

These General Operating Procedures and Protocols Apply ONLY to FDNY Haz-Tac EMTs and Paramedics

Preamble

- The hazardous materials (HAZMAT) environment is potentially harmful to victims and rescuers. The inexperienced or untrained rescuer may potentially expose themselves to serious health consequences. The goal of these protocols is to allow for the delivery of pre-hospital medical care while allowing for a standardized approach to medical interventions, procedures and destination decisions without unnecessary risk to the medical provider.

Purpose

- To establish protocols defining the scope of the New York City Fire Department's (FDNY) EMT Basic and Advanced Emergency Medical Technician-Paramedic (AEMT-Ps) units operating as Hazardous Material Tactical Units (Haz-Tac). These parameters set forth for standing orders and discretionary orders are only to be used on the scene of a declared hazardous materials incident.
- Only Haz-Tac certified EMTs and Paramedics operating under a declared HAZMAT incident by competent authority may use the protocols listed here. All other providers at a suspected HAZMAT incident shall operate under established REMAC Protocols for their level of certification. Under no circumstances may hazardous material technicians provide treatment using discretionary protocols without contact and receiving direction from an FDNY OMA Response Physician.

Scope

- The FDNY has extensively trained a limited number of EMTs and AEMT-Ps capable of performing pre-hospital emergency medical care within the exclusion zone of a hazardous materials environment. The FDNY has established specific protocols to be used exclusively by these EMTs and Paramedics as specified in the emergency response plan and under the discretion of the FDNY Office of Medical Affairs (OMA) Response Physician (5M) and the HAZMAT Branch Director. Haz-Tac members may operate under these protocols when utilized as a specialty resource, or when deemed necessary by the on-duty Haz-Tac Officer. These protocols are medical operational guidelines that should be used in conjunction with good clinical judgment relative to the presenting toxidrome signs and symptoms and available information.
- The FDNY is responsible for the coordination of patient care resources at the scene of a HAZMAT situation. CFRs/EMTs/Paramedics must notify FDNY in situations involving HAZMAT incidents which require decontamination.

Training

- All Haz-Tac Officers, EMTs, and AEMT-Ps must possess a valid New York State DOH Bureau of Emergency Medical Services EMT or EMT Paramedic certification. NYS certified paramedics must also possess a valid Regional Emergency Medical Services Committee of New York City (REMAC) certification. In addition all members must successfully complete an 120-hour basic hazardous materials medical technician course and participate in scheduled sustainment training throughout the year. Training programs will be based in accordance with OSHA1910.120 (HAZWOPER) and relevant best practices and recommendations as specified in NFPA standards 472 and 473.

SPECIALIZED EQUIPMENT AND MEDICATIONS

Equipment

- Multi-Gas meter
- SCOTT PAPR with CBRN and P100 canister
- Radiological dosimetry
- Self-contained breathing apparatus
- Chemical protective clothing
- Emergency decontamination kit

Medications

- Calcium Gluconate (solution and gel)
- Potassium Iodide (KI) tablets
- Methylene Blue
- Pyridoxine (Vitamin B6)
- Ketamine
- Prussian Blue
- Tetracaine

General Operating Procedures

- These protocols are to be utilized only by personnel trained in the use of Chemical Protective Clothing (CPC) as directed by the highest ranking Haz-Mat officer and with consultation of a Haz-Tac officer by either face-to-face communication, radio, or other electronic media.
- If significant resources are not on scene, the arriving Haz-Tac units must operate as an EMS resource until instructed otherwise by on-scene authority.

STANDARD APPROACH TO ALL HAZARDOUS MATERIALS INCIDENTS

1. Remain uphill and upwind from the incident and remain cognizant of changes in wind direction
2. Continuous personal atmosphere metering is mandatory throughout the assignment.
 - Haz-Tac members shall only operate in any suspected or confirmed Lower Explosive Limit (LEL) environment with approval of the Haz-Mat Group Leader
3. Attempt to make a tentative identification of the product or hazard utilizing the following resources:
 - U.N. ID placard number
 - NFPA Diamond
 - MSDS
 - Shipping papers
 - Bill of lading
 - Information from on scene personnel (civilian, FD, PD, DEP, etc.)
4. Determine and report the potential size and scope of incident(s) including but not limited to:
 - Number of actual or potential victims (inhabitants/occupants vs. actual exposures or contaminated), children, adults, special needs, etc.
 - If not already on scene contact the on-duty Haz-Tac officer and provide a preliminary report
5. Ascertain appropriate respiratory protection and chemical protective clothing (CPC) if necessary as established by the FDNY Haz-Mat Group Leader
6. Determine if the incident is involving a chemical exposure or contamination.
 - 6.1 If chemical exposure attempt to remove victims from the source of exposure if possible. Consider “off-gassing” of toxic fumes from the patient’s clothing and/or body

FDNY HAZ-TAC GENERAL OPERATING PROCEDURES AND PROTOCOLS

6.2 If chemical contamination has occurred attempt to remove contaminate from the patient if possible. Perform immediate emergency decontamination if necessary. Request appropriate additional resources through Emergency Medical Dispatch.

7. Attempt to identify a toxidrome

- Clinical signs and symptoms secondary to an acute and/or chronic exposure

Protocols

INITIAL MANAGEMENT

Consultation with the Haz-Mat Group Leader is required prior to Haz-Tac personnel operating in a potential LEL environment. Extreme caution must be utilized and risk versus benefit analysis must be performed, which will determine how patient care is conducted. It may be appropriate to delay certain patient care procedures until the patient and crew members are in a safer environment

EMT

1. Begin Basic Life Support procedures
 - 1.1 Unless in proper PPE, refrain from making direct contact with patients until decontamination procedures have been completed.
2. Establish a patent airway and support as needed.
 - 2.1 Approval must be obtained from the Haz-Mat group prior to any oxygen use
3. Ensure that breathing is adequate and support as needed
4. Begin pulse oximetry monitoring and administer oxygen if appropriate
 - 4.1 Use supplemental oxygen with a bag valve mask or non-rebreather mask
 - 4.2 Mouth to mouth or mouth to mask ventilation are strictly PROHIBITED
 - 4.3 Use SCBA face piece and mask with air bottle in oxygen rich (>22.5%) or oxygen deficient (<19.5%) atmosphere
 - 4.4 Protect the patient's airway from particulates using any of the following:
 - Surgical mask
 - N95 mask
 - P100 mask
 - Half face-piece respirator
 - Non-rebreather Oxygen mask (if administering oxygen)
 - SCBA mask:
 - SCBA mask and breathing circuit may be used for patients who are members of service and have been fit tested (any agency)
 - SCBA mask may be used as a loose-fitting protective device with free flow air for all other patients

5. Verify that adequate signs of circulation exist and support as needed
 - Compression only CPR should be performed if ventilator support is not feasible in the exclusion zone
 - Only life threatening hemorrhage should be treated in the exclusion zone.
6. Consider the need for spinal precautions
 - If necessary this should be done as expeditiously as possible
 - Immobilization device should not inhibit extrication or decontamination
 - Consider reverse isolation for radiologically contaminated patients.
7. Determine if Advanced Life Support assistance is required
8. Utilize caution when administering medication to patients with exposure to a known or unknown product
9. For **BRONCHOSPASM**:
 - 9.1 Administer 0.02% Ipratropium Bromide mixed with 0.083% Albuterol Sulfate nebulized over 5-15 minutes as follows:
 - **ADULT**: 0.02% Ipratropium Bromide 2.5 ml (1 unit dose) mixed with 0.083% Albuterol Sulfate 3 ml (1 unit dose) nebulized. Repeat as needed (maximum 3 doses)
 - **PEDIATRIC**:
 - Age < 6 years: 0.02% Ipratropium Bromide 1.25 ml (0.5 unit dose) mixed with 0.083% Albuterol Sulfate 3 ml (1 unit dose) nebulized. Repeat as needed (maximum 3 doses)
 - Age ≥ 6 years: 0.02% Ipratropium Bromide 2.5 ml (1 unit dose) mixed with 0.083% Albuterol Sulfate 3 ml (1 unit dose) nebulized. Repeat as needed (maximum 3 doses)
 - 9.2 For patients in severe respiratory distress, call for advanced life support assistance
 - 9.3 If symptoms persist, Albuterol Sulfate 0.083% may be repeated until the patient shows improvement
10. For **INGESTION**: Allow the patient to drink 5 ml/kg of water. Do not use Normal Saline solution (may induce vomiting)
11. For **CHEMICAL EYE INJURIES**: Treat in accordance with NYC REMAC Protocol Eye Injuries (Adult and Pediatric)
 - To assist with irrigation, administer Tetracaine 0.5% 1-2 drops topically in affected eye(s).

Repeat as needed

12. Maintain patient's body temperature (utilizing warming blankets if needed) and protect the patient from cross contamination
13. Treat the patient according to the appropriate REMAC Hazardous Material Technician Protocol
14. Begin transport to the nearest appropriate hospital, unless criteria are met for a specialty center referral

EMT STOP

Paramedic

15. Monitor patients for signs of upper airway compromise, severe respiratory distress, or impending respiratory failure/arrest. If necessary, perform advanced airway management as per NYC REMAC protocol
16. Monitor rhythm and record 12 lead EKG; assess and evaluate for rhythm abnormalities or signs of exposure induced chemical cardio toxicity
17. Start IV/IO of 0.9% Normal Saline KVO/Wide open as appropriate
18. Treat patients exhibiting an Altered Mental Status in accordance with NYC REMAC Protocols Altered Mental Status (Adult and Pediatric) and Overdose (Adult and Pediatric), with special consideration of a hazardous-material induced condition
19. Nasal Capnography should be used on all patients.
20. Pain management should be considered for adult and pediatric patients with pain secondary to hazardous-material exposure. Treat in accordance with NYC REMAC Protocol General Pain Management (Adult and Pediatric)
21. For adult and pediatric patients with on-going and continuous muscle spasms secondary to hazardous-material exposure, administer one of the following:
 - OPTION A: Midazolam 0.2 mg/kg IV/IN/IM (maximum 5 mg). Repeat as needed after 5 minutes (maximum cumulative dose 10 mg)
 - OPTION B: Lorazepam 0.1 mg/kg IV/IN/IM (maximum 2 mg). Repeat as needed after 5 minutes (maximum cumulative dose 4 mg)
 - OPTION C: Diazepam 0.2 mg/kg mg IV (maximum 5 mg) slowly over 1 minute. Repeat as needed after 5 minutes (maximum cumulative dose 10 mg)
22. For adult and pediatric patients with severe nausea/persistent vomiting secondary to hazardous-material exposure, treat in accordance with NYC REMAC Protocol Abdominal Pain / Severe Nausea / Severe Vomiting (Adult and Pediatric)

Paramedic STOP

Key Points / Considerations

- For non-cardiogenic acute pulmonary edema provide adequate oxygenation and ventilation via bag-valve mask or CPAP. DO NOT administer Furosemide or Nitroglycerin
- If hypoventilation develops after opioid pain medication administration, treat in accordance with NYC REMAC Protocol Overdose (Adult and Pediatric)

SUB-PROTOCOLS

A: CHLORINE/CHLORAMINE AND RELATED COMPOUNDS

B: HYDROGEN FLUORIDE (HF)/ HYDROFLUORIC ACID (HF)

C: HYDROGEN SULFIDE

D: METHEMOGLOBINEMIA

E: HYDRAZINE POISONING WITH SEIZURES

F: HYDROCARBON PRODUCTS/SOLVENTS

G: CYANIDE TOXICITY

H: ORGANOPHOSPHATES

I: RADIATION TREATMENT

Sub – Protocols

CHLORINE/CHLORAMINE AND RELATED COMPOUNDS

EMT

1. Begin BLS initial management procedures
2. Protect the patient's airway and administer 100% oxygen via non-rebreather mask, humidified if available. Assist ventilations if signs of respiratory insufficiency develop

EMT STOP

Paramedic

3. Begin ALS initial management protocols if applicable

Paramedic STOP

OMA Response Physician (5M) Approval Required

4. If respiratory burning persists; administer Sodium Bicarbonate via breath actuated nebulizer. Repeat every 20 minutes as needed (maximum 3 doses)
 - Adult patients - 7.5% 3 ml mixed with 3 ml normal saline
 - Pediatric patients - 4.2% 3 ml mixed with 3 ml normal saline

Key Points / Considerations

- Acute exposure symptoms may be immediate or delayed for a few hours
- IV fluid should be administered cautiously

HYDROGEN FLUORIDE (HF) / HYDROFLUORIC ACID (HF)

EMT

1. Begin BLS initial management procedures
2. For **DERMAL EXPOSURE**:
 - 2.1 Rapid decontamination is critical
 - 2.2 Apply pre mixed Calcium Gluconate gel to topically burned skin and leave in place. Vigorously massage burned areas with gel until pain is relieved
 - 2.2.1 Reapply if pain reoccurs
 - 2.2.3 For burn to the hand(s) place hand in a glove filled with this gel
3. For **OCULAR CONTAMINATION**:
 - 3.1 Instill Tetracaine according to Initial Management and irrigate the affected eye(s) with 1% Calcium Gluconate solution (Do Not Use Calcium Chloride). Prepare this solution by mixing 50 ml of 10% Calcium Gluconate in 500 ml of Normal Saline. Repeat if necessary

EMT STOP

Paramedic

4. Begin ALS initial management protocols if applicable

Paramedic STOP

OMA Response Physician (5M) Approval Required

5. **RESPIRATORY:** (Paramedic Only)
 - Administer Calcium Gluconate 1 gram via breath actuated nebulizer, administered as 5 ml of a 10% solution followed by a repeat of 5 ml of a 10% solution. Maximum total dose is 5 gm
6. **CARDIOVASCULAR:**
 - 6.1 Patient must be exhibiting signs of hypocalcaemia and/or hyperkalemia on 12 lead ECG, such as peaked T waves and/or prolonged QT segment
 - 6.2 Calcium Gluconate 1 gm of 10% solution slowly IV/IO over 5 minutes
Pediatric: 0.5 gm of 10% solution slowly IV/IO/ over 5 minutes

Key Points / Considerations

- Acute effects may progress for several days before symptoms appear
- Specific treatment depends on the body system affected

HYDROGEN SULFIDE

EMT

1. Begin BLS initial management procedures

EMT STOP

Paramedic

2. Begin ALS initial management protocols if applicable

Paramedic STOP

OMA Response Physician (5M) Approval Required

3. Administer Sodium Bicarbonate 1 mEq/kg IV/IO
 1. Adult patients - Sodium Bicarbonate 7.5%
 2. Pediatric patients - Sodium Bicarbonate 4.2%

Key Points / Considerations

- Fatalities have occurred to rescuers entering the hot zone
- Olfactory fatigue may occur and consequently odor may not provide adequate warning of hazardous concentrations

METHEMOGLOBINEMIA

EMT

1. Begin BLS initial management procedures

EMT STOP

Paramedic

2. Begin ALS initial management protocols if applicable
3. Obtain three blood tube samples and then administer Methylene Blue 2 mg/kg of a 1% solution IV/IO slowly over 5 minutes followed by 50 ml of normal saline. Observe for hypertension, nausea, or disorientation
4. If after 30 minutes cyanosis or severe methemoglobinemia symptoms persist, repeat above Methylene Blue dose
5. Administer high concentration oxygen for at least 2 hours following last Methylene Blue administration (do not delay transport)

Paramedic STOP

Key Points / Considerations

- Clinical levels of Methemoglobinemia and associated signs/symptoms:
 - < 15% Asymptomatic
 - 20-30% Headache, fatigue, cyanosis, AMS, dizziness, syncope
 - 30-50% Dyspnea
 - 50-70% Lethargy, stupor, dysrhythmias, seizure, coma
 - > 70% Death
- This treatment protocol should only be used when all of the following Methemoglobinemia criteria are met:
 - Known or suspected exposure to oxidizing agents (nitrates, nitrites, chlorates, etc) including: Amyl Nitrate, Aniline Dye Derivatives, Butyl Nitrite, Chlorobenzene, Isobutyl Nitrite, Naphthalene, Nitrophenol, Nitrous Gases, Sodium Nitrite, and more
 - Central or Peripheral Cyanosis
 - Signs and symptoms of significant (>20%) Methemoglobinemia
 - Chocolate brown colored blood in flash chamber of IV catheter
- Pulse oximetry readings may not be accurate in these patients
- Glucose 6 Phosphate Dehydrogenase (G6PD) Deficiency is a relative contraindication for Methylene Blue administration

HYDRAZINE POISONING WITH SEIZURES

EMT

1. Begin BLS initial management procedures.

EMT STOP

Paramedic

2. Begin ALS initial management protocols if applicable.
3. Administer 25 mg/kg Pyridoxine (Vitamin B6) IV/IO slowly over 5 minutes for seizures not controlled utilizing NYC REMAC Protocol Seizures (Adult and Pediatric). If seizures persist, a single repeat dose of Pyridoxine may be administered (maximum combined Pyridoxine dose: 5 gm).
4. If Methemoglobinemia develops, refer to above Methemoglobinemia Protocol.

Paramedic STOP

Key Points / Considerations

- Pulse oximetry readings may not be accurate if these patients develop Methemoglobinemia

HYDROCARBON PRODUCTS / SOLVENTS

EMT

1. Begin BLS initial management procedures

EMT STOP

Paramedic

2. Begin ALS initial management protocols if applicable

Paramedic STOP

Key Points / Considerations

- Avoid Epinephrine, Albuterol, and other beta-adrenergic agents, except in cases of cardiac arrest or refractory airway disease. These may induce fatal arrhythmias in the Hydrocarbon-sensitized myocardium

CYANIDE EXPOSURE

EMT

1. Begin BLS initial management procedures
2. Treat in accordance to NYC REMAC Protocol Cyanide Poisoning (Adult and Pediatric)

EMT STOP

Paramedic

3. Begin ALS initial management protocols if applicable

Paramedic STOP

OMA Response Physician (5M) Approval Required

4. Contact OMA Physician On-Call (5M) for approval to treat suspected or confirmed cyanide Weapons of Mass Destruction (WMD) exposure patients with protocol when number of patients is less than criteria for Class Order issuance

ORGANOPHOSPHATES

EMT

1. Begin BLS initial management procedures
2. Treat in accordance to NYC REMAC Protocol Weapons of Mass Destruction: Nerve Agent Exposure (Adult and Pediatric)

EMT STOP

Paramedic

3. Begin ALS initial management protocols if applicable

Paramedic STOP

OMA Response Physician (5M) Approval Required

4. Contact OMA Physician On-Call (5M) for approval to treat suspected or confirmed organophosphate exposure patients with protocol when number of patients is less than criteria for Class Order issuance

RADIATION TREATMENT

EMT

1. Begin BLS initial management procedures
 - 1.1 Red tag patients should be transported prior to decontamination following all reverse isolation procedures
 - 1.2 Orange, Green, and Yellow tag patients should be immediately sent for initial screening and decontamination

EMT STOP

Paramedic

2. Begin ALS initial management protocols if applicable

Paramedic STOP

OMA Response Physician (5M) Approval Required

3. **POTASSIUM IODIDE (for suspected radioactive iodine exposure):**
 - Administer Potassium Iodide (KI) as follows:

Age	Amount of Potassium Iodide
Newborns (Birth - 1 month)	16.25 mg (5 ml of Potassium Iodide Liquid Mixture)
Infants and Children (1 month - 3 years)	32.5 mg (10 ml of Potassium Iodide Liquid Mixture)
Children (3 years - 18 years)	65 mg (half 130 mg tablet or 65 mg tablet or 20 ml of Potassium Iodide Liquid Mixture)
Adults (up to 40 years)	130 mg (one 130 mg tablet or two 65 mg tablets or 40 ml of Potassium Iodide Liquid Mixture)
<p><i>To prepare Potassium Iodide Liquid Mixture:</i></p> <p>Grind one 130 mg tablet (or two 65 mg tablets) into powder and mix with 40 ml of sterile water. This will result in a concentration of 16.25 mg per 5 ml. Refer to this table for appropriate dosing.</p> <p>Patients who can swallow pills should be given tablets as above.</p>	

4. PRUSSIAN BLUE (for suspected Ingestion/internal-contamination with Radioactive Cesium or Thallium):

- Administer Prussian Blue orally. If unable to swallow capsule, break open capsule and mix with water:
 - Adult 2 gm (4 capsules)
 - Pediatrics greater than 2 years old 1 gm (2 capsules)

Key Points / Considerations

- The ALARA (As Low As Reasonably Achievable) principle must be utilized while operating at scenes of possible radioactive exposure
- All radioactively contaminated patients pose a secondary exposure and contamination risk to providers
- Prior to use of these protocols the specific isotope must be identified, as this will dictate treatment
- Potassium Iodide should be withheld in adults over 40 years of age. However, women who are pregnant or breastfeeding should take the full 130 mg dose regardless of age
- Prussian Blue may be administered to adults and children from age 2 years. Pregnant women may also take Prussian Blue. Administer with caution in patients with significant gastrointestinal problems (e.g., history of intestinal blockage, severe constipation, significant stomach issues).