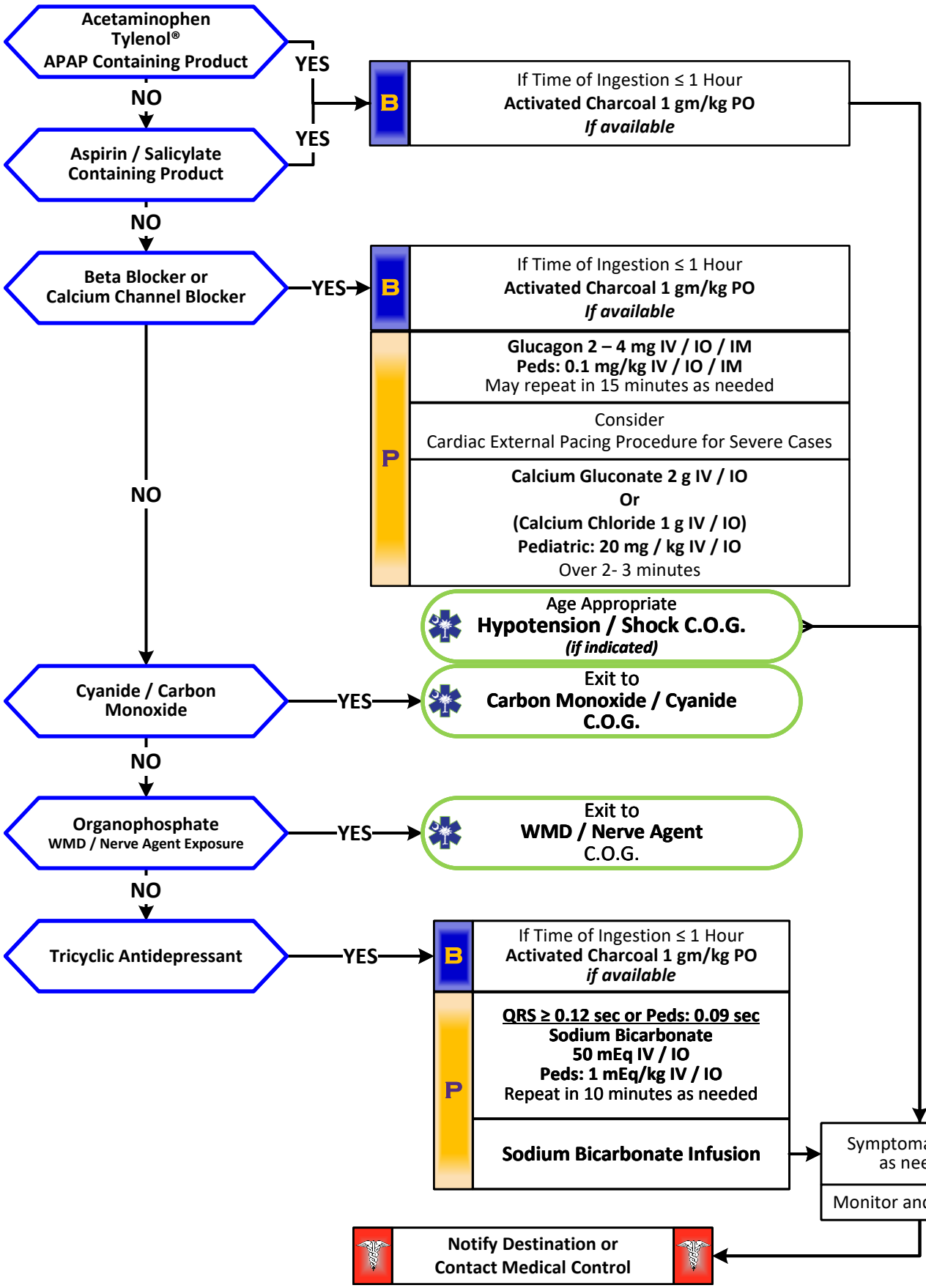
**Signs and Symptoms**
- Mental status changes
- Hypotension / hypertension
- Decreased respiratory rate
- Cardiac dysrhythmias
- Seizures
- **S.L.U.D.G.E.**
- **D.U.M.B.B.E.L.S**

**Differential**
- Tricyclic antidepressants (TCAs)
- Acetaminophen (Tylenol)
- Aspirin
- Depressants
- Stimulants
- Anticholinergic
- Cardiac medications
- Solvents, Alcohols, Cleaning agents
- Insecticides (organophosphates)




ENVIRONMENTAL / TOXIC

# Overdose / Toxic Ingestion




ENVIRONMENTAL / TOXIC

# Overdose / Toxic Ingestion

**PEARLS**

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **In Suicide Attempts – ALWAYS consider multiagent ingestion – e.g. Tylenol AND Aspirin; Sleeping Pills AND Alcohol; etc.**
- **Opioids and opiates may require higher doses of Naloxone to improve respiration, in certain circumstances up to 10 mg.**
- **Time of Ingestion:**
  - Most important aspect is the **TIME OF INGESTION** and the substance and amount ingested and any co-ingestants.
  - Every effort should be made to elicit this information before leaving the scene.
- **Charcoal Administration:**
  - **The American Academy of Clinical Toxicology DOES NOT recommend the routine use of charcoal in poisonings.**
  - **Consider Charcoal within the FIRST HOUR after ingestion. If a potentially life threatening substance is ingested or extended release agent(s) are involved and ≥ one hour from ingestion contact medical control or Poison Center for direction.**
  - **If NG is necessary to administer Charcoal then DO NOT administer unless agent is known to be adsorbed, and airway secured by intubation and ingestion is less than ONE HOUR confirmed and potentially lethal.**
  - **Charcoal in general should only be given to a patient who is alert and awake such that they can self-administer the medication.**
- **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.**
- **S.L.U.D.G.E: S**alivation, **L**acrimation, **U**rination, **D**efecation, **G**I distress, **E**mesis
- **D.U.M.B.B.E.L.S: D**iarrhea, **U**rination, **M**iosis, **B**radycardia, **B**ronchorrhea, **E**mesis, **L**acrimation, **S**alivation.
- **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 problems may develop 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.
- **When appropriate contact Online Medical Control and/or the Palmetto Poison Control Center for guidance.**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Repeat evaluation and documentation of signs and symptoms – patient clinical condition may deteriorate rapidly
  - ❑ Identification of possible etiology of poisoning
  - ❑ Initiation of measures on scene to prevent exposure of EMS or bystanders when appropriate/indicated.
  - ❑ Time of symptom onset and time of initiation of exposure specific treatment
  - ❑ Time of exposure/ingestion and Route of exposure/ingestion.
  - ❑ Quantiy of medication or toxin taken.
  - ❑ Where possible, safely collect all possible medications and/or agents and document

# Nerve Agent Protocol
## (Organophosphate)

**History**
- Exposure to chemical, biologic, radiologic, or nuclear hazard
- Potential exposure to unknown substance/hazard

**Signs and Symptoms**
- **S**alivation
- **L**acrimation
- **U**rination; increased, loss of control
- **D**efecation / Diarrhea
- **G**I Upset/abdominal pain/cramping
- **E**mesis
- **M**uscle Twitching
- Seizure Activity
- Respiratory Arrest

**Differential**
- 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.)

**Scene Safe. Appropriate PPE**

NO → Call for help / additional resources; stage until scene safe

YES →

Obtain history of exposure; observe for specific toxidromes; initiate triage and/or decontamination as indicted

- **Seizure C.O.G.** *(if indicated)*
- **Airway C.O.G.** *(if indicated)*

**Symptom Severity**

- **Major Symptoms:** Altered Mental Status, Seizures, Respiratory Distress, Respiratory Arrest
- **Minor Symptoms:** Respiratory Distress + SLUDGEM
- **Asymptomatic** → Monitor and Reassess every 15 minutes for symptoms; initiate treatment per appropriate arm

**B** — **Nerve Agent Kit IM**
**Up to 3 Doses Rapidly**
As based on symptom Severity – (*If available*)

**P** — **Atropine IM/IO/IV**

**P** — **Pralidoxime (2-PAM)**

**Vascular Access C.O.G.**

**Notify Destination or Contact Medical Control**

ENVIRONMENTAL / TOXIC

# Nerve Agent Protocol
## (Organophosphate)

ENVIRONMENTAL / TOXIC

**PEARLS**

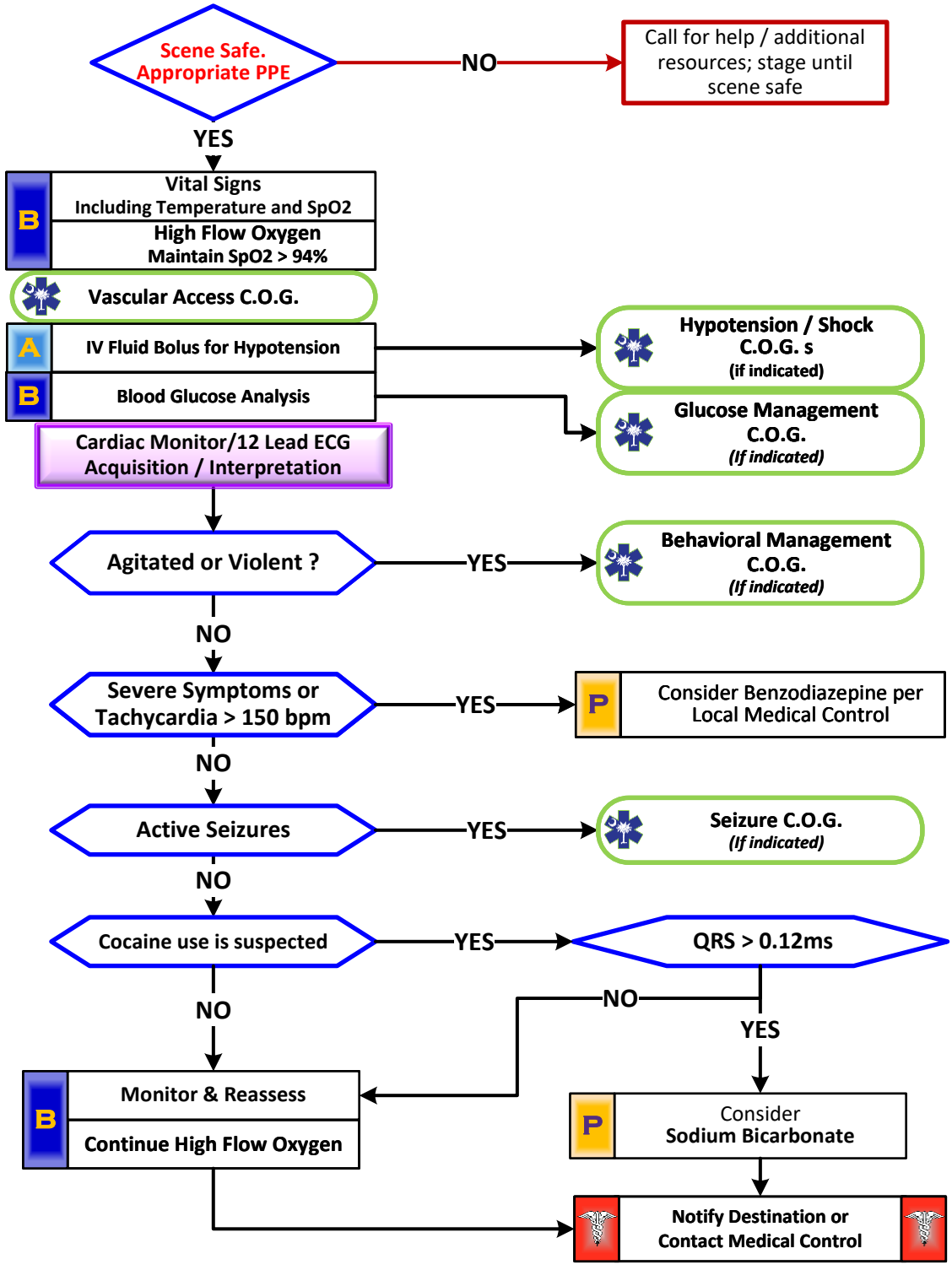
- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Neuro**
- **Follow local HAZMAT protocols for decontamination and use of personal protective equipment.**
- **In the face of a bona fide attack, begin with 1 Nerve Agent Kit for patients less than 7 years of age, 2 Nerve Agent Kits from 8 to 14 years of age, and 3 Nerve Agent Kits for patients 15 years of age and over.**
- **If Triage/MCI issues exhaust supply of Nerve Agent Kits, use pediatric atropines (if available). Use the 0.5 mg dose if patient is less than 40 pounds (18 kg), 1 mg dose if patient weighs between 40 to 90 pounds (18 to 40 kg), and 2 mg dose for patients greater than 90 pounds (>40 kg).**
- **Each Nerve Agent Kit contains 600 mg of Pralidoxime (2-PAM) and 2 mg of Atropine.**
- **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 their symptoms are 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 EMT-B may carry, self-administer or administer to a patient atropine / pralidoxime by C.O.G.. Agency medical director may require Contact of Medical Control prior to administration.
- **KEY DOCUMENTATION:**
  - ❑ Time to recognize initial signs and symptoms
  - ❑ Dosage and Number of repeated doses of atropine required for the secretions to diminish and respirations to improve
  - ❑ Patient reassessments
  - ❑ Patient response to therapeutic interventions
  - ❑ Measures taken to Decontaminate the patient
  - ❑ Measures taken to protect clean environments from contamination.
  - ❑ Availability of additional and adequate antidote assets if necessary

# Stimulant Overdose

**History**
- Past Medical History
- Ingestion or suspected ingestion
- Substance ingested/route/quantity
- Time of ingestion
- Prescribed Medications

**Signs and Symptoms**
- Hypertension
- Tachycardia
- Hallucinations
- Anxiety
- Chest Pain
- Respiratory Distress
- Seizures
- Hyperthermia
- Delusion/paranoia

**Differential**
- AMS Differentials
- Depressants
- Anticholinergics
- Alcohol Intoxication
- Schizophrenia
- Bipolar (Manic-depressive)
- Medication Effect/overdose




ENVIRONMENTAL / TOXIC

# Stimulant Overdose



**PEARLS**

- **Recommended exam: Neuro, Skin, Heart, Lungs, Abdomen, Extremities**
  - **Examination should include Heart Rate, Respiratory Rate, SpO2, and Temperature.**
- **Scene safety is priority.**
- **History is as important as Physical Examination**
- If the patient is found naked, this may elevate the suspicion for stimulant use or abuse. These substances increase the risk for sudden death secondary to delirium with agitated behavior.
- Neuroleptic malignant syndrome or serotonin syndrome can present with similar signs and symptoms
- If the patient is on psychiatric medication, but has failed to be compliant, this fact alone puts the patient at higher risk for the adverse outcome of delirium with agitated behavior
- If polypharmacy is suspected, hypertension and tachycardia are expected hemodynamic findings secondary to increased dopamine release. Stimulus reduction from benzodiazepines, anti-psychotics, and ketamine may improve patient's vital signs and behavior
- Be prepared for the potential of cardiovascular collapse as well as respiratory arrest
- **If a vasopressor is needed, epinephrine or norepinephrine is recommended over dopamine**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Repeat evaluation and documentation of signs and symptoms. Patient's clinical condition may deteriorate rapidly.
  - ❑ Identification of possible etiology of poisoning/overdose
  - ❑ Time of ingestion/exposure.
  - ❑ Time of symptom onset and time of initiation of exposure specific treatments.
  - ❑ Therapy and response to therapy.
  - ❑ Reason for Psychologic and Physical management procedures used and neurologic/circulartory exams with device use.
  - ❑ Reasons for medications selected for use
  - ❑ Documentation of QT Interval when antiemetic medications, haloperidol, or droperidol is used and result conveyed to ED Staff.

# Cyanide Exposure

**History**
- 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

**Signs and Symptoms**
- AMS
- Malaise, weakness, flu like illness
- Headache
- Dyspnea
- GI Symptoms; N/V; cramping
- Dizziness
- Seizures
- Syncope
- Reddened skin
- Chest pain

**Differential**
- Diabetic related
- Infection
- MI
- Anaphylaxis
- Renal failure / dialysis problem
- Head injury / trauma
- Co-ingestant or exposures
- Consider Carbon Moxoxide co-exposure with Cyanide

**Scene Safe. Appropriate PPE**

→ Call for help / additional resources; stage until scene safe

Immediately Remove from Exposure

**B**
- **High Flow Oxygen**
- **Blood Glucose Analysis** ↔ **Glucose Management C.O.G.** *(If indicated)*

Age appropriate **Multiple Trauma C.O.G.** *(if indicated)* ↔ **Spinal Motion Restriction C.O.G.** *(If indicated)*

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

**B**
- EtCO2 Monitoring
- Consider **Carbon Monoxide (CO) Monitoring**

Age appropriate **Airway C.O.G.** *(if indicated)*

**Suspicion of Cyanide ?**

**YES** →

**P**

**CYANIDE ANTIDOTAL THERAPY**

**Recommended:**

**Adult: Hydroxocobalamin**
**Initial Dose:** 5 GMS IV over 15 minutes
Additional 5 GM dose administer with **OLMC***
**Pediatric: Hydroxocobalamin** 70 mg/Kg Slow IV.

**2nd Choice Medication:**

**Sodium Thiosulfate**
**Adult:** 12.5 GMS IV
**Pediatric:** 0.5 GMS/Kg

**NO**

SBP <90
Age Specific VS
SBP < 70 + 2 *x* Age
Poor Perfusion / Shock

→ **As Indicated: Hypotension / Shock C.O.G. s**

**B**
- **Maintain excellent in-ambulance ventilation at all times Φ**
- **Monitor & Reassess**
- **Continue High Flow Oxygen**

→ **Notify Destination or Contact Medical Control**

ENVIRONMENTAL / TOXIC

# Cyanide Exposure

**CONSIDER CYANIDE POISONING FOR:**

- Patients on **NITROPRUSSIDE** infusions
- Smoke Exposure: Burning wools, silk, plastics, furniture
- Industrial / Laboratory Settings.
- Metal Processing, Jewelry Manufacturing, Photographic Processing, Dyeing, Plastics Manufacturing
- Agriculture / Mining

❖ **Φ If cyanide exposure is suspected – and particularly if there is risk that cyanide has been ingested – excellent, high flow ventilation through the transporting vehicle is critical. Ingested cyanide, in the presence of stomach acid may off-gas hydrogen cyanide gas.**

**PEARLS**

- **Recommended exam: Neuro, Skin, Heart, Lungs, Abdomen, Extremities**
- **Scene safety is priority.**
- **Don PPE and consider Self Contained Breathing Apparatus (SCBA) prior to entering contaminated area.**
- If there is some form of suicide signage, hoses, or buckets of substances visible as you arrive at the vehicle or residence, immediately retreat to well ventilated area and don self-contained breathing apparatus (SCBA) before opening the vehicle or making entry as these gases may be highly concentrated and potentially lethal to EMS responders
- Consider Carbon Monoixde (CO) and Cyanide with any product of combustion
- Normal environmental Carbon Monoxide (CO) level does not exclude Carbon Monoxide (CO) poisoning.
- Symptoms present with lower Carbon Monoxide (CO) levels in pregnancy, children and the elderly.
- Continue high flow oxygen regardless of pulse ox readings.
- **Pulse Oximetry Readings may read FALSELY HIGH with Carbon Monoxide Poisoning**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Repeat evaluation and documentation of signs and symptoms. Patient's clinical condition may deteriorate rapidly.
  - ❑ Identification of possible etiology of poisoning
  - ❑ Time of ingestion/exposure.
  - ❑ Time of symptom onset and time of initiation of exposure specific treatments.
  - ❑ Therapy and response to therapy.

ENVIRONMENTAL / TOXIC

# Carbon Monoxide/Smoke Exposure

**History**
- Smoke inhalation
- Industrial exposure
- Trauma
- Reason: Suicide, criminal, accidental
- Past Medical History
- Time / Duration of exposure

**Signs and Symptoms**
- Headache
- AMS
- Seizures
- Dizziness
- Syncope
- Malaise, weakness, flu like illness
- Dyspnea
- Chest pain
- GI Symptoms; N/V; cramping
- Reddened skin

**Differential**
- Diabetic related
- Infection
- MI
- Anaphylaxis
- Renal failure / dialysis problem
- Head injury / trauma
- Co-ingestant or exposures
- Consider Carbon Moxoxide co-exposure with Cyanide

**Scene Safe. Appropriate PPE** — NO → Call for help / additional resources; stage until scene safe. Consider SCBA.

YES

Immediately Remove from Exposure

B
- **High Flow Oxygen**
- **Blood Glucose Analysis** ↔ **Glucose Management C.O.G.** ***(If indicated)***

Age appropriate **Multiple Trauma C.O.G.** ***(if indicated)*** ↔ **Spinal Motion Restriction C.O.G.** ***(If indicated)***

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

B
- EtCO2 Monitoring
  Consider **Carbon Monoxide (CO) Monitoring** ↔ **Utilize environmental Carbon Monoxide meter if available**

Age appropriate **Airway C.O.G.** ***(if indicated)***

**Suspicion of Cyanide ?** — YES → **Cyanide C.O.G.** (if indicated/suspected)

NO

SBP <90
Age Specific VS
SBP < 70 + 2 *x* Age
Poor Perfusion / Shock ↔ **As Indicated: Hypotension / Shock C.O.G.s**

B
- **Maintain excellent in-ambulance ventilation at all times Φ**
- **Monitor & Reassess**
- **Continue High Flow Oxygen**

**Notify Destination or Contact Medical Control**

ENVIRONMENTAL / TOXIC

# Carbon Monoxide/Smoke Exposure



- In South Carolina Hyperbaric Oxygen Therapy is provided through PRISMA Health – Richland.
- **Contact 803-434-7222 for assistance**

## PEARLS

- **Recommended exam: Neuro, Skin, Heart, Lungs, Abdomen, Extremities**
- **Scene safety is priority.**
- **Don PPE and consider Self Contained Breathing Apparatus (SCBA) prior to entering contaminated area.**
- If there is some form of suicide signage, hoses, or buckets of substances visible as you arrive at the vehicle or residence, immediately retreat to well ventilated area and don self-contained breathing apparatus (SCBA) before opening the vehicle or making entry as these gases may be highly concentrated and potentially lethal to EMS responders
- Consider CO and Cyanide with any product of combustion
- Normal environmental Carbon Monoxide (CO) level does not exclude Carbon Monoxid (CO) poisoning.
- Symptoms present with lower Carbon Monoxide (CO) levels in pregnancy, children and the elderly.
- Continue high flow oxygen regardless of pulse ox readings.
- **Pulse Oximetry Readings may read FALSELY HIGH with Carbon Monoxide Poisoning**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Repeat evaluation and documentation of signs and symptoms. Patient's clinical condition may deteriorate rapidly.
  - ❑ Identification of possible etiology of poisoning
  - ❑ Time of exposure.
  - ❑ Environmental Carbon Monoxide (CO) detector reading/level – if available.
  - ❑ Evidence of soot or burns around the face, nares, or pharynx.
  - ❑ Signs & Symptoms of other patients encountered at the same location – if present.
  - ❑ Therapy and response to therapy.
  - ❑ Early and repeat assessment of patient's mental status and motor function for determination of response to therapy and need for hyperbaric oxygen therapy.
  - ❑ Early airway management/intervention in rapidly deteriorating patients.

# Respiratory Irritants

**History**
- Onset and location / Exposure
- Time & Duration of Exposure
- Chronic Lung Disease
- Past medical history
- Medication history

**Signs and Symptoms**
- Itching or hives
- Sneezing / Rhinorrhea
- Coughing / wheezing / Stridor
- Respiratory distress / Hypoxia
- Burning / Pain
- Chest Pain
- Chest or throat constriction / Voice Change
- Difficulty swallowing
- Edema

**Differential**
- **Environmental – Dusts / Powders**
- **Chemicals:**
  - Household / Industrial
  - Riot Control Agents
  - WMD
  - Inhalants of Abuse

**BEWARE:**
**Many gases are heavier than air and will concentrate in low-lying areas**

**Scene Safe**

YES → Don appropriate PPE Respiratory Protection is Critical. Consider SCBA

NO → Call for help / additional resources Stage until scene safe → Don appropriate PPE Respiratory Protection is Critical. Consider SCBA

**B**
- Remove patient from toxic environment
- Remove patient's clothing or decontaminate if liquid or solid contaminants
- Flush irrigate effected or burned areas
- Cover patient / Prevent Hypothermia
- With Ocular Exposure – Eye Irrigation ASAP

**Pulmonary Edema**

SEVERE → Age Appropriate **Airway C.O.G. s** *(as indicated)*

**B** Rapid assessment – Respiratory Status, Mental Status, Vitals & SpO2 & EtCO2

**P** Assess for airway burns, stridor, airway edema. Early Intubation ***if indicated.*** **AVOID BIADs**

**B** Continuous CPAP/BiPAP, intermittent positive pressure breathing. High Flow Oxygen for severe respiratory distress/impending respiratory failure

NO → **Wheezing/Dyspnea**

YES →
- **B** Consider Albuterol or Beta Agonist
- **P** Consider Epinephrine
- **P** Consider Steroids

NO →
- **B** **Administer humidified O2**
- **B** Albuterol 2.5 – 5 mg Nebulized for any signs of respiratory distress or bronchospasm. Repeat with unlimited frequency for ongoing distress (with OLMC)
- **P** Consider Ipratropium 0.5 mg nebulized up to 3 doses along with albuterol

**A** **Vascular Access**

**Vascular Access C.O.G.**

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

Age Appropriate **Hypotension C.O.G.** *(if indicated)*

**Notify Destination or Contact Medical Control**

ENVIRONMENTAL / TOXIC

# Respiratory Irritants

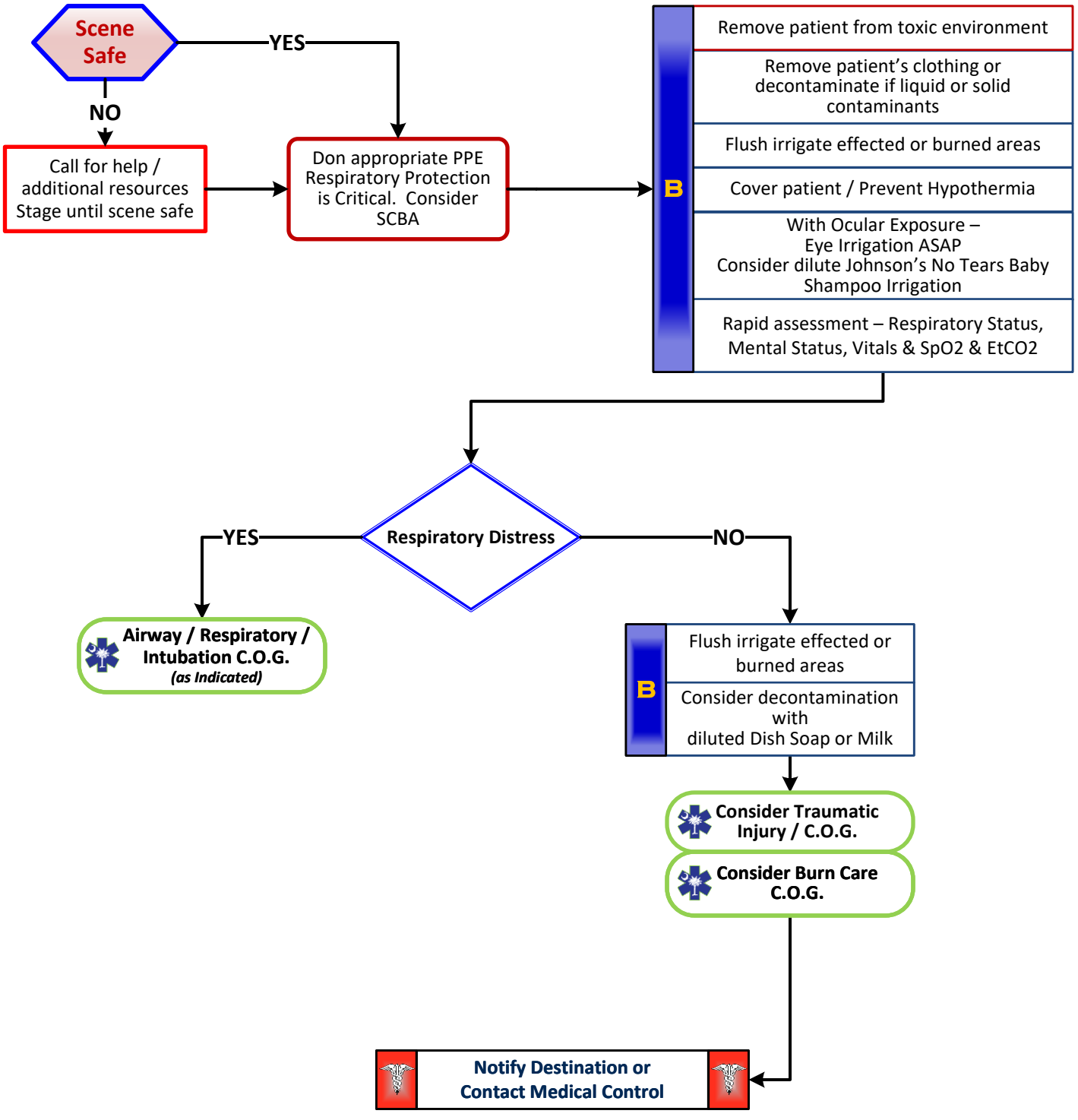
- **PEARLS**
- **Recommended Exam: Mental Status, Skin, Heart, Lungs, HEENT**
- **BEWARE: Many gases are heavier than air and will concentrate in low-lying areas**
- **Don PPE and consider Self Contained Breathing Apparatus (SCBA) prior to entering contaminated area.**
- If there is some form of suicide signage, hoses, or buckets of substances visible as you arrive at the vehicle or residence, immediately retreat to well ventilated area and don self-contained breathing apparatus (SCBA) before opening the vehicle or making entry as these gases may be highly concentrated and potentially lethal to EMS responders
- **Symptom Severity Classification:**
  - **Mild symptoms:**
    - **Flushing, hives, itching, erythema with normal blood pressure and perfusion.**
  - **Moderate symptoms:**
    - **Flushing, hives, itching, erythema plus symptomatic respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with normal blood pressure and perfusion.**
  - **Severe symptoms:**
    - **Flushing, hives, itching, erythema plus symptomatic respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with hypotension and poor perfusion.**
- **Patients with moderate and severe reactions should receive a 12 lead ECG and should be continually monitored, but this should NOT delay evacuation from potentially dangerous scene, decontamination, supplemental oxygen therapy.**
- Airway respiratory irritants can exacerbate underlying reactive airway diseases (e.g., asthma, chronic obstructive pulmonary disease (COPD)) and precipitate or exacerbate bronchospasm, respiratory distress, and hypoxia
- Patients may be off gassing (particularly hydrogen sulfide and hydrogen cyanide) in the back of the transport vehicle, it is important to have **EXCELLENT** through ventilation of the patient compartment
- Removal from the toxic environment, oxygen (humidified if available), general supportive therapy, bronchodilators, respiratory support, and rapid transport are core elements of care as there are no specific antidotes for any of these inhaled agents in the prehospital setting.
- Household bathroom, kitchen, and oven cleaners when mixed can generate various airway respiratory irritants (ammonia, chloramine, and chlorine gas releases are particularly common). A very common exposure is to chloramine, a gas liberated when bleach (hypochlorite) and ammonia are combined. Chloramine then hydrolyzes in the distal airways and alveoli to ammonia and hypochlorous acid
- **Suggested:** Patients who have ventricular arrhythmias after inhalant abuse should receive amiodarone or lidocaine rather than epinephrine. Amiodarone has been successfully used to treat butane-induced ventricular fibrillation. Patients who have inhaled halogenated hydrocarbons may develop ventricular arrhythmias in response to parenterally administered epinephrine or other catecholamines (e.g., norepinephrine) because these treatments can (theoretically) precipitate or worsen arrhythmias in the irritable myocardium.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Document key aspects of the exam to assess for a change after each intervention:
  - ❑ Respiratory rate
  - ❑ Oxygen saturation
  - ❑ Use of accessory muscles or tracheal tugging
  - ❑ Breath sounds
  - ❑ Air entry/stridor
  - ❑ Mental status
  - ❑ Color
  - ❑ Reduction of burning sensation in airway/pharynx
- **KEY PERFORMANCE MEASURES:**
  - ❑ Clinical improvement in patient and response to therapy
  - ❑ Survival rates of victims
  - ❑ Long term sequelae of the victims
  - ❑ No EMS clinicians injured while managing these incidents

# Riot Control Agents

**History**
- Exposure
- PMH
- Decontamination

**Signs and Symptoms**
- Itching or hives
- Coughing / wheezing or stridor
- Respiratory distress / SOB
- Chest or throat constriction
- Chest Tightness / Cough
- Difficulty swallowing / Choking
- Lacrimation
- Pain / Burning

**Differential**
- **Oleoresin Capsicum (OC)**
- Mace (CN) (CS)




ENVIRONMENTAL / TOXIC

# Riot Control Agents



- **PEARLS**
- **Recommended Exam: Mental Status, Skin, Heart, Lungs, HEENT**
- **BEWARE:** Many gases are heavier than air and will concentrate in low-lying areas
- **Don PPE and consider Self Contained Breathing Apparatus (SCBA) prior to entering contaminated area.**
- **Symptom Severity Classification:**
  - **Mild symptoms:**
    - **Flushing, hives, itching, erythema with normal blood pressure and perfusion.**
  - **Moderate symptoms:**
    - **Flushing, hives, itching, erythema plus symptomatic respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with normal blood pressure and perfusion.**
  - **Severe symptoms:**
    - **Flushing, hives, itching, erythema plus symptomatic respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with hypotension and poor perfusion.**
- **Patients with moderate and severe reactions should receive a 12 lead ECG and should be continually monitored, but this should NOT delay evacuation from potentially dangerous scene, decontamination, supplemental oxygen therapy.**
- Airway respiratory irritants can exacerbate underlying reactive airway diseases (e.g., asthma, chronic obstructive pulmonary disease (COPD)) and precipitate or exacerbate bronchospasm, respiratory distress, and hypoxia
- Patients may be off gassing (particularly hydrogen sulfide and hydrogen cyanide) in the back of the transport vehicle, it is important to have adequate ventilation of the patient compartment
- Removal from the toxic environment, oxygen (humidified if available), general supportive therapy, bronchodilators, respiratory support, and rapid transport are core elements of care as there are no specific antidotes for any of these inhaled agents in the prehospital setting.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Type of riot control agent if known
  - ❑ Symptoms being treated
  - ❑ Treatment provided
  - ❑ Response to treatment
- **KEY PERFORMANCE MEASURES:**
  - ❑ Riot control agent identified before making patient contact and providing treatment
  - ❑ PPE used by responders
  - ❑ Affected individuals removed from ongoing exposure
  - ❑ Contaminated clothing and contact lenses removed as able

# Topical Chemical Burn

**History**
- Type of exposure (acid or alkali chemical)
- Concentration of chemical
- pH of chemical if available
- Inhalation injury
- Time of Injury
- Onset of Burn sensation
- Past medical history and Medications
- Other trauma
- Loss of Consciousness

**Signs and Symptoms**
- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress could be indicated by hoarseness/ wheezing
- Careful evaluation of ocular and oropharyngeal exposure

**Differential**
- Thermal / Chemical / Electrical Burn Injury
  - Superficial
    - (1st Degree) red – painful
    - (Don't include in TBSA)
  - Partial Thickness
    - (2nd Degree) blistering
  - Full Thickness
    - (3rd Degree) painless/charred or leathery skin
- Radiation injury
- Blast injury

Appropriate PPE
Remove Patient clothing as necessary
Contaminated Clothing should be double bagged

Gather Chemical Information – including MSDS if available.
Prevent further contamination – of patient or EMTs

**Assess Burn / Concomitant Injury Severity**

**DRY CHEMICAL**

Brush off solid chemical PRIOR to irrigation

**WET CHEMICAL**

FLUSH the patient's skin and eyes (if involved) copiously with water or Normal Saline

**YES**

**Hydrofluoric Acid**

Vigorously irrigate all affected areas with water or NS > 15 mins

Cardiac Monitor for oral or large dermal exposure

Apply topical Calcium Preparations

Oral Ingestions or Large Dermal Exposure consider IV Calcium Gluconate

For eye exposure – continuous flusing. Morgan lens may facilitate

Consider topical ophthalmic anesthetic for chemical burns to eye

Minimize Hypothermia

Early airway intervention for airway compromise.

Age Appropriate **Airway C.O.G. (s)** ***(as indicated)***

Remove Rings, Bracelets / Constricting Items

Dry Clean Sheet or Dressings

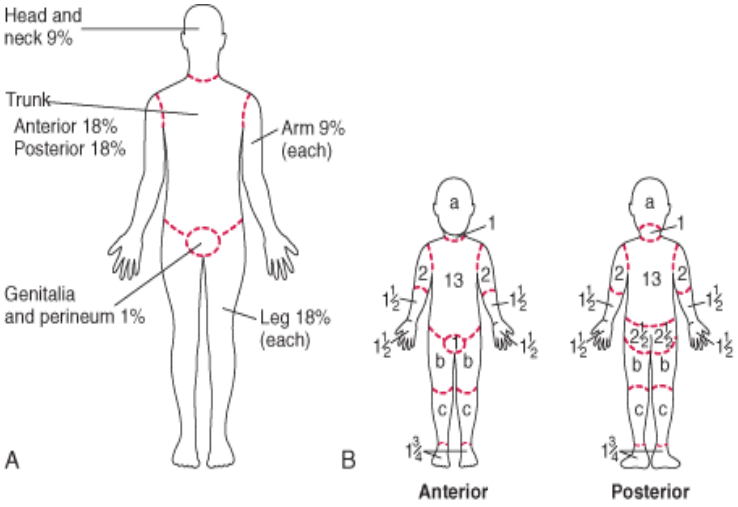
**Vascular Access C.O.G.**
Consider 2 IV sites if ≥ 15 % TBSA

Age Appropriate **Multiple Trauma C.O.G.** ***(if indicated)***

**Contact Medical Control. Early notification of receiving facility**

ENVIRONMENTAL / TOXIC

# Topical Chemical Burn




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 |

## Rule of Nines

- Rarely 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 1st degree burn(superficial) 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 (2nd) and Full Thickness (3rd) burns. Report the observation of other superficial (1st degree) burns but do not include those burns in your TBSA estimate.
- Some texts will refer to 4th 5th and 6th degree burns. There is significant debate regarding the actual value of identifying a burn injury beyond that of the superficial, partial and full thickness burn at least at the level of emergent and primary care. For EMS work, all are included in Full Thickness burns

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

**PEARLS**

- **Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- **Airway considerations:**
  - **For systems performing RSI, Rocuronium is preferred agent (succinylcholine can be used in the first 24-hours)**
  - **Singed nasal hairs, facial burns, and/or carbonaceous sputum are not absolute indications for intubation in a burn patient.**
  - **Utilizing non-rebreather face mask as well as NIPPV procedure are acceptable as tolerated.**
- **Critical or Serious Burns:**
  - **> 5-15% total body surface area (TBSA) 2nd or 3rd degree burns**
  - **3rd (full thickness) degree 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**
  - **Require direct transport to a Burn Center. Local facility should be utilized ONLY IF distance to Burn Center is excessive or critical interventions such as airway management are not available in the field.**
- Burn patients are trauma patients, evaluate for multisystem trauma.
- Assure whatever has caused the burn is no longer contacting the injury. (Stop the burning process!)
- 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 geriatric abuse with burn injuries in the elderly.
- Never administer IM pain injections to a burn patient.
- If commercially manufactured calcium gluconate gel is not available, a topical calcium gluconate gel preparation can be made by combining 150 mL (5 ounces) of a sterile water-soluble gel (e.g., Surgilube® or KY® jelly) with one of the following:
  - 35 mL of calcium gluconate 10% solution
  - 10g of calcium gluconate tablets (e.g., Tums)
  - 3.5 g calcium gluconate powder or
    - If calcium gluconate is not available, 10 mL of calcium chloride 10% solution in 150 ml in sterile water-soluble gel (e.g., Surgilube® or KY' jelly)
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Burn site
  - ❑ Body Surface Area Involved
  - ❑ Identification of Chemical, Chemical pH, and Chemical Concentration
  - ❑ Acquisition of and Transfer of MSDS, Chemical Container, or other pertinent substance information to receiving facility.

ENVIRONMENTAL / TOXIC

# Electrical Burns

**History**
- Source of Exposure – Home AC, High Voltage (powerline), DC, etc.
- Time of Injury
- Past medical history /Medications
- Other trauma
- Loss of Consciousness

**Signs and Symptoms**
- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress could be indicated by hoarseness/wheezing / Hypotension

**Differential**
- 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

**Ensure Electrical Source is NO longer in contact with patient before touching patient.**

**STOP THE BURN !**

**Assess Burn Type**
**Concomitant Injury Severity**

**ELECTRICAL BURN**

B **Remove metal objects**

Consider **Airway C.O.G**

Consider **Spinal Motion Restriction C.O.G.**

Consider **Trauma C.O.G.**

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

B **Identify Contact Points**

Consider **Vascular Access C.O.G.**

Consider Age Appropriate **Pain Control C.O.G.**

B **Cover burns with Dry Sterile Dressings**

**Notify Destination or Contact Medical Control**

**When significant Trauma coexists in the Burn Patient – initial transport should be to a BURN Center ONLY if the BURN Center has an appropriate Trauma Designation.**
**IF the available burn center does not have the appropriate TRAUMA designation for the coexistent injuries, or the patient is unstable for the time required to arrive at the burn center, THEN transport should be to the nearest appropriate trauma center first**

Age Appropriate **Cardiac Arrest / Pulseless Arrest / Arrhythmia C.O.G. (s)** ***(as indicated)***

ENVIRONMENTAL / TOXIC

# Electrical Burns

**Critical (Red)**

**>15% TBSA 2nd/3rd Degree Burn**
**Burns with Multiple Trauma**
**Burns with definite airway compromise**

- **Transport to a Burn Center when reasonable or reasonably accessible.**
- **Less than 30 minutes is a reasonable distance, at Service discretion for further distances.**
- **Pediatric patients should go to institution with BOTH a pediatric hospital and a BURN Center.**
- **If not accessible or patient unstable, transport to nearest Level 1 Trauma Center.**

**Serious (Yellow)**

**5-15% TBSA 2nd/3rd Degree Burn requiring intubation for airway stabilization**
**Hypotension or GCS < 14**

- **Transport to a Burn Center when reasonable or reasonably accessible.**
- **Less than 30 minutes is a reasonable distance, at Service discretion for further distances.**
- **Pediatric patients should go to institution with BOTH a pediatric hospital and a BURN Center.**
- **If not accessible or patient unstable, transport to nearest Level 1 Trauma Center.**

**Minor (Green)**

**< 5% TBSA 2nd/3rd Degree Burn**
**Not Intubated,**
**Normotensive**
**GCS>14**

- **If within 30 minutes of a burn center by ground, transport directly to burn center.**
- **If further, transport to the Local Hospital**

**PEARLS**

- **Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, Neuro, Skin**
- **When Trauma coexists in the Burn Patient – initial transport to a verified Trauma Center based on the Trauma Triage and Bypass Protocol is warranted.**
- **Green, Yellow and Red In burn severity do not apply to the SALT / Start / JumpStart Triage System.**
- **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.**
- **Bolus infusion of LR/NS (LR Preferred) if hypotensive.**
- **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 then 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.
  - For high voltage injuries (> 1000 v) maintain spinal motion restriction precautions and assume traumatic injuries are present until proven otherwise. Consider same for medium voltage (400 – 1000 v) injuries as well.
- IV Fluids: Run LR at 4 mL/Kg per % TBSA. Only bolus if hypotensive.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Characteristics of electrical current (if able to be determined):
    - ❑ AC / DC
    - ❑ Voltage / Amperage
  - ❑ Down Time if found in Cardiac Arrest
  - ❑ Positioning of the patient with respect to the electrical source
  - ❑ Accurate descripiton of external injuries
  - ❑ Document presence or absence of associated trauma
  - ❑ Documentation of Cardiac Rhythm and EKG Strips

ENVIRONMENTAL / TOXIC

# Radiation Incident

**History**
- Type of exposure (Inhaled, splashed, solid radiation source, etc.)
- Time of Injury
- Past medical history /Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

**Signs and Symptoms**
- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress could be indicated by hoarseness/wheezing / Hypotension

**Differential**
- 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

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

**Radiation Burn / Exposure**

↓

**Assess Burn / Concomitant Injury Severity**

↓

**B** **Consider Decontamination of External Radiation Source if Patient is Stable**

Irrigate any contaminated area copiously for **AT LEAST** 15 minutes

↓

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

→ Exit to Age Appropriate **Cardiac/ Pulseless Arrest & Arrhythmia C.O.G. s** ***(as indicated)***

↓

Go To Age Appropriate **Thermal Burn C.O.G.**

↓

**Contact Medical Control**
**Notify Receiving Facility ASAP**

In the event of a Declared Radiologic Emergency – SC DPH will provide supplies of Potassium Iodide tablets for administration

***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.·

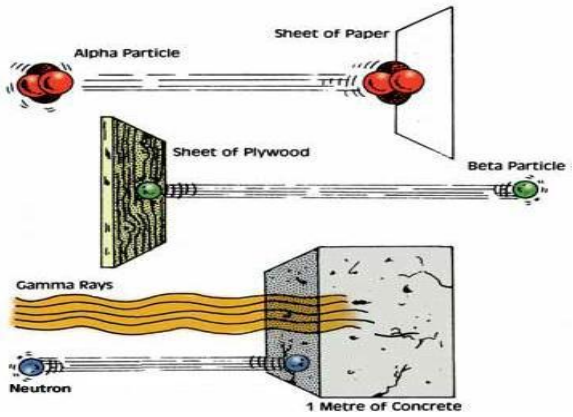
***Qualify:*** Determine exposure type; external irradiation, external contamination with radioactive material, internal contamination with radioactive material.·

***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.*

ENVIRONMENTAL / TOXIC

# Radiation Incident






**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.

## *Effects of Radiation by System and Severity*

| Symptom / Sign | Degree 1 | Degree 2 | Degree 3 | Degree 4 |
|---|---|---|---|---|
| **CONSTITUTIONAL** | | | | |
| Fatigue | Able to Work | Work Impaired | Assistance for ADLs | Cannot do ADLs |
| Temperature | < 38 °C (<100.4 °F) | 38-40 °C (100.4-104 °F ) | >40 °C for < 24 hours | >40 °C for > 24 hours |
| B/P | >100/70 | <100 / 70 | <90/60 | <80 Systolic |
| **CUTANEOUS** | | | | |
| Erythema | Minimal, Transient | Moderate < 10% BSA | Marked 10-40% BSA | Severe > 40% BSA |
| Sensation/Itching | Pruritus | Slight, intermittent. pain | Moderate persistent pain | Severe Persistent Pain |
| Blistering | Rare | Rare Hemorrhage | Bullae | Bullae Hemorrhage |
| Desquamation | Absent | Patchy, Dry | Patchy, Moist | Confluent, Moist |
| Ulcer/Necrosis | Epidermal Only | Dermal | Subcutaneous | Muscle or Bone |
| Onycholysis | Absent | Partial | Partial | Complete |
| **GASTROINTESTINAL** | | | | |
| Nausea | Mild | Moderate | Intense | Excruciating |
| Vomiting | Once/day | 2-5 times/day | 6-10 times/day | >10 times/day |
| Anorexia | Able to eat | Decreased Intake | Minimal Intake | Parenteral Nutrition |
| Stool (Number/day) | 2-3 | 4-6 | 7-9 | >10 |
| Stool (Consistency) | Bulky | Loose | Loose | Watery |
| GI Bleeding | Occult | Intermittent | Persistent | Persistent/Large Amount |
| Abdominal Cramps/Pain | Minimal | Moderate | Intense | Excruciating |
| **CEREBROVASCULAR** | | | | |
| Headache | Minimal | Moderate | Intense | Excruciating |
| Neurologic Deficits | Barely Detected | Easily Detected | Prominent | Life-Threatening – LOC |
| Cognitive Deficits | Minor | Moderate | Major Impairment | Complete Impairment |

# Radiation Incident

ENVIRONMENTAL / TOXIC

## PEARLS

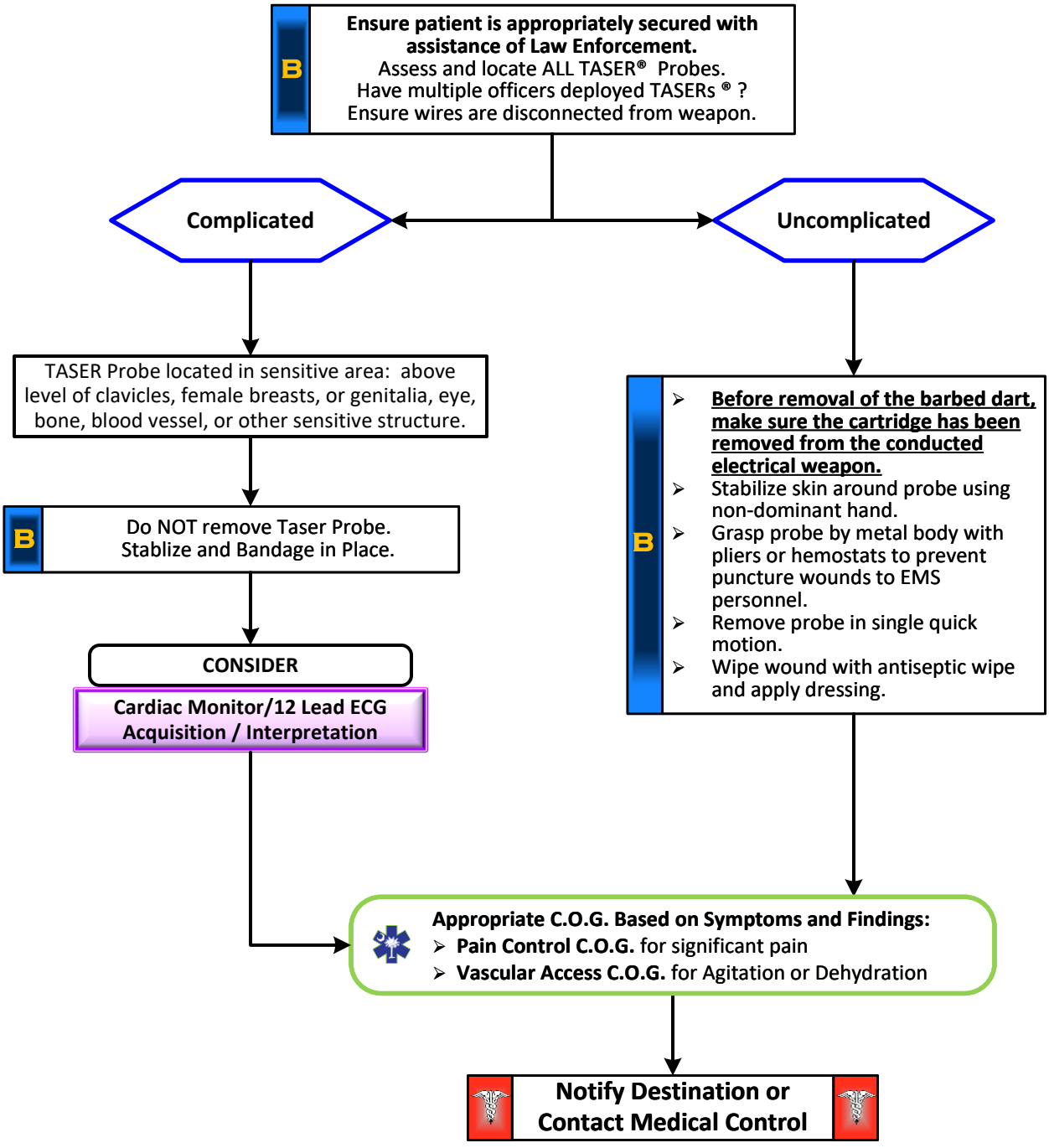
- Dealing with a patient with a radiation exposure can be a frightening experience. Do not ignore the ABC's, a dead but decontaminated patient is not a good outcome. Refer to the Decontamination Procedure for more information.
- Normal Saline or Sterile Water is preferred, however if not available, do 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.
- Maintain as much distance and shielding from source as possible.
- Wrap patient in clean linen to avoid particulate contamination of receiving facility
- Cover all open wounds to reduce internal contamination/exposure.
- **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 present 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 is 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 the source
  - Shielding from the source
- **Dirty bombs:** Ingredients generally include previously used radioactive material combined with a conventional explosive device to spread and distribute the contaminated material.
- Refer to Decontamination Procedure / WMD / Nerve Agent Protocol 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.
- This event may require an activation of the National Radiation Injury Treatment Network.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Duration of exposure to the radioactive source or environment
  - ❑ Distance (if able to be determined) from the radioactive source (if known)
  - ❑ Source of radiation (if known)
  - ❑ Scene Measurement of radioactivity
  - ❑ Time of onset of vomiting
  - ❑ Use of dosimetry by EMS Clinicians and use of appropriate PPE

# Conducted Electrical Device (TASER ®)

**History**
- Evaluate underlying issue that led to deployment of TASER
- Comprehensive evaluation for hypoglycemia, head injury, medication reaction

**Signs and Symptoms**
- Agitation
- Muscle Spasm
- Injury to head (from fall)
- Elevated Temperature
- Hallucinosis / Behavioral Illness

**Differential**
- Hypoglycemia
- Toxic / Adverse Drug Reaction
- Concomitant Alcohol/Drug Intoxication
- Head Injury
- Sepsis
- Behavioral Illness




ENVIRONMENTAL / TOXIC

# Conducted Electrical Device
## (TASER ®)



**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**
- Where darts have penetrated or are adjacent to sensitive and/or high risk areas, such as the eyes, ears, nose, mouth, face, neck, genitalia, spine, hands, feet or joints, the dart should be stablized and bandaged in situ.
- A patient with a pacemaker should undergo pacemaker assessment. That is, a pacemaker 'interrogation' should be performed by the Pacemaker technicians.
- The potential effects of TASER® discharge on the fetus are unknown, and pregnant women should be transported to the Emergency Department.
- **Before removal of the barbed dart, make sure the cartridge has been removed from the conducted electrical weapon.**
- Pre-existing injuries and toxic conditions leading to the patient being tasered are the most important problems requiring medical treatment after Taser use. Be vigilant for alcohol/drug intoxication; head injury; hypoglycemia; metabolic acidosis.
- EMS clinicians who respond for a conducted electrical weapon patient **should not** perform a "medical clearance" for law enforcement to then take the patient to a non medical facility.
- Law Enforcemnt should accompany any patient who has been “tasered” and/or requires physical restraints.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Vital Signs
  - ❑ If darts removed, document the removal location in the patient care report.
  - ❑ Physical exam and Trauma Findings
  - ❑ Cardiac rhythm and changes
  - ❑ Neurologic status assessment findings

# Bites and Envenomations

**History**
- 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

**Signs and Symptoms**
- 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

**Differential**
- Animal bite
- Human bite
- Snake bite (venomous)
- Spider bite (venomous)
- Insect sting / bite (bee, wasp, ant, tick)
- Infection risk
- Rabies risk
- Tetanus risk

**South Carolina Poison Control Center**
(803) 765-7359
(800) 222-1222

**B** **Hemorrhage Control Procedure** *(if indicated)*

**CONSIDER**

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

Position patient in position of comfort
Remove any constricting clothing/bands/jewelry
Mark margins of swelling/redness & note time
Immobilize area or limb
Ice/Cold application for insect sting/bite with pain/swelling

**Appropriate C.O.G. Based on Symptoms and Findings:**
- **Pain Control C.O.G.**
- **Vascular Access C.O.G.**
- **Allergic Reaction C.O.G.**
- **Trauma C.O.G.**
- **Hypotension / Shock C.O.G.**
- **Extremity Trauma C.O.G.**

**Identification**

**Spider Bite / Bee or Wasp Sting**

**B** Keep bitten area at level of heart *if able*
Apply Ice Packs

**P** **Muscle Spasm**
**Consider Benzodiazepine**

**Snake Bite**

**B** Keep bitten area at level of heart ***if able.***
Do **NOT** Elevate
Remove any constricting clothing / bands

**DO NOT apply ICE.**
**Do NOT apply tourniquet or constricting bands.**
**Do NOT Incise bite marks.**
**Do NOT Suction bite marks.**

Mark Margin of Swelling / Redness and Time

Monitor and Reassess

**Mammal Bite**

**Transport** — NO → **Animal Bites:** Document contact with Animal Control Officer. If patient not transported Document patient advised to follow up for medical care and possible rabies prophylaxis *(if indicated)*

YES

**Notify Destination or Contact Medical Control**

ENVIRONMENTAL / TOXIC

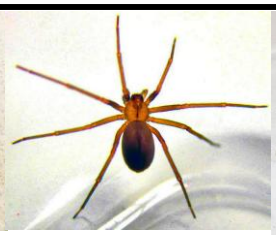
# Bites and Envenomations



**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**
- **Do not put responders in danger attempting to capture and animal or insect for identification purposes.**
- **Human bites:**
  - Human bites have higher infection rates than animal bites due to normal mouth bacteria.
- **Dog / Cat / Carnivore bites:**
  - 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 multicida).
- **Snake bites:**
  - Venomous snakes in this area are generally of the pit viper family: rattlesnake, water moccasin, and copperhead.
  - Coral snake bites are rare: Very little pain but very toxic. "Red on yellow - kill a fellow, red on black - venom lack."
  - Amount of envenomation is variable, generally worse with larger snakes and early in spring.
- **Spider 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 South Carolina Poison Control Center for guidance (1-800-222-1222).
- Do NOT apply Tourniquet for envenomations.
- Do NOT Incise Bite wounds
- Do NOT apply suction to bite wounds.
- **For patients refusing transport following wild mammal bites – ENCOURAGE medical follow up ASAP for consideration of rabies prophylaxis**
  - Document recommendation for Medical Follow Up. Try to get witness signatures for recommendation.
  - Notify Animal Control
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Accurate description of the suspected bite source
  - ❑ Repeat evaluation and documentation of signs and symptoms as patient clinical condition may rapidly deteriorate.
  - ❑ Time of symptoms onset and time of initiation of exposure specific treatments
  - ❑ Vital Signs (repeated measurements)
  - ❑ Therapy and response to therapy.

# Bites and Envenomations


Brown Recluse Spider


Black Widow Spider


Eastern Diamondback Rattlesnake

Timber Rattlesnake


Pygmy Rattlesnake

Coral Snake - POISONOUS

Scarlet King Snake – NON-Poisonous


Copperhead Snake


Cottonmouth
Water
Moccasin

ENVIRONMENTAL / TOXIC

# Marine Envenomations / Injury

**History**
- Type of bite / sting
- Identification of organism
- Previous reaction to marine organism
- Immunocompromised
- Household pets (i.e. marine)

**Signs and Symptoms**
- Intense localized pain
- Increased oral secretions
- Nausea / vomiting
- Abdominal cramping
- Allergic reaction / anaphylaxis

**Differential**
- Jellyfish sting
- Sea Urchin sting
- Sting ray barb
- Coral sting
- Swimmers itch
- Cone Shell sting
- Fish bite
- Lion Fish sting

General Wound Care Procedure

**Drowning C.O.G.** *(if indicated)*

**Vascular Access C.O.G.**

**If Needed**
**Palmetto Poison Control**
**1-800-222-1222**
**1-800-922-1117**

**Serious Injury / Hypotension**
- YES → Age Appropriate **Hypotension / Trauma C.O.G. s**
- YES → Age Appropriate **Hemorrhage Control C.O.G.**
- NO

**Allergy / Anaphylaxis**
- YES → **Allergy Anapylaxis C.O.G.**
- NO

**Moderate / Severe Pain**
- YES → Age Appropriate **Pain Control C.O.G.**

**Identification of Marine Creature**

| Jelly Fish<br>Anemone<br>Man-O-War | Sting Ray<br>Lion Fish<br>Urchin / Starfish | Large Organism |
|---|---|---|
| Immoblize Injury | Immoblize Injury | Immoblize Injury |
| Wash with clean seawater<br>DO NOT use fresh water or ice | Remove Barb or Spine. If large barb in thorax or abdomen – stabilize object. | Age appropriate **Multiple Trauma C.O.G.** *(if indicated)* |
| Lift away tentacles<br>Do NOT Brush or Rub | Immerse in Hot Water 110 – 114 ° F if available | **Extremity Trauma C.O.G.** *(if indicated)* |

**Notify Destination or Contact Medical Control**

ENVIRONMENTAL / TOXIC

# Marine Envenomations / Injury

Anemone

Jellyfish

Man of War

Stingray

Lion Fish

**KEY DOCUMENTATION ELEMENTS:**

- ❑ Accurately describe the suspect bite or sting source – without risking patient or EMS personnel
- ❑ Only transport source animal/insect if it can be done safely in a hard sided container
- ❑ Repeat evaluation and documentation of signs and symptoms. Patient clinical condition may deteriorate rapidly
- ❑ Time of symptom onset and time of initiation of exposure specific treatments
- ❑ Therapy and response to Therapy

**PEARLS**

- **Ensure your safety: Avoid the organism or fragments of the organism as they may impart further sting / injury.**
- **Priority is removal of patient from water (safely) to prevent drowning.**
- Patients can suffer cardiovascular collapse from both the venom and / or anaphylaxis even in seemingly minor envenomations.
- Ensure good wound care, immobilization and pain control.
- Sea creature bites and stings produce moderate to severe pain.
- **Coral:**
  - Coral is covered by various living organisms which are easily dislodged from the structure.
  - Victim may swim into coral causing small cuts and abrasions and the coral may enter cuts causing little if any symptoms initially.
  - The next 24 – 48 hours may reveal an inflammatory reaction with swelling, redness, itching, tenderness and ulceration
  - Treatment is flushing with large amounts of fresh water or soapy water then repeating
- **Jelly Fish / Anemone / Man-O-War:**
  - Wash the area with fresh seawater to remove tentacles and nematocysts.
  - Do not apply fresh water or ice as this will cause nematocysts firing as well.
  - Recent evidence does not demonstrate a clear choice of any solution that neutralizes nematocysts.
  - 50:50 mixture of Baking Soda and Seawater, and even meat tenderizer may have similar effects.
  - Immersion in warm water for 20 minutes, 110 – 114°F (43 - 46°C), has recently been shown to be effective in pain control.
  - Shaving cream may be useful in removing the tentacles and nematocysts with a sharp edge (card).
  - Stimulation of the nematocysts by pressure or rubbing cause the nematocyst to fire even if detached from the jellyfish.
  - Lift away tentacles as scraping or rubbing will cause nematocysts firing.
  - Typically symptoms are immediate stinging sensation on contact, intensity increases over 10 minutes.
  - Redness and itching usually occur.
  - Papules, vesicles and pustules may be noted and ulcers may form on the skin.
  - Increased oral secretions and gastrointestinal cramping, nausea, pain or vomiting may occur.
  - Muscle spasm, respiratory and cardiovascular collapse may follow.
- **Lionfish:**
  - This may occur in the home as they are often kept as pets in saltwater aquariums.
  - Remove any obvious protruding spines and irrigate area with copious amounts of saline.
  - The venom is heat labile so immersion in hot water, 110 – 114°F (43 - 46°C) for 30 to 90 minutes is the treatment of choice but do not delay transport if indicated.
- **Stingrays:**
  - Typical injury is swimmer stepping on ray and muscular tail drives 1 – 4 barbs into victim.
  - Venom released when barb is broken.
  - Typical symptoms are immediate pain which increases over 1 – 2 hours. Bleeding may be profuse due to deep puncture wound.
  - Nausea, vomiting, diarrhea, muscle cramping and increased urination and salivation may occur.
  - Seizures, hypotension and respiratory or cardiovascular collapse may occur.
  - Irrigate wound with saline. Extract the spine or barb unless in the abdomen or thorax, contact medical control for advise.
  - Immersion in hot water if available for 30 to 90 minutes but do not delay transport.

# Hyperthermia

**History**
- Age – Extremes of age more susceptible
- Exposure to increased temperatures and / or humidity
- Past medical history / medications
- Extreme exertion
- Time and length of exposure
- Poor PO intake
- Fatigue and / or muscle cramping
- EtOH / Illicit Drug Use

**Signs and Symptoms**
- Altered mental status or unconsciousness
- Hot, dry or sweaty skin
- Hypotension or shock
- Seizures
- Nausea

**Differential**
- Fever (Infection)
- Dehydration
- Medications/Drugs
- Hyperthyroidism (Storm)
- Delirium tremems (DT's)
- Heat cramps
- Heat exhaustion
- Heat stroke
- CNS lesions or tumors

| Degrees Fahrenheit | Degrees Centigrade(Celsius) |
|---|---|
| | |
| **98.6** | **37.00** |
| 99 | 37.22 |
| 100 | 37.78 |
| 101 | 38.33 |
| 102 | 38.89 |
| 103 | 39.44 |
| 104 | 40.00 |
| 105 | 40.56 |
| 106 | 41.11 |
| 107 | 41.67 |
| 108 | 42.22 |
| 109 | 42.78 |
| 110 | 43.33 |
| **212** | **100.00** |

**B** Temperature Measurement Procedure *(if available)* Temperature Measurement should NOT delay treatment of Hyperthermia

**B**
- Remove from heat source to cool environment
- Passive cooling measures
- Remove clothing
- **Active Cooling Measures Target Temp < 102.5°F**
- **Blood Glucose Analysis**

→ **Glucose Management C.O.G.** *(If Indicated)*

**Assess Symptom Severity**

**HEAT CRAMPS**
Normal to elevated body temperature
Warm, moist skin
Weakness, Muscle cramping

**HEAT EXHAUSTION**
Elevated body temperature
Cool, moist skin
Weakness, Anxious, Tachypnea

**HEAT STROKE**
Body temperature, usually > 105°F
Hot, dry skin
Hypotension, AMS / Coma

**B**
- PO Fluids as tolerated
- Monitor and Reassess

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

**Vascular Access C.O.G.** (as indicated)

**Airway C.O.G.** (as indicated)

**Altered Mental Status C.O.G.** (as indicated)

**Seizure C.O.G.** (as indicated)

**Poor Perfusion / Hypoperfusion**

YES

**Hypotension C.O.G.** (as indicated)

NO

**Monitor and Reassess**

**Notify Destination or Contact Medical Control**

**For aggressive active cooling consider use of a large vinyl/rubber bag (e.g Body Bag) to cocoon the patient in ice**

ENVIRONMENTAL / TOXIC

# Hyperthermia

**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, antipsychotics, synthetic cannabinoids, and excessive alcohol.
- Cocaine, Amphetamines, and Salicylates may elevate body temperatures.
- Sweating generally disappears as body temperature rises above 105° F (40° C).
- Intense shivering may occur as patient is cooled.
- **Heat Cramps** consists of benign muscle cramping secondary 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.
  - **Exertional Heat Stroke:**
    - **In exertional heat stroke (athletes, hard labor), the patient may have sweated profusely and be wet on exam.**
    - **Rapid cooling takes precedence over transport as early cooling decreases morbidity and mortality.**
    - **If available, immerse in an ice water bath for 5 – 10 minutes. Monitor rectal temperature and remove patient when temperature reaches 102.5°F (39°C). Your goal is to decrease rectal temperature below 104°F (40°C) with target of 102.5°F (39°C) within 30 minutes. Stirring the water aids in cooling.**
    - **Other methods include cold wet towels below and above the body or spraying cold water over body continuously.**
    - **For aggressive active cooling consider the use of a large rubber/vinyl bag (e.g. BodyBag or similar) to cocoon the patient in ice (i.e. ice under, around, and over the patient)**
- **Neuroleptic Malignant Syndrome (NMS):**
  - Neuroleptic Malignant Syndrome is a hyperthermic emergency which is not related to heat exposure.
  - It occurs after taking neuroleptic antipsychotic medications. This may occur at anytime while the patient is taking the medication and is unrelated to the duration of treatment.
  - This is a rare but often lethal syndrome characterized by muscular rigidity, AMS, tachycardia and hyperthermia.
  - **Drugs Associated with Neuroleptic Malignant Syndrome:**
    - Prochlorperazine (Compazine), promethazine (Phenergan), clozapine (Clozaril), and risperidone (Risperdal) metoclopramide (Reglan), amoxapine (Ascendin), and lithium.Potent typical neuroleptics such as haloperidol, fluphenazine, chlorpromazine, trifluoperazine, and prochlorperazine have been most frequently associated with NMS and thought to confer the greatest risk.
  - **Management of NMS:**
    - Supportive care with attention to hypotension and volume depletion.
    - Use benzodiazepines such as diazepam or midazolam for seizures and / or muscular rigidity.
- **Rapid cooling takes precedence over transport as early cooling decreased morbidity and mortality. Goal temperature is between 100.4 - 102.5 degF.**
- **ACTIVE Cooling includes EVAPORATIVE Cooling as well as placement of Ice Packs in the groin, axillae, and on the head.**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ **Patient assessment including:**
    - ❑ **All types of medications and / or drug use**
    - ❑ **Detailed Past Medical History**
  - ❑ **Environmental assessment performed. (With Ambient Temperature)**
  - ❑ **Cooling interventions considered and implemented**
  - ❑ **Decision making regarding monitoring ABCs (Airway, Breathing, Circulation)**
  - ❑ **Vital Signs – with Core Temperature**
- **KEY PERFORMANCE MEASURES:**
  - ❑ **Blood Glucose Level Obtained**
  - ❑ **Fluids given for hypotension**
  - ❑ **Attempts to reduce Core Temperature**
  - ❑ **Time from arrival at scene to when active cooling is started**

# Hypothermia

**History**
- Past medical history / medications
- Exposure to environment even in normal temperatures
- Exposure to extreme cold
- Extremes of age, very young & old
- Drug use: alcohol, barbituates
- Infections / Sepsis
- Length of exposure / wind chill

**Signs and Symptoms**
- Cold, clammy
- Shivering
- Altered mental status / coma
- Extremity pain or sensory abnormality
- Bradycardia
- Hypotension or shock

**Differential**
- Sepsis
- Environmental exposure
- Hypoglycemia
- CNS dysfunction
  - Stroke
  - Head injury
  - Spinal cord injury

| Degrees Fahrenheit | Degrees Centigrade(Celsius) |
|---|---|
| | |
| 0 | -17.78 |
| **32** | **0.00** |
| 75 | 23.89 |
| 77 | 25.00 |
| 79 | 26.11 |
| 81 | 27.22 |
| 83 | 28.33 |
| 85 | 29.44 |
| 87 | 30.56 |
| 89 | 31.67 |
| 91 | 32.78 |
| 93 | 33.89 |
| 95 | 35.00 |
| 97 | 36.11 |
| **98.6** | **37.00** |

**B**
- Remove Wet Clothing Dry/Warm Patient
- Passive Warming Measures
- Active Warming Measures
- Temperature Measurement *(if available)* Should NOT delay treatment of hypothermia
- **Blood Glucose Analysis** → **Glucose Management C.O.G.** (as indicated)

**Assess Symptom Severity**

**Localized Cold Injury**

**B**
- Monitor and Reassess
- General Wound Care
- DO NOT rub skin to warm
- Do NOT allow refreezing

**Systemic Hypothermia**

**Awake with/without AMS**

**Respiratory Distress ?** YES → **Respiratory Distress C.O.G.**

NO

**Airway C.O.G.** *(as indicated)*

**Altered Mental Status C.O.G.** *(as indicated)*

**Unresponsive**

**Does patient have pulse?** YES → **Airway C.O.G.** *(as indicated)*

NO

Exit to **Cardiac/ Pulseless Arrest & Arrhythmia C.O.G.s For Other Rhythms** *[See Pearls]*

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**

**Vascular Access C.O.G.** *(as indicated)*

**Hypotension C.O.G.** *(as indicated)*

**Exit to Multiple Trauma C.O.G.** (as indicated)

Monitor and Reassess

**Notify Destination or Contact Medical Control**

ENVIRONMENTAL / TOXIC

# Hypothermia

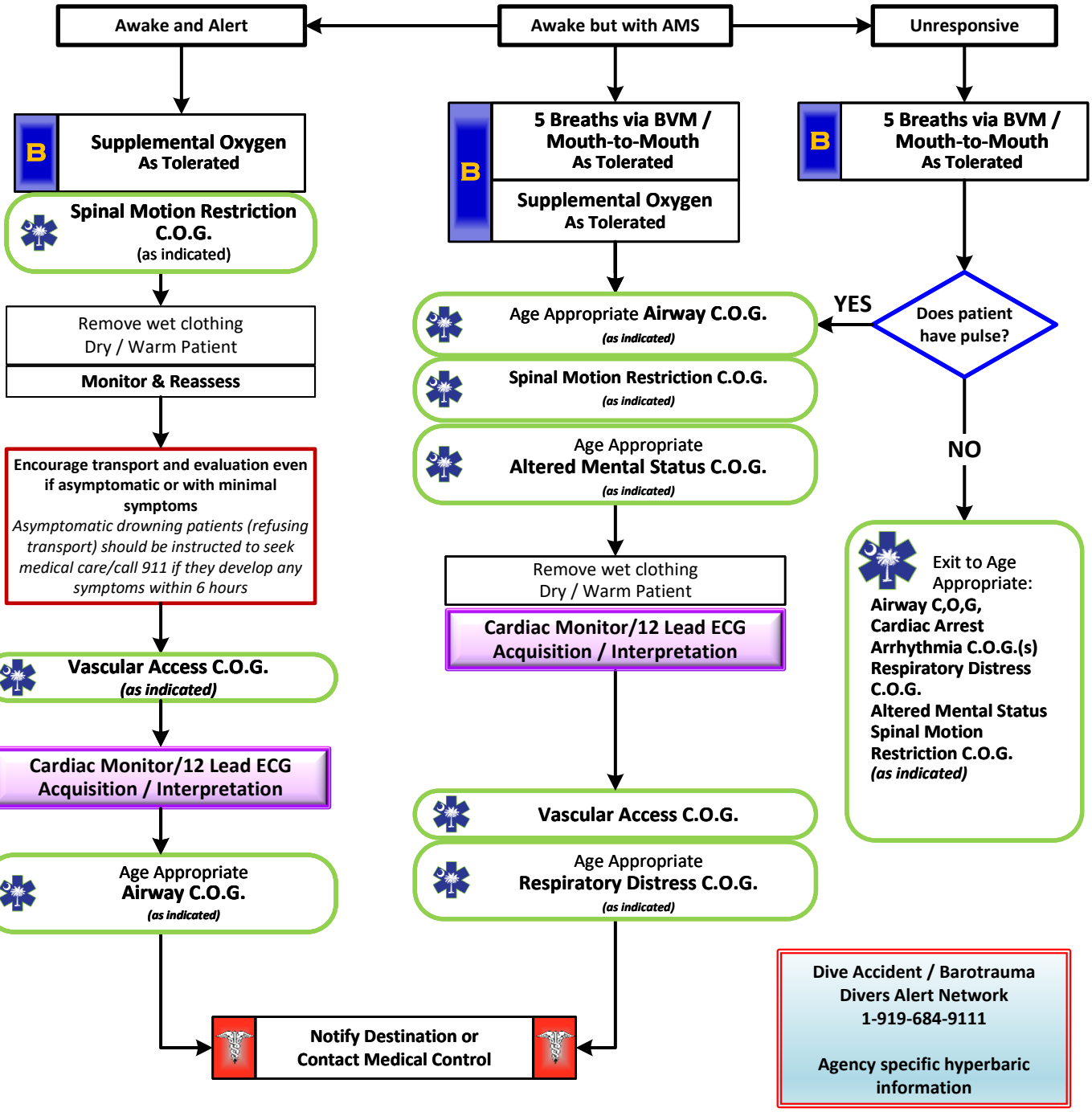
- **PEARLS**
- **Recommended Exam: Mental Status, Heart, Pulses, Lungs, Extremities, Neuro**
- **NO PATIENT IS DEAD UNTIL WARM AND DEAD (Body temperature ≥ 93.2 degrees F, 32 degrees C.)**
- **Hypothermia categories:**
  - Mild 90 – 95 degF ( 32 – 35 degC)
  - Moderate 82 – 90 degF ( 28 – 32 degC)
  - Severe < 82 degF ( < 28 degC)
  - Profound <75 degF (<24 degC)
- **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.
- **ACTIVE WARMING**
  - Remove from cold environment and to warm environment protected from wind and wet conditions.
  - Remove wet clothing and provide warm blankets / warming blankets.
  - 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
- **Caution if Intubation is required.**
  - **Should be performed by the most experienced personnel.**
  - **Gentle manipulation of the patient is required.**
  - **Avoid Hyperventilation.**
- **CPR:**
  - **Severe hypothermia may cause cardiac instability and rough handling of the patient theoretically can cause ventricular fibrillation. This has not been demonstrated or confirmed by current evidence. Intubation and CPR techniques should not be withheld due to this concern. Intubation can cause ventricular fibrillation so it should be done gently by most experienced person**
  - **Below 86 $^{O}$ F (30 $^{O}$ C) antiarrhythmics may not work and if given should be given at increased intervals. Contact Medical Control for direction. Epinephrine / Vasopressin can be administered. Below 86 $^{O}$ F (30 $^{O}$ C) pacing should not be done.**
  - **Consider withholding CPR if patient has organized rhythm or has other signs of life. Contact Medical Control.**
  - **If the patient is below 86 $^{O}$ F (30 $^{O}$ C) then defibrillate 1 time if defibrillation is required. Deferring further attempts until more warming occurs is controversial. Contact Medical Control for direction.**
  - **Hypothermia may produce severe bradycardia so take at least 45 seconds to palpate for a pulse.**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Duration of Cold Exposure
  - ❑ Ambient Temperature and recent range of temperatures
  - ❑ Rewarming attempts or other therapies performed prior to EMS arrival
  - ❑ Patient Core Temperature
  - ❑ Patient use of alcohol / drugs
  - ❑ Presence of Cardiac Arrhythmias and EKG Strips. (Rhythm strips should be long (recommend 60 secs).
  - ❑ Documentation of associated trauma (per Trauma Protocol) where present
  - ❑ Blood Glucose Level Obtained

# Drowning

**History**
- Submersion in water regardless of depth
- Possible trauma to C-spine
- History of trauma ie: diving board
- Duration of immersion
- Temperature of water or
- possibility of hypothermia
- Waterskiing, Surfing, or Watercraft accident
- SCUBA event *

**Signs and Symptoms**
- Mental status changes
- Unresponsive
- Decreased or absent vital signs
- Apnea
- Coughing
- Stridor / Wheezing / Rales
- Vomiting

**Differential**
- Trauma
- Pre-existing medical problem (hypoglycemia, cardiac dysrhythmia)
- Pressure injury (diving)
- Barotrauma
- Decompression sickness
- Post-immersion syndrome
- Hypothermia




Dive Accident / Barotrauma
Divers Alert Network
1-919-684-9111

Agency specific hyperbaric information

ENVIRONMENTAL / TOXIC

# Drowning

- In South Carolina Hyperbaric Oxygen Therapy is provided through PRISMA Health – Richland.
- **Contact 803-434-7222 for assistance**

ENVIRONMENTAL / TOXIC

## PEARLS

- **Recommended Exam: Respiratory, Mental status, Trauma Survey, Cardiac Exam, Skin, Neuro**
- **Drowning is the process of experiencing respiratory impairment (any respiratory symptom) from submersion / immersion in a liquid.**
- **Begin with BVM ventilations, if patient does not tolerate then apply appropriate mode of supplemental oxygen.**
- **Ensure scene safety. Drowning is a leading cause of death among would-be rescuers.**
- **When feasible, only appropriately trained and certified rescuers should remove patients from areas of danger.**
- **Regardless of water temperature – resuscitate all patients with known submersion time of ≤ 30 minutes.**
- **Regardless of water temperature – If submersion time ≥ 90 minutes consider moving to recovery phase instead of rescue.**
  - **Submersion survivablity is estimated at 30 minutes for water temperature > 43 degF and 90 minutes for water temperature < 43 degF.**
- **Foam is usually present in airway and may be copious, DO NOT waste time attempting to suction. Ventilate with BVM through foam (suction water and vomit only when present.)**
- **Cardiac arrest in drowning is caused by hypoxia, airway and ventilation are equally important to high-quality CPR.**
- **Encourage transport of all symptomatic patients (cough, foam, dyspnea, abnormal lung sounds, hypoxia) due to potential worsening over the next 6 hours.**
- **For SCUBA* Related Incidents – Refer to Diving/SCUBA Protocol and consider transport to Hyperbaric Oxygen (HBO) Center**
- **High Flow Oxygen should be delivered via NRB Mask at > 15 lpm enroute.**
- Predicting prognosis in prehospital setting is difficult and does not correlate with mental status. Unless obvious death, transport.
- Hypothermia is often associated with drowning and submersion injuries even with warm ambient conditions.
- Drowning patient typically has < 1 – 3 mL/kg of water in lungs (does not require suction.) Primary treatment is reversal of hypoxia.
- Spinal immobilization is usually unnecessary. When indicated it should not interrupt ventilation, oxygenation and / or CPR.
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Mechanism of injury or history suggesting cervical spine injury
  - ❑ Submersion Time
  - ❑ Water Temperature
  - ❑ Activities leading to drowning
  - ❑ Core Temperature when available

# Emerging Diseases
## (Respiratory Diseases)

**History**
- Positive 911 EMD / PSAP Screening
- Travel history to - or residence in -
- **a region with prevalent Category A disease within 21 days in conjunction with signs and symptoms listed within this Clinical Operating Guideline.**

**Signs and Symptoms**
- Fever of > 100.4 $^{O}$ F
- Severe Headache
- Muscle Pain
- Weakness
- Diarrhea
- Vomiting
- Abdominal Pain
- Unexplained Hemorrhage

**Differential (Life threatening)**
- **Cold / Influenza**
- Electrolyte Imbalance
- Hyperglycemia
- Other Viral/Bacterial Infections.

**If you respond to an incident where an Emerging Disease (Category A) risk may be present, as determined by prescreening – IMMEDIATELY contact your DPH Regional Public Health Epidemiology (EPI) as listed below. EPI will conduct a further risk assessment to determine what, if any, actions are necessary for disease containment or monitoring and assist in determining resources needed.**

| UPSTATE: | MIDLANDS | PEE DEE: | LOWCOUNTRY: |
|---|---|---|---|
| Abbeville, Anderson, Cherokee, Greenville, Greenwood, Laurens, McCormick, Oconee, Pickens, Spartanburg, Union | Aiken , Barnwell, Chester, Edgefield, Fairfield, Kershaw, Lancaster, Lexingtron, Newberry, Richland, Saluda, York | Chesterfield, Clarendon, Darlington, Dillon, Florence, Georgetown, Horry , Lee, Marion, Marlboro, Sumter, Williamsburg | Allendale, Bamberg, Beaufort, Berkeley, Calhoun, Charleston, Colleton, Dorchester, Hampton, Jasper, Orangeburg |
| **866.298.4442** | **888.801.1046** | **843.915.8845** | **843.441.1091** |

Appropriate **Personal Protective Equipment** in conjunction with current CDC recommendations **PRIOR** to entering scene, Consider patient masking as tolerated.

* No routine aerosol generating procedures unless absolutely medically necessary. This includes CPAP / BiPAP / Nebulized Medication Procedures
Advanced airway procedures should be performed under controlled conditions while not in motion.

Age Appropriate Airway C.O.G. If indicated *

**B**

Vital Signs
Pulse Oximetry
Does NOT include auscultation of Breath Sounds

Consider Supplemental Oxygen by NRB if SpO2 < %; Respiratory Distress; Altered LOC; or > 20 weeks pregnant

Provide Supportive Care
Continue to calm and reassure the patient(s)

**Cardiac Monitor/12 Lead ECG Acquisition / Interpretation**
**If symptomatic for cardiac related complaint**

**Patient Stable?**

YES → Provide for Transport to Appropriate Facility following orders from Incident Commander

NO → Exit to Appropriate Clinical Operating Guideline. Transport Immediately.

**Notify Destination or Contact Medical Control**

If your agency is providing transport, ALERT the Receiving Medical Facility:
- As soon as feasible, confidentially notify the Receiving Facility that you are transporting a potential higly infectious patient.
- **DO NOT TAKE THE PATIENT INTO THE MEDICAL FACILITY UNTIL YOU ARE INSTRUCTED TO DO SO.**
- **MEDICAL FACILITY PERSONNEL WILL DIRECT YOU TO THE PROPER ROOM THROUGH A SAFE ENTRANCE**

# Emerging Diseases
## (Respiratory Diseases)

**Category A Pathogens:**
The U.S. public health system and primary healthcare providers must be prepared to address various biological agents, including pathogens that are rarely seen in the United States. High-priority agents include organisms that pose a risk to national security because they:

- can be easily disseminated or transmitted from person to person;
- result in high mortality rates and have the potential for major public health impact;
- might cause public panic and social disruption; and
- require special action for public health preparedness.



**PEARLS**

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Extremities, Neuro**
- **Transport Destination is chosen based on the EMS System Plan with EMS pre-arrival notification.**
- IF your agency is providing transport, ALERT the Receiving Medical Facility:
  - ❖ As soon as feasible, confidentially notify the Receiving Facility that you are transporting a potential highly infectious patient.
  - ❖ DO NOT TAKE THE PATIENT INTO THE MEDICAL FACILITY UNTIL YOU ARE INSTRUCTED TO DO SO.
  - ❖ MEDICAL FACILITY PERSONNEL WILL DIRECT YOU TO THE PROPER ROOM THROUGH A SAFE ENTRANCE.
- Application of Cardiac Monitor should be utilized IF the patient is symptomatic for cardiac related complaint.
- *** No routine aerosol generating procedures unless absolutely medically necessary. This includes CPAP / BiPAP /Nebulized Aerosol Treatments. Advanced airway procedures should be performed under controlled conditions while not in motion.**
- **❖ ONLY Personnel who have been well trained in use of PPE and know how to put it on and take it off safely and properly should enter contaminated zone.**
- **❖ There should be NO exposed skin once full PPE has been put on prior to entry.**
- **❖ Per CDC Guidelines, withhold invasive procedures unless, absolutely necessary:**
  - ➢ **Do not attempt any invasive procedures while in motion to minimize exposure risk(s).**
- **❖ Always have a monitor for the doffing procedure to insure there is no provider contamination during doffing.**
- **❖ There should be a standardized procedure for donning and doffing that is monitored by a Safety Officerr.**
- **❖ Remain cognizant that potential patients may experience heightened anxiety due to situation and EMS Responder in PPE**
- **Key Documentation Elements**
  - ❑ Vital Signs including SpO2 and Temperature
  - ❑ Procedures performed and patient response
- **KEY PERFORMANCE MEASURES:**
  - ❑ Documentation of notification/pre-notification of receiving facility
  - ❑ Appropriate PPE use

# Emerging Diseases
## (Respiratory Diseases)

**PEARLS**

- Every patient contact should be considered to have potential for infection. Limit number of personnel when caring for patients to limit exposures and PPE use.
- Place facemask on any patient complaining of respiratory problems with or without a fever.
- **Dispatch Screening:**
  - If caller interrogation results in positive screen first responders are assigned based on local agency direction.
  - This screening process will result in many False Positive screens in order to be very sensitive.
- **First Responder and EMS Screening:**
  - Limit distance initially to ≥ 6 feet and conduct a quick screening using the EMD specific question.
  - If this results in a positive screen, immediately place a facemask on the source patient and all providers don appropriate PPE and limit provider number to that which necessary for patient care.
- Close Contact and Duration Definition:
  - Healthcare provider exposure is defined as being within 6 feet for ≥ 15 minutes in a patient with suspected illness.
  - Unprotected (no or incorrect PPE) with direct contact with body fluids, including respiratory generated body fluids.
- **Transport:**
  - Occupants in cab of vehicle all should wear facemasks. Riders should be discouraged in order to limit PPE use.
  - Limit number of providers in vehicle required to provide patient care in order to limit exposures.
  - Ensure use of correct PPE for crew and passengers when aerosol-producing procedures utilized.
- Recommend facemask and gloves with every patient contact. It is reasonable to wear eye protection on every patient contact.
- **Negative Pressure in care compartment:**
  - Door or window available to separate driver's and care compartment space:
    - Close door/window between driver's and care compartment and operate rear exhaust fan on full.
  - No door or window available to separate driver's and care compartment space:
    - Open outside air vent in driver's compartment and set rear exhaust fan to full.
  - Set vehicle ventilation system to non-recirculating to bring in maximum outside air.
  - Use recirculating HEPA ventilation system if equipped.
- **Airborne precautions:**
  - Standard PPE with fit-tested N95 mask (or PAPR respirator) and utilization of a gown or coveralls, change of gloves after every patient contact, and strict hand washing precautions.
  - This level is utilized with Aspergillus, SARS/MERS/COVID-19, Tuberculosis, Measles (rubeola) Chickenpox (varicella-zoster), Smallpox, Influenza, disseminated herpes zoster, or Adenovirus/Rhinovirus.
- **Contact precautions:**
  - Standard PPE with utilization of a gown or coveralls, change of gloves after every patient contact, and strict hand washing precautions.
  - This level is utilized with GI complaints, blood or body fluids, C diff, scabies, wound and skin infections, MRSA.
  - Clostridium difficile (C diff) is not inactivated by alcohol-based cleaners and washing with soap and water is indicated.
- **Droplet precautions:**
  - Standard PPE plus a standard surgical mask for providers who accompany patients in the treatment compartment and a surgical mask or NRB O2 mask for the patient.
  - This level is utilized when Influenza, Meningitis, Mumps, Streptococcal pharyngitis, Pertussis, Adenovirus, Rhinovirus, and
  - undiagnosed rashes.
- **All-hazards precautions:**
  - Standard PPE plus airborne precautions plus contact precautions.
  - This level is utilized during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g. SARS, MERS-CoV, COVID-19).

# Emerging Diseases
## (Respiratory Diseases)

## Decontamination Recommendations

### EMS Personnel Requires Decontamination

**Driver:**
- Should wear full PPE as described when caring for patient.
- Remove all PPE, except respiratory (N95, PAPR, or equivalent) and perform hand hygiene prior to entering cab to prevent contamination of driver's compartment. Cab occupants only need to wear facemasks if respirator not already used.

**Wash hands:**
- Thoroughly after transferring patient care and/or cleaning ambulance

**Maintain records:**
- All prehospital providers exposed to patient at the scene and during ambulance transport (self-monitoring for symptoms for 14 days is recommended, even if wearing appropriate PPE).
- This does not mean the providers can no longer work.
- List all prehospital provider names (students, observers, supervisors, first response etc.) in the Patient Care Report.

### EMS Equipment / Transport Unit Requires Decontamination

**Safely clean vehicles used for transport:**
- Follow standard operating procedures for the containment and disposal of regulated medical waste.
- Follow standard operating procedures for containing and reprocessing used linen.

**Wear appropriate PPE when:**
- Removing soiled linen from the vehicle. Avoid shaking the linen.
- Clean and disinfect the vehicle in accordance with agency standard operating procedures.
- Personnel performing the cleaning should wear a disposable gown and gloves (a respirator should not be needed) during the clean-up process; the PPE should be discarded after use.
- All surfaces that may have come in contact with the patient or materials contaminated during patient care (e.g., stretcher, rails, control panels, floors, walls, work surfaces) should be thoroughly cleaned and disinfected using an EPA-registered disinfectant appropriate for the suspected Category A pathogen in accordance with manufacturer's recommendations. Keep doors open to patient care compartment while cleaning to allow air exchanges.

## EMS Provider Exposure Risk & Monitoring Recommendations

**Close Contact**
**Less than 6 feet for ≥ 15 minutes**
**Source Patient: NOT** Wearing a Mask

| PPE Utilized | Exposure Risk | Monitoring | Work Restrictions |
|---|---|---|---|
| NONE | HIGH | SELF-Monitor Supervision | **If symptomatic:** Fever and Respiratory symptoms (cough, difficulty breathing or other respiratory symptoms) **THEN** **Exclude from work:** • At least 72 hours after fever resolution with no use of fever reducing medications. **AND** • At least 10 days since symptom onset. |
| No facemask (N95 or PAPR) | HIGH | | |
| No Eye Protection | MEDIUM | | |
| No Gown/Coveralls or Gloves | LOW | | |
| ALL Recommended PPE – EXCEPT standard facemask INSTEAD OF N95 or PAPR | LOW | | |

**Close Contact**
**Less than 6 feet for ≥ 15 minutes**
**Source Patient: WEARING** a Mask

| PPE Utilized | Exposure Risk | Monitoring | Work Restrictions |
|---|---|---|---|
| NONE | MEDIUM | SELF-Monitor Supervision | **If symptomatic:** Fever and Respiratory symptoms (cough, difficulty breathing or other respiratory symptoms) **THEN** **Exclude from work:** • At least 72 hours after fever resolution with no use of fever reducing medications. **AND** • At least 10 days since symptom onset. |
| No facemask (N95 or PAPR) | MEDIUM | | |
| No Eye Protection | LOW | | |
| No Gown/Coveralls or Gloves | LOW | | |
| ALL Recommended PPE – EXCEPT standard facemask INSTEAD OF N95 or PAPR | LOW | | |

**Placing a simple/surgical mask on the patient within 15 minutes of contact decreases exposure risk.**
**Refer to Current CDC Guidelines for Return to Work Practice and Work Restrictions regarding Category A Exposures.**
Prior to duty shift, measure temperature and assess for illness symptoms either by provider, infection control officer, or occupational or public health.
- Self-monitoring with oversight by agency's infection control officer, occupation or public health department per agency policy.
- Wear mask at all times and restrict care of immunocompromised patients (Cancer, Transplant, Steroid use) until all symptoms have resolved or 14 days after onset of illness, whichever is longest.
- Social distance: Employee should maintain 6 feet of separation as work duties permit in the workspace.
- Remove from work if employee becomes symptomatic.

**https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-for-ems.html**
**https://www.cdc.gov/coronavirus/2019-ncov/healthcare-facilities/hcp-return-work.html**
**https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2-covid-19**

# Emerging Diseases
# Viral Hemorrhagic Fevers

**History**
- Positive 911 EMD / PSAP Screening
- Travel history to - or residence in -
- **a region with prevalent Category A disease within 21 days in conjunction with signs and symptoms listed within this Clinical Operating Guideline.**
- **Those areascurrently designated by the CDC as being high risk**
- **See C.O.G. 700-001 for DPH Notifications.**

**Signs and Symptoms**
- Fever of > 100.4 $^{O}$ F
- Severe Headache
- Muscle Pain
- Weakness
- Diarrhea
- Vomiting
- Abdominal Pain
- Unexplained Hemorrhage
- Delirium
- Coma
- Multi-Organ Failure

**Differential (Life threatening)**
- Cold / Influenza
- Electrolyte Imbalance
- Hyperglycemia
- Other Viral/Bacterial Infections.

**Viral Hemorrhagic Fevers**
- **Dengue**
- **Ebola**
- **Lassa**
- **Marburg**
- **Yellow Fever**
- **Hanta Virus**
- **Rift Valley Fever**

Appropriate **Personal Protective Equipment** in conjunction with current CDC recommendations **PRIOR** to entering scene

Obtain a travel history / exposure history and assess for clinical signgs and symptoms.
**EMS Immediate Concern**
1. Traveler from area with known VHF with or without symptoms
2. Traveler from locations currently designated by the CDC as being high risk

AND

| | | |
|---|---|---|
| Fever | Headache | Joint and/or Muscle Aches |
| Fatigue | Abdominal Pain | Vomiting and/or Diarrhea |
| Anorexia | Weakness | Bleeding |

Exit to Appropriate C.O.G. If indicated *

EMS Personal Protective Equipment
- Place surgical mask on Patient.
- Use Non-rebreather mask if Oxygen Needed
- Donning and Doffing Guidelines

NO Routine Aerosol Generating Procedures
- Avoid aerosol generating procedures UNLESS medically Necessary.
- NIPPV / Nebulizer therapy / Intubation / BIAD-SGA / Suctioning

NO Routine IV / IO Procedures
- Avoid routine IV or IO Access unless medically Necessary.
- If IV/IO necessary – STOP VEHICLE to lessen exposure risk

**Patient Stable?**

YES → Provide for Transport to Appropriate Facility following orders from Incident Commander

NO → Exit to Appropriate Clinical Operating Guideline. Transport Immediately.

**EMS Personnel / Equipment / Transport Unit REQUIRES Decontamination**

**Notify Destination or Contact Medical Control**

If your agency is providing transport, ALERT the Receiving Medical Facility:
- As soon as feasible, confidentially notify the Receiving Facility that you are transporting a potential highly infectious patient.
- **DO NOT TAKE THE PATIENT INTO THE MEDICAL FACILITY UNTIL YOU ARE INSTRUCTED TO DO SO.**
- **MEDICAL FACILITY PERSONNEL WILL DIRECT YOU TO THE PROPER ROOM THROUGH A SAFE ENTRANCE**

SPECIAL: VIRAL HEMORRHAGIC FEVERS

# Emerging Diseases
# Viral Hemorrhagic Fevers

**PARTICULAR ATTENTION MUST BE PAID TO PROTECTING MUCOUS MEMBRANES OF THE EYES, NOSE, and MOUTH FROM SPLASHES OF INFECTIOUS MATERIAL OR SELF INOCULATION FROM SOILED PPE / GLOVES.**
**THERE SHOULD BE NO EXPOSED SKIN**

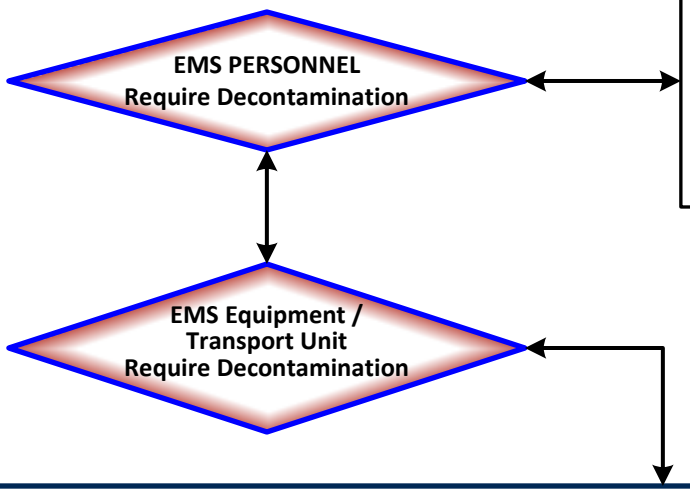
- **DONNING PPE:** **BEFORE** you enter the patient area.
  - **Recommended PPE:**
  - **PAPR:** A PAPR (Powered Air Purifying Respirator)with a full face shield, helmet, or headpiece. Any reusable helmet or headpiece must be covered with a single-use (disposable) hood that extends to the shoulders and fully covers the neck and is compatible with the selected PAPR.
  - **N95 Respirator:** Single-use (disposable) N95 respirator in combination with single-use (disposable) surgical hood extending to shoulders and single-use (disposable) full face shield. If N95 respirators are used instead of PAPRs, careful observation is required to ensure healthcare workers are not inadvertently touching their faces under the face shield during patient care.
  - **Single-use (disposable) fluid-resistant or impermeable gown** that extends to at least mid-calf or coverall without integrated hood. Coveralls with or without integrated socks are acceptable.
  - **Single-use (disposable) nitrile examination gloves with extended cuffs.** Two pairs of gloves should be worn. At a minimum,
  - outer gloves should have extended cuffs.
  - **Single-use (disposable), fluid-resistant or impermeable boot covers** that extend to at least mid-calf or single-use (disposable) shoe covers. Boot and shoe covers should allow for ease of movement and not present a slip hazard to the worker.
  - **Single-use (disposable) fluid-resistant or impermeable shoe covers** are acceptable only if they will be used in combination with a coverall with integrated socks.
  - **Single-use (disposable), fluid-resistant or impermeable apron** that covers the torso to the level of the mid-calf should be used if Ebola patients have vomiting or diarrhea. An apron provides additional protection against exposure of the front of the body to body fluids or excrement. If a PAPR will be worn, consider selecting an apron that ties behind the neck to facilitate easier removal during the doffing procedure

- **DOFFING PPE:** **OUTSIDE OF PPE IS CONTAMINATED! DO NOT TOUCH**
  - PPE must be carefully removed without contaminating one s eyes, mucous membranes, or clothing with potentially infectious materials.
    - **Use great care while doffing your PPE so as not to contaminate yourself (e.g. Do not remove your N-95 facemask or eye protection BEFORE you remove your gown). There should be a dedicated monitor to observe donning and doffing of PPE. It is very easy for personnel to contaminate themselves when doffing. A dedicated monitor should observe doffing to insure it is done correctly. Follow CDC guidance on doffing.**
  - PPE must 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.
    - Hand Hygiene should be performed by washing with soap and water with hand friction for a minimum of 20 seconds.
    - Alcohol-based hand rubs may be used if soap and water are not available.
    - EVEN IF AN ALCOHOL-BASED HAND RUB IS USED, WASH HANDS WITH SOAP AND WATER AS SOON AS FEASIBLE.
- THE USE OF GLOVES IS NOT A SUBSTITUTE FOR HAND WASHING WITH SOAP & WATER
- For any provider exposure or contamination contact occupational health.
- If the patient is being transported via stretcher then a disposable sheet can be placed over them

**PEARLS**

- **Transmission to another individual is the greatest after a patient develops fever. Once there is fever, the viral load in the bodily fluids appears to be very high and thus a heightened level of PPE is required.**
- **Patient contact precautions are the most important consideration.**
- **Incubation period 2-21 days**
- Ebola must be taken seriously; however using your training, protocols, procedures and proper Personal Protective Equipment (PPE), patients can be cared for safely.
- When an infection does occur in humans, the virus can be spread in several ways to others. The virus is spread through direct contact (through broken skin or mucous membranes) with a sick person's blood or body fluids (urine, saliva, feces, vomit, an semen) objects (such as needles) that have been contaminated with infected body fluids.
- Limit the use of needles and other sharps as much as possible. All needles and sharps should be handled with extreme care and disposed in puncture-proof, sealed containers. Safety devices must be employed immediately after use.
- Ebola Information: For a complete review of Ebola go to:
  - **http://www.cdc.gov/vhf/ebola/index.html**

# Suspected Viral Hemorrhagic Fevers Decontamination




**If EMS personnel are exposured to blood, bodily fluids, secretions, or excretions from a patient with suspected or confirmed Ebola should immediately:**

- Stop working and wash the affected skin surfaces with soap and water.
- Mucous membranes (e.g., conjunctiva) should be irrigated with a large amount of water or eyewash solution

- **EMS personnel performing decontamination / disinfection should wear recommended PPE**
- **When performing Decontamination EMS Personnel MUST wear appropriate PPE, which includes:**
  - Gloves (Double glove)
  - Fluid resistant (impervious) Tyvek Like Full length (Coveralls)
  - Eye protection (Goggles)
  - N-95 face mask
  - Fluid resistant (impervious)-Head covers
  - Fluid resistant (impervious)-Shoe / Boot covers
- Face protection (N-95 facemask with goggles) should be worn since tasks such as liquid waste disposal can generate splashes.
- Patient-care surfaces (including stretchers, railings, medical equipment control panels, and adjacent flooring, walls and work surfaces) are likely to become contaminated and should be decontaminated and disinfected after transport.
- A blood spill or spill of other body fluid or substance (e.g., feces or vomit) should be managed through removal of bulk spill matter, cleaning the site, and then disinfecting the site.
  - For large spills, a chemical disinfectant with sufficient potency is needed to overcome the tendency of proteins in blood and other body substances to neutralize the disinfectant s active ingredient.
  - An EPA-registered hospital disinfectant with label claims for viruses that share some technical similarities to Ebola (such as, norovirus, rotavirus, adenovirus, poliovirus) and instructions for cleaning and decontaminating surfaces or objects soiled with blood or body fluids should be used according to those instructions.
  - (Alternatively, a 1:10 dilution of household bleach (final working concentration of 500 parts per million or 0.5% hypochlorite solution) that is prepared fresh daily (i.e., within 12 hours) can be used to treat the spill before covering with absorbent material and wiping up. After the bulk waste is wiped up, the surface should be disinfected as described in the section above).
- Contaminated reusable patient care equipment should be placed in biohazard bags (double-bagged) and labeled for decontamination and disinfection.
- Reusable equipment should be cleaned and disinfected according to manufacturer's instructions by appropriately trained personnel wearing correct PPE.
- Avoid contamination of reusable porous surfaces that cannot be made single use. Use only a mattress and pillow with plastic or other covering that fluids cannot get through.
- To reduce exposure, all potentially contaminated textiles (cloth products) should be discarded. This includes non-fluid-impermeable pillows or mattresses. They should be considered regulated medical waste and placed in biohazard red bags. They must be double-bagged prior to being placed into regulated medical waste containers.

# Suspected Viral Hemorrhagic Fevers Deceased Subjects

## Decedent Known or suspected carrier of VHF / Ebola Requires Transportation

- Only personnel trained in handling infected human remains, and wearing FULL PPE, should touch or move any Ebola (VHF)-infected remains
- Handling of human remains should be kept to a minimum.

## Donning / Doffing PPE

**PPE should be in place BEFORE contact with the body**

- Prior to contact with body, postmortem care personnel must wear PPE consisting of: surgical scrub suit, surgical cap, impervious TyvexCoveralls, eye protection (e.g., face shield, goggles), facemask, shoe covers, and double surgical gloves.
- Additional PPE (leg coverings,) might be required in certain situations (e.g., copious amounts of blood, vomit, feces, or other body fluids that can contaminate the environment)

**PPE should be removed immediately after and discarded as regulated medical waste.**

- 1) Use caution when removing PPE as to avoid contaminating the wearer.
- 2) Hand hygiene (washing your hands thoroughly with soap and water or an alcohol based hand rub) should be performed immediately following the removal of PPE. If hands are visibly soiled, use soap and water.

## Preparation of Body Prior to Transport

- At the site of death, the body should be wrapped in a plastic shroud. Wrapping of the body should be done in a way that prevents contamination of the outside of the shroud.
- Change your gown or gloves if they become heavily contaminated with blood or body fluids.
- Leave any intravenous lines or endotracheal tubes that may be present in place.
- Avoid washing or cleaning the body.
- After wrapping, the body should be immediately placed in a leak-proof plastic bag not less than 150 µm thick and zippered closed The bagged body should then be placed in another leak-proof plastic bag not less than 150 µm thick and zippered closed before being transported to the morgue.

## Surface Decontamination

- Prior to transport to the morgue, perform surface decontamination of the corpse-containing body bags by removing visible soil on outer bag surfaces with EPA-registered disinfectants which can kill a wide range of viruses.
- Follow the product s label instructions. Once the visible soil has been removed, reapply the disinfectant to the entire bag surface and allow to air dry.
- Following the removal of the body, the patient room should be cleaned and disinfected.
- Reusable equipment should be cleaned and disinfected according to standard procedures

## Trasportation of Deceased / VHF Remains

- PPE is required for individuals driving or riding in a vehicle carrying human remains. DO NOT handle the remains of a suspected / confirmed case of Ebola The remains must be safely contained in a body bag where the outer surface of the body bag has been disinfected prior to the transport.

**PEARLS**

- **Ebola Information: For a complete review of Handling Remains of Ebola Infected Patients go to:**
  - **http://www.cdc.gov/vhf/ebola/hcp/guidance-safe-handling-human-remains-ebola-patients-us-hospitals-mortuaries.html**

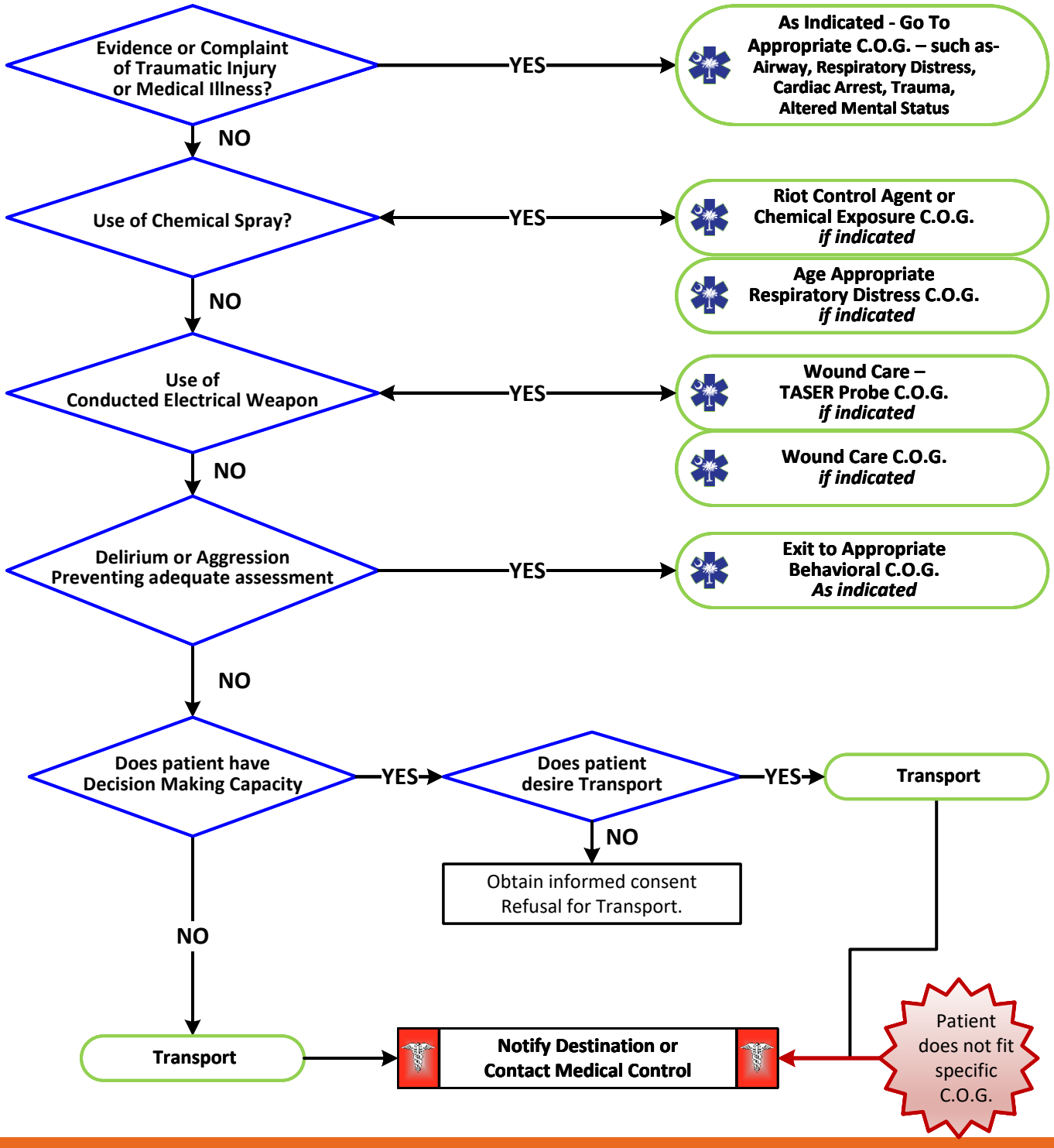
SPECIAL: VIRAL HEMORRHAGIC FEVERS

# Law Enforcement Custody

**History:**
- Traumatic Injury
- Drug Abuse
- Cardiac History
- History of Asthma
- Psychiatric History

**Signs and Symptoms**
- External Signs of Trauma
- Palpitations
- Shortness of Breath
- Wheezing
- Altered Mental Status
- Intoxication/Substance Abuse

**Differential**
- Delirium with Agitation Secondary to Psychiatric Illness
- Delirium with Agitation Secondary to Substance Abuse
- Traumatic Injury
- Closed Head Injury
- Asthma Exacerbation
- Cardiac Dysrhythmia




SPECIAL: LAW ENFORCEMENT CUSTODY

# Law Enforcement Custody

**PEARLS:**

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Neurologic status**
- **EMS agency should formulate a policy with local law enforcement agencies concerning patients requiring EMS and Law Enforcement involvement simultaneously.**
- **Agencies should work together to formulate a disposition in the best interest of the patient, however, decisions regarding best medical care resides with the Senior medic on scene.**
- **Law Enforcement:**
  - **Any patient who is handcuffed or restrained by Law Enforcement and transported by EMS, should be accompanied by law enforcement during transport capable of removing the devices.**
  - **Patient should not be transported with upper extremities hand-cuffed behind back as this prevents proper assessment and could lead to injury.**
- **Maintain high-index of suspicion for underlying medical or traumatic disorder causing or contributing to behavioral disturbance. Medical causes more likely in ages < 12 or > 40.**
- **Sedating agents are never utilized upon request of Law Enforcement.**
  - **Medications are not to be used solely to aid in placing an individual into police custody.**
  - **Physical and/or chemical restraints are reserved for a medical emergency in order to prevent imminent injury to a patient and/or providers.**
  - **Utilization of a sedating medication should be made by the Senior Medical personnel on scene and with guidance of the Clinical Operating Guidelines.**
- **Restraints:**
  - **Do not position or transport any restrained patient is such a way that could impact the patients respiratory or circulatory status.**
  - **When EMS providers have utilized medical restraints in accordance with Restraint Procedure, the law enforcement agent may follow behind the ambulance during transport.**
- The responsibility for patient care rests with the highest authorized medical provider on scene per South Carolina law.
- 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.
- Patients exposed to chemical spray, with or without history of respiratory disease, may develop respiratory complaints up to 20 minutes post exposure.
- All patients with decision-making capacity in police custody retain the right to participate in decision making regarding their care and may request care or refuse care of EMS.

**Key Documentation Elements:**

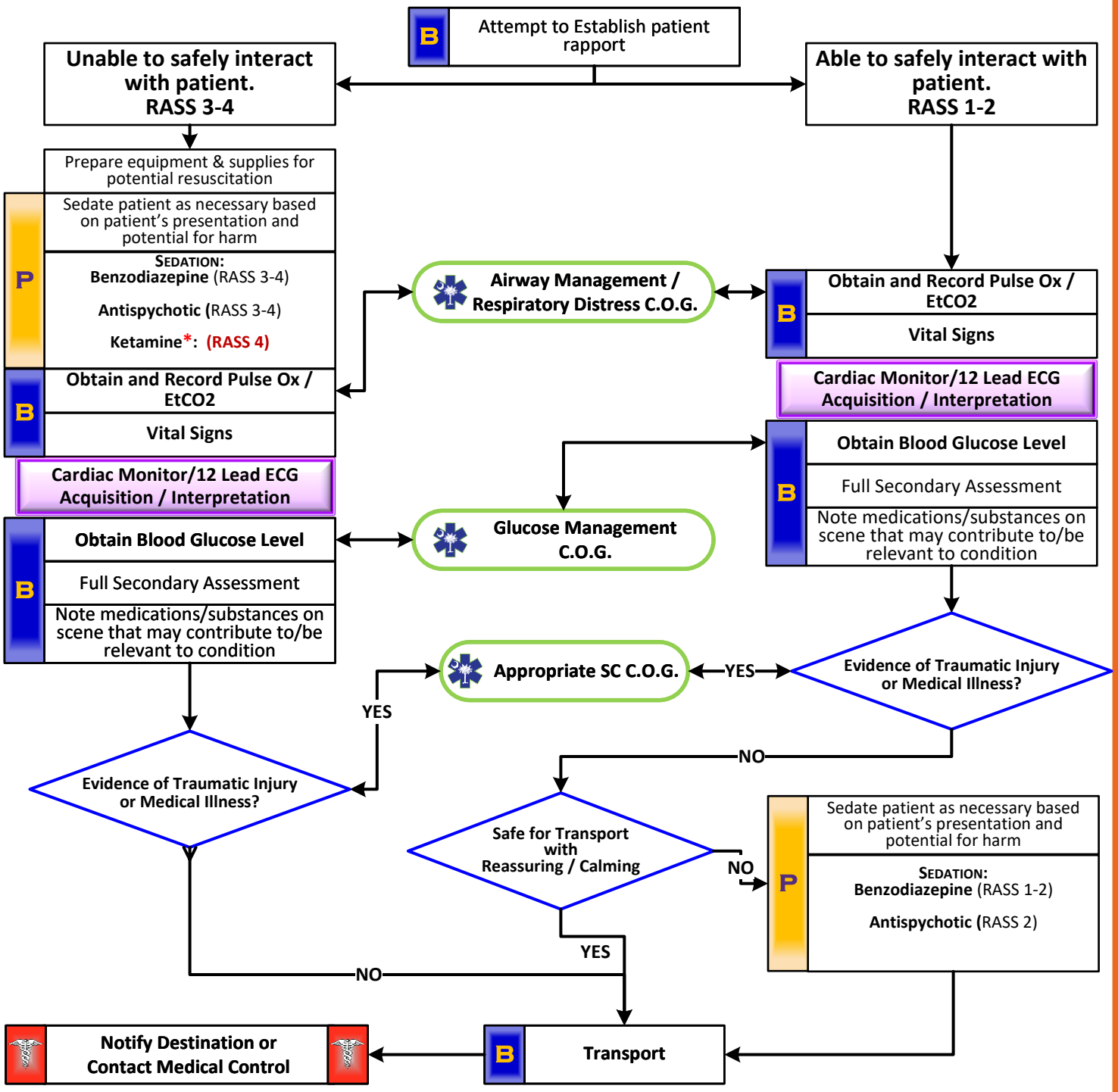
- ❑ Etiology of agitated or violent behavior if known
- ❑ Patient's medications, other medications or substances found on scene
- ❑ Patient's medical history or other historic factors reported by patient, family, or bystanders
- ❑ Glasgow Coma Score (GCS) or AVPU description
- ❑ Vital Signs including Temperature (when able); Oxygen Saturation, Pulse Rate, Cardiac Rhythm, Respiratory Rate
- ❑ Examination Including: Pupil and neck; evaluation of perfusion and skin exam were performed
- ❑ Recorded EKG with documentation of Cardiac rhythm and changes (if obtained)
- ❑ Blood glucose measurement (if obtained).
- ❑ If darts removed, document the removal location in the patient care report
- ❑ Physical evidence or history of trauma. Physical exam trauma findings
- ❑ Dose, route, and number of doses of pharmacologic management medications administered
- ❑ Clinical response to pharmacologic management medications
- ❑ Any and all repeated assessments should be documented.
- ❑ Communications with EMS medical direction
- ❑ Initiation and duration of engagement with law enforcement
- ❑ Discussions regarding Capacity, Informed Consent, and Refusals.
- ❑ Patient and medic safety were considered

# Behavioral Emergency
# Agitated or Violent Patient

**History:**
- Situational crisis
- Psychiatric illness/ medications
- Injury to self or threats to others
- Medical alert tag
- Substance abuse / overdose
- Diabetes

**Signs and Symptoms**
- Anxiety, agitation, confusion
- Affect change, hallucinations
- Delusional thoughts, bizarre behavior
- Combative / Violent
- Expression of suicidal / homicidal thoughts

**Differential**
- Delirium with Agitation Secondary to Psychiatric Illness or Substance Abuse
- **See *Altered Mental Status differentials***
- **Alcohol intoxication**
- **Toxin / Substance abuse**
- **Medication effect/ overdose**
- **Withdrawal syndromes**
- **Depression / Anxiety disorder**
- **Bipolar (manic-depressive)**
- **Schizophrenia**
- **Seizure / Postictal**




SPECIAL: BEHAVIORAL EMERGENCY – VIOLENT OR AGITATED PATIENTS

# Behavioral Emergency
# Agitated or Violent Patient



**PEARLS:**

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Neurologic status**
- **Patient does not have to be in police custody or under arrest to utilize this protocol.**
- **EMS agency should formulate a policy with local law enforcement agencies concerning patients requiring EMS and Law Enforcement involvement simultaneously.**
- **Agencies should work together to formulate a disposition in the best interest of the patient.**
- **Law Enforcement:**
  - **Any patient who is handcuffed or restrained by Law Enforcement and transported by EMS, must be accompanied by law enforcement during transport capable of removing the devices.**
  - **Patient should not be transported with upper extremities hand-cuffed behind back as this prevents proper assessment and could lead to injury.**
  - **Consider multidisciplinary coordination with law enforcement to approach verbal de-escalation, restraint, and/or take-down restraint procedure.**
- **Restrained or sedated patients are NEVER to be transported or positioned in a prone position**
- **Maintain high-index of suspicion for underlying medical or traumatic disorder causing or contributing to behavioral disturbance. Medical causes more likely in ages < 12 or > 40.**
- **Medications are not to be used solely to aid in placing an individual into police custody.**
- **Physical and/or chemical restraints are reserved for a medical emergency in order to prevent imminent injury to a patient and/or providers.**
- These patient should be monitored continuously for deterioration. Including – but not limited to hemodynamic and respiratory compromise.
  - Monitoring should be continuously observational and should be expanded to include – at a minimum
    - The use of pulse oximetry, cardiac and vital sign monitoring as soon as it is safe to do so.
  - Decompensation may occur rapidly.
  - **EMS Providers should be prepared to resuscitate *before* administering sedating agents.**
- Direct medical oversight may be contacted at any time for advice, especially when patient's level of agitation is such that transport may place all parties at risk.
- Stretchers with adequate foam padding, particularly around the head, facilitates patient's ability to self position the head and neck to maintain airway patency.
- For patients with key-locking devices, applied by another agency, consider the following options:
  - Remove device and replace it with a device that does not require a key.
  - Administer pharmacologic management medication then remove and replace device with another non-key-locking device after patient has become more cooperative.
  - Transport patient, accompanied in patient compartment by person who has device key.
- Use **SAFER** model:
  - **S**tabilize the situation by containing and lowering the stimuli (remove unnecessary personnel, remove patient from stress, reassure, calm and establish rapport.) Keep hands in front of your body (non-threatening posture.) Only one provider should communicate with patient. Outline the patient's choices and calmly set some boundaries of acceptable behavior.
  - **A**ssess and acknowledge crisis by validating patient's feelings and not minimizing them.
  - **F**acilitate resources (Friends, family, police, chaplain).
  - **E**ncourage patient to use resources available and take actions in their best interest.
  - **R**ecovery or referral: Leave patient in care of responsible person, professional or transport to medical facility.
- Restraints:
  - 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 is such a way that could impact the patients respiratory or circulatory status.
  - However, when EMS providers have utilized physical restraints in accordance with Restraint Procedure, the law enforcement agent may follow behind the ambulance during transport.
  - Restraint Form should be completed if restraints are utilized.
- The responsibility for patient care rests with the highest authorized medical provider on scene per South Carolina law.
- All patients with decision-making capacity in police custody retain the right to participate in decision making regarding their care and may request care or refuse care of EMS.
- If extremity / chemical / law enforcement restraints are applied, follow Restraint Procedure.
- **Delirium Syndrome with Agitated Features and/or Violent:**
  - Medical emergency: Combination of delirium, psychomotor agitation, anxiety, hallucinations, speech disturbances, disorientation, violent / bizarre behavior, insensitivity to pain, hyperthermia and increased strength.
  - Potentially life-threatening and associated with use of physical control measures, including physical restraints.
  - 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 or substance withdrawal as well as head trauma may also contribute to the condition.
- **If patient suspected of Delirium Syndrome with Agitated Features and/or Violent suffers cardiac arrest, consider a fluid bolus and sodium bicarbonate early.**

# Behavioral Emergency
# Agitated or Violent Patient

| Richmond Agitation Sedation Scale (RASS) | | | |
|---|---|---|---|
| SCORE | TERM | DESCRIPTION | *Recommended Treatment* |
| | | | |
| 4 | *Combative* | Overtly combative, violent, immediate danger to self or personnel | **Benzodiazepine - or Antipsychotic - OR - KETAMINE*** |
| 3 | *Very Agitated* | Pulls or removes tubes or catheters; aggressive | **Benzodiazepine - or - Antipsychotic** |
| 2 | *Agitated* | Frequent non-purposeful movement, fights interventions or ventilator | **Benzodiazepine - or - Antipsychotic** |
| 1 | *Restless* | Anxious - but movements not aggressive - vigorous | **Verbal Reassurance and calm patient - or Benzodiazepine** |
| 0 | *Alert & Calm* | | |
| -1 | *Drowsy* | Not fully alert, but has sustained awakening (eye-opening/eye contact) to voice (> 10 seconds) | |
| -2 | *Light Sedation* | Briefly awakens with eye contact to voice (<10 seconds) | |
| -3 | *Moderate Sedation* | Movement or eye opening to voice (but 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 to physical stimulation | |

**Use of KETAMINE * requires notification of Local Medical Director within 24 hours for completion of QA Policy**

Medication utilization for control of an agitated or combative patient are **RECOMMENDED** by the EMS Medical Control Committee based upon RASS Scoring.
Final determination of which medications to utilize, under which circumstances, and in what doses is left to the discretion of the Local Medical Director.

## PEARLS:

- **PERTINENT ASSESSMENT FINDINGS**
  - **Continuous monitoring of:**
    - **Airway patency**
    - **Respiratory status with pulse oximetery and capnography**
    - **Circulatory status with frequent blood pressure measurements**
    - **Mental status and trends in level of patient cooperation**
    - **Cardiac status, especially if the patient has received pharmacologic management medication**
    - **Extremity perfusion with capillary refill in patients in physical management device**
- **KEY DOCUMENTATION ELEMENTS:**
  - ❑ Etiology of agitated or violent behavior if known
  - ❑ Patient's medications, other medications or substances found on scene
  - ❑ Patient's medical history or other historic factors reported by patient, family, or bystanders
  - ❑ Measures taken to establish patient rapport and de-escalation
  - ❑ Glasgow Coma Score (GCS) or AVPU description
  - ❑ Vital Signs including Temperature (when able); Oxygen Saturation, Pulse Rate, Cardiac Rhythm, Respiratory Rate
  - ❑ Examination Including: Pupil and neck; evaluation of perfusion and skin exam were performed
  - ❑ Recorded EKG with documentation of Cardiac rhythm and changes (if able to be done)
  - ❑ Blood glucose measurement
  - ❑ IV fluids given for poor perfusion
  - ❑ If darts removed, document the removal location in the patient care report
  - ❑ Physical evidence or history of trauma. Physical exam trauma findings
  - ❑ Measures taken to establish patient rapport
  - ❑ Dose, route, and number of doses of pharmacologic management medications administered
  - ❑ Clinical response to pharmacologic management medications
  - ❑ Number and physical sites of placement of physical management devices
  - ❑ Duration of placement of physical management devices
  - ❑ Repeated assessment of airway patency; respiratory rate, effort, pulse oximetry/capnography
  - ❑ Repeated assessment of circulatory status with blood pressure, capillary refill, cardiac monitoring
  - ❑ Repeated assessment of mental status and trends in the level of patient cooperation
  - ❑ Repeated assessment of capillary refill in patient with extremity securing devices
  - ❑ Communications with EMS medical direction
  - ❑ Initiation and duration of engagement with law enforcement
  - ❑ Patient and medic safety were considered
- **KEY PROCESS IMPROVEMENT ELEMENTS**
  - ❑ **Incident of injuries to patient, EMS personnel or others on scene or during transport**
  - ❑ **Medical or physical complications (including sudden death) in patients**
  - ❑ **Use of Ketamine triggers Medical Director review**

SPECIAL: BEHAVIORAL EMERGENCY – VIOLENT OR AGITATED PATIENTS

# Behavioral Emergency
# Agitated or Violent Patient

| RESTRAINT CHECKLIST | |
|---|---|
| **Patient Name** | |
| **ePCR Number** | **Date** |
| **It is STRONGLY recommended that a Restraint Checklist be completed with any restraint use.** | |
| **1. Reason for restraint (check all that apply)** | |
| ☐Patient attempting to hurt/harm self | |
| ☐Patient attempting to hurt/harm others | |
| ☐Patient attempting to remove medical necessary devices | |
| ☐Other: | |
| **2. Attempted Verbal reassurance/redirection/de-escalation?** | |
| ☐YES | ☐NO |
| **3. Attempted environmental modification (i.e. remove patient from stressful environment)** | |
| ☐YES | ☐NO |
| **4. Received medical control order for restraints?** | |
| ☐YES | ☐NO |
| Medical Control Authorizing Retraints: | |
| **5. Time and Type of Restraint utilized (Check all that apply):** | |
| Date: | Time: |
| Limb Restraints: | |
| ☐LUE<br>☐LLE | ☐RUE<br>☐RLE |
| Chemical Restraing | ☐YES ☐NO |
| If YES – Drug Used | |
| If YES – Total Drug Dose | |
| **6. Vital signs and extremity neurovascular exam should be taken every 15 minutes** | |
| **7. Transport Position (Patient should NOT be in prone position)** | |
| ☐Supine Position | ☐Lateral Recumbent Position |

SPECIAL: BEHAVIORAL EMERGENCY – VIOLENT OR AGITATED PATIENTS

# Interfacility Transport Form

**This Form can be found at: SC EMS Interfacility Transport Form https://dph.sc.gov/sites/scdph/files/Library/D-3485.pdf**

SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

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

Electronic EMS Patient Care Record #: _____

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

Referring Physician: _____ Transferring Facility: _____

Accepting Physician: _____ Receiving Facility: _____

**********

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

**********

**DIAGNOSIS:** (1) _____
(2) _____
(3) _____

**LAST VITAL SIGNS:** Time: _____ Initials: _____
HR: _____ B/P: _____/_____ RR: _____
SpO2: _____ BGL: _____ Other: _____

IV Fluids: _____ Rate: _____
Medications: _____
Dosage / Rate/Concentration: _____
Comments/Additional Orders: _____

IV Fluids: _____ Rate: _____
Medications: _____
Dosage / Rate/Concentration: _____
Comments/Additional Orders: _____

IV Fluids: _____ Rate: _____
Medications: _____
Dosage / Rate/Concentration: _____
Comments/Additional Orders: _____

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

This report was given by (**Print name**): _____ RN / PA / NP / MD / DO
Signature: _____ Date: _____ Time: _____
*(None of the drugs being sent with this patient are part of an experimental program.)*

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

**EMS Service must retain a copy of this form for their records.**
*If any problems are experienced en route, the EMT-P must contact on-line medical control.*

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

3485-ENG-DPH (05/2025) SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

FORMS

# Interfacility Transport Form

**This Form can be found at: SC EMS Interfacility Transport Form https://dph.sc.gov/sites/scdph/files/Library/D-3485.pdf**

## PART B - DEVICE REPORT

Electronic EMS Patient Care Record #: _____

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

Referring Physician: _____ Transferring Facility: _____

Accepting Physician: _____ Receiving Facility: _____

**********

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

**********

**INTERFACILITY INVASIVE/IMPLANTED DEVICES USED IN THIS TRANSPORT**

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

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

Comments/Additional Orders:

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

Signature: _____ Date : _____ Time: _____

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

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

3485-ENG-DPH (05/2025) SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

FORMS

# Interfacility Transport Form

**This Form can be found at: SC EMS Interfacility Transport Form https://dph.sc.gov/sites/scdph/files/Library/D-3485.pdf**

## PART C – VENTILATOR SETTINGS

Electronic EMS Patient Care Record #:_____

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

Referring Physician: _____ Transferring Facility:_____

Accepting Physician:_____ Receiving Facility:_____

**********

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

**********

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

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

Mode (check one): ☐AC ☐SIMV ☐PSV

☐PRVC ☐BiPAP ☐Other:_____

Patient Sedated: ☐No ☐Induction ☐Maintenance

Patient Paralyzed: ☐No ☐Induction ☐Maintenance

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

Respiratory Set Rate: _____ Actual Rate: _____

Tidal Volume (VT): _____

Fraction of Inspired Oxygen (FiO2): _____

Insp. Press/PS: _____ PEEP: _____

I:E ratio:_____ PIP: _____

SpO2: _____ ETCO2: _____

Additional Orders/ Comments:

**Initial Transport Settings: to be filled out by EMS Provider**

Mode (check one): ☐AC ☐SIMV ☐PSV

☐PRVC ☐BiPAP ☐Other:_____

Patient Sedated: ☐No ☐Induction ☐Maintenance

Patient Paralyzed: ☐No ☐Induction ☐Maintenance

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

Respiratory Set Rate: _____ Actual Rate: _____

Tidal Volume (VT): _____

Fraction of Inspired Oxygen (FiO2): _____

Insp. Press/PS: _____ PEEP: _____

I:E ratio:_____ PIP: _____

SpO2: _____ ETCO2: _____

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

_____
Paramedic Signature Date Time

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

Signature: _____ Date : _____ Time: _____

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

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

3485-ENG-DPH (05/2025) SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

**BUREAU OF EMS AND TRAUMA**
**INTERFACILITY TRANSPORT FORM**

Instructions for Completing 3485-ENG-DPH

**Purpose**: To record any drugs, devices and/or ventilator settings that may be required for patientcare during an interfacility transport.

**Audience**: The form will be completed by the sending facilities medical provider that is in charge of patient care. (RN / RT / PA / NP / MD / DO).

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

**Office Mechanics & Filing**: The form is filed with the agencies ePCR (electronic patient care report) and uploaded into the state database. It is maintained by retention schedule 10010 — Licensed Provider Files.

This Form may be found at: SC EMS DNR Form https://dph.sc.gov/sites/scdph/files/Library/D-3462.pdf

SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

**Emergency Medical Services**
**Do Not Resuscitate Order**

## SOUTH CAROLINA
## EMERGENCY MEDICAL SERVICES


## DO NOT RESUSCITATE ORDER

### NOTICE TO EMS PERSONNEL

This notice is to inform all emergency medical personnel who may be called to render assistance to

_____ that he/she has a terminal condition which has been diagnosed by me
(Name of Patient)

and has specifically requested, or a parent or legal guardian with the authority to make medical decisions for a child has requested that no resuscitative efforts including artificial stimulation of the cardiopulmonary system by electrical, mechanical, or manual means be made in the event of cardiopulmonary arrest.

### REVOCATION PROCEDURE

**THIS FORM MAY BE REVOKED BY AN ORAL STATEMENT BY THE PATIENT TO EMS PERSONNEL, OR BY MUTILATING, OBLITERATING, OR DESTROYING THE DOCUMENT IN ANY MANNER.**

_____ _____
Date Patient's Signature (or Surrogate or Agent)

_____ _____
Physician's/ APRN's/ PA's Name (Please Print) Physician's/ APRN's/ PA's Signature

_____ _____
Physician's/ APRN's/ PA's Address Physician's/ APRN's/ PA's Telephone Number

3462-ENG-DPH (06/2024) SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

**DNR INFORMATION FOR THE PATIENT, THE PATIENT'S FAMILY, PHYSICIAN, ADVANCED PRACTICE REGISTERED NURSE (APRN), PHYSICIAN ASSISTANT (PA), AND EMS PERSONNEL**

1. Responsibilities of the Patient or his/her Surrogate or Agent
The patient and his/her surrogate or agent:

   Will make all care givers aware of the location of the EMS DNR Form and will ensure that the form is displayed in such a manner that it will be visible and available to EMS personnel;

   Understanding the consequences of refusing resuscitative measures;

   Are aware that if the form is altered in any manner resuscitative measures will be initiated; and

   Understand that in all cases, supportive care will be provided to the patient.

2. Responsibilities of the Health Physician
The patient's physician, APRN, or PA:

   Has determined that the patient has a terminal condition;

   Has completed the patient's EMS DNR Form;

   Has explained to the patient and family the consequences of withholding resuscitative care; the medical procedures that will be withheld and the palliative and supportive care that will be administrated to the patient; and

   Must execute the DNR order pursuant to the provisions of the Emergency Medical Services Do Not Resuscitate Order Act in accordance with their respective practice acts.

3. Responsibilities of EMS Personnel
EMS personnel:

   Will confirm the presence of the EMS DNR Form and the identity of the Patient;

   Upon finding an unaltered EMS DNR Form, will withhold or withdraw resuscitative measures such as CPR, endotracheal intubation or other advanced airway management, artificial ventilation, defibrillation, cardiac resuscitation medication and related procedures;

   Will provide palliative and supportive treatment such as suctioning the airway, administration of oxygen, control bleeding, provision of pain and non-cardiac medications, provide comfort care and provide emotional support for the patient and the patient's family; and

   Will assure that the DNR Form accompanies the patient during transport.

3462-ENG-DPH (06/2024)

# SC POST FORM

**This form may be found at: https://dph.sc.gov/sites/scdph/files/Library/D-4061.pdf**

SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

**South Carolina Physician Orders for Scope of Treatment (POST)**

| | | |
|---|---|---|
| **Patient's Diagnosis:** | **Patient Last Name:** | **Patient First Name/MI:** |
| | **Patient Date of Birth:** (MM/DD/YYYY) | **Patient/Legal Representative Phone Number:** |
| | **Social Security Number last 4 digits:** (*Optional*) XXX-XX- | **Gender:** ☐ M ☐ F ☐ Other |
| | **Patient Mailing Address:** (street/city/state/zip) | |

**Section A** *Check One Box Only*

**CARDIOPULMONARY RESUSCITATION (CPR): Unresponsive, pulseless, & not breathing.**

☐ **Attempt Resuscitation/CPR** (Selecting CPR requires Full Treatment in Section **B**.)

☐ **Do Not Attempt Resuscitation/DNR** (Allow Natural Death.)

If patient is not in cardiopulmonary arrest, follow orders in **B**, **C** and **D**.

**Section B** *Check One Box Only*

**MEDICAL INTERVENTIONS: If patient has pulse and/or is breathing.**

☐ **Full Treatment.** In addition to care described in Comfort Measures Only and Limited Treatment, use intubation, advanced airway interventions, mechanical ventilation, and cardioversion as indicated. ***Transfer to hospital and/or intensive care unit if indicated.***
**Treatment Plan: All treatments including breathing machine.**

☐ **Limited Treatment.** In addition to care described in Comfort Measures Only, use medical treatment, antibiotics, IV fluids and cardiac monitor as indicated. No intubation, advanced airways interventions, or mechanical ventilation. May consider less invasive airway support (e.g. CPAP, BiPAP). ***Transfer to hospital, if indicated. Avoid ICU if possible.***
**Treatment Plan: Provide basic medical treatments.**

☐ **Comfort Measures Only.** Keep clean, warm and dry. Provide treatments to relieve pain and suffering through the use of any medication by any route, positioning, wound care and other measures. Use oxygen, suction and manual treatment of airway obstruction as needed for comfort. ***Patient prefers no transfer to hospital for life-sustaining treatments. Transfer if comfort needs cannot be met in current location.***
**Treatment Plan: Provide treatments for comfort through symptom management.**

**Additional Orders:**

**Section C** *Check One Box Only*

**ANTIBIOTICS**

☐ Use antibiotics if life can be prolonged.
☐ Determine use or limitation of antibiotics when infection occurs.
☐ No antibiotics except for relief of pain and discomfort.

**Additional Orders:**

**Section D** *Check One Box in Each Column*

**ARTIFICIALLY ADMINISTERED NUTRITION AND FLUIDS: Offer food and fluids by mouth if feasible.**

| | |
|---|---|
| ☐ Long-term artificial nutrition by tube. | ☐ Long-term IV fluids. |
| ☐ Trial period of artificial nutrition by tube. | ☐ Trial period of IV fluids. |
| ☐ Do not insert feeding tube. | ☐ No IV fluids. |
| ☐ Decide when/if the situation arises. | ☐ Decide when/if the situation arises. |
| **Additional Orders:** | **Additional Orders:** |

**Section E** *Signature of Physician, APRN, or PA*

**Signature of Physician, Advanced Practice Registered Nurse, or Physician Assistant**
My signature below indicates to the best of my knowledge that the patient has been diagnosed with a serious illness or, based upon a medical diagnosis, may be expected to lose capacity within 12 months, and that these orders are consistent with the patient's medical condition, diagnosis, and preferences.

| | | |
|---|---|---|
| Physician/APRN/PA Signature: *(required)* | Physician/APRN/PA Name: *(print)* | ☐ Physician ☐ APRN ☐ PA (*Select one*) |
| Date: (MM/DD/YYYY) *(required)* | Physician/APRN/PA Phone Number: | Physician/APRN/PA License #: |

Check everyone who participated in discussion: ☐ Patient with decision-making capacity ☐ Legal Representative ☐ Other:

**Section F** *Signature of Patient or Legal Representative*

**Signature of Patient or Legal Representative**
I am aware that this form is voluntary. I agree that adequate information has been provided and significant thought has been given to life-prolonging measures. Treatment preferences have been expressed to the physician, physician assistant, or advanced practice registered nurse and this document reflects those treatment preferences. *If signed by a legal representative, preferences expressed must reflect patient's wishes as best understood by the legal representative.*

| | | |
|---|---|---|
| Signature: *(required)* | | Relationship: (*write "self" if patient*) |
| Print Name: | Date: (MM/DD/YYYY) *(required)* | Phone Number: |

**Section G** *Facilitator (if applicable)*

**Facilitator Assisting with POST Form Completion (if applicable)**

| | | |
|---|---|---|
| Print Name: | Date: (MM/DD/YYYY) | Phone Number: |

**FORM MUST ACCOMPANY PATIENT WHEN TRANSFERRED OR DISCHARGED**

# SC POST FORM

| POST Form | ****ATTACH to Page 1**** |
|---|---|
| **Patient Full Name:** | |

| Form Completion Information (Optional but Helpful) | |
|---|---|
| Reviewed patient's advance directive to confirm no conflict with POST form: (A POST form does not replace an advance directive such as a Health Care Power of Attorney or living will.) | ☐ Yes; date of the document reviewed: _____<br>☐ Conflict exists, notified patient (if patient lacks capacity, noted in chart)<br>☐ Advance directive not available<br>☐ No advance directive exists |

- A POST form is a designated document designed for use as part of advance care planning, the use of which must be limited to situations where the patient has been diagnosed with a serious illness or, based upon medical diagnosis, may be expected to lose capacity within 12 months and consists of a set of medical orders signed by a patient's physician, APRN, or PA addressing key medical decisions consistent with patient goals of care concerning treatment at the end of life that is portable and valid across health care settings.
- A POST form executed in South Carolina as provided in the POST Act, or a similar form executed in another jurisdiction in compliance with the laws of that jurisdiction, must be deemed a valid expression of a patient's wishes as to health care. A South Carolina health care provider or health care facility may accept a properly executed POST form as a valid expression of whether the patient consents to the provision of health care in accordance with Section 44-66-10, et seq. of the South Carolina Adult Health Care Consent Act.
- The effective date of the form is the date the POST form has been completed, executed, and signed by the Physician/APRN/PA and the patient or the patient's legal representative.
- A copy, facsimile, or electronic version of a completed POST form is considered to be legal.
- **The execution of a POST form is always voluntary and is for a person with an advanced illness.** The POST form records a patient's wishes for medical treatment in the patient's current state of health. Preferred medical treatment as stated by the patient on the POST form may be changed at any time by the patient or a designated health care representative or health care agent of the patient to reflect the patient's new wishes in accordance with the POST Act.
- Any physician who is responsible for the creation and execution of a POST form shall make reasonable efforts to periodically review and update the POST form with the patient as the patient's needs dictate but at least once per year.
- A patient's legal representative is defined under the POST Act to mean a person with priority to make health care decisions for patient pursuant to Section 44-66-10, et seq. of the South Carolina Adult Health Care Consent Act.
- An APRN may create, execute and sign a POST form if authorized to do so by his or her practice agreement. The POST form must be for a patient of the APRN, the physician with whom the APRN has entered into a practice agreement, or both.
- A PA may create, execute, and sign a POST form if authorized to do so by his or her scope of practice guidelines. The POST form must be for a patient of that PA, the PA's supervising physician, or both.

## Revocation of POST Form

- A POST form may be revoked at any time by an oral or written statement by the patient or a patient's legal representative.
- A revocation is only effective upon communication to the health care provider or health care facility by the patient or the patient's legal representative.
- The execution of a POST form by a patient, or the patient's legal representative, pursuant to the POST Act, automatically revokes any previously executed POST form.
- A POST form executed pursuant to the POST Act remains effective until revoked or until a new POST form is executed pursuant to the POST Act.

**Nothing herein shall be construed as legal advice.**

**FORM MUST ACCOMPANY PATIENT WHEN TRANSFERRED OR DISCHARGED**

# Medical Control Physician - Change

This Form can be found at: SC EMS Medical Control Physician https://dph.sc.gov/sites/scdph/files/Library/D-0965.pdf

SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

## Medical Control Physician

**South Carolina Department of Public Health**
**Division of EMS and Trauma**
**Medical Control Physician Update Form**

**Section I**

1. **Service Information**

Service Name _____ SC DPH License #: _____

Service Mailing Address _____

City/State/Zip Code _____

Telephone Number _____ FAX Number _____

2. **Medical Control Physician Information**

☐ Primary ☐ Assistant

Name Med Control Physician _____ SC Lic.# _____

E-Mail Address _____

Mailing Address _____

City/State/Zip _____

( ) _____ ( ) _____
Telephone Number Emergency Number

**Gender:** ☐ Male ☐ Female

**Race:** (Select)
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Other Race

**Ethnicity:** (Select)
- ☐ Hispanic or Lantino
- ☐ Not Hispanic or Lantino

**Statement of Understanding & Authorized Signatures:**
I have read and understood the duties & responsibilities of the Medical Control Physician as outlined in Regulation 61-7 § 402 (A through G) and § 44-61-130. Of the EMS law also included on this form. Further, If my EMS service has a State-Approved In-Service Training program, I accept full responsibility for the program and understand that I may not waive anyone from the State recertification examination until I have attended a State-Approved EMS Medical Control Workshop. If I have not already attended a Medical Control Physician Workshop, I understand that I must attend the next available workshop within the next twelve (12) months in order to remain as Medical Control Physician for the above EMS service.

☐ I have Attended a Medical Control Workshop ☐ I have not Attended a Medical Control Workshop

**Signature Primary Med Control Physician/Date** **Signature ASSISTANT Med Control Physician/Date**

I understand that I must Notify the SCPH Division of EMS & Trauma of any change in Medical Control, Drug List, and/or Standing Orders/Protocols within ten (10) days (Regulation 61-7 ,§ 402 E)

**Signature EMS Director/Date**

0965-ENG-DPH (07/2024) SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

FORMS

# Preliminary Handoff Form

**This Form can be found at: SC Preliminary Handoff Form** https://dph.sc.gov/sites/scdph/files/Library/4484-ENG-DPH.pdf

SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

## Preliminary Handoff Form

| Date | Provider & Ambulance # | Incident # | Sex ☐ M ☐ F | Age | DOB | Incident Location |
|---|---|---|---|---|---|---|
| Name (Last, First) | | | | Area Code | Phone # | |
| Permanent Mailing Address | | | | | Apt # | |
| City | | | | State | Zip Code | Chief Complaint |

Dispatch Time: _____ At Patient Time: _____
Depart Scene: _____ ED Arrival Time: _____
☐ STEMI – Symptom Onset Time: ____:____hrs
☐ Stroke – Last Time w/o Symptoms:

| Advancement Procedure(s) | Size / Qty | Medication | Dose / Route | Time |
|---|---|---|---|---|
| ☐ Venous Access ☐ IV ☐ IO | | ☐ Oxygen | | |
| ☐ Venous Access ☐ IV ☐ IO | | | | |
| ☐ Cardiac Monitor ☐ 12-Lead ECG | | | | |
| ECG Documentation: ☐ Attached ☐ Transmitted | | | | |
| ☐ Vagal Maneuver ☐ TCP: Rate ____/____mA | | | | |
| ☐ Defibrillation ☐ Cardioversion | | | | |
| ☐ _____J ☐ _____J ☐ _____J ☐ _____J | | | | |
| ☐ Advanced Airway: ☐ BIAD ☐ ETT | Size / Depth | | | |

**Basic Procedure(s)**

| | | |
|---|---|---|
| ☐ Airway NPA | ☐ Airway OPA | |
| ☐ Suctioning | ☐ CPR | ☐ BVM |
| ☐ CPAP | ☐ Splint Extremity | |
| ☐ Wound Care | | |
| ☐ Hemorrhage Control TQ Time: | ☐ Spinal Motion Restriction | |
| ☐ Other: | ☐ Other: | |

| Time | B/P | Pulse | Resp | ECG | BGL | LOC | SpO2 | ETCO2 | GCS | RACE | RTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Pt Allergies ☐ NKDA ☐ Unknown

Pt Medication ☐ None ☐ Unknown

**MOI:** ☐ MVC ☐ Pedestrian ☐ Fall ☐ Assault ☐ CSW ☐ Stabbing ☐ Heat ☐ Cold ☐ Bite/Sting
☐ Thermal ☐ Other: _____ **Safety Equipment:** ☐ Helmet ☐ Seatbelt ☐ SRS

**Narrative:**

Pt History ☐ None ☐ Unknown

☐ Cardiac ☐ Hypertension
☐ Diabetic ☐ GI / GU
☐ Respiratory ☐ COPD ☐ Asthma
☐ Behavioral ☐ Substance Abuse
☐ Neurological ☐ Stroke ☐ Seizure
☐ Other: _____
☐ Other: _____
☐ Other: _____

| Attendants | Print Name | EMT Number | Print Name | EMT Number |
|---|---|---|---|---|
| | | SC | | SC |

| Receiving Facility Signature | Name | Signature |
|---|---|---|
| | | |

*This is a preliminary patient transfer form – this is not a final patient care report.*



4484-ENG-DPH (05/2025)

# Preliminary Handoff Form

**This Form can be found at: SC Preliminary Handoff Form** https://dph.sc.gov/sites/scdph/files/Library/4484-ENG-DPH.pdf

| Glascow Coma Score | | | | | |
|---|---|---|---|---|---|
| **Best Eye Response (4)** | | **Best Verbal Response (5)** | | **Best Motor Response (6)** | |
| 1 | No eye opening | 1 | No verbal response | 1 | No motor response |
| 2 | Eye opening to pain | 2 | Incomprehensible sounds | 2 | Extension to pain |
| 3 | Eye opening to verbal command | 3 | Inappropriate words | 3 | Flexion to pain |
| 4 | Eye opening spontaneously | 4 | Confused | 4 | Withdrawal to pain |
| | | 5 | Oriented | 5 | Localizes pain |
| | | | | 6 | Obeys commands |

| Revised Trauma Score | | | |
|---|---|---|---|
| **Glascow Coma Scale (GSC)** | **Systolic Blood Pressure (SBP)** | **Respiratory Rate (RR)** | **Coded Value** |
| 13-15 | >89 | 10-29 | 4 |
| 9-12 | 76-89 | >29 | 3 |
| 6-8 | 50-75 | 6-9 | 2 |
| 4-5 | 1-49 | 1-5 | 1 |
| 3 | 0 | 0 | 0 |

*This is a preliminary patient transfer form – this is not a final patient care report.*

This Form can be found at: SC Preliminary Handoff Form https://dph.sc.gov/sites/scdph/files/Library/4484-ENG-DPH.pdf

## Preliminary Handoff Form

Instructions for Completing 4484-ENG-DPH

**PURPOSE:** Within sixty (60) minutes of the completion of the call, the EMS Agency will make each ePCR available to the receiving facility. The EMS Agency may substitute this paper information sheet, provided the ePCR is made available to the receiving facility no later than twenty-four (24) hours from completion of the call.

**AUDIENCE:** Ambulance crews transporting patients to hospitals.

**INSTRUCTIONS:** This form will be filled out by the primary caregiver and turned over to the receiving facilities staff upon transfer of patient care.

**OFFICE MECHANICS & FILING:** This form is left with the hospital staff; no copy is retained for DPH or EMS.

# SC EMS Request for Change

**This Form can be found at: SC EMS Request for Change Form** https://dph.sc.gov/sites/scdph/files/Library/4483-ENG-DPH.pdf

SOUTH CAROLINA DEPARTMENT OF PUBLIC HEALTH

## Request for Change Form

**THE REQUESTED CHANGE WILL (PRIMARILY) EFFECT:**

☐ Drug Formulary ☐ Device ☐ Procedure

☐ Protocol ☐ Scope of Practice

**THE REQUESTED CHANGE WILL INVOLVE:**

☐ Addition or Expansion ☐ Change in Use ☐ Deletion or Restriction

**INITIAL COMMITTEE FOR REVIEW:**

☐ EMS-C ☐ Medical Control Committee ☐ Trauma Advisory Committee

☐ Stroke Advisory Committee ☐ EMS Advisory Council

**DRUG FORMULARY CHANGE REQUEST:**

1. Generic Name:
2. Trade Name:
3. How Supplied:
4. Proposed Methods of Administration:
5. Indications for Administration:
6. Contraindications for Use:
7. Recognized Side Effects and/or Adverse Reactions:
8. Therapeutic Effects:
9. Adults Dosage:
10. Pediatric Dosage:
11. Is there an age range for this drug?
12. Note: Is the proposed use of the DRUG approved by the FDA? ☐ YES ☐ NO
13. Reason for Recommendation: [Include similar agents already approved and why the new agent is recommended in favor of current medications.]
14. Advantages of Adding/Deleting This Drug:
15. What Protocols are Affected by Addition/Deletion of this Drug:
16. Literature Supporting This Change in Formulary in the Pre-Hospital EMS Setting:



4483-ENG-DPH (05/2025)

| DEVICE CHANGE REQUEST: |
|---|
| 1. Device Name: |
| 2. Device Function: |
| 3. Indications for Use: |
| 4. Contraindications for Use: |
| 5. Recognized Side Effects and/or Adverse Reactions: |
| 6. Therapeutic Effects: |
| 7. Adult Usage Criteria and Methods: |
| 8. Pediatric Usage Criteria and Methods: |
| 9. Is there an age restriction on this device? |
| 10. Note: Is the proposed use of the device approved by the FDA? ☐ YES ☐ NO |
| 11. Reason for Recommendation: [Include similar devices already approved and why the new device is recommended in favor of currently approved device/s] |
| 12. Advantages of Adding/Deleting This Device: |
| 13. What Protocols Are Affected by Addition/Deletion of This Device: |
| 14. What Type and Frequency of Recurrency Training is Recommended/Suggested to Insure Continued Competence with This Procedure: |
| 15. Cost Estimates to Purchase, Train, Test, and Provide Recurrency Training:<br>a. Cost to Acquire:<br>b. Cost of Initial Training:<br>c. Cost of Recurrency Training and Frequency:<br>d. Cost of Maintenance and Upkeep if Indicated: |
| 16. What Method of Training Will be Employed to Educate the Personnel Who Are Affected:<br>a. Planned Hours of Training to be Required:<br>b. Proposed Outline and Curriculum for Training: |
| 17. Literature Supporting This Change in Device Usage in the Pre-Hospital EMS Setting: |



4483-ENG-DPH (05/2025)

| PROCEDURE CHANGE REQUEST: |
|---|
| 1. Procedure Name: |
| 2. Procedure Function: |
| 3. Indications for Use: |
| 4. Contraindications for Use: |
| 5. Recognized Side Effects and/or Adverse Reactions: |
| 6. Therapeutic Effects: |
| 7. Adult Usage Criteria and Methods: |
| 8. Pediatric Usage Criteria and Methods: |
| 9. Is there an age restriction on this procedure? |
| 10. Note: Is the proposed use of the procedure approved by the FDA? ☐ YES ☐ NO |
| 11. Reason for Recommendation: [Include similar procedures already approved and why the new procedure is recommended in favor of currently approved procedure/s] |
| 12. Advantages of Adding/Deleting This Procedure: |
| 13. What Protocols Are Affected by Addition/Deletion of This Procedure: |
| 14. What Type and Frequency of Recurrency Training is Recommended/Suggested to Insure Continued Competence with This Procedure: |
| 15. Cost Estimates to Purchase, Train, Test, and Provide Recurrency Training:<br>a. Cost to Acquire:<br>b. Cost of Initial Training:<br>c. Cost of Recurrency Training and Frequency:<br>d. Cost of Maintenance and Upkeep if Indicated: |
| 16. What Method of Training Will be Employed to Educate the Personnel Who Are Affected:<br>a. Planned Hours of Training to be Required:<br>b. Proposed Outline and Curriculum for Training: |
| 17. Literature Supporting This Change in Procedure Usage in the Pre-Hospital EMS Setting: |



4483-ENG-DPH (05/2025)

| PROTOCOL CHANGE REQUEST: |
|---|
| 1. Protocol Name and ID Number [if referencing a Current SC Prehospital Protocol]: |
| 2. Protocol Function: |
| 3. Indications for Use: |
| 4. Contraindications for Use: |
| 5. Adult Protocol Changes (if necessary): |
| 6. Pediatric Protocol Changes (if necessary): |
| 7. Is there an age restriction on this procedure? |
| 8. Reason for Recommendation [Include why the currently approved protocol (if such exists) should be changed and why the new protocol change is recommended in favor of currently approved protocol/s]: |
| 9. Advantages of Adding/Deleting This Protocol: |
| 10. What Protocols Are Affected by Addition/Deletion of This Procedure [address both Adult and Pediatric Protocols]: |
| 11. What Type and Frequency of Recurrency Training is Recommended/Suggested to Insure Continued Competence with This Protocol: |
| 12. Cost Estimates to Purchase, Train, Test, and Provide Recurrency Training:<br>a. Cost to Acquire:<br>b. Cost of Initial Training:<br>c. Cost of Recurrency Training and Frequency:<br>d. Cost of Maintenance and Upkeep if Indicated: |
| 13. What Method of Training Will be Employed to Educate the Personnel Who Are Affected:<br>a. Planned Hours of Training to be Required:<br>b. Proposed Outline and Curriculum for Training: |
| 14. Literature Supporting This Change in Protocol Usage in the Pre-Hospital EMS Setting: |



4483-ENG-DPH (05/2025)

**SCOPE OF PRACTICE CHANGE REQUEST:**

1. Level of Certification/s for Requested Change in Scope of Practice

☐ EMR ☐ EMT-B ☐ EMT-A ☐ EMT-P

☐ EMT-CP ☐ EMT-CC ☐ EMT-TM ☐ EMT-FM

2. Current Scope of Practice for Specific Level/s That Are Being Considered for Change:

3. Recommended Change in Scope of Practice for Specific Level/s That Are Being Considered for Change [Will the requested change effect different levels differently – e.g. Is the request for change ONLY going to affect the EMT-TM or EMT-FM – but NOT CHANGE the Scope of Practice for the EMT-P or EMT-CP, etc. Would the change effect only the EMT-A – but is already approved at the EMT-P level, etc.]

4. Adult Protocol Changes (if necessary):

5. Pediatric Protocol Changes (if necessary):

6. Is there an age restriction on this change in Scope of Practice?

7. Reason for Recommendation [Include why the currently approved scope practice (for this activity) should be changed and why the new scope of practice change is recommended in favor of currently approved Level Specific Scope of Practice]:

8. Advantages of Adding/Deleting/Changing This Scope of Practice:

9. What Protocols Are Affected by Addition/Deletion of This Scope of Practice [address both Adult and Pediatric Protocols]:

10. What Type and Frequency of Recurrency Training is Recommended/Suggested to Insure Continued Competence with This Changed Scope of Practice:

11. Cost Estimates to Purchase, Train, Test, and Provide Recurrency Training:
    a. Cost to Acquire:
    b. Cost of Initial Training:
    c. Cost of Recurrency Training and Frequency:
    d. Cost of Maintenance and Upkeep if Indicated:

12. What Method of Training Will be Employed to Educate the Personnel Who Are Affected:
    a. Planned Hours of Training to be Required:
    b. Proposed Outline and Curriculum for Training:

13. Literature Supporting This Change in Scope of Practice in the Pre-Hospital EMS Setting:



4483-ENG-DPH (05/2025)

**THE ABOVE REQUESTED CHANGE IS REQUESTED BY [ALL MUST BE COMPLETED]:**

1. Name of EMS Service:
2. Signature of EMS Service Administrative Director:
3. Signature of EMS Service Medical Control Physician:
4. Signature of Regional EMS Medical Director:

**THIS REQUESTED CHANGE WILL BE FORWARDED TO [CHECK ALL THAT APPLY]:**

☐ Director, DPH EMS & Trauma Section

☐ State Medical Control Physician

☐ Assistant State Medical Control Physician

***NOTE:**

The EMS & Trauma Section Medical Control Committee reviews the Prehospital Formulary Annually in the Spring. Formulary changes are only considered at that time – with the exception of cases where there is Emergent need to consider a change outside of this schedule (e.g. Drug Recall, Drug Shortage, Immediate change in Standard of Care). Temporary approval of formulary changes MAY be approved prior to full Medical Control Committee review in extenuating circumstances – but such approval will continue, at maximum, until the Annual Formulary Review by the Medical Control Committee.

Other committees will determine the schedule for which Policies, Protocols, Procedures, Devices, and Scope of Practice are reviewed by those committees. This determination will be made by the committee of jurisdiction for the issue in question.

This application should be completed in full. Incomplete applications may be significantly delayed for committee review. The Requesting Agency/Medical Control Physician should address how any change will affect adults as compared to pediatrics; what costs are involved in acquisition, training, replacement, recurrency training, etc.; the planned educational format and curriculum; and should provide current literature that supports the recommended change in the prehospital EMS setting.





4483-ENG-DPH (05/2025)

## Request for Change Form

Instructions for Completing 4483-ENG-DPH

**PURPOSE:** To request changes in the Drug Formulary, a device, procedure, protocol, or Scope of Practice, which includes addition or expansions, changes in use, and deletions or restrictions.

**AUDIENCE:** The EMS Service, with the signature of the EMS Service Administrative Director and the EMS Service Medical Control Physician.

**INSTRUCTIONS:** Complete applicable sections and supply the requested information.

**OFFICE MECHANICS & FILING:** Once reviewed and approved or disapproved by the committee(s), this form should be scanned and placed into the agency's electronic profile in the state database. This form is maintained by 10010 — Licensed Provider Files. Once the file is no longer needed for reference and quality review has been completed, an ARM-11 destruction request should be submitted and approved prior to disposal of the original form.

# SC R.A.C.E. FORM

This Form can be found at: SC R.A.C.E. Form https://dph.sc.gov/sites/scdph/files/Library/DPH-EMS-R.A.C.E.-Stroke-Scale.pdf

## South Carolina Department of Public Health EMS R.A.C.E. Stroke Scale

### Rapid Arterial oCclusion Evaluation Scale

Patient Name: _____

DOB: _____ Date: _____

☐ Emergency Contact ☐ Medication List

☐ Last Known Normal/Well Time ☐ Blood Glucose

| ITEM | Instruction | Result | Score | NIHSS Equivalent |
|---|---|---|---|---|
| **Facial Palsy** | Ask patient to show their teeth (Smile) | **Absent** (symmetrical movement)<br>**Mild** (slight asymmetrical)<br>**Moderate to Severe** (completely asymmetrical) | 0<br>1<br>2 | 0-3 |
| **Arm Motor Function** | Extending the arm of the patient 90° (if sitting) or 45° (if supine) palms up | **Normal** to **Mild** (limb upheld more than **10** seconds)<br>**Moderate** (limb upheld less than **10** seconds)<br>**Severe** (patient unable to raise arm against gravity) | 0<br>1<br>2 | 0-4 |
| **Leg Motor Function** | Extending the leg of the patient 30° (in supine), one leg at a time | **Normal** to **Mild** (limb upheld more than **5** seconds)<br>**Moderate** (limb upheld less than **5** seconds)<br>**Severe** (patient unable to raise leg against gravity) | 0<br>1<br>2 | 0-4 |
| **Head & Gaze Deviation** | Observe range of motions of eyes and look for head turning to one side | **Absent** (normal eye movements to both sides and no head deviation was observed)<br>**Present** (eyes and/or head deviation to one side was observed) | 0<br>1 | 0-2 |
| **Aphasia (if RIGHT sided weakness)** | Ask patient to follow 2 simple commands:<br>***1. Close your eyes.***<br>***2. Make a fist.*** | **Normal** (performs both tasks requested correctly)<br>**Moderate** (performs only 1 of 2 tasks requested correctly)<br>**Severe** (Cannot perform tasks requested correctly) | 0<br>1<br>2 | 0-2 |
| **Agnosia (if LEFT sided weakness)** | Inability to recognize familiar objects.<br>Ask patient: 1. **"Whose arm is this?"** (while showing the affected arm)<br>2. **"Can you move your arm?"** | **Normal** (appropriate or correct answer)<br>**Moderate** (does not recognize limb **or** states that they can move it but cannot)<br>**Severe** (does not recognize arm **and** is unaware of arm) | 0<br>1<br>2 | 0-2 |

Any score **> 0** is a ***Stroke Alert***
Any score **≥ 4** Shows significant likelihood of an ***LVO***.

**RACE SCALE TOTAL** → MAX = 9

FORMS