ARIZONA DEPARTMENT OF HEALTH SERVICES
PREPAREDNESS

Bureau Of Emergency Medical Services & Trauma System
150 N. 18th Avenue, Suite 540
Phoenix, Arizona 85007-3248
602-364-3150

MEDICAL DIRECTION COMMISSION

Date: January 19, 2017 - **Time**: 12:00 PM

Location: 250 N. 17th Avenue, Lab Auditorium (Igloo)

Conference Call: 1-888-205-5513 **Code**: 486276#

iLinc URL: https://azdhsems.ilinc.com/register/zvhkcxs

You must register prior to joining the web conference session

AGENDA

I. Call to Order – Ben Bobrow, MD

II. Roll Call - Tammy Gagnon (12 members, 7 required for quorum)

III. Chairman's Report – Ben Bobrow, MD

- a. Attendance Report (Attach. III.a.)
- b. Vacancies
  - i. Faculty Representative of Emergency Medicine Residency Program
  - ii. Physician Specializing in Acute Head Injury/Spinal Cord Care

IV. Bureau Report – David Harden, JD

- a. Trauma Rules Revisions – Noreen Adlin
- b. EMS to Hospital Data Linkage – Anne Vossbrink
- c. EMS Agencies 2015 Outcomes – Anne Vossbrink
- d. Workgroups & Public Health Excellence in Law Enforcement – Terry Mullins, MPH

V. Discussion and Action Items

- a. Discuss, amend, approve MDC Minutes from September 15, 2016 (Attachment V.a.)
- b. Discuss, amend, approve Medical Director Recognition Program Manual & Application (Attachment V.b.) – Gail Bradley, MD/Franco Castro-Marin, MD
- c. Discuss, amend, approve Treatment Guidelines (Attachment V.c.) – Toni Gross, MD
- d. Ketamine Use for Delirium/Pain Control/Adverse Effects – Gail Bradley, MD

VI. Reports

- a. Study on Suicide in the EMS Profession – Ben Bobrow, MD
- b. Protocols, Medications, and Devices Committee – Toni Gross, MD
- c. Trauma and EMS Performance Improvement Standing Committee – Gail Bradley, MD
- d. Education Standing Committee – Gail Bradley, MD
- e. Treat & Refer Recognition Program – David Harden, JD

VII. Agenda Items for Next Meeting

Persons with disabilities may request a reasonable accommodation such as a sign language interpreter, by contacting Angie McNamara, Program Project Specialist II, at 602-364-3156; State TDD Number 1-800-367-8939; or Voice Relay Number 711. Request should be made as early as possible to allow time to arrange accommodations

"Health and Wellness for all Arizonans"

VIII. Call to the Public: A public body may make an open call to the public during a public meeting, subject to reasonable time, place and manner restrictions, to allow individuals to address the public body on any issue within the jurisdiction of the public body. The Committee may ask staff to review a matter or may ask that a matter be put on a future agenda. Members of the public body shall not discuss or take legal action on matters raised during an open call to the public unless the matters are properly noticed for discussion and legal action. A.R.S. § 38-431.01(G)

IX. Summary of Current Events

a. AEMS Annual EMS Odyssey Conference June 1-2, 2017 https://www.aems.org/ems-odyssey

b. Traffic Incident Management for First Responders (Free 4-Hour Course) February 24, 2017, ADHS State Lab Auditorium; email hardend@azdhs.gov for registration information.

Visit the Bureau's News & Conferences page for upcoming events: http://www.azdhs.gov/preparedness/emergency-medical-services-trauma-system/index.php#news-conference-home

Visit the Bureau's Training Programs page for upcoming CE opportunities: http://www.azdhs.gov/documents/preparedness/emergency-medical-services-trauma-system/training/continuing-education.pdf

X. Next Meetings: May 18, 2017 @ 12:00 PM in rooms 215A & 215B 150 Building

XI. Adjournment

Persons with disabilities may request a reasonable accommodation such as a sign language interpreter, by contacting Angie McNamara, Program Project Specialist II, at 602-364-3156; State TDD Number 1-800-367-8939; or Voice Relay Number 711. Request should be made as early as possible to allow time to arrange accommodations

MEDICAL DIRECTION COMMISSION

September 15, 2016 - 12:00 PM

150 N. 18th Ave., Conference Room 215A&B

Meeting Minutes - Draft

Present
Ben Bobrow, MD
Gail Bradley, MD
Toni Gross, MD
Jon Maitem, DO
Rianne Page, MD*
Dan Spaite, MD
Frank Walter, MD*
Kevin Foster, MD*
Michele Butler, MD*
Phillip Richemont*

Absent
Nicolas Theodore, MD

*Indicates teleconference

I. Call to Order – Ben Bobrow, MD-12:00 pm

II. Roll Call - Tammy Gagnon (12 members, 7 required for quorum) – **Quorum met**

III. Chairman's Report – Ben Bobrow, MD

a. Attendance Report
b. 2017 Meeting Schedule
c. Vacancies
   i. Faculty Representative of Emergency Medicine Residency Program
   ii. Physician Specializing in Acute Head Injury/Spinal Cord Care

IV. Bureau Report – David Harden, JD

a. Trauma Rules Revisions – Noreen Adlin

V. Discussion and Action Items

a. Discuss, amend, approve MDC Minutes from May 19, 2016
   Motion by Jonathan Maitem, DO, seconded by Frank Walter, MD- **Motion carries.**
b. Discuss, amend, approve Treatment Guidelines – Toni Gross, MD
   Motion made by Bentley Bobrow, MD, seconded by Gail Bradley, MD and Jonathan Maitem, DO - **Motion Carries**
c. Discuss Medical Director's Recognition Program – Gail Bradley, MD/Franco Castro-Marin, MD
d. Ketamine Use for Delirium/Pain Control/Adverse Effects – Gail Bradley, MD
   Tabled to next meeting

VI. Reports

a. Protocols, Medications, and Devices Committee – Toni Gross, MD
b. Trauma and EMS Performance Improvement Standing Committee – Gail Bradley, MD
c. Education Standing Committee – Gail Bradley, MD
d. Data and Quality Assurance – Terry Mullins, MPH/Vatsal Chikani, MPH
e. Medication Administration Report – Anne Vossbrink, MS
f. STAB Annual Report 2016 – Vatsal Chikani, MPH
g. Treat & Refer Recognition Program – David Harden, JD

VII. Agenda Items for Next Meeting

VIII. Call to the Public: A public body may make an open call to the public during a public meeting, subject to reasonable time, place and manner restrictions, to allow individuals to address the public body on any issue within the jurisdiction of the public body. The Committee may ask staff to review a matter or may ask that a matter be put on a future agenda. Members of the public body shall not discuss or take legal action on matters raised during an open call to the public unless the matters are properly noticed for discussion and legal action. A.R.S. § 38-431.01(G)

IX. Summary of Current Events

a. September 26, 2016 – Extreme Medicine for EMS , Casa Grande, Arizona - Barbara.bovee@mihs.org; http://www.azdhs.gov/documents/preparedness/emergency-medical-services-trauma-system/news-conferences/mihs-ems-conference-sept-26-2016.pdf

b. September 26-29, 2016 – Traffic Incident Management Train-the-Trainer Courses (Phoenix, Flagstaff, and Tucson) Visit the Bureau's website for registration instructions.

c. November 3 – 4, 2016 – Emergency Pediatric Interdisciplinary Care Conference http://www.epiccaz.org/

d. November 10 – 11, 2016 – 8th Annual Southwest Trauma and Acute Care Symposium http://www.aztracc.org/symposium/

Visit the Bureau's News & Conferences page for upcoming events: http://www.azdhs.gov/preparedness/emergency-medical-services-trauma-system/index.php#news-conference-home

Visit the Bureau's Training Programs page for upcoming CE opportunities: http://www.azdhs.gov/documents/preparedness/emergency-medical-services-trauma-system/training/continuing-education.pdf

X. Next Meetings: January 19, 2017 @ 12:00 PM in rooms 215A & 215B 150 Building

XI. Adjournment: 1:44pm

Approved by:

Date:

VISITORS PLEASE SIGN IN

Medical Direction Commission (MDC) - September 15, 2016 @ 12:00 pm

	Name (PLEASE PRINT)	Organization & Position
1	BRIAN SMITH	FMC
2	Randy Perkins	Gilbert Fire.
3	CHRIS Thompson	YRMC
4	Rebecca Haro	NCFMD
5	RYAN HEREDIA	MESA FIRE
6	DAVID HARDEN	ADHS
7	Kori Wass	CRMC TPM
8	Chris Bird	Sun Lakes Fire
9	Cindy Inskeep	Maricopa Fire
10	Paul Hargrave	Peoria Fire medical
11	RONALD MARTINEZ	FMC
12	Daniel Stites	HH/MMR
13	Jill McAdoo	AMR
14	Anne Vossbrink	ADHS
15		
16		
17		

Bureau of EMS & Trauma System

Emergency Medical Services Medical Director Recognition Program Manual

[Draft 6: Jan. 4, 2017]

ARIZONA DEPARTMENT
OF HEALTH SERVICES

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INTRODUCTION

The Emergency Medical Services (EMS) Medical Director is an essential component of an EMS and trauma system. The Bureau of Emergency Medical Services and Trauma System (Bureau) Medical Director Recognition Program has been developed to recognize physicians who demonstrate the necessary commitment to their unique and essential role as EMS Medical Directors within Arizona's EMS and Trauma System. That commitment extends to:

- EMS system measurement,
- EMS system development at the state, regional and local levels,
- Continuing education, training and maintenance of core competencies,
- Knowledge of and compliance with regulatory requirements,
- Bureau verification of medical director commitment to meet or exceed program criteria.

Role and Duties of the EMS Medical Director

The roles of EMS medical directors can best defined by the degree of engagement and consistency of actions they take for the systems they oversee. EMS system successes can be commensurate with the level of intensive EMS medical director involvement.[1] Physicians who serve EMS agencies or base hospitals in this capacity provide essential clinical guidance, leadership, and oversight for all aspects of prehospital care. From a patient care perspective, an emergency medical care technician (EMCT) serves as an extension of the EMS medical director. Fundamentally, the most important duties of an EMS medical director are to formulate system performance specifications, monitor compliance with those specifications, and initiate action for compliance as needed. The EMS medical director MUST be engaged with the design and execution of retrospective, concurrent, and prospective quality improvement (QI) initiatives for an EMS agency or base hospital to optimize clinical outcomes. These QI initiatives should have clearly defined processes and outcomes, along with assignment of roles for the individuals involved (e.g., QI/QA team, educator, supervisor). It is specifically recognized that concurrent quality improvement can be a very efficient and cost-effective way to create and maintain culture, change behavior, and identify important information about patient care activities. This relies on direct oversight of EMS personnel at the time of service delivery. The Bureau strongly recommended that EMS medical directors actively participate in prehospital care by providing on-site medical direction through "ride along" and scene response activities. This should be considered fundamental to the job of EMS medical direction.[1] The EMS agency or base hospital should provide the necessary resources, time and personnel to achieve desired results from all QI initiatives.

The above recommendations are based on evolving national standards and core competencies of EMS medicine. See Attachment-1 for two publications providing specifics to these recommendations.

PROGRAM BACKGROUND

The EMS physician is a vital, but not yet fully integrated or supported component of the Arizona EMS and Trauma System. The Bureau established standards for EMS medical directors in rule under Arizona Administrative Code (A.A.C.) §§ R9-25-201 and R9-256-202, facilitating qualification benchmarks. In May 2016, the Bureau solicited volunteers from the medical direction community to develop initial training standards, continuing medical education (CME) standards and performance expectations for an EMS Medical Director Recognition Program. This EMS Medical Director Recognition Program Manual and Application is the result of the Medical Director Recognition Workgroup's collective efforts. Precedence for this program includes the Premier EMS Agency Program, the Treat and Refer Recognition Program, Excellence in Prehospital Injury Care (EPIC), and SHARE.

PROGRAM BENEFITS

The EMS Medical Director Recognition Program is intended to be a natural extension of the American Board of Emergency Medicine's 2010 approval of EMS medicine as a unique subspecialty discipline as well as the subsequent creation of the Fellow of the Academy of Emergency Medical Services (FAEMS) designation by the National Association of EMS Physicians. The Medical Director Recognition Program will facilitate the following benefits:

- Increase individual and collective awareness of the EMS medical director's contribution to high quality prehospital care, improved patient safety and outcomes, and integration of prehospital care into the overall healthcare continuum,

- Promote consistency in training, qualifications, activities, and performance of physicians serving as EMS medical directors across the state,
- Establish a mechanism for the Bureau to identify EMS medical directors through a single database in order to enhance communication and collaboration, and
- Encourage EMS medical directors to become personally involved in EMS Regional Council meetings, and Bureau statutory and standing committees (i.e., EMS Council, STAB, MDC, Education, TEPI, and PMD).

The EMS Medical Director Recognition Program will be reviewed annually by the Bureau to ensure that it continues to facilitate and promote EMS-related physician commitments and the roles of EMS medical directors. The program will be continuously evaluated to maintain high levels of integrity, relevance, and quality.

RECOGNITION APPLICATION STANDARDS

I. The application for recognition includes the following requirements from Arizona Revised Statutes (A.R.S.) and Arizona Administrative Code (A.C.C.) – See Attachment-2

- The physician must be licensed pursuant to A.R.S. Title 32, Chapter 13 or 17 and provide direction within the Arizona EMS and Trauma System.
- The physician must meet the Administrative Medical Director (AMD) requirements of A.A.C. § R9-25-201.
- The AMD must ensure online medical direction is consistent with A.A.C. § R9-25-202.

II. Criteria for Recognition

- Meet the physician requirements delineated in A.A.C. § R9-25-201,
- EMS Board Certification or completion of an EMS Medicine Fellowship (optional),
- Complete at least five hours of EMS continuing medical education (CME) each year, with a total of 20 EMS CME hours during the four-year EMS Medical Director Recognition Period,
- Maintain core competencies during the four-year EMS Medical Director Recognition Period,
- Demonstrate ongoing commitment to evidence-based medicine,
- Engage in direct oversight of EMS providers through scene response or ride-along time.
- Personal involvement in regional EMS councils, and Bureau of EMS statutory or standing committees,
- Completion of an EMS Medical Director's Course, e.g., NAEMSP, ACEP (course offered during annual meeting),

See Attachment-3 for the Performance Improvement Plan.

III. Criteria for Renewal

Recognition is valid for four years from the initial recognition date. EMS medical directors must re-apply and meet all recognition criteria, including A.A.C. § R9-25-201 requirements, on or before the current expiration date to retain recognition.

IV. Medical Direction Agreement Template (Optional)

Example medical direction agreement templates: FEMA USFA Medical Directors Handbook

V. Continuous Quality Improvement Forms

- Data & Quality Assurance Section
- Burns
- Cardiac Arrest
- Major Trauma
- ST-Segment Elevation Myocardial Infarction
- Stroke

VI. Useful Website Links

- Arizona Prehospital Information & EMS Registry System (AZ-PIERS)
- Statutory and Regulatory Resources
- Time Sensitive Emergencies Resources
- Bureau of EMS & Trauma System Online Services
- Statutory and Standing Committees
- Drug Profiles (Bureau Website)
- EMS Regional Councils
- Community Paramedicine
- Arizona Treat & Refer Recognition Program
- National Association of EMS Physicians (NAEMSP)
- National Association of State EMS Officials (NASEMSO)
- National EMS Information System (NEMSIS) Technical Assistance Center
- EMS Compass Initiative

VII. Citations

See Attachment-2 Arizona Revised Statutes and Arizona Administrative Code Citation Language.

VIII. Application Form (See Attachment-4)

ATTACHMENT-1

SAMPLE QUALIFICATIONS AND JOB DESCRIPTION FOR EMS MEDICAL DIRECTOR

"Medical Direction of Emergency Medical Systems." Medical Oversight of EMS. Pepe, P, Ed. RR Bass, et al. Dobuque: Kendall/Hunt Publishing Company, 2009. 51;

"Legal Issues." Medical Oversight of EMS. Maggiore, WA., Ed. RR Bass, et al. Dobuque: Kendall/Hunt Publishing Company, 2009. 90).

ATTACHMENT-2

ARIZONA REVISED STATUTES AND ARIZONA ADMINISTRATIVE CODE CITATION LANGUAGE

A.R.S. Title 36 – Public Health & SAFETY, Chapter 21.1 Emergency Medical Services

§ 36-2201. Definitions

1. **"Administrative medical direction"** means supervision of emergency medical care technicians by a base hospital medical director, administrative medical director or basic life support medical director. For the purposes of this paragraph, "administrative medical director" means a physician who is licensed pursuant to title 32, chapter 13 or 17 and who provides direction within the emergency medical services and trauma system.

§ 36-2204. Medical Control

5. Medical standards for certification and recertification of certified emergency receiving facilities and advanced life support base hospitals and approval of physicians providing medical control or medical direction for any classification of emergency medical care technicians who are required to be under medical control or medical direction.

6. Standards and mechanisms for monitoring and ongoing evaluation of performance levels of all classifications of emergency medical care technicians, emergency receiving facilities and advanced life support base hospitals and approval of physicians providing medical control or medical direction for any classification of emergency medical care technicians who are required to be under medical control or medical direction.

7. Objective criteria and mechanisms for decertification of all classifications of emergency medical care technicians, emergency receiving facilities and advanced life support base hospitals and for disapproval of physicians providing medical control or medical direction for any classification of emergency care technicians who are required to be under medical control or medical direction.

A.A.C., Article 2. Medical Direction; ALS Base Hospital Certification

§ R9-25-201. Administrative Medical Direction

A. An emergency medical services provider or ambulance service shall:

1. Except as specified in subsection (B) or (C), designate a physician as administrative medical director who meets one of the following:

a. Has emergency medicine certification issued by a member board of the American Board of Medical Specialties;

b. Has emergency medical services certification issued by the American Board of Emergency Medicine;

c. Has completed an emergency medicine residency training program accredited by the Accreditation Council for Graduate Medical Education or approved by the American Osteopathic Association; or

d. Is an emergency medicine physician in an emergency department located in Arizona and has current certification in:

i. Advanced emergency cardiac life support that includes didactic instruction and a practical skills test, consistent with training recognized by the American Heart Association, in:

(1) Airway management during respiratory arrest;

(2) Recognition of tachycardia, bradycardia, pulseless ventricular tachycardia, ventricular fibrillation, pulseless electrical activity, and asystole;

(3) Pharmacologic, mechanical, and electrical arrhythmia interventions; and

(4) Immediate post-cardiac arrest care;

ii. Advanced trauma life support recognized by the American College of Surgeons; and

iii. Pediatric advanced life support that includes didactic instruction and a practical skills test, consistent with training recognized by the American Heart Association, in:

(1) Pediatric rhythm interpretation;

(2) Oral, tracheal, and nasal airway management;

(3) Peripheral and central intravenous lines;

(4) Intraosseous infusion;

(5) Needle thoracostomy; and

(6) Pharmacologic, mechanical, and electrical arrhythmia interventions;

§ R9-25-202. On-line Medical Direction

A. An emergency medical services provider or ambulance service shall:

1. Ensure that a physician provides on-line medical direction to EMCTs on behalf of the emergency medical services provider or ambulance service only if the physician meets one of the following:

a. Has emergency medicine certification issued by a member board of the American Board of Medical Specialties;

b. Has emergency medical services certification issued by the American Board of Emergency Medicine;

c. Has completed an emergency medicine residency training program accredited by the Accreditation Council for Graduate Medical Education or approved by the American Osteopathic Association; or

d. Is an emergency medicine physician in an emergency department located in Arizona and has current certification that meets the requirements in R9-25-201(A)(1)(d)(i) through (iii)

ATTACHMENT-3

PERFORMANCE IMPROVEMENT PLAN

Personal involvement in and documentation of a performance improvement plan (PIP), including data collection and evidence of implementation, for the following disease processes:

Acute Stroke:
- Patient's last well known time
- Stroke assessment and results
- Contact date/time hospital was contacted
- Blood glucose
- Transport to a Stroke Center (if available)

STEMI:
- ECG acquisition
- Notification of the receiving hospital on the ECG (results/transmit)
- Aspirin administration (unless contraindicated)
- Transport to a Cardiac Center (if available)

Out-of-Hospital Cardiac Arrest:
- Bystander CPR documentation
- Whether cardiac arrest was witnessed
- Initial cardiac rhythm
- Whether return of spontaneous circulation
- Termination of resuscitation time
- CPR quality measures
- Time to defibrillation
- Transport to a Cardiac Center (if available)

Major Trauma:
- Minimize on scene time
- Trauma triage criteria met
- Vital Sign measurement
- Document any transfers of patients
- Intubations attempts and successes
- TBI treatment guidelines followed
- Transport to a designated Trauma Center (if available)

Rapid Sequence Intubation (RSI)
- EMS agencies performance rapid sequence intubation (RSI) requires 100% CQI of RSI patients ePCRs.

ATTACHMENT-4

EMS MEDICAL DIRECTOR RECOGNITION PROGRAM APPLICATION

ARIZONA DEPARTMENT OF HEALTH SERVICES PREPAREDNESS	**BUREAU OF EMERGENCY MEDICAL SERVICES & TRAUMA SYSTEM** **EMS MEDICAL DIRECTOR RECOGNITION PROGRAM APPLICATION**

SECTION I. APPLICANT PHYSICIAN INFORMATION		
1	Physician Name (Last, First, MI)	
2	Medical License Number	
3	Primary Business Address	
4	Office Phone Number	
5	Cell Phone Number	
6	**Register on the Bureau's Medical Practitioner Website, completing all data fields and attaching a headshot photograph.**	

SECTION II. PRACTICE LOCATIONS (Copy & Paste Additional Rows with text fields if needed)

Agency/Entity Name	Role/Title	Entity/Agency Type

SECTION III. COMMITTEES & COUNCILS INVOLVEMENT

Which EMS Regional Councils and Statutory/Standing Committees you are personally involved with and your capacity?

EMS Regional Councils		ADHS Statutory Committees		ADHS Standing Committees	
Name	Capacity	Name	Capacity	Name	Capacity

SECTION IV. BOARD CERTIFICATIONS

Please indicate your board certification or eligibility for the two boards

American Board of Emergency Medicine		American Osteopathic Board of Emergency Medicine		EMS Board Certification		Other/Hospital ED Medical Director
Certified ☐	Eligible ☐	Certified ☐	Eligible ☐	Certified ☐	Eligible ☐	

SECTION V. ATTESTATIONS		CHECK BOX
Your initials for each statement signifies your attestation		
1	Personal involvement in regional councils, ADHS statutory and/or standing committees listed in Section IV.	☐
2	Board certification or eligibility in the American Board of Emergency Medicine and the American Osteopathic Board of Emergency Medicine	☐
3	Complete at least 5 hours of EMS continuing medical education (CME) each year, totaling 20 EMS CME hours during the 4-year Recognition Period.	☐
4	Commitment to evidence-based medicine.	☐
5	Maintain core competencies during 4-year recognition period	☐
6	Personal involvement in and documentation of a performance improvement plan, with data collection and evidence of implementation for Acute Stroke, STEMI, OHCA, Major Trauma, and RSI (please confirm compliance for each criterion listed below).	☐

SECTION VI. RESERVED FOR RECOGNITION RENEWAL ONLY
Please Attach in Section VI.A. Below Documentation Consistent with Section IV Attestation Statements
ATTACHMENTS FOR SECTION VII.B. RECOGNITION RENEWAL

By signing below, I attest that I am committed to supporting the tenets and requirements of the EMS Medical Director Recognition Program, and will notify the Bureau of EMS and Trauma System if information in this application changes.

Physician Printed Name		**Date:**
Physician Signature		**Date:**

REFERENCES

1. Pepe, P et al. "Medical Direction of Emergency Medical Services Systems." Medical Oversight of EMS. Ed. RR Bass, et al. Dobuque: Kendall/Hunt Publishing Company, 2009.

HOW TO USE THESE GUIDELINES

These guidelines have been adapted from the National Association of State EMS Officials (NASEMSO) Model EMS Clinical Guidelines published online in October 2014. These algorithms include specific recommendations for evaluation and treatment.

- The inclusion and exclusion patient criteria are listed under the title of each guideline.
- The recommendations within each guideline are listed in order by provider level scope of practice. It is assumed that higher levels of EMCT will perform all recommended evaluations and treatments included in the preceding level of care.
- The guidelines include specific pediatric recommendations, highlighted by the EMS for Children bear logo, *where specific pediatric recommendations differ from those for adults*. It is assumed that children will receive the evaluation and care recommended for all patients, unless specific pediatric recommendations are included in the algorithm.
  - Pediatric patient is defined as age less than 15 years.
- Online medical direction should be utilized at any time during the patient encounter per local protocols.

The appendix contains additional reference material applicable to these guidelines, such as burn assessment and neurologic assessment tools. The NASEMSO model guidelines include additional information that medical direction authorities may find helpful for education, training, and quality improvement activities, including patient safety considerations, educational pearls, performance measures, and literature references: https://nasemso.org/Projects/ModelEMSClinicalGuidelines/documents/National-Model-EMS-Clinical-Guidelines-Aug2016.pdf

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Cardiac Arrest (VF/VT/Asystole/PEA): Adult & Pediatric

Patients with cardiac arrest. For adult patients who obtain ROSC, refer to **Adult Post-ROSC Care** guideline.

Excludes:

1. Patients suffering cardiac arrest due to severe hypothermia (see **Hypothermia/Cold Exposure** guideline).
2. Patients with identifiable Do Not Resuscitate (or equivalent) order (see **Do Not Resuscitate** guideline).
3. Patients with transient loss of consciousness and presence of pulses upon EMS evaluation (see **Syncope** guideline).
4. Patients in arrest due to traumatic etiology (see **General Trauma Management** guideline).

EMT

- Initiate 200 uninterrupted chest compressions or take over chest compressions from bystanders
  - Compression rate: 100-120/minute
  - Depth at least 2 inches (5 cm)
- Set up AED
  - If arrest witnessed by EMS or adequate uninterrupted bystander CPR has been performed, immediately proceed with rhythm analysis and defibrillation, if appropriate

- Chest compressions should resume immediately after defibrillation attempts with no pauses for pulse checks

- Ensure patent airway
  - Initial passive ventilation acceptable for witnessed arrest (non-rebreather mask and oral airway)
  - Airway management should not interrupt compressions
  - BVM ventilation rate 10 breaths/minute, avoid excessive ventilation

- Infant: < 1 year old
- Child: 1 year to puberty

- Compression rate: 100-120/minute
- Depth: at least
  - 1.5 inches (4 cm) for infant
  - 2 inches (5cm) for children

- Ensure patent airway; begin assisted ventilation
- Compression-to-breath ratio:
  - 30:2 for single rescuer
  - 15:2 for 2-rescuer

- An AED equipped with a pediatric attenuator is preferred for infants and children < 8 years old; if not available, may use adult AED

AEMT

- IV/IO access as soon as possible without interrupting chest compressions

EMT-I/Paramedic

- Set up manual defibrillator
  - If arrest witnessed by EMS or adequate uninterrupted bystander CPR has been performed, immediately proceed with rhythm analysis and defibrillation, if appropriate
  - Debrillate at 360 J monophasic or biphasic equivalent

- Epinephrine 1:10,000 1 mg IV/IO every 3-5 minutes

- If advanced airway placed, chest compressions at 100/minute without interruptions for ventilations

- For recurrent VF/Pulseless VT:
  - Amiodarone 300 mg/kg IV/IO (may give 2nd dose 150 mg) or
  - Lidocaine 1-1.5 mg/kg IV/IO every 5 minutes to total dose of 3 mg/kg
- For torsades de pointes:
  - Magnesium sulfate 2 gm IV/IO **(Paramedic only)**

- Defibrillate at 4 J/kg
  - Repeat up to 10 J/kg

- Epinephrine every 3-5 minutes
  - 1:10,000 0.01 mg/kg IV/IO or
  - 1:1,000 0.1 mg/kg ETT

- For recurrent VF/Pulseless VT:
  - Amiodarone 5 mg/kg IVIO (may repeat twice, max 300 mg) or
  - Lidocaine 1 mg/kg IV/IO
- For torsades de pointes:
  - Magnesium sulfate 25-50 mg/kg IV/IO **(Paramedic)**

- Consider reversible causes of cardiac arrest:
  - Hyperkalemia
  - Hypovolemia
  - Tricyclic antidepressant overdose

Determination of Death/Withholding Resuscitative Efforts: Adult & Pediatric

Resuscitation must be started on all patients who are found apneic and pulseless unless the following conditions exist (does not apply to victims of lightning strikes, drowning or hypothermia):

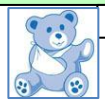
1. Traumatic injury or body condition clearly indicating biological death (irreversible brain death), limited to:
   a. Decapitation: the complete severing of the head from the remainder of the patient's body
   b. Decomposition or putrefaction: the skin is bloated or ruptured, with or without soft tissue sloughed off. The presence of at least one of these signs indicated death occurred at least 24 hours previously
   c. Transection of the torso: the body is completely cut across below the shoulders and above the hips through all major organs and vessels. The spinal column may or may not be severed
   d. Incineration: 90% of body surface area with full thickness burns as exhibited by ash rather than clothing and complete absence of body hair with charred skin
   e. Dependent lividity with rigor mortis (when clothing is removed there is a clear demarcation of pooled blood within the body, and the body is generally rigid)
   f. Injuries incompatible with life (such as massive crush injury, complete exsanguination, severe displacement of brain matter)

OR

2. A valid DNR order (form, card) or other actionable medical order (e.g. POLST/MOLST form) present, when it:
   a. Is intact: it has not been cut, broken or shows signs of being repaired
   b. Displays the patient's name and the physician's name

EMT

- If the components above are confirmed, no CPR is required
- If CPR has been initiated but the components above have been subsequently confirmed, CPR may be discontinued and online medical direction contacted as needed
- If any of the findings are different than those described above, clinical death is not confirmed and resuscitative measures must be immediately initiated or continued and the patient transported to a receiving hospital unless paramedic intercept is pending. The **Termination of Resuscitation** guideline should then be implemented
- Do Not Resuscitate order (DNR/MOLST/POLST) with signs of life:
  - If there is a DNR bracelet or DNR transfer form and there are signs of life (pulse and respirations), provide standard appropriate treatment under existing protocols matching the patient's condition
  - To request permission to withhold treatment under these conditions for any reason obtain online medical direction
  - If there is documentation of a Do Not Intubate (DNI/MOLST/POLST) advanced directive, the patient should receive full treatment per protocols with the exception of any intervention specifically prohibited in the patient's advanced directive
  - If for any reason an intervention that is prohibited by an advanced directive is being considered, online medical direction should be obtained



- In cases where the patient's status is unclear and the appropriateness of withholding resuscitation efforts is questioned, EMS personnel should initiate CPR immediately and then contact direct medical oversight
- Special Consideration: For scene safety and/or family wishes, provider may decide to implement CPR even if all the criteria for death are met

Do Not Resuscitate Status/Advanced Directives/Healthcare Power of Attorney Status: Adult & Pediatric

1. Patients must have one of the following documents or a valid alternative (such as identification bracelet indicating wishes) immediately available:
   a. Physician Orders for Life Sustaining Treatment (POLST) or Medical Orders for Life Sustaining Treatment (MOLST) – explicitly describes acceptable interventions for the patient in the form of medical orders, must be signed by a physician or other empowered medical provider to be valid
   b. Do Not Resuscitate (DNR) order – identifies that CPR and intubation are not to be initiated if the patient is in arrest or peri-arrest. The interventions covered by this order and the details around when to implement them can vary widely
   c. Advanced directives – document that describes acceptable treatments under a variable number of clinical situations including some or all of the following: what to do for cardiac arrest, whether artificial nutrition is acceptable, organ donation wishes, dialysis, etc. Frequently does not apply to emergent or potentially transient medical conditions
   d. In the absence of formal written directions (MOLST, POLST, DNR, advanced directives), and in the presence of a person with power of attorney for healthcare, or healthcare proxy, that person may prescribe limits of treatment
2. One of the documents above is valid when it meets all of the following criteria:
   a. Is intact: it has not been cut, broken or shows signs of being repaired
   b. Displays the patient's name and the physician's name
3. If there is question about the validity of the form/instrument, the best course of action is to proceed with the resuscitation until additional information can be obtained to clarify the best course of action.
4. If a patient has a valid version of one of the above documents it will be referred to as a "valid exclusion to resuscitation" for the purposes of this protocol.

EMT

- If the patient has a valid exclusion to resuscitation, no CPR or airway management should be attempted; this does not exclude comfort measures
- If CPR has been initiated and a valid exclusion to resuscitation has been subsequently verified, CPR may be discontinued and online medical direction contacted as needed

↓

- If there is a valid exclusion to resuscitation and there are signs of life (pulse and respirations), EMS providers should provide standard appropriate treatment under existing protocols according to the patient's condition. If the patient has a MOLST or POLST, it may provide specific guidance on how to proceed in this situation. Directives should be followed as closely as possible and online medical direction contacted as needed
- The patient should receive full treatment per protocols with the exception of any intervention specifically prohibited in the patient's valid exclusion to resuscitation
- If for any reason an intervention that is prohibited by an advanced directive is being considered, online medical direction should be obtained

↓

- In cases where the patient's status is unclear and the appropriateness of withholding resuscitation efforts is questioned, EMS personnel should initiate CPR immediately and contact online medical direction

↓

EMT-I/Paramedic

- If no CPR or airway management attempted, this does not exclude medications for pain as appropriate

Pediatric Respiratory Distress - Bronchiolitis

Child < 2 yo with wheezing or diffuse rhonchi.
Excludes suspected anaphylaxis, croup, epiglottitis, foreign body aspiration, submersion/drowning.

EMT

- ABCDE Assessment, full set of vitals signs (T, BP, RR, P, SaO_2)
- Suction nose and/or mouth (via bulb, Yankauer, or catheter) if needed
- Supplemental oxygen: escalate from nasal cannula to face mask to non-rebreather mask as needed in order to maintain normal oxygenation

↓

- BVM for children with respiratory failure

↓

AEMT

- IV should only be placed for clinical concerns of dehydration or for administration of IV medications
- Administer Epinephrine 0.5 mg (0.5 mL of 1:1,000 in 2.5 mL NS) nebulized for severe respiratory distress if suctioning and oxygen fail to result in clinical improvement

↓

- Patients receiving inhaled epinephrine should be transported to definitive care

↓

EMT-I/Paramedic

- Pulse oximetry and end-tidal carbon dioxide ($EtCO_2$) should be routinely used as an adjunct to other forms of monitoring
- Administer Epinephrine 0.5 mg (5 mL of 1:10,000 or 0.5 mL of 1:1,000 in 2.5 mL NS) nebulized for severe respiratory distress if suctioning and oxygen fail to result in clinical improvement

↓

- Patients receiving inhaled epinephrine should be transported to definitive care

↓

- If available, non-invasive positive pressure ventilation or high flow nasal cannula (HFNC) should be administered for severe respiratory distress
  - Do not delay administration of medication to administer non-invasive positive pressure ventilation
- Supraglottic devices and intubation should be utilized only if BVM ventilation fails. The airway should be managed in the least invasive way possible

Pediatric Croup

History of stridor or barky cough.
Excludes suspected anaphylaxis, foreign body aspiration, submersion/drowning, asthma, bronchiolitis.

EMT

- ABCDE Assessment, full set of vitals signs (T, BP, RR, P, SpO_2)
- Maintain position of comfort in accordance with safe transport guidelines
- Supplemental oxygen: escalate from nasal cannula to face mask to non-rebreather mask as needed in order to maintain normal oxygenation
- Suction nose and/or mouth (via bulb, Yankauer, or catheter) if excessive secretions are present

↓

- BVM for children with respiratory failure

↓

AEMT

- Administer Epinephrine 0.5 mg (0.5 mL of 1:1,000 in 2.5 mL NS) nebulized for severe respiratory distress if suctioning and oxygen fail to result in clinical improvement

↓

- Patients receiving inhaled epinephrine should be transported to definitive care

↓

EMT-I/Paramedic

- Pulse oximetry and $EtCO_2$ should be routinely used as an adjunct to other forms of monitoring

↓

- Epinephrine 0.5 mg (5 mL of 1:10,000 *or* 0.5 mL of 1:1,000 in 2.5 mL NS) nebulized if stridor at rest
  - May repeat dose with unlimited frequency for ongoing respiratory distress
- Dexamethasone 0.6 mg/kg (max dose 16 mg) PO, IV, or IM should be administered, if available

↓

- Patients receiving inhaled epinephrine should be transported to definitive care

↓

- If available, non-invasive positive pressure ventilation may be administered for severe respiratory distress
  - Do not delay administration of medication(s) to administer non-invasive positive pressure ventilation
- Supraglottic devices and intubation should be utilized only if BVM ventilation fails. The airway should be managed in the least invasive way possible

↓

- Consider performing 12-lead ECG, where available, only if there are no signs of clinical improvement after treating respiratory distress

Brief Resolved Unexplained Event (BRUE)/ Pediatric Apparent Life Threatening Event (ALTE)

A patient with an episode that is frightening to the observer with some combination of the following:
1) Absent, decreased or irregular breathing (apnea: central or obstructive) including choking or gagging; 2) Color change (usually cyanosis or pallor); 3) Marked change in muscle tone (flaccid or rigid).
Excludes: Age > 12 months**,** Seizure, Respiratory distress, Cardiopulmonary arrest, Trauma with known mechanism of injury.
Have high index of suspicion for abuse in children presenting with BRUE/ALTE.

EMT

- ABCDE Assessment, full set of vitals signs (T, BP, RR, P, SaO_2)
- If apneic, initiation bag-valve-mask ventilation
- Pulse oximetry should be routinely used as an adjunct to other monitoring
- Supplemental oxygen for signs of respiratory distress or hypoxemia: escalate from nasal cannula to face mask to non-rebreather mask as needed in order to maintain normal oxygenation
- Suction nose and/or mouth (via bulb, Yankauer, or catheter) if excessive secretions are present

↓

- Check blood glucose; refer to **Hypoglycemia** guideline if appropriate

↓

AEMT

- IVs should only be placed in children for clinical concerns of shock, or when administering IV medications

↓

EMT-I/Paramedic

- Place on cardiac monitor
- Pulse oximetry and $EtCO_2$ should be routinely used as an adjunct to other forms of monitoring

↓

- Supraglottic devices and intubation should be utilized only if bag-valve-mask ventilation fails in setting of respiratory failure or apnea. The airway should be managed in the least invasive way possible

↓

- Regardless of patient appearance, all patients with a history of signs or symptoms of BRUE/ALTE should be transported for further evaluation
  - Given possible need for intervention, all patients should be transported to facilities with baseline readiness to care for children, where available, per local protocol

Neonatal Resuscitation

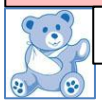
Newly born infants.
Excludes: Documented gestational age < 20 weeks. If any doubt about accuracy of gestational age, initiate resuscitation.

EMT

- Clamp cord in 2 places and cut between clamps if still attached to the mother
- Warm, dry, and stimulate
  - Wrap infant in dry towel and keep as warm as possible during resuscitation; keep head covered if possible
- If strong cry, regular respiratory effort, good tone, and term gestation, infant should be placed skin to skin with mother and covered with dry linen
- If weak cry, signs of respiratory distress, poor tone, or preterm gestation, position airway (sniffing position) and clear airway as needed. If thick meconium or secretions present *and* signs of respiratory distress, suction mouth then nose
- If heart rate > 100 beats per minute:
  - Monitor for central cyanosis and provide blow by oxygen as needed
  - Monitor for signs of respiratory distress. If apneic or in significant respiratory distress, initiate bag-valve-mask ventilation with room air at 40-60 breaths per minute
- If heart rate < 100 beats per minute:
  - Initiate bag-valve-mask ventilation with room air at 40-60 breaths per minute while monitoring heart rate closely
  - If no improvement after 90 seconds: change O2 delivery to 100% FiO2 until heart rate normalizes
- If heart Rate < 60 beats per minute:
  - Ensure effective ventilations with supplementary oxygen and adequate chest rise
  - If no improvement after 30 seconds, Initiate chest compressions (2 thumb technique preferred)
  - Coordinate chest compressions with positive pressure ventilation (3: 1 ratio, 90 compressions and 30 breaths per minute)

AEMT

EMT-I/Paramedic



- If apneic or in significant respiratory distress, consider endotracheal intubation as per local guidelines

- Epinephrine is indicated if the newborn's heart rate remains less than 60 beats/min after at least 30 seconds of positive pressure ventilation that moves the chest and another 60 seconds of chest compressions coordinated with PPV using 100% oxygen. Epinephrine is not indicated before you have established ventilation that effectively inflates the lungs.
  - Epinephrine 1:10,000, 0.01-0.03 mg/kg IV/IO
  - Epinephrine 1:10,000, 0.05-0.1 mg/kg ETT

Childbirth

Imminent delivery with crowning.
Excludes:
1. Vaginal bleeding in any stage of pregnancy without signs of imminent delivery (see **Obstetrical/Gynecological Conditions** guideline).
2. Emergencies in first or second trimester of pregnancy (see **Obstetrical/Gynecological Conditions** guideline).
3. Seizure from eclampsia (see **Seizure** guideline), which can occur up to 6 weeks post partum.

EMT

- Delivery should be controlled

- If complications of delivery are identified, follow the following steps:
  - Shoulder Dystocia – if delivery fails to progress after head delivers, quickly attempt the following
    - Hyperflex mother's hips to severe supine knee-chest position
    - Apply firm suprapubic pressure to attempt to dislodge shoulder
    - Apply high-flow oxygen to mother
  - Prolapsed Umbilical Cord
    - Placed gloved fingers between infant and uterus to avoid compression of cord
    - Consider placing mother in prone knee-chest position
    - Apply high-flow oxygen to mother
  - Maternal cardiac arrest:
    - Apply manual pressure to displace uterus from right to left
    - See **Cardiac Arrest (VF/VT/Asystole/PEA)** guideline for resuscitation care
    - Transport as soon as possible if infant is estimated to be over 24 weeks gestation (perimortem Cesarean section at receiving facility is most successful if done within 5 minutes of maternal cardiac arrest)
  - Breech birth – if head fails to deliver:
    - Placed gloved hand into vagina with fingers between infant's face and uterine wall to create an open airway
    - Apply high-flow oxygen to mother
- Transport as soon as possible
- Contact online medical direction and/or closest appropriate receiving facility for direct medical oversight and to prepare team

- Support the newborn's head as needed
- Check the umbilical cord surrounding the neck. If present, slip it over the head. If unable to free the cord from the neck, double clamp the cord and cut between the clamps
- Do NOT routinely suction the infant's airway (even with a bulb syringe) during delivery
- Grasping the head with hand over the ears, gently pull down to allow delivery of the anterior shoulder
- Gently pull up on the head to allow delivery of the posterior shoulder
- Slowly deliver the remainder of the infant
- Clamp cord 2 inches from the abdomen with 2 clamps and cut the cord between the clamps
- Record APGAR scores at 1 and 5 minutes. After delivery of infant, suctioning (including suctioning with a bulb syringe) should be reserved for infants who have obvious obstruction to the airway or require positive pressure ventilation (follow **Neonatal Resuscitation** guideline for further care of the infant)

- The placenta will deliver spontaneously, often within 5-15 minutes of the infant. Do not force the placenta to deliver. Contain all tissue in plastic bag and transport
- After delivery, massaging the uterus and allowing the infant to nurse will promote uterine contraction and help control bleeding

EMT-I/Paramedic

- If pre-eclamptic (BP >140/90 and blurred vision, dizziness, headache, altered mental status, peripheral edema, abdominal pain, nausea, or vomiting):
  - Magnesium sulfate (Paramedic Only) 4-6 gm IV over 10-15 minutes

Obstetrical/Gynecologic Conditions

Includes female patient with vaginal bleeding in any trimester, female patient with pelvic pain or possible ectopic pregnancy. Maternal age at pregnancy may range from 10 to 60 years of age .

Excludes:

1. Childbirth and active labor (see **Childbirth** guideline).
2. Seizure related to pregnancy/eclampsia (see **Seizures** guideline), which can occur up to 6 weeks post partum.
3. Post-partum hemorrhage (see **Childbirth** guideline).

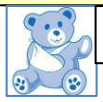
EMT

- Vital signs, skin color
- Monitor pulse oximetry if signs of hypotension or respiratory symptoms

- If signs of shock or orthostasis, position patient supine and keep patient warm
- Patients in third trimester of pregnancy should be transported on left side or with uterus manually displaced to left if hypotensive
- Do not place hand/fingers into vagina of bleeding patient except in cases of prolapsed cord or breech birth that is not progressing

AEMT

- If signs of shock or orthostasis, NS 1-2 L IV/IO
- Reassess vital signs and response to fluid resuscitation



EMT-I/Paramedic

- Monitor ECG if history of syncope or lightheadedness

- If pre-eclamptic (BP >140/90 and blurred vision, dizziness, headache, altered mental status, peripheral edema, abdominal pain, nausea, or vomiting):
  - Magnesium sulfate (Paramedic Only) 4-6 gm IV over 10-15 minutes

Nausea/Vomiting: Adult & Pediatric

Patients currently nauseated and/or vomiting.

EMT

- Vital signs

AEMT

- Consider NS bolus 500 mL IV, unless contraindicated (history of CHF, renal failure)
- May repeat as indicated

- Consider NS bolus 20 mL/kg IV, unless contraindicated (history of CHF, renal failure)

EMT-I/Paramedic

- Ondansetron 4 mg PO/IV

- Ondansetron 0.15 mg/kg PO/IV (max 4 mg)

Airway Management: Adult & Pediatric

Children and adults with signs of severe respiratory distress/respiratory failure.
Patients with evidence of hypoxemia or hypoventilation.
Excludes:
1. Patients with tracheostomies.
2. Chronically ventilated patients.
3. Newborn patients.
4. Patients in whom oxygenation and ventilation is adequate with supplemental oxygen via nasal cannula or face mask alone.

EMT

- Use bag-valve mask (BVM) ventilation in the setting of respiratory failure or arrest
- Consider the addition of oropharyngeal airways (OPA) and nasopharyngeal airways (NPA) to make BVM more effective

- Use appropriate sized mask with BVM
- Avoid excessive pressures or volumes during BVM

AEMT

- Consider the use of a supraglottic airway (SGA) if BVM is not effective in maintaining oxygenation or ventilation
- Tubes should be secured with a commercial tube holder or tape

- Use least invasive means of airway management

EMT-I/Paramedic

- Non-invasive ventilation techniques for severe respiratory distress or impending respiratory failure:
  - Continuous positive airway pressure (CPAP)
  - Bilevel positive airway pressure (i.e. BiPAP)

- Avoid endotracheal intubation unless less invasive methods fail
- For children < 8 years old, only option for cricothyroidotomy is needle cricothyroidotomy

- Gastric decompression may improve oxygenation and ventilation

- When less invasive methods are ineffective, use endotracheal intubation
- Tubes should be secured with a commercial tube holder or tape
- Monitor clinical signs, pulse oximetry and capnography for the intubated patient
  - $EtCO_2$ should be used to verify tube placement and prevent hyper- or hypoventilation

- Consider cricothyroidotomy (**Paramedic only**) when patients cannot be oxygenated/ ventilated with above interventions and the risk of death seems to outweigh the risk of a procedural complication

Pulmonary Edema: Adult & Pediatric

Respiratory distress with presence of rales.
Clinical impression consistent with congestive heart failure.
Excludes:
1. Clinical impression consistent with infection (e.g. fever).
2. Clinical impression consistent with asthma/COPD.

EMT

- Manage airway as necessary
- Provide supplemental oxygen as needed to maintain $SaO_2 \geq 94\%$

AEMT

- Establish IV access

- Nitroglycerin 0.4 mg SL if SBP > 100
  - May repeat every 3-5 minutes

EMT-I/Paramedic

- Cardiac monitoring
- Perform 12-lead ECG, where available
- End-tidal CO_2 monitoring

- Non-invasive positive pressure ventilation should be administered for severe respiratory distress **(Paramedic Only)** per local protocol
- Consider advanced airway for severe distress or if not improving with less invasive support

- If high altitude pulmonary edema suspected, follow **Altitude Illness** guideline

General Trauma Management: Adult & Pediatric

Patients of all ages who have sustained an injury as a result of mechanical trauma. This includes both blunt and penetrating injury as well as burns.

EMT

- Assess scene safety
- Determine number of patients
- Determine mechanism of injury
- Request additional resources if necessary
- Consider declaration of mass casualty if needed
- Use appropriate personal protective equipment (PPE)

- Primary survey
  - ABCDE assessment
  - Establish patent airway with cervical spine precautions (see **Airway Management** and **Spinal Care** guidelines)
  - Hemorrhage control (see **External Hemorrhage** guideline)
    - Apply direct pressure or tourniquet (if extremity hemorrhage) as needed to control bleeding

- Monitor oxygen saturation, provide supplemental oxygen

- For open chest wound, place semi-occlusive dressing
- If pelvis is unstable and patient is hypotensive, place pelvic binder or sheet to stabilize pelvis
- Maintain spine precautions per **Spinal Care** guideline
- Splint extremity deformities per **Extremity Trauma** guideline

- If clinical signs of traumatic brain injury, see **Head Injury** guideline

AEMT

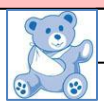
- Establish IV access
- If SBP < 90 mm Hg or HR > 120, give bolus of 1 L NS or LR and reassess

- If tachycardia for age with signs of poor perfusion, give 20 mL/kg NS or LR bolus and reassess

- Provide pain medications per **Pain Management** guideline

EMT-I/Paramedic

- If absent or diminished breath sounds in a hypotensive patient, consider tension pneumothorax, perform needle decompression



- Avoid hypothermia
- Transport to most appropriate facility per local protocol

Blast Injuries: Adult & Pediatric

Patients exposed to explosive force (injuries may include any or all of the following: blunt and/or penetrating trauma, burns, pressure-related injuries (barotrauma), and toxic chemical contamination).

EMT

- Assess scene safety

- Assess airway patency
- Hemorrhage control (see **External Hemorrhage** guideline)
- ABCDE assessment
- Monitor oxygen saturation, provide supplemental oxygen
- Assist respirations as needed

- For open chest wound, place semi-occlusive dressing
- Splint extremity deformities per **Extremity Trauma** guideline

- If clinical signs of traumatic brain injury, see **Head Injury** guideline
- Apply spinal precautions as per **Spinal Care** guideline
- Monitor GCS during transport to assess for changes

AEMT

- Establish IV access with 2 large bore IVs or IOs
- Consider IVF per **General Trauma** or **Burn** guideline

EMT-I/Paramedic

- If thermal or chemical burn to airway is suspected, early airway control is vital (see **Airway Management** guideline)

- If patient has evidence of tension pneumothorax (decreased or absent breath sounds and signs of shock), perform needle decompression

Burns: Adult & Pediatric

Includes patients sustaining thermal burns.
Excludes: Electrical, chemical, and radiation burns (see **Toxins and Environmental** section)

EMT

- ABCDE assessment, resuscitation as indicated
- Assess airway patency
- Monitor oxygen saturation, provide supplemental oxygen as needed or if patient rescued from confined space
- Assist respirations as needed

- Stop the burning:
  - Soak clothing and skin with water if burning or smoldering
  - Remove clothing if not stuck to patient
  - Remove jewelry
- Leave blisters intact
- Cover burns with dry dressing or clean sheet

- Estimate BSA burned and depth of burn (burn charts in Appendix)

AEMT

- Use length-based tape for weight estimate

- Establish IV access, avoid placement through burned skin
- Initiate fluid resuscitation: Use lactated ringers or normal saline
  - If patient in shock, give fluid per **Shock** guideline
  - If patient not in shock: Begin fluids based on estimated TBSA. Initial fluid rate can also be calculated as: body weight (kg) X TBSA = cc of fluid to be given in first 2 hours

- Manage pain appropriately (refer to **Pain Management** guideline)

EMT-I/Paramedic

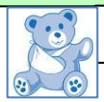
- $EtCO_2$ monitoring
- If thermal burn to airway is suspected, early airway control is vital (see **Airway Management** guideline)

External Hemorrhage Management: Adult & Pediatric

Includes patients with bleeding.

EMT

- Apply direct pressure/pressure dressing to injury



- If direct pressure ineffective or impractical (hemorrhage not controlled)
  - and wound amenable to tourniquet placement (e.g. extremity injury):
    - Apply a tourniquet*
  - and wound *not* amenable to tourniquet placement (e.g. junctional injury):
    - Apply a topical hemostatic agent# with direct pressure

- If tourniquet applied, do not release a properly-applied tourniquet until the patient reaches definitive care

*Use of tourniquet for extremity hemorrhage is strongly recommended if sustained direct pressure 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.

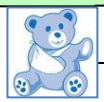
#Apply a topical hemostatic agent, in combination with direct pressure, for wounds in anatomic areas where tourniquets cannot be applied and sustained direct pressure alone is ineffective or impractical; Only apply topical hemostatic agents in a gauze format that supports wound packing; Only utilize topical hemostatic agents which have been determined to be effective and safe in a standardized laboratory injury model.

Extremity Trauma: Adult & Pediatric

Includes patients with amputations or potential extremity fractures or dislocations.

EMT

- Evaluate for deformity, instability
- Evaluate neuro status of extremity
- Evaluate for pallor, pulse, capillary refill, degree of bleeding/blood loss, with assessment of the color of the blood and if it is pulsatile or not



- For active bleeding, see **External Hemorrhage Control** guideline

- Stabilize suspected fractures/dislocations
  - If distal vascular function is compromised, gently attempt to restore normal anatomic position
  - Use splints as appropriate to limit movement of suspected fracture
  - Reassess distal neurovascular status after any manipulation or splinting
  - Elevate extremity fractures above heart level whenever possible to limit swelling
- Apply ice/cool packs to limit swelling in suspected fractures or soft tissue injury; do not apply ice directly to skin

- Transport amputated part(s) wrapped in a dry, sterile dressing. Place in a water tight container or plastic bag. Keep cool but do not place directly on ice.

AEMT

- Manage pain (see **Pain Management** guideline)

- Strongly consider pain management before attempting to move a suspected fracture

EMT-I/Paramedic

Facial Trauma: Adult & Pediatric

Includes patients with Isolated facial injury, including trauma to the eyes, nose, ears, midface, mandible, dentition.
Excludes: **General Trauma, Burns**.

EMT

- ABCDE assessment with focus on ability to keep airway patent
  - Stable midface
  - Stable mandible
  - Stable dentition
  - Bleeding
- Oxygen supplementation based on hypoxia to maintain O_2 saturation $\geq$ 94%

- Overall trauma assessment for spinal injury, head injury

- Avulsed teeth should be collected on scene
  - Avoid touching the root of the avulsed tooth. Do not wipe off tooth
  - Pick up at crown end. If dirty, rinse off under cold water for 10 seconds
  - Place in milk or saline as the storage medium.

- Eye trauma: consider eye shield
  - If globe is avulsed, do not put back into socket; cover with moist saline dressings
- Mandible unstable: have suction available
- Epistaxis: squeeze nose for 10-15 minutes
- Nose/ear avulsion: recover tissue if it does not waste scene time; wrap tissue in sterile gauze moistened with sterile saline

AEMT

- IV access as needed for fluid or pain medication administration
- Manage pain (see **Pain Management** guideline)

EMT-I/Paramedic

- Use $ETCO_2$ to help monitor for hypoventilation and apnea

Traumatic Brain Injury: Adult & Pediatric

Adult or pediatric patient with blunt or penetrating head injury.

EMT

- ABCDE assessment with focus on ability to keep airway patent, GCS
- Continuous pulse oximetry
- Oxygen supplementation 15 L/min; prevent any desaturation < 90%
  - Airway maneuvers, BVM 10 breaths/min as needed to maintain $SaO_2 \geq 90\%$
- Do not hyperventilate patient unless signs of herniation
- Frequent blood pressure, SaO2, HR measurement (every 3-5 minutes)

- BVM ventilation rates for $SaO_2 < 90\%$
  - Infants (0-24 mo): 25 breaths/min
  - Children (2-14 yrs): 20 breaths/min
  - Adolescents (15-17 yrs): 10 breaths/min (same as adults)

- Maintain cervical stabilization (see **Spinal Care** guideline)
- Control bleeding with direct pressure if no suspected open skull injury
- Evaluate blood glucose (see **Hypoglycemia** guideline)
- Trend neurologic status assessment (GCS or AVPU)

AEMT

- Do not delay transport to initiate IV access
- IV access as needed for fluid administration
- Avoid hypotension
  - For SBP < 90 mmHg or other signs of shock
    - Initial bolus 1 L NS or LR
    - Continue IVF at sufficient rate to keep SBP ≥ 90 mmHG

- Hypotension in children
  - 0-9 yrs: SBP < [70 + (age in years x 2)]
  - ≥ 10 yrs: SBP < 90 mmHg
- For hypotension or other signs of shock
  - 20 mL/kg bolus NS
  - Repeat until hypotension resolves

EMT-I/Paramedic

- Use $ETCO_2$ to monitor for hypoventilation and apnea; target $ETCO_2$ 35-40 mm Hg
- Consider advanced airway if experienced provider available
  - Pre-oxygenate with 100% O_2 BVM 10 breaths/min

- Consider advanced airway if experienced provider available
  - Pre-oxygenate with 100% O_2 BVM at age-appropriate rate

- Avoid nasal intubation

Spinal Motion Restriction (SMR): Adult & Pediatric

Adult or pediatric patient with traumatic mechanism of injury.

EMT

- Assessment:
  - In position that patient was found, if scene safety allows
  - Consider SMR if high risk characteristic/mechanism
    - Age > 65
    - Trauma triage mechanism criteria
      - Falls > 20 feet
      - High-risk auto crash
        - Intrusion: >12 in. occupant site; >18 in. any site
        - Ejection (partial or complete) from auto
        - Death in same passenger compartment
      - Auto vs. pedestrian/bicyclist thrown, run over, or with significant (>20 mph) impact
      - Motorcycle crash > 20 mph
    - Axial load injuries, diving injuries
    - Sudden acceleration/deceleration, lateral bending forces to neck/torso
    - Violent impact or injury to head, neck, torso, pelvis

- Consider SMR if high risk characteristic/mechanism
  - Trauma triage mechanism criteria
    - Falls > 20 feet
    - High-risk auto crash
      - Roll-over
      - Head-on collision
      - Speed > 55 mph
      - Intrusion: >12 in. occupant site; >18 in. any site
      - Ejection (partial or complete) from auto
      - Death in same passenger compartment
    - Auto vs. pedestrian/bicyclist thrown, run over, or with significant (>20 mph) impact
    - Motorcycle crash > 20 mph
  - Axial load injuries, diving injuries
  - Sudden acceleration/deceleration, lateral bending forces to neck/torso
  - Violent impact or injury to head, neck, torso, pelvis

- Apply SMR IF ANY of the following:
  - Altered LOC (GCS < 15)
  - Unreliable patient interaction
    - Communication/language barrier that prevents accurate assessment
    - Lack of cooperation during exam
    - Evidence of drug or alcohol intoxication
    - Another severe or painful distracting injury is present, such as long bone fracture
  - Midline neck/spine pain or tenderness
  - Anatomic deformity of spine
  - Neurologic deficit or complaint (e.g. numbness, tingling, paresthesia)

- Apply SMR IF ANY of the following:
  - Altered LOC (GCS < 15)
  - Unreliable patient interaction
    - Language barriers; inability to communicate; age < 2 yr
    - Lack of cooperation during exam
    - Evidence of drug or alcohol intoxication
    - Another severe or painful distracting injury is present, such as long bone fracture
  - Midline neck/spine pain or tenderness
  - Anatomic deformity of spine
  - Torticollis
  - Neurologic deficit or complaint (e.g. numbness, tingling, paresthesia)

- For patients with penetrating neck injuries,
  - Apply SMR if focal neurologic deficit or complaint (e.g. unilateral numbness, weakness, or paresthesia)

- Patients should not routinely be transported on long boards, unless the clinical situation warrants long board use. In these rare situations, long boards should be padded or have a vacuum mattress applied.

- Extrication: after placing cervical collar, patient should be allowed to self-extricate

- Extrication: after placing cervical collar,
  - Children in booster seat should be allowed to self-extricate
  - Infants and toddlers already strapped in a car seat with a built-in harness should be extricated while strapped in his/her car seat

Low risk characteristics/mechanisms for adults
- Simple rear end collision
- Ambulatory on scene at any time
- No neck pain on scene
- No midline cervical tenderness

Helmet removal:
- If a football helmet needs to be removed, it is recommended to remove the face mask followed by manual removal (rather than the use of automated devices) of the helmet while keeping the neck immobilized. Occipital padding should be applied, as needed, with the patient in a supine position, in order to maintain neutral cervical spine positioning

Poisoning/Overdose Universal Care: Adult & Pediatric

Presentation may vary depending on the concentration and duration of exposure.
Poisoning may occur by

- Absorption
- Ingestion
- Inhalation
- Injection

Refer to guidelines for specific agents as indicated.
National 24-hour toll-free telephone number to poison control centers: **1-800-222-1222**.

EMT

- Ensure scene is safe
- Consider Body Substance Isolation or appropriate personal protective equipment (PPE)
- Remove patient from hazardous material environment/decontaminate to remove continued sources of exposure
- ABCDE assessment, vital signs
- Check blood glucose level
- Assess risk for organ impairments (heart, brain, kidney)
- Treat signs and symptoms in effort to stabilize patient
- Assure a patent airway
- Administer oxygen and if hypoventilation, support breathing with BVM ventilation
- Maintain or normalize patient temperature

- Children often show signs of poisoning before adults due to increased absorption of toxin
- When wet decontaminating children, attempt to prevent hypothermia
- Wet infants are slippery; care should be exercised during decontamination to avoid additional injuries

AEMT

- Identify intoxicating agent by toxidrome or appropriate environmental testing
- Identify antidote or mitigating agent

- Initiate IV access for infusion of lactated ringers or normal saline
  - Fluid bolus (20 mL/kg) if evidence of hypoperfusion

EMT-I/Paramedic

- Monitor pulse oximetry and end-tidal CO_2 ($ETCO_2$) for respiratory decompensation
- Ensure maintenance of airway, oxygenation, and ventilation
- Place on cardiac monitor
- Consider blood samples if EMS management might change value (e.g. glucose, cyanide)
- Monitor ECG, where available, with special attention to rate, rhythm, QRS and QT duration

- Symptomatic dystonia, extrapyramidal signs or symptoms: consider diphenhydramine 1 mg/kg IV/IO or IM (max dose 25 mg)
- Supraglottic devices and intubation should be utilized only if BVM ventilation fails. The airway should be managed in the least invasive way possible

- Symptomatic dystonia, extrapyramidal signs or symptoms: consider diphenhydramine 25 mg IV/IO or IM

Acetylcholinesterase Inhibitors (Carbamates, Nerve Agents, Organophosphates): Adult & Pediatric

DUMBELS mnemonic used to describe the signs and symptoms of acetylcholinesterase inhibitors:

D Diarrhea
U Urination
M Miosis (pinpoint pupils)/Muscle weakness
B Bronchospasm/Bronchorrhea
E Emesis
L Lacrimation
S Salivation/Sweating

Penetration into the central nervous system can cause seizures, lethargy or unresponsiveness, apnea, death.

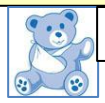
EMT

- Don appropriate personal protective equipment (PPE)
- Remove patient's clothing and wash the skin with soap and water
- ABCDE assessment, vital signs, assess pupils
- Administer oxygen
- Maintain or normalize patient temperature

- Children often show signs of poisoning before adults due to increased absorption of toxin
- When wet decontaminating children, attempt to prevent hypothermia

AEMT

- Establish IV access (if possible)



EMT-I/Paramedic

- Apply a cardiac monitor
- Continuous and ongoing patient reassessment is critical

- Atropine 0.05-0.1 mg/kg IM, up to 1-4 mg/dose
  - Repeated doses should be administered liberally
  - Clinical improvement should be based upon the drying of secretions and easing of respiratory effort

- Atropine 2-6 mg IM
  - Repeated doses should be administered liberally
  - Clinical improvement should be based upon the drying of secretions and easing of respiratory effort

- For patients with seizure activity:
  - Lorazepam, diazepam or midazolam, per local Seizure protocol

Radiation Exposure: Adult & Pediatric

Patients exposed to a known or suspected source of radiation, particularly patients exhibiting the signs and symptoms of acute radiation toxicity:

a. Nausea
b. Vomiting
c. Petechiae
d. External bleeding
e. Suspected internal bleeding
f. Dizziness
g. Headache
h. Altered mental status

Most patients will be asymptomatic initially.

EMT

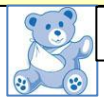
- Ensure scene safety
- Don appropriate personal protective equipment (PPE)
- Exercise universal precautions at all times
- Decontamination should not delay the stabilization of traumatic injuries
- Place contaminated towels, waste water, and body fluids in secured containers denoted for radioactive waste materials
- For skin exposures:
  - Remove patient's clothing and wash the skin with wet gauze or water
- For inhalation contamination:
  - Administer oxygen
  - Maintain the airway
- ABCDE assessment, vital signs

- When wet decontaminating children, attempt to prevent hypothermia

- Trauma patients who have been exposed to or contaminated by radiation should be triaged and treated on the basis of the severity of their conventional injuries

AEMT

- Refer to **Trauma** guidelines as indicated.



EMT-I/Paramedic

- Refer to **Trauma** guidelines as indicated.

Topical Chemical Burn: Adult & Pediatric

Patients exposed to a chemical that can cause a topical burn in a delayed clinical presentation.

EMT

- Don the appropriate personal protective equipment (PPE)
- Remove the patient's clothing, if necessary
  - Contaminated clothing should preferably be placed in bags
- Carefully brush off solid chemical prior to flushing as the irrigating solution may activate a chemical reaction
- Flush the patient's skin (and eyes if involved) with copious amounts of water or normal saline
- Calculate the estimated total body surface area that is involved
- ABDCE assessment, vital signs
- For hydrofluoric acid exposure:
  - Apply generous amounts of calcium gluconate gel to the exposed skin sites

- Take measures to minimize hypothermia

AEMT

- Initiate IV fluid resuscitation if necessary to obtain hemodynamic stability

EMT-I/Paramedic

- Refer to **Pain Management** guideline, per local protocol
- For chemical burns of the eye:
  - Proparacaine eye drops for pain control

- For hydrofluoric acid exposure:
  - Apply a cardiac monitor as hypocalcemia may occur
  - If clinically significant signs and symptoms of hypocalcemia, administer Calcium Chloride 10% IV/IO (**Paramedic only**)

Stimulant Poisoning/Overdose: Adult & Pediatric

Substances include cocaine, amphetamines, phencyclidine (PCP), Ecstasy, methamphetamine, bath salts.

EMT

- ABDCE assessment, vital signs including temperature
  - Refer to **Hyperthermia/Heat Exposure** guideline as needed
- Check blood glucose level
- Check for trauma, self-inflicted injury
- Ask about chest pain and difficulty breathing

- Children may experience acute coronary syndrome due to coronary artery vasospasm caused by cocaine.
- Seizures are more common serious event due to stimulant poisoning.

- Treat chest pain as Acute Coronary Syndrome
- Refer to **Agitated or Violent Patient** guideline if indicated

AEMT

- IV access if need for fluids or medications
  - Give fluids for poor perfusion

EMT-I/Paramedic

- Apply a cardiac monitor and examine rhythm strip for arrhythmias
- Monitor end-tidal CO_2 ($ETCO_2$) for respiratory decompensation

- Perform 12-lead ECG, where available
  - Follow STEMI protocol if indicated

Cyanide Exposure: Adult & Pediatric

Suspect in occupational or smoke exposures (i.e. firefighting), industrial accidents, natural catastrophes, suicide and murder attempts, chemical warfare and terrorism.
Signs and symptoms of high concentration of cyanide include hypotension, cardiac arrest, altered level of consciousness, loss of consciousness, arrhythmias, cardiovascular collapse, and seizure.
Non-specific and early signs of cyanide exposure include anxiety, vertigo, weakness, headache, tachypnea, nausea, dyspnea, vomiting, and tachycardia.

EMT

- Remove patient from toxic environment
- If indicated, expose patient, then cover to retain body heat
- ABDCE assessment, vital signs including temperature
- Check blood glucose level

- For patients with appropriate history and manifesting one or more signs or symptoms of high concentration of cyanide:
  - 100% oxygen via non-rebreather mask or BVM

AEMT

EMT-I/Paramedic

- Apply a cardiac monitor and examine rhythm strip for arrhythmia potentials
- Consider 12-lead ECG, where available
- Monitor pulse oximetry and end-tidal CO_2 ($ETCO_2$) for respiratory decompensation

- For patients with appropriate history and manifesting one or more signs or symptoms of high concentration of cyanide:
  - Hydroxocobalamin (Cyanokit)
    - Consider collecting a pre-treatment blood sample
    - 70 mg/kg slow IV over 15 minutes; (maximum dose 5 gm)
    - Additional dose per local protocol

- For patients with appropriate history and manifesting one or more signs or symptoms of high concentration of cyanide:
  - Hydroxocobalamin (Cyanokit)
    - Consider collecting a pre-treatment blood sample
    - 5 gm slow IV over 15 minutes
    - Additional dose per local protocol

- If patient seizing, consider lorazepam, midazolam or diazepam per local Seizure protocol; refer to **Seizure** guideline

Beta Blocker Poisoning/Overdose: Adult & Pediatric

Patients present with:
a. Bradycardia
b. Hypotension
c. Lethargy
d. Weakness
e. Shortness of breath
f. Possible seizures

EMT

- ABCDE assessment, vital signs including temperature
- Check blood glucose level

- Identify medication taken, noting immediate release vs. sustained release formulations

- Immediate blood glucose level check, as beta blockers cause hypoglycemia in pediatric patients

AEMT

- For hypotension, IV/IO fluids 20 mL/kg

- For symptomatic patient, consider glucagon 1mg IV every 5 minutes (may require 6 mg to see clinical effects)

- For hypoglycemia, refer to **Hypoglycemia** guideline

- For symptomatic patient, consider glucagon:
  - < 25 kg: 0.5 mg IV every 5 minutes as necessary
  - 25-40 kg: 1 mg IV every 5 minutes as necessary

EMT-I/Paramedic

- Apply a cardiac monitor, examine rhythm strip for arrhythmias; consider 12-lead ECG where available
- Monitor pulse oximetry and end-tidal CO_2 ($ETCO_2$) for respiratory decompensation

- Consider ondansetron if glucagon given

- For symptomatic bradycardia, consider atropine sulfate 1 mg IV/IO every 5 minutes to max of 3 mg

- For symptomatic bradycardia, consider atropine sulfate 0.02 mg/kg (0.5 mg max) IV/IO every 5 minutes to max total dose of 1 mg IV/IO

Calcium Channel Blocker Poisoning/Overdose: Adult & Pediatric

Patients present with:
a. Bradycardia
b. Hypotension
c. Decreased AV nodal conduction
d. Cardiogenic shock

EMT

- ABCDE assessment, vital signs including temperature
- Check blood glucose level

- Identify medication taken, noting immediate release vs. sustained release formulations, time of ingestion, and quantity

AEMT

- For symptomatic patient, consider glucagon 1mg IV every 5 minutes (may require 5-15 mg to see clinical effects)

- For symptomatic patient, consider glucagon:
  - < 25 kg: 0.5 mg IV every 5 minutes as necessary
  - 25-40 kg: 1 mg IV every 5 minutes as necessary

- Consider IV fluids (NS or LR) 20 mL/kg, up to 2 L

- Consider IV fluids (NS or LR) 20 mL/kg, up to 1 L

EMT-I/Paramedic

- Apply a cardiac monitor, examine rhythm strip for arrhythmias; consider 12-lead ECG where available
- Monitor pulse oximetry and end-tidal CO_2 ($ETCO_2$) for respiratory decompensation

- For symptomatic bradycardia, consider atropine sulfate 0.02 mg/kg (max 0.5 mg) IV every 5 minutes to max of 1 mg

- Consider calcium chloride (**Paramedic Only**) 20 mg/kg (0.2 ml/kg) slow IVP/IO (50 mg/minute), maximum dose 1 gm or 10 mL

- Consider ondansetron if glucagon given

- For symptomatic bradycardia, consider atropine sulfate 1 mg IV every 5 minutes to max of 3 mg

- Consider calcium chloride (**Paramedic Only**) 0.5-1 gm slow IVP/IO (50 mg/minute)

- Consider vasopressors after adequate fluid resuscitations for the hypotensive patient:
  - Dopamine: 2 mcg/kg/min, titrate 2-20 mcg/kg/minute **(Paramedic Only)**
    - Titrate to maintain SBP > 90 mm Hg

- Consider transcutaneous pacing

Carbon Monoxide/Smoke Inhalation: Adult & Pediatric

Known or suspected exposure to carbon monoxide or smoke from fire, propane or charcoal stoves/heaters, or combustion engines.

Patients may present with:

1. Mild
   a. Nausea
   b. Fatigue
   c. Headache
   d. Vertigo
   e. Lightheadedness
2. Moderate to Severe
   a. Altered Mental Status
   b. Tachypnea
   c. Tachycardia
   d. Convulsion
   e. Cardiopulmonary Arrest

EMT

- Remove patient from toxic environment

- ABCDE assessment, vital signs including temperature
- Check blood glucose level
- 100% oxygen via non-rebreather mask or bag valve mask
- If seizure, see **Seizure** guideline

AEMT

EMT-I/Paramedic

- Apply a cardiac monitor, examine rhythm strip for arrhythmias; consider 12-lead ECG where available
- Monitor pulse oximetry and end-tidal CO_2 ($ETCO_2$) for respiratory decompensation

Opioid Poisoning/Overdose: Adult & Pediatric

Includes patients of all ages with access to opioids and known or suspected opioid use or abuse.
Excludes patients with altered mental status exclusively from other causes (e.g. head injury, hypoxia, or hypoglycemia)

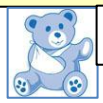
EMT

- ABCDE assessment
- Support patient's airway by positioning, oxygen administration, and ventilation assistance with bag valve mask if necessary
- For respiratory depression, perform critical resuscitation, then consider naloxone administration 0.4-2 mg IM/IN (max 4 mg)
  - IN: divide dose equally between nostrils to max of 1 mL per nostril
  - May assist with patient's own autoinjector
- Identify medication taken, noting immediate release vs. sustained release formulations, time of ingestion, and quantity
- Assess for other etiologies of altered mental status including hypoxia, hypoglycemia, hypotension, and traumatic head injury
- Monitor for recurrent respiratory depression and decreased mental status
- Consider transport to hospital if poisoning is by oral opioid

- Consider naloxone administration 0.1 mg/kg IM/IN (max 2 mg)
  - IN: divide dose equally between nostrils to max of 1 mL per nostril

AEMT

- Naloxone may be given via IV route



EMT-I/Paramedic

- Naloxone may be given via ETT or IV/IO route

Bites and Envenomation: Adult & Pediatric

Bites, stings, and envenomations can come from a variety of marine and terrestrial animals and insects causing local or systemic effects. Patients may present with toxin specific reactions. There is a spectrum of toxins or envenomations and limited EMS interventions that will have any mitigating effect on the patient in the field. The critical intervention is to get the patient to a hospital that has access to the antivenin if applicable.

EMT

- ABCDE assessment, vital signs including temperature
- Check blood glucose level

- Pain control, including limited external interventions to reduce pain (see **Pain Management** guideline)
- **DO NOT** perform the following:
  - Tourniquet or constricting bands
  - Incision and/or suction
  - Application of cold packs
- If seizure, see **Seizures** guideline
- Envenomations known to have antivenin or antitoxin (e.g. scorpion, fanged snakes, black widow spider, octopi, lizards): consider transport to hospital that has access to antivenin if feasible

AEMT

- Consider IV fluids (NS or LR) 20 mL/kg, up to 2 L

- Consider IV fluids (NS or LR) 20 mL/kg, up to 1 L

EMT-I/Paramedic

- Apply a cardiac monitor, examine rhythm strip for arrhythmias; consider 12-lead ECG where available
- Monitor pulse oximetry and end-tidal CO_2 ($ETCO_2$) for respiratory decompensation

- Consider vasopressors after adequate fluid resuscitations for the hypotensive patient:
  - Dopamine: 2 mc/kg/min, titrate to 2-20 mcg/kg/minute **(Paramedic Only)**
    - Titrate to maintain SBP > 90 mm Hg

Hyperthermia/Heat Exposure: Adult & Pediatric

Heat cramps are minor muscle cramps usually in the legs and abdominal wall. Temperature is normal.
Heat exhaustion has both salt and water depletion usually of a gradual onset. As it progresses tachycardia, hypotension, elevated temperature, and very painful cramps occur. Symptoms of headache, nausea and vomiting occur. Heat exhaustion can progress to heat stroke.
Heat stroke occurs when the cooling mechanism of the body (sweating) ceases due to temperature overload and/or electrolyte imbalances. Temperature is usually > 104 F. When no thermometer is available, it is distinguished from heat exhaustion by altered level of consciousness.
Excludes: Fever from infectious or inflammatory conditions, malignant hyperthermia, neuroleptic malignant syndrome

EMT

- ABCDE assessment, vital signs including temperature

- Move patient to a cool area and shield from the sun or any external heat source
- Remove as much clothing as is practical and loosen any restrictive garments
- If alert and oriented, give small sips of cool liquids
- If altered mental status, check blood glucose level
- Maintain airway vigilance for emesis, seizure
- If temperature is > 104 degrees F (40 degrees C) or if altered mental status is present, begin active cooling by:
  - Continually misting the exposed skin with tepid water while fanning the victim (most effective)
  - Truncal ice packs may be used, but are less effective than evaporation
- Shivering should be treated as soon as possible

AEMT

- Establish IV access for heat stroke
- Give cool fluids at 20 mL/kg boluses and reduce to 10 mL/kg boluses when vital signs are stable

EMT-I/Paramedic

- Place on cardiac monitor and record ongoing vital signs and level of consciousness
- Monitor for arrhythmia and cardiovascular collapse (see **Cardiovascular** section)

- Monitor for shivering and seizures:
  - Midazolam 0.1 mg/kg IV/IO or 0.2 mg/kg IN/IM (max 1 mg)
  - Lorazepam 0.1 mg/kg IV/IM/IO (max 1 mg)
  - Diazepam 0.2 mg/kg IV/IO or 0.5 mg/kg PR

- Monitor for shivering and seizures:
  - Midazolam 2.5 mg IV/IN/IO or 5 mg IM
  - Lorazepam 1 mg IV/IO or 2 mg IM
  - Diazepam 2 mg IV/IO

Hypothermia/Cold Exposure: Adult & Pediatric

Patients suffering systemic or localized cold injuries.
Excludes: Patients without cold exposure, or patients with cold exposure but no symptoms referable to hypothermia or frostbite.

EMT

- ABCDE assessment, vital signs including temperature
  - Mild hypothermia: 32.1-35°C/89.8-95°F
  - Moderate hypothermia: 28-32°C/82.5-89.7°F
  - Severe hypothermia: 22-28°C/68.1-82.4°F
- Assess for evidence of circulatory collapse

- Maintain patient and rescuer safety
- Manage airway as indicated

- Mild hypothermia (nl mental status, shivering):
  - Remove the patient from the environment
  - Remove wet clothes and dry skin, insulate from the ground, shelter the patient from wind and wet conditions and insulate the patient with dry clothing or a hypothermia wrap/blankets, cover the patient with a vapor barrier and, if available, move the patient to a warm environment
  - If oxygen is deemed necessary, it should be warmed, to a maximum temperature between 104-108° F (40-42° C) and humidified if possible
  - Provide beverages or foods containing glucose if feasible and patient is awake and able to manage airway independently.
  - Vigorous shivering can substantially increase heat production. Shivering should be fueled by caloric replacement.
  - Consider field-rewarming methods such as placement of large heat packs or heat blankets.
  - Monitor frequently. If temperature or level of consciousness decreases, refer to severe hypothermia, below
  - If alterations in mental status, consider measuring finger stick blood glucose and treat as indicated (follow **Hypoglycemia/Hyperglycemia** guideline)
  - Transport to a hospital capable of rewarming the patient

- Moderate or severe hypothermia (progressive bradycardia, hypotension, decreased respirations, altered mental status):
  - Pulse checks for 60 seconds
  - Avoid hyperventilation
  - Handle the patient gently, limiting motion of the extremities
  - Remove the patient from the environment
  - Remove wet clothes and dry skin, insulate from the ground, shelter the patient from wind and wet conditions and insulate the patient with dry clothing or a hypothermia wrap/blankets, cover the patient with a vapor barrier and, if available, move the patient to a warm environment
  - If oxygen is deemed necessary, it should be warmed, to a maximum temperature between 104-108° F (40-42° C) and humidified if possible
  - Consider field-rewarming methods such as placement of large heat packs or heat blankets.
  - If alterations in mental status, consider measuring finger stick blood glucose and treat as indicated (follow **Hypoglycemia/Hyperglycemia** guideline)
  - Transport as soon as possible

- Frostbite: avoid rewarming of extremities until definitive treatment is possible; only rewarm if refreezing is absolutely preventable

AEMT

- Mild hypothermia: consider IV access
- Moderate to severe hypothermia: provide warmed IV fluids as NS bolus

EMT-I/Paramedic

- Apply cardiac monitor

Drowning: Adult & Pediatric

Includes patients suffering from drowning or drowning events independent of presence or absence of symptoms.

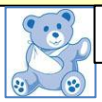
EMT

- Ensure scene safety
- Remove patient from water as soon as possible

- Aggressive airway management and restoration of adequate oxygenation and ventilation
  - A-B-C approach
  - Oxygen to maintain $SaO_2 \geq 94\%$
  - Assist ventilation as needed
- Follow **Cardiac Arrest** guideline as indicated
- Consider possible C-spine injury; manage C-spine if evaluation suggests injury
- Consider hypothermia and treat per **Hypothermia/Cold Exposure** guideline
  - Remove wet clothing
  - Do not aggressively re-warm cold water drownings

AEMT

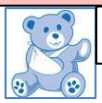
- Establish IV access
- Fluid bolus as indicated



- Escalate airway management as indicated, assist ventilation as needed

EMT-I/Paramedic

- Consider continuous positive airway pressure in awake patients with respiratory distress
- Advanced airway as indicated
- Consider positive end-expiratory pressure if available



- Cardiac monitor
- Consider nasogastric or orogastric tube for gastric decompression

SCUBA Injury/Accidents: Adult & Pediatric

Includes patients with recent history of SCUBA diving exhibiting potential signs and/or symptoms of dive related illness/injury.

EMT

- Be alert for signs of pulmonary injury (e.g. unequal or abnormal lung sounds, subcutaneous emphysema)
- Monitor vital signs including oxygen saturations
  - If SaO_2 < 92%, provide supplemental oxygen to maintain SaO_2 ≥ 94%
- Patients with symptoms suspicious for decompression illness should all be placed on supplemental oxygen

↓

- If SCUBA accident includes associated drowning/ near-drowning, see **Drowning** guideline

↓

- Manage airway as indicated
- If air embolism suspected, place in left lateral recumbent position

↓

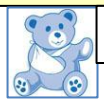
- Consider hypothermia and treat per **Hypothermia/Cold Exposure** guideline

↓

- Consider need for hyperbaric treatment
  - Assess submersion time, greatest depth achieved, ascent rate

↓

AEMT



- Establish IV access
- Fluid bolus as indicated

↓

- Escalate airway management as indicated

↓

- Consider analgesia per **Pain Management** guideline

↓

EMT-I/Paramedic

- Continuous positive airway pressure may be contraindicated in barotrauma; consider contacting online medical direction

↓

- Advanced airway management as indicated

↓

- Cardiac monitor

Conducted Electrical Weapon (e.g. TASER®): Adult & Pediatric

Patients who received either the direct contact discharge or the distance two-barbed dart discharge of the conducted electrical weapon.
Patient may have sustained fall or physical confrontation trauma.
Patient may be under the influence of toxic substances and/or may have underlying medical or psychiatric disorder.

EMT

- Once patient has been appropriately secured or restrained with assistance from law enforcement, perform primary and secondary assessment including vital signs, pulse oximetry
- Evaluate patient for evidence of excited delirium

AEMT

- Refer to **Agitated Patient/Behavioral Health Emergency** or **Trauma** guidelines as indicated

EMT-I/Paramedic

- Place on cardiac monitor
- Consider 12-lead ECG, where available
- Do not remove barbed darts

Electrical Injuries: Adult & Pediatric

Patients who are exposed to electrical current (AC or DC).

EMT

- Verify scene is secure
- Electrical source must be disabled prior to assessment

- Assess for dysrhythmias or cardiac arrest
- Even patients who appear dead may have good outcomes with prompt intervention
  - Refer to **Cardiac Arrest** guideline as indicated

- Identify all sites of burn injury
  - Electrical burns are often full thickness and involve significant deep tissue damage

- Assess for potential associated trauma
  - If altered mental status, assume trauma and refer to **Trauma** guidelines as appropriate

- Determine characteristics of source if possible
  - AC or DC, voltage, amperage, time of injury

- Apply dry dressing to any wounds
- Remove constricting clothing and jewelry since additional swelling is possible

AEMT

- Administer fluid resuscitation per **Burn** guidelines
  - External appearance will underestimate degree of tissue injury

EMT-I/Paramedic

- Place on cardiac monitor
- Consider 12-lead ECG

Lightning/Lightning Strike Injury: Adult & Pediatric

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

EMT

- Verify scene is secure; move to safe area

- Assure patent airway
  - If in respiratory arrest only, manage airway as appropriate
- Assess for dysrhythmias or cardiac arrest
  - Refer to **Cardiac Arrest** guideline if in cardiopulmonary arrest
- Assess for potential associated trauma
  - If altered mental status, assume trauma and refer to **Trauma** guidelines as appropriate
- Consider early pain management (see **Pain Management** guideline)

AEMT

- Consider placing IV

EMT-I/Paramedic

- Place on cardiac monitor; cardiac monitoring during transport
- Consider 12-lead ECG, where available

Adrenal Insufficiency: Adult & Pediatric

Includes patients with a known medical history of adrenal insufficiency, such as Congenital adrenal hyperplasia (CAH), Panhypopituitarism, Long-term use of steroids (replacement therapy, asthms, COPD, rheumatoid arthritis, and transplant recipients), who are presenting with Illness or injury, including but not limited to:

- Shock/hypoperfusion
- Fever > 100.4ºF
- Multi-system trauma
- Multiple long bone fractures
- Hyperthermia or hypothermia
- Respiratory distress
- Partial or full thickness burns > 5% BSA
- Drowning
- Vomiting/Diarrhea with signs/symptoms of dehydration

EMT

- Assess ABC's, VS, LOC (ABCDE Assessment)
- Oxygen 15 lpm via NRBM (titrate oxygen to SpO_2 ≥ 94%)
- Pulse oximetry
- Check blood glucose
- If pregnant, place in left lateral recumbent position

AEMT

- Establish IV/IO access
- If hypoensive or no pulse, bolus with IV fluids (20 ml/kg; max 1 L) over 10-20 minutes
  - May repeat up to 3 times
- Correct blood glucose if < 60 mg/dl (refer to **Hypoglycemia** guideline)

- May repeat IV fluid bolus up to 3 times

- Stress dose steroids:
- Assist with patient's home medication hydrocortisone (Solu-Cortef):
  - Child: 2 mg/kg IM or
    - 0 – 3 yo = 25 mg IM
    - 3 – 12 yo = 50 mg IM
    - ≥ 12 yo = 100 mg IM

- Stress dose steroids:
- Assist with patient's home medication hydrocortisone (Solu-Cortef):
  - Adult Adult: 100 mg IM

EMT-I/Paramedic

- Cardiac monitor

- Stress dose steroids (if home medication not available):
  - Methylprednisolone 2 mg/kg IV (max 125mg)

Abnormal Vital Signs

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

Neurologic Status Assessment: Adult & Pediatric

Neurologic status assessment involves establishing a baseline and then trending any change in patient neurologic status. Glasgow Coma Score (GCS) is frequently used, but there are often errors in applying and calculating this score. With this in consideration, Glasgow Coma Score may not be more valid than a simpler field approach. Either AVPU (Alert, Verbal, Painful, Unresponsive – see below) or only the motor component of the GCS may more effectively serve in this capacity.

Glasgow Coma Score

	Points	Pediatric	Adult
Eyes	1	No eye opening	
	2	Eye opening to pain	
	3	Eye opening to verbal	
	4	Eyes open spontaneously	
Verbal	1	No vocalization	No verbal response
	2	Inconsolable, agitated	Incomprehensible sounds
	3	Inconsistently consolable, moaning	Inappropriate words
	4	Cries but consolable, inappropriate interactions	Confused
	5	Smiles, oriented to sounds, follows objects, interacts	Oriented
Motor	1	No motor response	
	2	Extension to pain	
	3	Flexion to pain	
	4	Withdraws from pain	
	5	Localizes pain	
	6	Obeys commands	

AVPU

A: The patients is alert
V: The patient responds to verbal stimulus
P: The patient responds to painful stimulus
U: The patient is completely unresponsive

Motor/Sensory Exam for Suspected Spinal Injury

- Wrist/hand extension bilaterally
- Foot plantarflexion/dorsiflexion bilaterally
- Gross sensation in all extremities
- Check for paresthesias

Stroke Scales

Los Angeles Prehospital Stroke Screen (LAPSS)

1. Patient Name: _____ (Last) _____ (First)
2. Information/History from:
   [ ] Patient
   [ ] Family Member } _____ (Name) Phone: _____
   [ ] Other
3. Last known time patient was at baseline or deficit free and awake: *Military Time:* _____ *Date:* _____

SCREENING CRITERIA:

	Yes	Unknown	No
4. Age > 45	[ ]	[ ]	[ ]
5. History of seizures or epilepsy **absent**	[ ]	[ ]	[ ]
6. Symptom duration **less than** 24 hours	[ ]	[ ]	[ ]
7. At baseline, patient is **not** wheelchair bound or bedridden	[ ]	[ ]	[ ]

	Yes	No
8. Blood glucose between 60 and 400:	[ ]	[ ]

9. Exam: **LOOK FOR OBVIOUS ASYMMETRY**

	Normal	Right	Left
Facial Smile/Grimace:	☐	☐ Droop	☐ Droop
Grip:	☐	☐ Weak Grip ☐ No Grip	☐ Weak Grip ☐ No Grip
Arm Strength:	☐	☐ Drifts Down ☐ Falls Rapidly	☐ Drifts Down ☐ Falls Rapidly

	Yes	No
Based on exam, patient has **only unilateral** (and not bilateral) weakness:	[ ]	[ ]

	Yes	No
10. ***Items 4,5,6,7,8,9 all YES's (or unknown) → LAPSS screening criteria met:***	[ ]	[ ]

11. If LAPSS criteria for stroke met, call receiving hospital with a "code stroke", if not then return to the appropriate treatment protocol. (Note: the patient may still be experiencing a stroke even if LAPSS criteria are not met.)

Cincinnati Prehospital Stroke Scale

Assess for the unilateral presence of at least one of the following:

Item	*Description*
Facial droop	Ask the patient to smile. Watch for weakness on one side of the face.
Arm drift	Ask the patient to hold both arms out with palms up and eyes closed for 10 seconds. Watch for a drift of one side. A positive result is present if there is weakness in one arm. Weakness in both arms or normal strength is a negative test result.
Slurred speech	Ask the patient to repeat a simple sentence such as "You can't teach an old dog new tricks." Inability to repeat the words correctly and intelligibly is a positive result.

Arizona Guidelines for Field Triage of Injured Patients

(Regional modifications are permissible)

FIELD TRIAGE DECISION SCHEME

Measure vital signs and level of consciousness

Step One

Glasgow Coma Scale	≤13
Systolic blood pressure (mmHg)	<90 mmHg
Respiratory rate	<10 or >29 breaths per minute (<20 in infant aged < 1 year[1]), or need for ventilator support

YES → Transport to a Trauma Center[2]. Steps 1 and 2 attempt to identify the most seriously injured patients. These patients should be transported preferentially to the highest level of care within the trauma system.

NO → Assess anatomy of injury.

Step Two[3]

- All penetrating injuries to head, neck, torso, and extremities proximal to elbow or knee
- Chest wall instability or deformity (e.g., flail chest)
- Two or more proximal long-bone fractures
- Crushed, de-gloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Pelvic fractures
- Open or depressed skull fracture
- Paralysis

YES → Transport to a Trauma Center[2]. Steps 1 and 2 attempt to identify the most seriously injured patients. These patients should be transported preferentially to the highest level of care within the trauma system.

NO → Assess mechanism of injury and evidence of high-energy impact.

Step Three[3]

- Falls
  - Adults: >20 feet (one story is equal to 10 feet)
  - Children[4]: >10 feet or two or three times the height of the child
- High-risk auto crash
  - Intrusion[5], including roof: >12 inches occupant site; >18 inches any site
  - Ejection (partial or complete) from automobile
  - Death in same passenger compartment
  - Vehicle telemetry data consistent with high risk of injury
- Auto vs. pedestrian/bicyclist thrown, run over, or with significant (>20 mph) impact[6]
- Motorcycle crash >20 mph

YES → Transport to a trauma center, which, depending on the trauma system, need not be the highest level trauma center[7].

NO → Assess special patient or system considerations.

Step Four

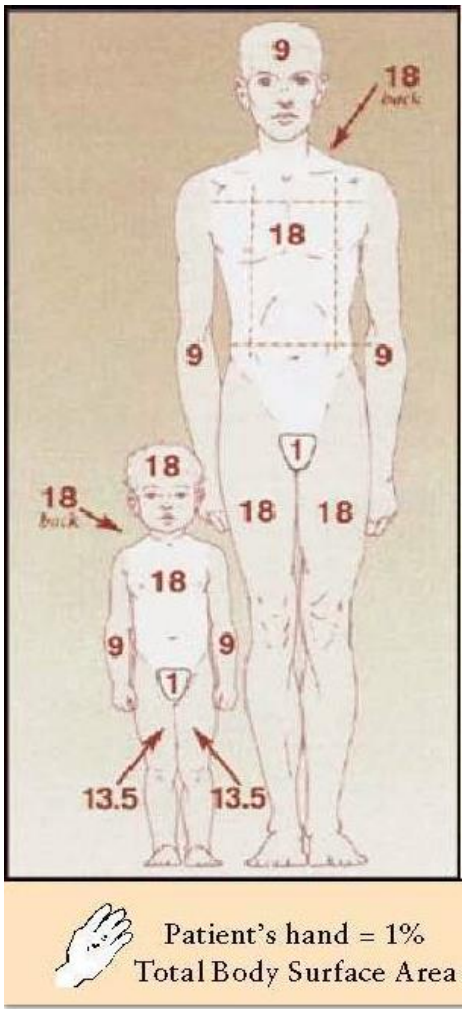
- Older Adults[8]
  - Risk of injury/death increases after age 55 years
  - SBP<110 might represent shock after age 65 years
  - Low impact mechanisms (e.g., ground level falls) might result in severe injury
- Children
  - Should be triaged preferentially to pediatric-capable trauma centers
- Anticoagulation and bleeding disorders
  - Patients with head injury are at high risk for rapid deterioration
- Burns
  - Without other trauma mechanism: triage to burn facility[9]
  - With trauma mechanism: triage to trauma center
- Pregnancy >20 weeks
- EMS[10] provider judgment

YES → Transport to a trauma center or hospital capable of timely and thorough evaluation and initial management of potentially serious injuries. Consider consultation with medical control.

NO → Transport according to protocol.[11]

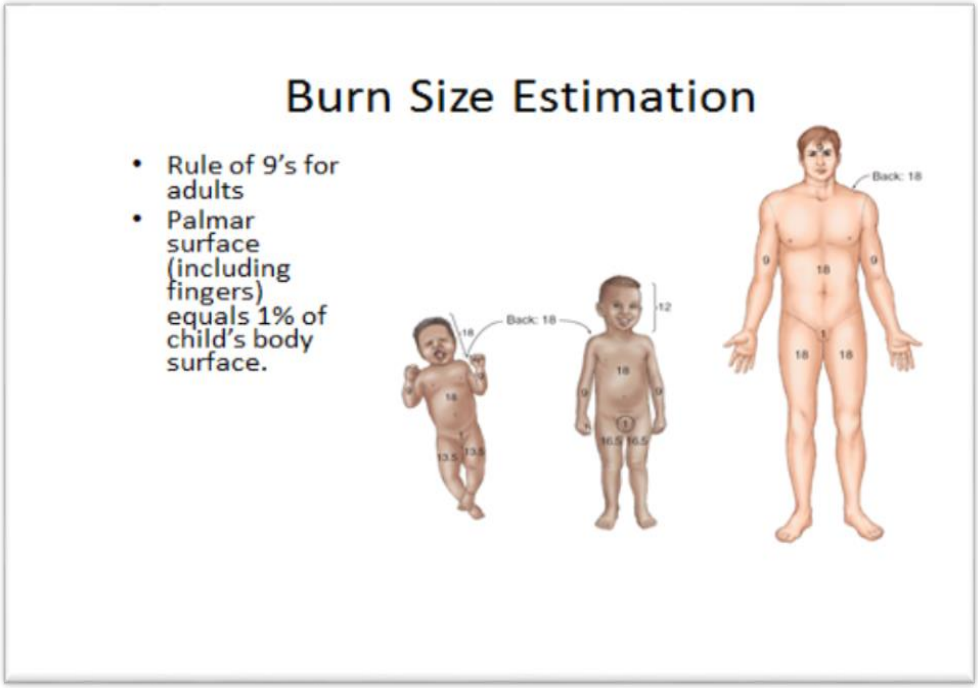
WHEN IN DOUBT, TRANSPORT TO A TRAUMA CENTER

Burn Size Chart 1



Source: University of Utah Burn Center

Burn Size Chart 2



Source: American Heart Association, *Pediatric Advanced Life Support* Textbook, 2013

Percentage of Total Body Surface Area by Age, Anatomic Structure, and Body Habitus

	Infant < 10 kg	Child	Adult	Obese Adult > 80 kg
Head and neck	20%			2%
Anterior head		9%	4.5%	
Posterior head		9%	4.5%	
Anterior torso	16%	18%	18%	25%
Posterior torso	16%	18%	18%	25%
Leg, each	16%			20%
Anterior leg, each		6.75%	9%	
Posterior leg, each		6.75%	9%	
Arm, each	8%			5%
Anterior arm, each		4.5%	4.5%	
Posterior arm, each		4.5%	4.5%	
Genitalia/perineum	1%	1%	1%	0%

Parkland Formula

For patients who require who require fluid resuscitation, consider use of the Parkland formula to calculate the volume of normal saline or Lactated Ringer's solution that should be administered intravenously to ensure hemodynamic stability.

Volume of Intravenous Fluid required in the first 24 hours (in ml) = (4 X patient weight in kg) X (Percentage of total body surface area burned)

The first half of the volume of fluid should be administered over the first 8 hours following the burn with the remaining fluid administered over the following 16 hours.

For pediatric patients, a weight-based assessment tool (length-based tape or other system) should be used to provide a more accurate estimate of the patient's weight. Likewise, the total body surface area (BSA) estimates are different for pediatric patients compared to adults due to larger head and trunk size. For children, the palmar surface of the hand (not including the fingers is approximately equal to 1% BSA. The guidelines listed above will provide assistance during the estimation of the percentage of total body surface area burned for patients of various ages and body habitus.

Burn Injury IV Fluid Rates: Fluid Infusion Rate > 30 kg

University of Utah Burn Center. https://crisisstandardsofcare.utah.edu

*Fluid of choice LR/NS, DO NOT use dextrose containing fluids

Wt (lbs)	Wt (kg)	% TBSA	/Hr for 1st 8 Hrs of care	60 gtt set, gtt/min	20 gtt set, gtt/min	15 gtt set, gtt/min	10 gtt set, gtt/min
66	30	10	75	75	25.0	18.8	12.5
66	30	20	150	150	50.0	37.5	25.0
66	30	30	225	225	75.0	56.3	37.5
66	30	40	300	300	100.0	75.0	50.0
66	30	50	375	375	125.0	93.8	62.5
66	30	60	450	450	150.0	112.6	75.0
88	40	10	100	100	33.3	25.0	16.7
88	40	20	200	200	66.7	50.0	33.3
88	40	30	300	300	100.0	75.0	50.0
88	40	40	400	400	133.3	100.0	66.7
88	40	50	500	500	166.7	125.00	83.3
88	40	60	600	600	200.0	150.0	100.0
110	50	10	125	125	41.7	31.3	20.8
110	50	20	250	250	83.3	62.5	41.7
110	50	30	375	375	125.0	93.8	62.5
110	50	40	500	500	166.7	125.0	83.3
110	50	50	625	625	208.3	156.3	104.2
110	50	60	750	750	250.0	187.6	125.0
132	60	10	150	150	50.0	37.5	25.0
132	60	20	300	300	100.0	75.0	50.0
132	60	30	450	450	150.0	112.5	75.0
132	60	40	600	600	200.0	150.0	100.0
132	60	50	750	750	250.0	187.5	125.0
132	60	60	900	900	300.0	225.0	150.0
154	70	10	175	175	58.3	43.8	29.2
154	70	20	350	350	116.7	87.5	58.3
154	70	30	525	525	175.0	131.3	87.5
154	70	40	700	700	233.3	175.0	116.7
154	70	50	875	875	291.7	218.8	145.8
154	70	60	1050	1050	350.0	262.6	175.0
176	80	10	200	200	66.7	50.0	33.3
176	80	20	400	400	133.3	100.0	66.7
176	80	30	600	600	200.0	150.0	100.0
176	80	40	800	800	266.7	200.0	133.3
176	80	50	1000	1000	333.3	250.0	166.7
176	80	60	1200	1200	400.0	300.0	200.0
198	90	10	225	225	75.0	56.3	37.5
198	90	20	450	450	150.0	112.5	75.0
198	90	30	675	675	225.0	168.8	112.5
198	90	40	900	900	300.0	225.0	150.0
198	90	50	1125	1125	375.0	281.3	187.5
198	90	60	1350	1350	450.0	337.6	225.0
220	100	10	250	250	83.3	62.5	41.7
220	100	20	500	500	166.7	125.0	83.3
220	100	30	750	750	250.0	187.5	125.0
220	100	40	1000	1000	333.3	250.0	166.7
220	100	50	1250	1250	416.7	312.5	208.3
220	100	60	1500	1500	500.0	375.0	250.0
242	110	10	275	275	91.6	68.7	45.9
242	110	20	550	550	183.4	137.5	91.6
242	110	30	825	825	275	206.2	137.5
242	110	40	1100	1100	366.6	275.0	183.4
242	110	50	1375	1375	458.4	343.7	229.1
242	110	60	1650	1650	550.0	412.4	275
264	120	10	300	300	99.9	74.9	50.1
264	120	20	600	600	200.1	150.0	99.9
264	120	30	825	825	300.0	224.9	150.0
264	120	40	1200	1200	399.9	300.0	200.1
264	120	50	1500	1500	500.1	374.9	249.9
264	120	60	1650	1650	600.0	449.8	300

Burn Injury IV Fluid Rates: Fluid Infusion Rate < 30 kg

University of Utah Burn Center. https://crisisstandardsofcare.utah.edu

*Fluid of choice LR/NS, DO NOT use dextrose containing fluids

Wt (lbs)	Wt (kg)	% TBSA	/Hr for 1st 8 Hrs of care	60 gtt set, gtt/min	20 gtt set, gtt/min	15 gtt set, gtt/min	10 gtt set, gtt/min
11	5	10	12.5	12.5	4.2	3.2	2.1
11	5	20	25	25	8.3	6.3	4.2
11	5	30	37.5	37.5	12.5	9.5	6.3
11	5	40	50	50	16.7	12.5	8.3
11	5	50	62.5	62.5	20.8	15.7	10.5
11	5	60	75	75	25	18.7	12.5
22	10	10	25	25	8.4	6.4	4.1
22	10	20	50	50	16.6	12.5	8.4
22	10	30	75	75	25	18.9	12.5
22	10	40	100	100	33.3	25	16.6
22	10	50	125	125	41.6	31.4	20.9
22	10	60	150	150	50	37.4	25
27.5	12.5	10	31.3	31.3	10.5	7.5	5.2
27.5	12.5	20	62.5	62.5	20.8	15.7	10.5
27.5	12.5	30	93.8	93.8	31.3	23.6	15.7
27.5	12.5	40	125	125	41.7	31.7	21
27.5	12.5	50	156.2	156.2	52.1	39.8	26.3
27.5	12.5	60	187.4	187.4	62.5	47.9	31.6
33	15	10	37.5	37.5	12.6	8.5	6.2
33	15	20	75	75	25	18.8	12.6
33	15	30	112.5	112.5	37.5	28.3	18.8
33	15	40	150	150	50	37.5	25
33	15	50	187.5	187.5	62.5	46.7	31.2
33	15	60	225	225	75	55.9	37.4
38.5	17.5	10	43.8	43.8	14.7	10.6	7.3
38.5	17.5	20	87.5	87.5	29.2	21.9	14.7
38.5	17.5	30	131.3	131.3	43.8	33	21.9
38.5	17.5	40	175	175	58.3	44.2	29.2
38.5	17.5	50	218.7	218.7	72.8	55.4	36.5
38.5	17.5	60	262.4	262.4	87.3	66.6	43.8
44	20	10	50	50	16.7	12.6	8.3
44	20	20	100	100	33.3	25	16.7
44	20	30	150	150	50	37.6	25
44	20	40	200	200	66.7	50	33.3
44	20	50	250	250	83.3	62.6	41.7
44	20	60	300	300	100	75	50
49.6	22.5	10	56.3	56.3	18.8	14.2	9.4
49.6	22.5	20	112.5	112.5	37.5	28.1	18.8
49.6	22.5	30	168.8	168.8	56.3	42.3	28.2
49.6	22.5	40	225	225	75	56.4	37.6
49.6	22.5	50	281.2	281.2	93.7	70.5	47
49.6	22.5	60	337.4	337.4	112.5	84.6	56.4
55.1	25	10	62.5	62.5	20.9	15.7	10.4
55.1	25	20	125	125	41.7	31.2	20.9
55.1	25	30	187.5	187.5	62.5	47	31.3
55.1	25	40	250	250	83.4	62.5	41.8
55.1	25	50	312.5	312.5	104.2	78	52.3
55.1	25	60	375	375	125	93.5	62.8
60.6	27.5	10	68.8	68.8	23	17.3	11.5
60.6	27.5	20	137.5	137.5	45.9	34.4	23
60.6	27.5	30	206.2	206.2	68.8	51.7	34.4
60.6	27.5	40	274.9	274.9	91.7	79.7	53.3
60.6	27.5	50	343.6	343.6	114.6	96.9	64.8
60.6	27.5	60	412.4	412.4	137.5	114.1	76.3
66	30	10	75	75	25.0	18.8	12.5
66	30	20	150	150	50.0	37.5	25.0
66	30	30	225	225	75.0	56.3	37.5
66	30	40	300	300	100.0	75.0	50.0
66	30	50	375	375	125.0	93.8	62.5
66	30	60	450	450	150.0	112.6	75.0