Greenville County
Emergency Medical Services
Hazardous Material Team

Clinical Operating Guidelines

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Greenville County EMS HAZMAT Team, Clinical Operating Guidelines

This document describes the methods by which the Greenville County EMS HAZMAT Team will continue to provide exceptional pre-hospital care. Evidenced – based guidelines, proven practices, and years of experience have been incorporated into this document to provide a solid foundation for the treatment of patients exposed to substances that may pose a risk to their health. Medical Control can be contacted for those patients who do not fall into a stated protocol or if deviation from the stated protocol is required to best treat the patient. These orders should be used in conjunction with the existing system wide Clinical Operating Guidelines. Providers must utilize good clinical judgment when interpreting these protocols and always act in the best interest of the patient. While appropriate and clinically sound care is imperative, it must also be delivered compassionately and empathetically.

Only Greenville County Emergency Response Team (ERT) HAZMAT members functioning on duty at Greenville County EMS, Mauldin Fire department or on an ERT call out may use these Clinical Guidelines, and only to the level of their certification.

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

- Receives basic or advanced medical/trauma treatment
- Is physically examined
- Has visible signs of injury or illness or has a medical complaint
- Has been exposed to a potentially hazardous material and needs to be assessed or monitored for medical complications
- Identified by anyone as a possible patient because of some known, or reasonably suspected illness or injury
- Has a personal medical device evaluated or manipulated by EMS
- Requests EMS assistance with the administration of personal medications or treatments

Greenville County EMS HAZMAT Team
Clinical Operating Guidelines

1. **Mission**
    a. The mission of the Greenville County EMS Hazardous Materials Team is to provide medical support to the Greenville County Emergency Response Team, Hazardous Materials Division.
2. **Organization and Purpose**
    a. The Greenville County Emergency Response Team (GCERT/ERT), Hazardous Materials Division, is governed by the Greenville County Fire Chief's Association. The members of the team are from various emergency response agencies and industry within Greenville County. The members of the team are paid and covered under Workers' Compensation by their respective sponsoring organization. Membership on the team is solely at the discretion of the chief officer of the sponsoring organization. Greenville County Emergency Medical Services, in a spirit of cooperation, provides the medical component of the Emergency Response Team which is required by federal law. The purpose of the Greenville County Emergency Medical Services (GCEMS/EMS) – Hazardous Materials Response Team (HMRT) is to provide medical support to the Greenville County Emergency Response Team.
3. **General Guidlines**
    a. 3.1 Due to the inherent risks of responding to incidents where it is suspected that Weapons of Mass Destruction have been deployed, it is paramount that Greenville County Emergency Medical Services personnel utilize an all hazards approach to ensure their personal safety as well as the safety of other responders.
    b. 3.2 Medical personnel must utilize the appropriate level of personal protective equipment; maintain a high index of suspicion regarding the possibility of secondary devices, cross contamination, and residual contaminant.
    c. 3.3 Victims of suspected WMD incidents must be presumed to have combination injuries; which consists of traumatic injuries and chemical contamination

Greenville County EMS HAZMAT Team Clinical Operating Guidelines

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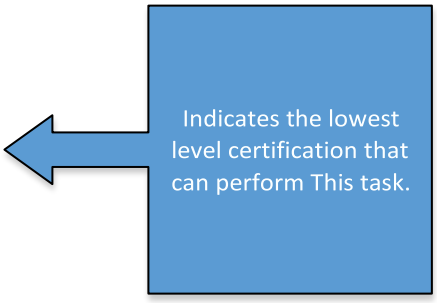

Note: Advance Hazmat Life Support (AHLS) recommends recertification every 4 years. Paramedics that were previously certified in AHLS can call med control and request permission to conduct “TOX” treatments.

Notification &Response

1. **Operations:** The routine scope of operations of the GCEMS – HMRT is to provide medical monitoring, rehabilitation, and treatment of ERT personnel at the scene of a Hazardous Material Incident. The GCEMS – HMRT is also responsible for the initial treatment of civilian and professional victims of a Hazardous Material Incident. The GCEMS – HMRT is also expected to provide any medical reference materials and information. This information is to be provided to emergency response officials, governmental and industrial officials, and allied health professionals and facilities as it may be necessary before, during, and after a Hazardous Material Incident within Greenville County.
    a. **Team Notification:**
        i. The Greenville County Emergency Response Team (GCERT) utilizes a commercial app to notify member agencies of a response. The GCEMS – HMRT pager is located in the GCEMS Communications Center located at Greenville County Square.
        ii. The Fire Department Officer requesting the GCERT Hazmat Team will advise Wade Hampton Fire Department Dispatch to respond the Hazmat Team Coordinators only, or the full Hazmat Team. This information will be included on the message received on the Hazmat pager. Regardless of the response requested, GCEMS Communications will notify the GCEMS –HMRT Coordinator on call. This notification should be attempted by pager and by telephone. The GCEMS – HMRT Coordinator will determine the most appropriate response for the GCEMS – HMRT and will direct GCEMS Communications on how to respond the EMS team.
        iii. The GCEMS – HMRT is notified by the GCEMS paging system. The GCEMS Communications Center will provide all necessary information to team members either by pager or by telephone. GCEMS-HMRT members will respond as directed.
    b. **Response:**
        i. ll Team members will respond as direct in a NON-EMERGENT mode

0.4.1 Cold Zone

The members of the GCEMS – HMRT will work only in the “cold” zone on a routine basis. On duty EMS personnel, not on the HMRT, which may be called to the hazardous materials incident scene may be assigned to work in the “cold” zone only!

0.4.2 Warm Zone

The members of the GCEMS – HMRT may work in the “warm” zone for the purpose of medical evaluation in the decontamination area if this is deemed necessary by the EMS Hazmat Team Coordinator on the scene. Only those GCEMS – HMRT members with appropriate training will be allowed to work in the “warm” zone.

0.4.3 Hot Zone

The GCEMS – HMRT members will only enter the designated “HOT ZONE” when reliable reports of sick and/or injured person(s) exist, and this/these person(s) are unable to be removed from the “HOT ZONE” and the need for medical personnel is obvious and necessary for the reason of life safety and preservation.

The decision for EMS Hazmat team members to enter the “HOT ZONE” will be made ONLY by the GCEMS – HMRT Coordinator on the scene. The GCEMS – HMRT Coordinator will document in a separate report any utilization of a GCEMS – HMRT member in the “HOT ZONE.”

Only those EMS Hazmat members with the appropriate level of training, equipment, and ability will be allowed to enter the “HOT ZONE.” The GCEMS – HMRT will provide medical treatment and rescue as needed to safely remove the patient(s) from the “HOT ZONE.” Once all viable patients have been removed from the “HOT ZONE,” all EMS Hazmat team members will safely exit the “HOT ZONE” through the established decontamination area. GCEMS – HMRT members will follow the same post-decontamination procedures as all other GCERT personnel.

3.5.1 Medical Officer

The first arriving GCEMS – HMRT member will assume the position of Medical Officer until the GCEMS – HMRT Coordinator arrives on the scene. The Coordinator may designate another team member as the Medical Officer for the incident as he/she deems necessary. The initial Medical Officer will coordinate with GCERT Hazmat Coordinators already on the scene.

3.5.2 Staging

GCEMS – HMRT members will report to the Staging Area. The Staging Officer should assign all GCEMS – HMRT members to the Medical Officer for assignment.

3.5.3 Coordinator

The GCEMS – HMRT Coordinator will report to the incident Command Post**.**

On-Scene Duties

The following positions/areas will be established as needed and directed by the HMRT Coordinator.

3.6.1 Medical Coordinator – Location: Command Post

a. Coordinates all medical activities within incident operations.
b. Advises the Incident Commander and other Command Officers of medical hazards and/or needs at the incident site.
c. Advises appropriate medical facilities of the incident and the potential impact on life and health.
d. Coordinates with medical control physician the treatment of victims.
e. Performs other duties as assigned by the Incident Commander.
f. Reports to the Incident Commander.

3.6.2 Medical Officer – Location: Medical Area or most strategic location

a. Coordinates operation of all medical teams at the incident site.
b. Assigns incoming GCEMS – HMRT personnel to duty assignments.
c. Acts as Transport Officer. May assign other EMS personnel to this position if the need exists.
d. Advises the Medical Coordinator of all medical operations as appropriate.
e. Performs other duties as assigned by the Medical Coordinator.
f. Reports to the Medical Coordinator.

3.6.3 Treatment Team – Location: Medical Area at the end of the Decontamination Line

a. Provides medical treatment to victims and personnel in the medical area.
b. Triages patients for transport.
c. Reports to the Medical Officer.

3.6.4 Rehabilitation Team – Location: Medical Area at the end of the Decontamination Line

a. Monitors all post-decontamination personnel.
b. Assures proper hydration and nutrition of personnel following operational duties.
c. Turns personnel in need of medical attention to the Treatment Team. Advises the Medical Officer.
d. Reports to the Medical Officer.

On- Scene Duties continued

3.6.5 Pre-Entry Team – Location: Staging

a. Performs physical examinations of all operational teams prior to entry into the incident site.
b. Logs physical findings on the appropriate forms.
c. Advises the Medical Officer of personnel with potential medical problems.
d. Advises operational personnel of signs and symptoms of exposure.
e. Performs other duties as assigned by the Medical Officer.
f. Reports to the Medical Officer.

3.6.6 Post-Decontamination Team – Location: Medical Area at the end of the Decontamination Line/Rehabilitation Area

a. Performs post-operational physical examinations.
b. Logs all physical findings on the appropriate forms.
c. Releases post-operational personnel to the staging area or rehabilitation areas as indicated.
d. Performs other duties as assigned by the Medical Officer.
e. Reports to the Medical Officer.

3.6.7 Records – Location: Medical Area

a. Logs “HOT ZONE” entry and exit times for all operational teams.
b. Advises the Medical Officer of operational team status.
c. Maintains records of all medical activities at the incident.
d. Files records of the incident appropriately.
e. Uses reference materials and resources to determine appropriate medical response for hazardous materials at the incident. Advises the Medical Officer of the signs and symptoms of exposure.
f. Performs other duties as assigned by the Medical Officer.
g. Reports to the Medical Officer.

Standard Policies

Firefighter Rehabilitation

2.0

Policy:

- At the request of the fire department on-scene commander, EMS may be asked to perform firefighter rehabilitation.

Purpose:

- Provide parameters for normal vital signs.
- Identify individuals requiring treatment and transport.

Procedure

1. Encourage the removal of all PPE (including bunker pants), rest, cooling, and oral hydration
2. Assess pulse rate. If greater than 85 percent maximum for age (see note below) perform orthostatic vitals. If pulse rate increases greater than 20 bpm or a systolic B/P drop more than 20 strongly suggest immediate IV hydration and transport.
3. Assessment of vital signs after the responder has rested for 10 minutes after their last exertion.
    a. Abnormal vital signs include:
        1. Blood pressure: systolic greater than 200 or diastolic greater than 110.
        2. Heart rate greater than 110.
        3. Respirations less than 8 or greater than 40 per minute.
        4. Temperature greater than101.
        5. Pulse oximetry less than 90%.
        6. CO greater than 10%.
4. If any abnormal vital signs, strongly suggest rest, rehydration, and active cooling. Re-evaluate in 10 minutes and strongly suggest transport with no improvement in total rehab time of 30 minutes. Report all abnormal vital signs to the on-scene fire incident commander or rehab officer.
5. Fire personnel should not be medically cleared to return to full duty with abnormal vital signs.
6. Any person with abnormal vital signs who refuse intervention or return to full duty against medical advice will sign a refusal.
7. Transport will be encourage automatically for the following:
    a. Chest pain.
    b. Shortness of breath unresolved by 10 minutes of high flow O2.
    c. Heart rhythm other than normal sinus or sinus tach.
    d. Syncope, disorientation, or confusion.
    e. Vital signs that have not returned to normal limits after 30 minutes of rehabilitation.
    f. Inability to hold fluids down or vomiting.
    g. Any request for transport.

Notes: NFPA Age-Predicted 85% maximum heart rate

Age	85 Percent
• 20-25	170
• 25-30	165
• 30-35	160
• 35-40	155
• 40-45	152
• 45-50	148
• 50-55	140
• 55-60	136
• 60-65	132

Standard Procedure (Skill)

Treatment: Decontamination

2.2

Clinical Indications:

- Any patient who may have been exposed to significant hazardous materials, including chemical, biological, or radiological weapons.

Procedure:

1. In coordination with HazMat and other emergency management personnel, establish hot, warm and cold zones of operation.
2. Ensure that personnel assigned to operate within each zone have proper personal protective equipment.
3. In coordination with other public safety personnel, assure each patient from the hot zone undergoes appropriate initial decontamination. This is specific to each incident; such decontamination may include:
    a. Removal of patients from hot zone.
    b. Simple removal of clothing.
    c. Irrigation of eyes.
    d. Passage through high-volume water bath (e.g., between two fire apparatus) for patients contaminated with liquids or certain solids. Patients exposed to gases, vapors, and powders often will not require this step as it may unnecessarily delay treatment and/or increase dermal absorption of the agent(s).
4. Initial triage of patients should occur after step 3. Immediate life threats should be addressed prior to technical decontamination.
5. Assist patients with technical decontamination (unless contraindicated based on 3 above). This may include removal of all clothing and gentle cleansing with soap and water. All body areas should be thoroughly cleansed, although overly harsh scrubbing which could break the skin should be avoided.
6. Place triage identification on each patient. Match triage information with each patient's personal belongings which were removed during technical decontamination. Preserve these personnel affects for law enforcement.
7. Monitor all patients for environmental illness.
8. Transport patients per appropriate protocol.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the Greenville County EMS system.

F	First Responder
B	Basic EMT
A	Advanced EMT
P	Paramedic

Special Team Procedures (Skills)

Wound Care: Eye Irrigation

2.3

Clinical Indications:

- Irrigation for eye injuries prior to and during transport.

Irrigation Guidelines and Procedures:

1. For chemical splashes to the eye, emergent irrigation is critical to preventing further tissue damage. If there is no concern for physical trauma to the eye, utilize a Morgan Lens® to immediately provide copious irrigation directly to the globe. Have patient remove contact lenses. Follow the **Eye Injury/Complaint Protocol**.
2. To utilize the Morgan Lens®, follow these steps:
    a. Apply topical ocular anesthetic (e.g., 2 drops **Tetracaine**).
    b. Attach Morgan Lens® set to IV tubing to sterile solution (e.g., saline bag); START FLOW.
    c. Have patient look down, retract upper lid, and insert Morgan Lens® under upper lid.
    d. Have patient look up, retract lower lid, and then gently drop lens in place.
    e. Release lower lid over lens and ensure steady, copious flow. Secure tubing to prevent accidental lens removal. Absorb outflow with towels. DO NOT RUN DRY.
    f. Irrigate with at least one liter of sterile solution. For lens removal, ENSURE FLOW OF SOLUTION IS CONTINUING, have patient look up, retract lower lid (and upper lid slightly if necessary), and slide Morgan Lens® out. Stop flow only after removing lens.
3. Document the procedure, including solution and volume used to irrigate, in the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the Greenville County EMS system.

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Universal Hazmat Patient Care Protocol

3.0

HAZMAT

Patient has been exposed to a dangerous substance. Do they need decontamination?

Yes

No → See Appropriate Protocol

Does the substance pose a danger to EMS providers?

Yes

Maintain a safe distance from incident. Request FD/HAZMAT response and wait till they decontaminate the patient.

No

F

- don appropriate PPE
- Safely remove the patient from the environment
- Remove contaminated clothing
- Brush away any powered contaminates
- Use available water sources to remove surface liquid contaminates
- If needed use available soap to remove oil-based substances

F

- Work with FD/ERT to identify the substance
- Baseline Vital Signs
- Consider Supplemental **Oxygen**

B

- Consider SpO2 and SpCO monitoring
- Consider Glucose measurement
- Consider 12 lead, 3 lead and waveform capnography Monitoring

Glucose <60 with signs of hypoglycemia → See: AMS /Diabetic Emergency

Seizure → See: Seizure Protocol

Based off this assessment and available information on the substance follow the appropriate HAZMAT Protocol

Notify receiving facility or contact Medical Control

PEARLS:

- Never knowingly enter a hazardous environment without proper training and PPE. When you find yourself in such a situation remove yourself immediately.
- Never take a patient covered in flammable liquids or any other hazardous substance into the hospital. If the patients must be transported still contaminated, alert the hospital early so they can be prepared for decontamination prior to entering the hospital.
- If unsure if a substance is hazardous to responders assume is it a proceed with caution
- All patients exposed to toxins must be monitored for delayed onset of signs and symptoms and transported to an appropriate receiving hosital
- Poisoning Treatment Paradigm
  - **Alter Absorption:** remove the patient from the poison, poison from the patient, decontamination.
  - **Administer antidotes:** very few HAZMAT exposures have antidotes. Those available to GCEMS are listed in the specific protocol
  - **Basics:** these standing orders should be used in conjunction with the Full GCEMS COGs. Support of the Patients Airway, Breathing and Circulation are key to treatment of any patient
  - **Change Catabolism:** some of the antidotes breakdown the toxins to less toxic metabolites
  - **Distribute differently:** for example, activated charcoal binds to toxins so they are not absorbed in the digestive track
  - **Enhance Elimination:** (exhalation, urination, defecation) for example high flow O2 helps removed CO

Stimulant / Sympathomimetics Exposure

Common Sources

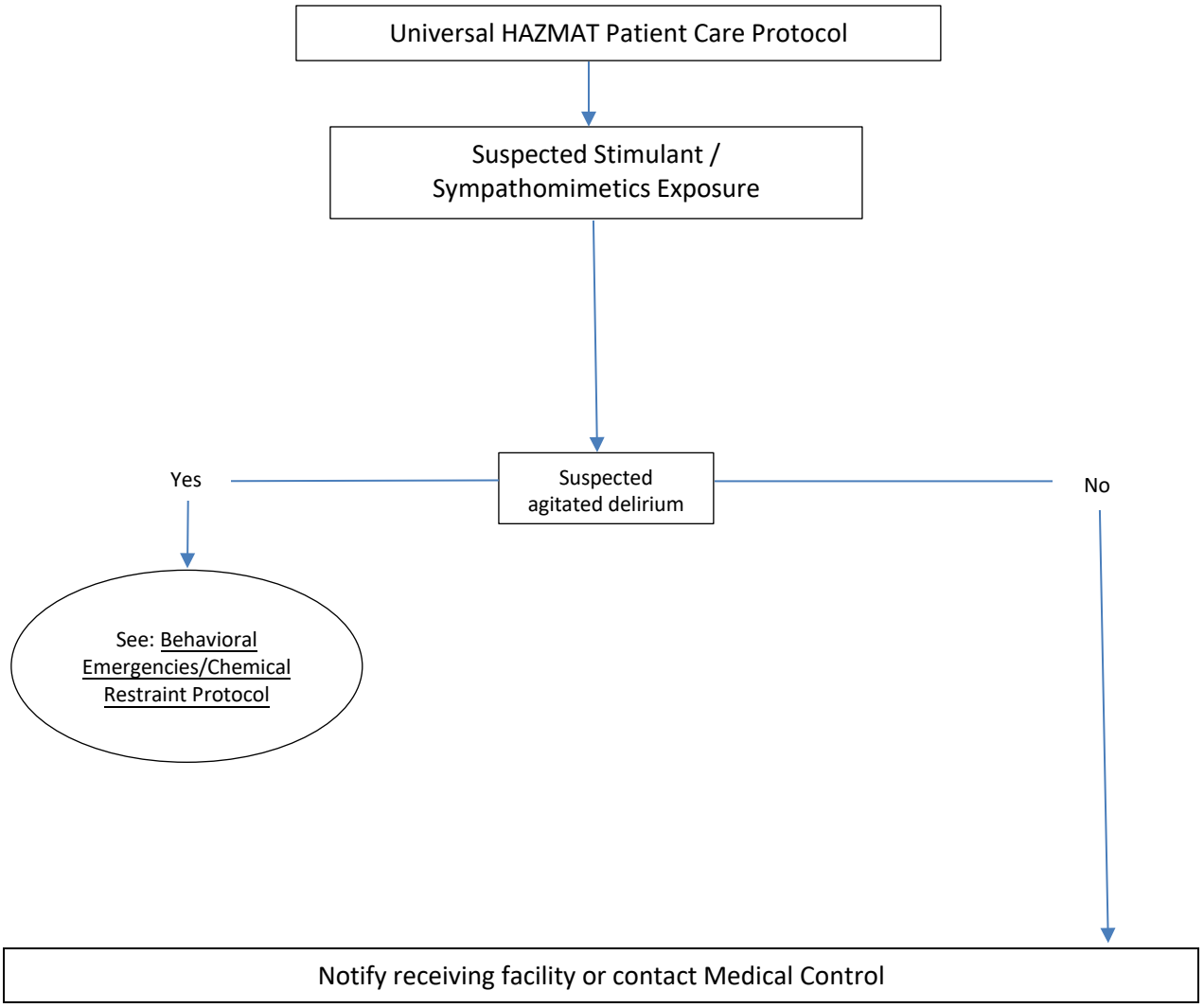
- Stimulants
  - Amphetamines
  - Methamphetamines
  - Cocaine
  - Bath Salts
- Sympathomimetics
  - Pseudoephedrine
  - Phenylephrine
  - Phenylpropanolamine
  - Amphetamines

Significant Findings

- Restlessness
- Agitation
- Incessant Talking
- Dilated Pupils
- Tachycardia
- Tachypnea
- Hypertension
- Paranoia
- Seizures

Differential (causes of exposure):

- Alcohol Intoxication
- Poly-pharmaceutical abuse
- Substance abuse
- Anxiety disorder
- Suicidal Ideation
- Exposure to a meth lab



HAZMAT

Pearls

- In every HAZMAT exposure try to determine the substance, the route of exposure, dose of exposure and relay this accurately to the hospital staff.
- The Poisoning Treatment Paradigm (Alter absorption, Antidote administration, Basics, Change catabolism, Distribute differently, and Enhance elimination)

Cholinergics Exposure

Common Sources

- Organophosphates
  - Acephate (Orthene)
  - Diazinon
  - Knox Out
  - Spectracide
  - Parathion
- Nerve agents
  - Sarin
  - VX gas

Significant Findings:

- Visual disturbances
- Headache
- Nausea/vomiting
- Salivation
- Lacrimation
- Respiratory distress
- Diaphoresis
- Seizure activity
- Respiratory arrest
- Fasciculation

Differential (causes of exposure):

- Organophosphate Exposure (pesticide)
- Nerve agent exposure (intentional release)

Universal HAZMAT Patient Care Protocol

A — Initiate IV

Minor Symptoms:
Salivation
Lacrimation
Visual Disturbances

P — **Atropine 1-2 mg IV/IM** every 5 min until symptoms resolve or a max of 6mg

Improving — No → (Major Symptoms)

Yes

Major Symptoms:
Altered Mental Status
Seizures Respiratory distress

B	**Nerve agent kit IM x 3 Rapidly**
P	If unconscious , seizing and/or fasciculation: **Lorazepam (Ativan) 1-2 mg IV/IM** (may be repeated once after 5 min) or Midazolam (Versed) 10 mg/2 mL slow IV push
P	**Atropine 1-2 mg IV**; May repeat every 5 min; **max 6 mg**
TOX	**AHLS medics do not have a maximum dose of Atropine as long as symptoms persist**
TOX	**Pralidoxime 1 gram IV drip over 15 min place of the Nerve agent kits**

Notify receiving facility or contact Medical Control

HAZMAT

Pearls

- The Poisoning Treatment Paradigm (Alter absorption, Antidote administration, Basics, Change catabolism, Distribute differently, and Enhance elimination)
- In the face of a bona fide attack, begin with:
  - 1 nerve agent kit for patients less than 7 years of age,
  - 2 nerve agent kits from 8 to 14 years of age
  - 3 nerve agent kits for patients 15 years of age and over.
- If triage/MCI issues exhaust supply of nerve agent kits, use pediatric atropens (if available).
  - Use the 0.5 mg dose if patient is less than 40 pounds (18 kg),
  - 1 mg dose if patient weighs between 40 to 90 pounds (18 to 40 kg),
  - 2 mg dose for patients greater than 90 pounds (greater than 40 kg).
- The main symptom that the Atropine addresses is excessive secretions so Atropine should be given until salivation improves.
- Carbamates present very similarly to organophosphates and should be treated with Atropine as described above but not Pralidoxime or Nerve agent kits.

Inhaled Toxin Exposures

3.3

Common Sources

- Irritant Gas
  - Ammonia
  - Hydrogen Chloride
  - Formaldehyde
  - Chlorine
  - Phosgene
- Asphyxiant Gas
  - CO
  - Hydrogen Cyanide
  - Isobutyl nitrate

Significant Irritant Gas Findings

- Burning sensation in airway
- Rales, wheezing, stridor
- Dyspnea
- Tachypnea
- C/P
- Anxiety/ agitation
- Rhinorrhea
- Lacrimation

Significant Asphyxiant Gas Findings

- Tachypnea
- Apnea
- Headache
- Confusion
- Agitation
- AMS

Universal HAZMAT Patient Care Protocol

Wheezing present

See: Reactive Airway Protocol

F	Remove the patient to a well-ventilated area
F	If appropriate remove contaminated clothing
F	High Flow Oxygen regardless of Vital signs
A	Initiate IV
P	If presents with any of the symptoms listed above: protect the patient's airway, maintain adequate ventilation. Monitor SpO2, SpCO, end tidal and heart rhythm continuously

Irritant Gas

P — Monitor for stridor, consider intubation early if present

Symptomatic CO poisoning SpCO >20%

B — Rapid transport to facility with hyperbaric chamber capabilities

Suspected Cyanide poisoning or significant smoke inhalation with AMS

TOX — Administer Hydroxocobalamin (CyanoKit) 5 grams over 15 mins

If eye irritation is present consider flushing after all Airway, Breathing and Circulation issues are addressed

Notify receiving facility or contact Medical Control

HAZMAT

Pearls

- The Poisoning Treatment Paradigm (Alter absorption, Antidote administration, Basics, Change catabolism, Distribute differently, and Enhance elimination)
- Cyanide is commonly found in the smoke produced in household goods and is likely present in structure fire smoke.
- Laryngospasm is rare in irritant gas exposures, but should be treated aggressively.
- Half-life of carboxyhemoglobin room air:4.5 hours, high flow O2: 1.5 hours, hyperbaric oxygen: 30min.
- Indications for Hyperbaric treatment: Carboxyhemoglobin (SpCO) level > 25% (>20% in pregnant patients).
- Hydrogen sulfide poisoning is treated with Amyl Nitrite and Sodium Nitrite neither are currently carried by EMS or the ERT.
- Individual patients in need of a hyperbaric chamber should be transported to GMMC. If multiple patients require a hyperbaric chamber there are additional chamber available at Spartanburg regional.

Methemoglobinemia

Common Sources

- Aniline
- Nitrates
- Nitrobenzene
- Nitro dioxides
- Paints
- Topical benzocaine (Orajel)
- Inks
- Dyes
- Agricultural chemicals

Significant Findings

- Acrocyanosis (possibly without any other symptoms)
- Dyspnea
- C/P
- Confusion
- Seizures
- Coma (indicates level >30%)
- Blood has chocolate brown color
- O2 saturation in the Mid 80s to low 90s

- **Differential (causes of exposure):**
  - Airway irritation
  - Coughing
  - Progressive

Universal HAZMAT Patient Care Protocol

F	High flow Oxygen regardless of vital signs
B	If ingested within the last 60 minutes and patient can follow commands and swallow, **Administer 1 G/Kg of Activated Charcoal orally**
A	Initiate IV
TOX	**Administer Methylene Blue 1-2 Mg/Kg IV/IO over 5 minutes (Adults and Pediatrics)**

Notify receiving facility or contact Medical Control

Pearls

- Methemoglobin results from the presence of iron in the ferric form instead of the usual ferrous form. This results in a decreased availability of oxygen to the tissues.
- As of Fall of 2020o Methylene blus has been no nation wide back order for five years. Use if availble.
- when administering methylene blue, the patient's pulse ox may drop precipitously. The medication is a dark blue and confuses the sat probe.
- The Poisoning Treatment Paradigm (Alter absorption, Antidote administration, Basics, Change catabolism, Distribute differently, and Enhance elimination
- May cause seizures, should be treated with applicable protocol
- Phenol based substances like fertilizer, wood preservatives, textiles and adhesives may also cause methemoglobinemia and should be treated with this protocol if symptomatic, while monitoring closely for hypotension and pulmonary edema. Treat these symptoms with appropirate GCEMS Clinical Operating Guidline.

Corrosives Toxidrome

Common Sources

- Acids
  - Hydrochloric acid
  - Nitric Acid
  - Sulfuric
- Bases
  - Ammonium Hydroxide
  - Sodium Hydroxide
  - Potassium Hydroxide

Significant Findings

- Surface absorption
  - Painful chemical burns
  - Skin Necrosis
- Ingestion
  - Airway irritation
  - Coughing

- **Differential (causes of exposure):**
  - Intentional or accidental ingestion
  - Industrial accidents
  - Hydrofluoric Acids
    - Manufacture of fluorinated chemicals
    - Etching, cleaning, and polishing metals

Universal HAZMAT Patient Care Protocol

F	If chemical burns are present and 100% sure they are not thermal burns it is recommended that the blisters are popped during decontamination
A	Initiate IV

Hydrofluoric acid exposure

Yes

Tox	For systemic toxicity indicated by cardiac dysrhythmias administer 5-20ml Calcium Gluconate IV/IO over 5 minutes
Tox	Chemical burns to the skin after decontamination can be treated with topical Calcium Gluconate
Tox	For inhalation injuries administer nebulized 2.5 % Calcium Gluconate

No

Notify receiving facility or contact Medical Control

HAZMAT

Pearls

- The Poisoning Treatment Paradigm (Alter absorption, Antidote administration, Basics, Change catabolism, Distribute differently, and Enhance elimination
- The most common arrhythmias in this type of poisoning are Prolonged QT and peaked T-waves. This is due to the leaching of electrolytes causing Hyperkalemia and hypocalcemia
- Do not administer calcium gluconate in the presence of V-Fib
- To make topical calcium gluconate mix 10ml of calcium gluconate with 1 ounce of water soluble gel and cover the effected area
- To get 2.5% calcium gluconate for nebulizing mix 250mg (2.5CC) of calcium Gluconate with 7.5cc of saline.

Radiation Response

Common Sources

- Terrorist attack
- Nuclear Waste products
- Power plants
- Cancer treatment
- X-ray equipment

Significant Findings

- Nausea/ vomiting
- Diarrhea
- Elevated temperature
- Headache
- Fatigue
- Altered mental status
- Hair loss

Differential (causes of exposure):

- Radiation treatment
- Exposure to irradiating waste
- Intentional attack

Universal HAZMAT Patient Care Protocol

F	Maintain as much distance and shielding from the source as possible
F	Cover all open wounds to avoid internal contamination
A	Use good clinical judgment and do not intubate or start IV/IOs, unless absolutely necessary, to avoid further internal contamination of the patient
B	Strip the transport truck of all equipment not being used on the transport prior to loading the patient.
B	Cocoon the patient in clean linens to try to limit contamination of the transport vehicle and the corridors of the hospital

Notify receiving facility or contact Medical Control

Pearls

- Dealing with a patient with a radiation exposure can be a frightening experience. Do not ignore the ABC s, a dead but decontaminated patient is not a good outcome. Refer to the Decontamination Procedure for more information.
- Normal Saline or Sterile Water is preferred, however if not available, do not delay irrigation using tap water. Other water sources may be used based on availability. Flush the area as soon as possible with the cleanest readily available water or saline solution using copious amounts of fluids.
- **Three methods of exposure:**
  - External irradiation
  - External contamination
  - Internal contamination
- **Two classes of radiation:**
  - Ionizing radiation (greater energy) is the most dangerous and is generally in one of three states: Alpha Particles, Beta Particles and Gamma Rays.
  - Non-ionizing (lower energy) examples include microwaves, radios, lasers and visible light.
- Radiation burns with early presentation are unlikely, it is more likely this is a combination event with either thermal or chemical burn being presented as well as a radiation exposure. Where the burn is from a radiation source, it indicates the patient has been exposed to a significant source, (> 250 rem).
- Patients experiencing radiation poisoning are not contagious. Cross contamination is only a threat with external and internal contamination.
- Typical ionizing radiation sources in the civilian setting include soil density probes used with roadway builders and medical uses such as x-ray sources as well as radiation therapy. Sources used in the production of nuclear energy and spent fuel are rarely exposure threats as is military sources used in weaponry. Nevertheless, these sources are generally highly radioactive and in the unlikely event they are the source, consequences could be significant, and the patients outcome could be grave.
- **The three primary methods of protection from radiation sources:**
  - Limiting time of exposure: work quickly and efficiently and rotate qualified personnel if available
  - Distance: from when not actively providing patient care remain a few feet away from the patient
  - Shielding from the source
- Dirty bombs ingredients generally include previously used radioactive material and combined with a conventional explosive device to spread and distribute the contaminated material.
- Refer to Decontamination Procedure / WMD / Nerve Agent Protocol for dirty contamination events.
- If there is a time lag between the time of exposure and the encounter with EMS, key clinical symptom evaluation includes: Nausea/ Vomiting, hypothermia/hyperthermia, diarrhea, neurological/cognitive deficits, headache and hypotension.
- This event may require an activation of the National Radiation Injury Treatment Network