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## ***Nerve Agent/Organophosphate Pesticide Exposure Treatment***

**Purpose:** This Protocol is intended for EMS personnel at all levels to assess and treat patients exposed to nerve agents and organophosphate pesticides. The protocol includes the use of the Mark I/Duo Dote Antidote Kits and the Atropen auto injector for personnel trained in the use of these devices and authorized by the local medical control authority.

### **Chemical Agents**

1. Agents of Concern
  - A. Military Nerve Agents including: Sarin (GB), Soman (GD), Tabun (GA), VX
  - B. Organophosphate Pesticides (OPP) including Glutathione, Malathion, Parathion, etc.
2. Detection: The presence of these agents can be detected through a variety of monitoring devices available to most hazardous materials response teams and other public safety agencies.

### **Patient Assessment**

1. **SLUDGEM** Syndrome
  - A. **S** Salivation / Sweating / Seizures
  - B. **L** Lacrimation (Tearing)
  - C. **U** Urination
  - D. **D** Defecation / Diarrhea
  - E. **G** Gastric Emptying (Vomiting) / GI Upset (Cramps)
  - F. **E** Emesis
  - G. **M** Muscle Twitching or Spasm
2. Threshold Symptoms: These are symptoms that may allow rescuers to recognize that they may have been exposed to one of these agents and include:
  - A. Dim vision
  - B. Increased tearing / drooling
  - C. Runny nose
  - D. Nausea/vomiting
  - E. Abdominal cramps
  - F. Shortness of breath

**NOTE:** Many of the above may also be associated with heat related illness.

3. Mild Symptoms and Signs:
  - A. Threshold Symptoms *plus*:
  - B. Constricted Pupils\*
  - C. Muscle Twitching
  - D. Increased Tearing, Drooling, Runny Nose
  - E. Diaphoresis
4. Moderate Symptoms and Signs
  - A. Any or all above *plus*:
  - B. Constricted Pupils
  - C. Urinary Incontinence
  - D. Respiratory Distress with Wheezing

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- E. Severe Vomiting
- 5. Severe Signs
  - A. Any or All of Above *plus*
  - B. Constricted Pupils\*
  - C. Unconsciousness
  - D. Seizures
  - E. Severe Respiratory Distress

**\*NOTE:** Pupil constriction is a relatively unique finding occurs early and persists after antidote treatment. The presence of constricted pupils with SLUDGEM findings indicates nerve agent / OPP toxicity.

**Personal Protection**

1. Be Alert for secondary device in potential terrorist incident
2. Personal Protective Equipment (PPE)
  - A. Don appropriate PPE as directed by Incident Commander.
  - B. Minimum PPE for Non-Hot Zone (i.e., DECON Zone)
    - a. Powered Air Purifying Respirator or Air Purifying Respiratory with proper filter
    - b. Chemical resistant suit with boots
    - c. Double chemical resistant gloves (butyl or nitrile)
    - d. Duct tape glove suit interface and other vulnerable areas
3. Assure EMS personnel are operating outside of Hot Zone
4. Avoid contact with vomit if ingestion suspected – off gassing possible
5. Assure patients are adequately decontaminated *prior* to transport
  - A. Removal of outer clothing provides significant decontamination
  - B. Clothing should be removed before transport
  - C. DO NOT transport clothing with patient
6. Alert hospital(s) as early as possible

**Patient Management (After Evacuation and Decontamination)**

1. Evaluate and maintain the airway, provide oxygenation and support ventilation as needed.
2. NOTE: Anticipate need for extensive suctioning
3. Antidote administration per Mark I Kit/Duo Dote auto injector Dosing Directive – See Chart
-  4. Establish vascular access
-  5. Atropine 2-6 mg IV/IM per Mark I Kit Dosing Directive if Mark I Kit is not available (each Mark I Kit/Duo Dote auto injector contains 2 mg of atropine)
6. Treat seizures
  - A. **Adult**
    - a. Administer **Diazepam** 2-10 mg IV/IM **OR** Midazolam 0.05 mg/kg to max 5 IV/IM

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- b. Administer **Midazolam** 0.1 mg/kg to max 10 mg IM
- c. If available, **Valium** auto-injector




**B. Pediatrics**

- a. **Midazolam** 0.15 mg/kg IV/IM (maximum individual dose 5 mg)
- b. If available, **Valium** auto-injector

7. Monitor EKG



8. Additional **Atropine** 2 mg IV/IM for continued secretions (0.05 mg/kg for pediatrics) 

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<b>*NA Kit Dosing Directive</b>				
	<b>Clinical Findings</b>	<b>Signs/Symptoms</b>	<b>Required Conditions</b>	<b>NA Kits To Be Delivered</b>
<b>SELF-RESCUE</b>	<b>Threshold Symptoms</b>	<ul style="list-style-type: none"> <li>• Dim vision</li> <li>• Increased tearing</li> <li>• Runny nose</li> <li>• Nausea/vomiting</li> <li>• Abdominal cramps</li> <li>• Shortness of breath</li> </ul>	Threshold Symptoms <i>-and-</i> Positive evidence of nerve agent or OPP on site	1 NA Kit (self-rescue)
<b>ADULT PATIENT</b>	<b>Mild Symptoms and Signs</b>	<ul style="list-style-type: none"> <li>• Increased tearing</li> <li>• Increased salivation</li> <li>• Dim Vision</li> <li>• Runny nose</li> <li>• Sweating</li> <li>• Nausea/vomiting</li> <li>• Abdominal cramps</li> <li>• Diarrhea</li> </ul>	Medical Control Order	1 NA Kit
	<b>Moderate Symptoms and Signs</b>	<ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Difficulty breathing</li> <li>• Severe vomiting</li> </ul>	Constricted Pupils	2 NA Kits
	<b>Severe Signs</b>	<ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Unconsciousness</li> <li>• Seizures</li> <li>• Severe difficulty breathing</li> </ul>	Constricted Pupils	3 NA Kits (If 3 NA Kits are used, administer 1 <sup>st</sup> dose of available benzodiazepine)
<b>PEDIATRIC</b>	<b>Pediatric Patient with Non-Severe Signs/Symptoms</b>	<i>Mild or moderate symptoms as above</i>	Positive evidence of nerve agent or OPP on site	Age ≥ 8 years old: <ul style="list-style-type: none"> <li>• As Above</li> </ul> Age < 8 years old <ul style="list-style-type: none"> <li>• Per Medical Control</li> </ul>
	<b>Pediatric Patient with Severe Signs/Symptoms</b>	<ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Unconsciousness</li> <li>• Seizures</li> <li>• Severe difficulty breathing</li> </ul>	Severe breathing difficulty  Weakness	Age ≥ 8 years old: <ul style="list-style-type: none"> <li>• 3 NA Kits</li> </ul> Age < 8 years old: <ul style="list-style-type: none"> <li>• 1 NA Kit</li> </ul> Contact Medical Control as needed

**\*NOTE: Nerve-agent Antidote (NA) = 1 Duo Dote or 1 Mark I**