CHEMPACK
An Overview

Ohio Department of Public Safety
Division of Emergency Medical Services

EMS/Homeland Security Committee

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Introduction

The Ohio Department of Public Safety has provided disaster management, incident command, and weapons of mass destruction (WMD) awareness programs for personnel who protect and support the citizens of Ohio during mass casualty events. In November 2004, the Ohio Department of Public Safety formed the EMS/Homeland Security Committee to identify and address health crisis needs that are specific to EMS providers and to reinforce the existing network between EMS and our colleagues in crisis management.

Health crisis planning requires coordination between EMS providers, hazardous materials teams, law enforcement, public health agencies, and health care facilities. The EMS/Homeland Security Committee has recognized that EMS providers will be the largest source of manpower in the prehospital setting with specialized responsibilities and capabilities for the provision of patient care. Furthermore, the EMS/Homeland Security Committee has recognized that there are critical actions that EMS providers are certified to perform in the prehospital setting with the appropriate training that will save and protect lives during an event that creates a health crisis.

This program will provide you with overview of CHEMPACK, a federal asset within the Strategic National Stockpile (SNS). Upon the completion of this program you will be oriented to the purpose and contents of the CHEMPACK as well as the required operational procedures during a CHEMPACK deployment in the state of Ohio.

Course Objectives

- Describe the Strategic National Stockpile (SNS) Program
- Describe the CHEMPACK project
- Discuss field indications for CHEMPACK use (SLUDGEM)
- Review the process for CHEMPACK activation
- Review the state CHEMPACK deployment plan
The Department of Health and Human Services (HHS), the Department of Homeland Security, and the Centers for Disease Control (CDC) have developed a Strategic National Stockpile (SNS) program throughout the country.

The SNS has medical supplies that will be urgently needed by patients exposed to chemical, biological, radiological, nuclear, explosive (CBRNE) as well as large natural disasters for treatment and prophylaxis.

The first objective of the CDC SNS is to push medical supplies to the State within 12 hours of the CDC’s decision to deploy in response to a declared emergency.

The medical supplies will provide the initial treatment until the patients can be transported to a health care facility or until additional medical supplies can be delivered to the affected areas.
The medications and antidotes in the Strategic National Stockpile are federal assets. Although they are strategically placed throughout our communities, your hospital, city, county, region, and the state of Ohio do not own them. Therefore, hospitals, municipalities, counties, states, and emergency physicians do not have the authority to withhold the SNS assets from other communities in need. The assets must be transferred immediately if ordered by the federal government.

Due to the rapid action of nerve agents, CHEMPACK assets are positioned within the communities in such a manner that the contents can be distributed to the location of need within one hour of deployment.
CHEMPACK project is the second wave response to a nerve agent incident

- Nerve agent antidote auto-injectors (i.e. MARK I kits) in many EMS agencies are first level response
- CHEMPACK is second level response
- SNS is third level response

The CHEMPACK should only be used when the number of people affected by the nerve agent is greater than 50 victims and will overwhelm the nerve agent antidote resources of the local EMS agencies and hospitals.

Due to the rapid action of nerve agents, CHEMPACK assets are positioned within the communities in such a manner that the contents can be transported to the location of need within one hour of deployment.

CHEMPACK should be used when the number of people affected by the nerve agent exceeds 50.
The Food and Drug Administration (FDA) has included the CHEMPACK assets within their Shelf Life Extension Program (SLEP) provided that there is compliance with the CDC’s security and temperature-control requirements. SLEP extends the expiration dates of the CHEMPACK assets to ten years. The federal government currently will not replace CHEMPACK assets that are used during a deployment or deemed expired by the CDC due to loss of temperature control or SLEP expiration dates. The pharmaceutical contents of the CHEMPACK include:

All CHEMPACKs contain large quantities of atropine, pralidoxime (2-PAM), and diazepam (Valium) and vials of sterile water. They are required to be stored in a secured, temperature-controlled site with electrical power and a dedicated telephone line. A Sensaphone connects the CHEMPACK to the telephone line and automatically sends a message to the CDC in the event of a disconnection of the CHEMPACK from the telephone line, alteration of room temperature outside of the acceptable range, or a breach in security.

There are two types of CHEMPACKs that are provided by the SNS in the event of a nerve agent release. Designated hospitals will have hospital CHEMPACKs for hospital use and EMS CHEMPACKs for distribution to EMS providers in the field. The hospital and EMS CHEMPACKs each contain a quantity of medications to initiate the treatment of 1000 patients. The primary difference between the hospital and EMS CHEMPACK is that the EMS CHEMPACK contains significantly more pre-filled auto-injectors of nerve agent antidotes, including Mark I kits, and diazepam in addition to the multi-dose vials of these medications. Also, the CHEMPACK assets in the EMS CHEMPACK are contained in smaller boxes to facilitate ease in portability and wider distribution in the field. All boxes of CHEMPACK assets, hospital and EMS, are stored in a 50-square foot metal cage that is connected to the Sensaphone of the storage site.
EMS CHEMPACK Contents

- Mark I auto-injectors
- Atropine sulfate
  - 0.4mg/ml (20ml)
  - auto-injector 0.5mg (AtroPen)
  - auto-injector 1.0mg (AtroPen)
- 2-PAM (pralidoxime) solution 1gm (20ml)
- Diazepam
  - 5mg/ml auto-injector
  - 5mg/ml vial, 10ml
- Sterile water for injection, 20ml vials

- Mark I Auto-injectors
- AtroPen 0.5 mg
- AtroPen 1.0 mg
- Atropine Sulfate 0.4mg/ml, 20ml
- Diazepam 5mg/ml autoinjector
- Diazepam 5mg/ml vial, 10 ml
- Pralidoxime 1 gm injectable, 20 ml
- Sterile water for injection, 20cc vials

CHEMPACK

- During a nerve agent release, it is highly unlikely that EMS providers will be able to immediately identify the agent.

- The appropriate actions for all emergency care providers will hinge upon the rapid recognition of signs and symptoms.
Nerve agents are typically WMDs and are mostly likely to be used as a weapon of mass destruction include:
- Sarin (GB)
- Soman (GD)
- Tabun (GA)
- VX.

Nerve agents that are mostly likely to be used as WMDs include Sarin (GB), Soman (GD), Tabun (GA), and VX. Both nerve agents and organophosphates act by blocking the enzyme acetylcholinesterase in the nerve endings. The signs and symptoms that they produce are similar, although the antidote doses required for treatment of an organophosphate exposure are typically higher than that for a nerve agent. Nerve agents are toxic and are not available to the general public. Organophosphates are in pesticides and are easily bought and sold to the public every day.

During a nerve agent release, it is highly unlikely that you or the EMS providers will be able to identify the agent. The appropriate actions for all emergency care providers will hinge upon the rapid recognition of signs and symptoms. SLUDGEM is the mnemonic used to describe the symptoms caused by nerve agents and organophosphates. There will be excessive secretions in the form of salivation, excessive tearing, urination, diarrhea, and vomiting as well as abdominal cramping, muscle twitching, and pinpoint pupils. The onset of symptoms and progression to death will vary depending on the amount and route of exposure.
Nerve Agents & Organophosphates

- SLUDGEM signs and symptoms produced by nerve agents are similar to those resulting from organophosphate exposure.

- The antidote doses required for treatment of an organophosphate exposure are typically higher than that for a nerve agent.

S-Salivation
L-Lacrimation (tearing)
U-Urination
D-Defecation
G-Gastrointestinal upset
E-Emesis
M-Muscle twitching/Miosis

SLUDGEM
Nerve Agents & Organophosphates

- Treatment
- Mark I kits (Nerve agent antidote auto-injectors)
  - Designed for military
  - Can also be administered to victims
- Contents
  - Atropine
  - 2-PAM (pralidoxime)

Nerve Agency Antidote Auto-injectors

Nerve agent antidote auto-injectors, like the Mark I kit or Duodote, contain atropine and 2-PAM and were designed for the rescue of the symptomatic first responder, but they can be administered to victims as well. The medications in these kits are contained in auto-injectors which avoid the delay of drawing it out of a bottle into a syringe and provide ease in rapid administration.

For symptomatic patients, atropine and 2-PAM should be administered intravenously or intramuscularly in doses according to the emergency physician’s orders or the State of Ohio CHEMPACK Standard Operating Procedures. An exposure to a nerve organophosphate does not directly affect the victim’s heart rate. Therefore, administration of the contents of a nerve agency antidote auto-injector should not be withheld during a known or suspected nerve agent or organophosphate exposure regardless of the victim’s heart rate.

The EMS Board of the State of Ohio changed the administrative rules on September 1, 2006 to allow EMS providers of all certification levels to administer nerve agent antidote auto-injectors in a declared emergency if they have received the proper training to perform the procedure.

Mark I Kit
CHEMPACK deployment requires a suspected or confirmed nerve agent release that will affect a large number of patients and will overwhelm the local EMS and hospital supplies of nerve agent antidotes. The EMS/Homeland Security Committee has developed a state of Ohio CHEMPACK deployment protocol to facilitate the expedient delivery of CHEMPACK assets to areas within the state and to other states. The CHEMPACK fielding procedures were developed by the CDC, the Ohio Department of Health, and the Ohio Department of Public Safety, Division of EMS. The fielding procedures determine the local authorities to be contacted by EMS to initiate a CHEMPACK deployment and present guidelines to coordinate the efforts of the CDC and local public health and health care facilities to best support EMS during the CHEMPACK deployment.

If the criteria for CHEMPACK deployment have been met, emergency care providers should immediately don PPE, declare a disaster, and establish incident command. The CHEMPACK deployment is initiated by contacting the state of Ohio CHEMPACK activation agency, which is the Law Enforcement Response Plan (LERP), by calling (866) 599-LERP (5377). The state of Ohio CHEMPACK activation agency will contact the appropriate point of contact (POC) at a CHEMPACK hospital. From the report provided by the emergency care provider, medical control, the incident commander, and the EMS staff will determine the criteria for CHEMPACK deployment have been met. Ideally the report should include a description of patient symptoms, the anticipated number of victims, and the estimated geographical area potentially involved by the known or suspected nerve agent release.

When the CHEMPACK deployment has been activated, the state of Ohio CHEMPACK transportation protocol will be initiated by LERP to transport the CHEMPACK assets to the staging area of the scene of the incident or to the requesting health care facility. The transportation personnel must identify themselves and sign a CHEMPACK Controlled Substance Transfer Form log to receive the assets. The transport vehicle must have lights and a siren, and the transportation personnel must possess a DEA registration or exemption. A security escort for the transportation vehicle and personnel is strongly recommended.

**CHEMPACK Protocol**

The EMS/Health Crisis Planning Committee has developed a state of Ohio CHEMPACK deployment protocol to facilitate the expedient delivery of CHEMPACK assets to areas within the state.
 Incident Commander (IC) on scene
Known or suspected nerve agent or Organophosphate exposure
-or-
SULDGEM Signs and Symptoms present

IC contacts local Medical Control (MC)

YES

CHEMPACK NEEDED?

IC contacts Ohio Joint Dispatch Facility and requests CHEMPACK

Law Enforcement Response Plan (LERP)
database identifies closest CHEMPACK

LERP contacts State Emergency Management Agency Duty Officer

Hospital Host is Notified

Closest Ohio State Petrol post or Law enforcement agency is dispatched to host hospital

Contact is made with County EMA or disaster personnel

Additional CHEMPACK assets/use are coordinated by state EOC

NO

EMS utilizes appropriate local care protocols

CHEMPACK is picked up by law enforcement

Law enforcement delivers CHEMPACK to staging area
1. Contact local medical control for collaboration of CHEMPACK deployment.
   A. Medical control____________________________________________
   B. Doctor’s name _______________________________________________
   C. Phone number _______________________________________________
   D. Type of emergency ____________________________________________
   E. Estimated number of victims____________________________________

2. Contact State of Ohio Joint Dispatch Facility (OJDF) at 1-866-599-5377.
   Note: OJDF needs to know all information in sections 2 and 3.
   A. IC Name _____________________________    Rank ________________
      Agency ______________________________________________________
      Cell phone command post number #1 _____________________________
      Cell phone command post number #2 _____________________________
   B. County in which incident occurred _______________________________
   C. Jurisdictional law enforcement agency __________________________

3. Identify staging location:
   A. Address _____________________________________________________
      and/or
      GPS: Latitude ___________________ Longitude ____________________

4. OSP will call back IC and identify the host hospital where CHEMPACK is coming from the Point of Contact (POC), phone number, and approximate ETA.

5. Upon OSP’s arrival at staging they will make direct contact with the staging manager.

6. Complete CHEMPACK Control Substance Transfer Form.
Law Enforcement Response Plan (LERP) 1-866-599-LERP (5377)

- Computerized database of assets
- EMS & Hospital CHEMPACK listed in the LERP database
- A computer algorithm selects the closest CHEMPACK for activation
- Automated voice/text messages sent
  - Hospital Location of CHEMPACK
  - OSHP or closest law enforcement agency to CHEMPACK being activated
  - County EMA

LAW ENFORCEMENT ROLE

- When the CHEMPACK deployment has been activated, the state of Ohio CHEMPACK transportation protocol is initiated to transport the CHEMPACK assets to the staging area of the scene of the incident or to the requesting health care facility.
The transport vehicle must have lights and a siren, and the transportation personnel must possess a DEA registration or exemption.

The transportation personnel must identify themselves and sign a CHEMPACK controlled substance transfer form to receive the assets.

Ohio State Highway Patrol will provide primary transportation of the EMS CHEMPACK from the hospital to a safe location near the place of need.

A second response vehicle/officer should be tasked to provide mission support in lieu of a crash or breakdown.

OSHP will coordinate with other law enforcement agencies (county sheriff, local police) to transport CHEMPACK if OSHP is unavailable.
The CHEMPACK controlled substance transfer form is stored with the CHEMPACKs at each hospital. This form is used to track the transfer of the controlled substances from one location to another. It is designed to be completed rapidly so as not to slow the response of the CHEMPACK assets.
### Nerve Agent Antidote Dosing Guidelines for EMS

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<th>Patient</th>
<th>Atropine</th>
<th>2-PAM</th>
<th>Diazepam</th>
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<tr>
<td>Infant or Young Child</td>
<td>0.02 mg/kg IV or 0.05 mg/kg IM q 5 min. until secretions decrease</td>
<td>25-50 mg/kg IV/IM</td>
<td>0.2 mg/kg IV or 0.5 mg/kg IM/rectal (Max total dose 5 mg)</td>
</tr>
<tr>
<td>Older child or Adult</td>
<td>2 mg IV/IM q 5 min. until secretions decrease</td>
<td>1 gm IV 600 – 1200 mg IM</td>
<td>5-10 mg IV/IM (Max total dose 10 mg)</td>
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During a CHEMPACK deployment, utilization of the State of Ohio WMD nerve agent protocol is mandatory and supersedes local EMS protocols for nerve agent treatment only. This is the nerve agent antidote dosing regimen from the State of Ohio Weapons of Mass Destruction (WMD) protocol that is to be followed during a CHEMPACK deployment.

The dose of atropine is 0.02 milligrams per kilogram IV or 0.05 milligrams per kilogram IM for the pediatric patient and 2 milligrams IV or IM for the adult patient every five minutes until secretions diminish. If an Atropen, or the atropine from a Mark I is administered, a dose calculation prior to administration is not necessary and additional auto-injectors can be administered until secretions diminish. Pediatric Atropens containing 0.5 milligrams should be administered to children who appear to weigh up to 20 kilograms. The EMS provider can administer two pediatric Atr-pens simultaneously to an adult if adult Atropens containing 1 milligram are unavailable.

The dose of 2-PAM is 25 to 50 milligrams per kilogram for the pediatric patient and 1 gram IV or 600 milligrams to 1.2 grams IM for the adult patient. The dose of diazepam for the pediatric patient is 0.2 milligrams per kilogram IV or 0.5 milligrams per kilogram IM or rectally with a maximum total dose of 5 milligrams. The dose of diazepam for the adult patient is 5 to 10 milligrams IV or IM with a maximum total dose of 10 milligrams.

Atropine is the primary antidote for a nerve agent exposure, and repeated doses should be administered liberally to victims. Although a dose of 2-PAM should be administered early in the course of treatment, repeat doses should be reserved for patients who continue to exhibit respiratory distress. In the pediatric population, an overdose of 2-PAM may cause profound neuromuscular weakness and subsequent respiratory depression. In the adult population, especially for the geriatric victim, excessive doses of 2-PAM may cause severe systolic and diastolic hypertension, neuromuscular weakness, headache, tachycardia, and visual impairment.
For the geriatric victim who may have underlying medical conditions, particularly impaired kidney function or hypertension, the EMS provider should consider administering the lower recommended adult dose of 2-PAM IV. If the contents of a Mark I kit have been administered to these patients, the EMS provider should consider deferring the administration of additional 2-PAM auto-injectors from subsequent Mark I kits dispensed to the victim.
## Initial Antidote Dosing Based on Symptoms for EMS

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<th>Exposure</th>
<th>Symptoms</th>
<th>Initial Dosing</th>
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| Mild to Moderate | SLUDGEM, agitation, respiratory depression | 1 - 2 doses of atropine initially  
               |                                                | Administer 2-PAM if dyspnea develops               |
| Severe        | SLUDGEM, agitation, respiratory depression, seizure | 3 doses of atropine initially  
               |                                                | Administer 2-PAM  
               |                                                | Administer diazepam every 2-5 minutes            |

Patients with mild to moderate nerve agent exposures will have SLUDGEM symptoms, agitation and possibly respiratory distress. These patients should receive 1-2 doses of atropine initially. If respiratory distress persists after the patient has begun to improve after atropine administration, then a dose of 2-PAM should be administered to the patient.

Patients with severe nerve agent exposures will have SLUDGEM symptoms, agitation, respiratory distress, and seizures. Patients with symptoms of a severe nerve agent exposure should receive 3 doses of atropine initially, a dose of 2-PAM after improvement following atropine administration, and also diazepam every 2-5 minutes for the seizures.
The CHEMPACK project is part of the Strategic National Stockpile, a federal program that supplies states with additional medical supplies in the event of a disaster.

CHEMPACKs contain medications to treat nerve agent or organophosphate exposures. Due to the rapid need for these medications, CHEMPACKs are located throughout the state.

There are 2 types of CHEMPACKs, EMS and Hospital. Hospital CHEMPACKs have enough medications to treat one thousand patients. The EMS CHEMPACKs, have enough medications to treat 454 patients and contain more auto-injectors than the hospital CHEMPACKs.

If a nerve agent or organophosphate exposure occurs and more than 50 patients are expected, the EMS incident commander should review the situation with their local medical control and can request a CHEMPACK by calling the LERP 1-866-599-5377, 24 hours a day, seven days a week.
The Ohio State Highway Patrol is responsible for transportation of the CHEMPACKs to the incident location, and will work closely with local law enforcement agencies to ensure rapid delivery of the assets.

For more information about the SNS and CHEMPACK program, contact the Ohio Department of Health at (614) 752-1361

EMS Health Crisis Planning Committee
CHEMPACK Subcommittee

- Mark Burgess, Chief – Ashland Fire Dept.
- Dr. Carol Cunningham, State Medical Director
- Capt. Jeff Dickey, Ohio State Highway Patrol
- Chris Feller, Administrator - Aultman Hosp.
- David Fiffick, Clemente Ambulance Service
- Mike Glenn, Division of EMS
- Mark Keeler, Ohio Dept. of Health
- Elizabeth Kitchen, Ohio Dept. of Health
- Carol Jacobson, Ohio Hospital Association
- Brian Pfeffer, Division of EMS
- John Sands, Division of EMS
- Don Snyder, Assistant Chief, Plain Twp. Fire Dept.
- Mark Resanovich, EMT-P, Green Fire Dept.
Basic Definitions

Disaster

Any disaster, whether it is natural, accidental, or covert act of terrorism, can trigger a health crisis. By definition, a disaster is defined as any event, regardless of size or expanse, which overwhelms the available resources. In the event of a declared disaster or emergency, EMS providers may be authorized by order of the governor, public health director, state or local EMS medical directors, or the federal government to administer medications under specialized protocols.

Triage

Trier is a French verb that means “to sort”. Triage is the sorting and allocation of treatment to patients and especially to battle and disaster victims according to a system of priorities designed to maximize the number of survivors. Triage of victims is essential to the initial management of a disaster after scene safety has been secured. In the event of a mass casualty incident, the state of Ohio has adopted the START and Jump START triage system for EMS providers.