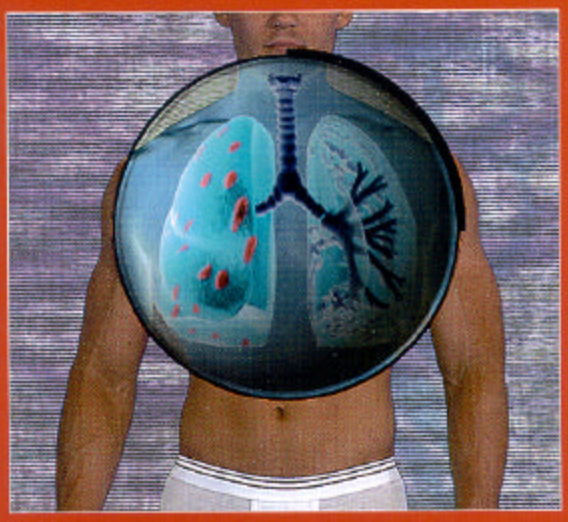
Re-ACT FAST II

Refresher on Agent Characteristics and Toxicology
First Aid and Special Treatment



This video is a refresher course for CSEPP emergency workers. It describes the signs and symptoms of chemical agent exposure along with the initial treatment of persons exposed to nerve and blister agents. The program also includes sections on atropine and 2-Pam Chloride, including the use of auto injectors, appropriate decontamination procedures, the various forms of CSEPP approved PPE, and the donning and doffing of the protective suits and the loose–fitting and tight–fitting PAPR's.

FACILITATOR GUIDE

Re-ACT FAST II VIDEO FACILITATOR GUIDE

Refresher on Agent Characteristics and Toxicology
First Aid and Special Treatment

Prepared for

FEDERAL EMERGENCY MANAGEMENT AGENCY
Preparedness, Training, and Exercise Directorate
Washington, DC

and

UNITED STATES ARMY
SOLDIER AND BIOLOGICAL CHEMICAL COMMAND
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TABLE OF CONTENTS

SECTION 1. INTRODUCTION

This video was designed for the Chemical Stockpile Emergency Preparedness Program (CSEPP) as a refresher course to prepare emergency workers to recognize and provide initial treatment to persons exposed to nerve (VX, GB, G) and blister (H, HD, HT) agents. The topics are covered in modules that the student can view either sequentially or as needed for refresher training for the Agent Characteristics and Toxicity, First Aid and Special Treatment (ACT FAST) course. Because this is refresher training, the student should be familiar with material contained in the ACT FAST course.

Although some material from the ACT FAST course is included, additional information provided in this video includes the recommended doses of atropine and pralidoxime chloride (2-PAM Chloride), decontamination procedures as approved by the US Department of the Army and the Federal Emergency Management Agency (FEMA) for CSEPP, and the appropriate personal protective equipment (PPE) to be worn by CSEPP emergency workers.

1.1 Target Audience

The target audience includes those emergency and pre-hospital workers who require refresher training for the purposes of responding to an accidental release of nerve or blister (vesicant) agents. This audience includes those qualified to perform emergency medical treatment, such as emergency medical technicians, paramedics, ambulance operators, nurses, and others who may be in a position to provide assistance to persons exposed to nerve or blister agents. The personnel authorized to provide emergency medical assistance will differ from state to state according to state and local protocols. The reader should be aware of the specific requirements for response at their site.

1.2 Goals

The goals of the video training are to ensure that CSEPP emergency and pre-hospital workers have the most current information on the treatment of persons exposed to nerve and blister agents and that they are aware of and understand the CSEPP-prescribed decontamination procedures. This training is intended to refresh the student's understanding of the characteristics and toxicity of nerve and blister agents, their effects on the human body, the signs and symptoms of exposure, the appropriate treatment of persons exposed to nerve and blister agents, and the need to protect oneself from exposure to those agents.

1.3 Training Objectives

Before treating patients exposed to chemical warfare agents, it is important that emergency responders and pre-hospital personnel understand the characteristics of chemical warfare agents and the potential hazards to both the victim and the emergency worker. At the end of the training, participants should be able to describe:

- the characteristics of nerve (VX, GA, and GB) and blister (H, HD, HT) agents in the aging chemical warfare agent stockpile,
- the potential hazards, routes of exposure, and effects of nerve and blister agents on the human body,
- the signs and symptoms of nerve agent exposure and the appropriate response treatment (including the recommended dosages of atropine and 2-PAM Chloride of various age groups),
- the signs and symptoms of blister agent exposure and the appropriate response treatment since there is no antidote,
- the CSEPP-approved decontamination procedures, and
- the CSEPP-approved PPE for emergency workers and the appropriate methods for donning and removing the equipment.

1.4 How This Video Differs from Other CSEPP Training Courses

The viewer should be aware of how the training contained in this video differs from that of the Chemical Agent Characteristics and Toxicity, First Aid and Special Treatment (ACT FAST) course and accompanying video, Chemical Stockpile Agent Characteristics and Effects. This video contains additions to previous information, including updated descriptions of the toxicity of nerve and blister agents, the recommended doses of atropine, 2-PAM Chloride and the use of MARK I kits for various age groups, appropriate procedures for decontaminating persons exposed to nerve and blister agents before transport to a medical facility, the approved types of PPE (respirators and protective clothing) for CSEPP emergency workers, and the recommended procedures for donning and removing the PPE.

1.5 Explanation of modules

The information in this video is provided in modules. The material in this facilitator guide is divided into sections that correspond with the modules of the video. At the end of each module, the screen fades to black and there is a blank space of several seconds before the next video image appears. This allows viewers the opportunity to repeat modules, fast forward to other modules if desired, or pause and engage in discussion with the facilitator or others if questions arise.

The modules are linked to sections of this facilitator guide by descriptive headings that are also noted in the table of contents for later reference. Each module can also be identified by the “text on screen” descriptor provided in the second column of the text file following the introductions in the various sections.

1.6 How to use this guide

This guide is intended to facilitate learning contained in the video. As such, it replicates the entire text of the video, including both spoken narration and written text that appears on the screen. This permits the reader to review sections as necessary and to mark those areas which are unclear or to add notes provided by the individual trainers that may be specific to the state or local area. The reader will note that additional text is provided in the notes field to enhance or further develop concepts the narrative or screen text when needed.

The guide is designed to be a user-friendly companion text to the video. The sections are organized as follows. Objectives are outlined at the beginning of each section. This allows the reader to focus on the important concepts provided in that module. The narration and on-screen text from the video is then presented in column format. The use of columns is intended to help the reader conveniently orient the material. The narration from the video is contained in column one, the screen text in column two, and the prescribed notes and accompanying space for additional note taking in column three.

This video is designed as refresher training and should be used as an accompaniment to other CSEPP-approved courses. It is recommended that the video be used in a classroom setting with a facilitator present, although some individual viewing in other situations may be appropriate.

SECTION 2. EXPOSURE

2.1 Objectives

At the end of this section, the student should be able to:

1. Describe the major topics covered in the training video.
2. Describe how chemical agents are stored.
3. Describe the hazards of chemical agents vapors.
4. Describe what is meant by cumulative exposure.
5. Describe the routes of exposure.
6. Describe the methods to protect oneself from becoming exposed.

VOICE	SCREEN	NOTES

2.2 Introductory Video Text

As an emergency worker, what you do in the first few minutes with someone who's been exposed to a chemical agent can mean the difference between life and death. There's no time to get the person to an emergency room. You cannot wait to get to a doctor for treatment to begin.

In this video we will discuss exposure, the characteristics of agents stored in the U.S. Army's chemical munitions stockpile, how chemical agents affect the human body, signs and symptoms of agent exposure, the right emergency response treatment for exposed patients, and personal protective equipment.

- ?? Exposure
- ?? Agent characteristics
- ?? Effects on the body
- ?? Signs & symptoms
- ?? Emergency response
- ?? Protective equipment

VOICE	SCREEN	NOTES

2.3 Definition of Exposure

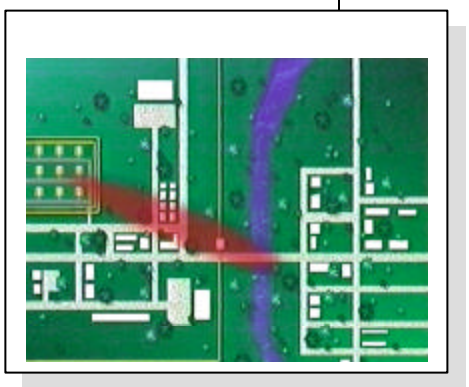
The effect a chemical warfare agent has on someone depends on which agent it is, how much the person has been exposed to, the dose, how long the person was exposed, the route of exposure, and the sensitivity of the person's system.

All chemical warfare agents in the U.S. Army's stockpile are stored as liquids or solids. If an agent is released some will remain as a liquid, some could become aerosols (which are very small droplets suspended in air); and some may volatilize or evaporate and become a vapor.

Note: Mustard becomes a solid at temperatures below 57-59? F.

Stockpiled agents differ in their volatility and thus in the degree of vapor hazard they pose.

Should an accident occur, vapor would be the most likely form of nerve agent to escape off-site. If there's an explosion or a fire, droplets and aerosols might form, but they would likely drop to the ground within just a short distance. Mustard agents are less likely to volatilize and so they present less of an off-post vapor hazard.



VOICE	SCREEN	NOTES

The key to determining the health effects of vapors or aerosols is knowing the amount, or concentration, of chemical agent in the air during the release.

In CSEPP, we measure exposure by concentration of agent in a plume multiplied by exposure time for that concentration. In this program, this is called cumulative exposure.

Chemical Stockpile Emergency Preparedness Program

2.4 Becoming Exposed

The number one rule for treating someone exposed to a chemical warfare agent is to protect yourself against contamination because you can't help anyone if you get a toxic dose. Chemical agents can cause repeated injuries by cross-contamination from victim to emergency worker.

Don't Become a Victim!

To keep from being contaminated, make sure you know the areas that you can enter safely. Remember that you're not authorized to go into a contaminated area.

Protect yourself by wearing appropriate personal protective equipment, following established work rules and following decontamination procedures.

- Know where you can go safely
- Use personal protective equipment
- Follow established work rules
- Follow decontamination procedures

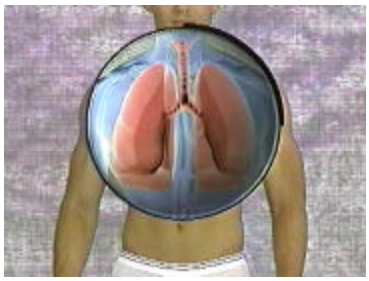
VOICE	SCREEN	NOTES

2.5 Routes of Exposure

Now, there are three main ways that a person can be exposed to nerve or blister agents.

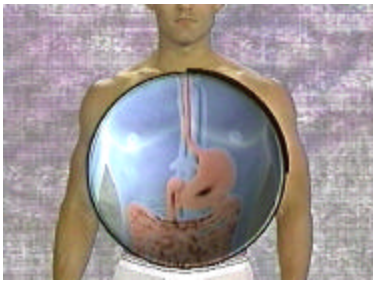
Becoming Exposed

The first is by inhaling air contaminated with vapors or aerosols. The agent enters the body through the respiratory tract, where it will be absorbed into the blood stream that will carry it to other places in the body.



The second is by direct contact or absorption through the skin or eyes. This happens when body tissues touch liquid or are exposed to high levels of vapor. The agent can more readily enter the body through cuts, scratches, sunburn, or other breaks in the skin. Once it is absorbed into the blood stream, it will spread to other parts of the body.

The third route of exposure is by ingestion, that is by swallowing the chemical agent or anything contaminated with liquid agent. From the digestive tract the agent will be absorbed into the bloodstream.



SECTION 3. NERVE AGENTS

3.1 Objectives

At the end of this section on nerve agents, students should be able to:

1. Describe the nerve agents in the stockpile and their toxicity.
2. Describe the physical characteristics of nerve agents, including their volatility.
3. Describe how nerve agents affect the human body.

VOICE	SCREEN	NOTES

3.2 Types of Nerve Agents

The nerve agents in the chemical stockpile are tabun (or GA), sarin (or GB), and VX. Because GA is only located in small quantities at Deseret Chemical Depot in Tooele, Utah, nerve agents VX and GB will be the nerve agents covered in this video. Nerve agents are chemically similar to organophosphate pesticides, but are up to a thousand times more potent.

?? GA
?? GB
?? VX

VX is the most potent of all nerve agents. It's approximately 50 times more toxic than cyanide gas.

3.3 Dose

The dose that would be lethal to 50% of people exposed, or LD_{50}, is 10 milligrams of liquid nerve agent VX on the skin of a 155-pound man.

VX LD_{50}(skin)=10 mg

This is equivalent to a tiny drop that could be held on the end of a straight pin or about the size of Lincoln's head on the back of a penny.

Nerve agent vapor in its pure form is colorless. Liquid GB is clear and resembles water. Liquid VX is amber and looks like light weight oil.

?? VX
?? GB

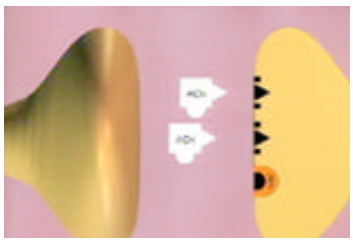
VOICE	SCREEN	NOTES

If a chemical accident with potential off-site consequences should occur at one of the storage locations, the general public and local authorities would immediately be notified. Emergency response and medical treatment centers would be established at one or more locations, where people with agent signs or symptoms could be decontaminated, screened for level of treatment, and treated if necessary.

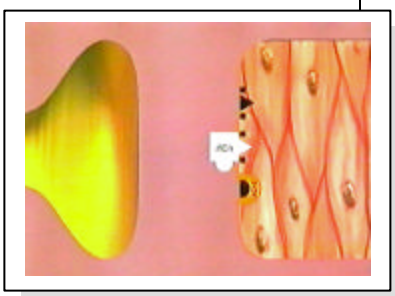
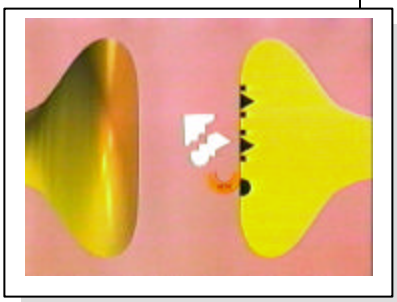
3.4 Effects on the Human Body

The action of the nerve agents can be visualized by this simulation of the synapse, or coupling point, between two nerve cell endings.

Effects on the Human Body



In normal nervous system function, an electrical impulse travels down a nerve cell to the nerve ending or end plate. At the end plate, the impulse causes the release of a chemical neurotransmitter called acetylcholine. Acetylcholine crosses the small space, known as a synapse, between the end plates of adjacent cells to stimulate receptor sites on the target nerve cell. The stimulated receptor site then activates the target cell between nerve cells.

VOICE	SCREEN	NOTES
If the nerve cell is at a junction with a skeletal muscle, the acetylcholine stimulates receptor sites that activate muscle cells to contract. If at a junction with smooth muscles such as those around the small intestine, the muscles will move rhythmically. If at a junction with a gland, the glandular cells will secrete. This is how impulses are transmitted from nerve cells to end organs.		
Let's go back to the nerve cell synapse for a more detailed look. Once the neurotransmitter acetylcholine acts on the receptor site, it is inactivated by the enzyme acetylcholinesterase. Stimulation of the target cell stops with removal of the neurotransmitter acetylcholine.		
Nerve agents inhibit or block the activity of acetylcholinesterase, so that it cannot function to destroy acetylcholine. As a result, the neurotransmitter acetylcholine accumulates and continues to stimulate receptor sites on the target nerve cell, muscle, or gland.		

VOICE	SCREEN	NOTES
The target cells continue to be stimulated long after the original impulse is transmitted. If the affected nerve is stimulating a muscle, it continues to contract or twitch in an uncontrolled and repetitive manner until it goes into a prolonged contraction, a condition commonly referred to as tetany, and becomes flaccidly paralyzed or goes limp. If the affected nerve is stimulating a gland, it will continue to secrete, resulting in excess tearing, salivation, runny nose, and accumulation of secretions in the airways.		
When the antidote atropine is administered, it blocks receptor sites from the stimulating action of the acetylcholine neurotransmitter. Secretions dry up, and breathing becomes easier. However, atropine does not free up the agent-inhibited acetylcholinesterase. A second component, pralidoxime chloride—more commonly known as 2-PAM Chloride—restores the acetylcholinesterase enzyme by breaking the enzyme-agent bond and removing the agent molecule. The acetylcholinesterase can once again function, allowing resumption of normal nerve transmission. Convulsions stop.		

VOICE	SCREEN	NOTES
Laws regulating the use of controlled drugs differ from state to state. In some states atropine or 2-PAM Chloride can only be administered under the direction of a physician. You should be familiar with the laws and local protocols governing drug administration in emergency situations in your state.		

SECTION 4. NERVE AGENT SIGNS AND SYMPTOMS

4.1 Objectives

At the end of this section, the student should be able to:

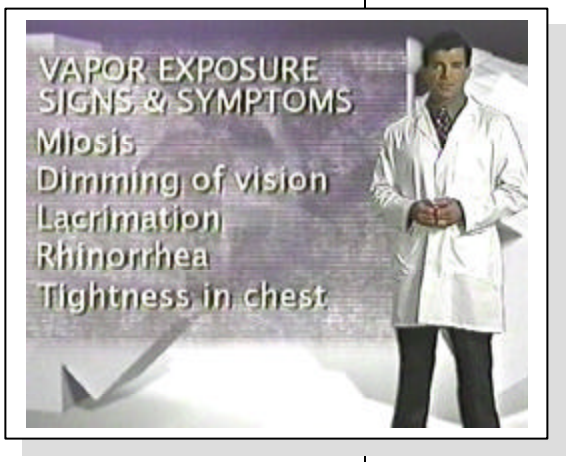
1. Describe the usual first signs and symptoms of nerve agent exposure.
2. Describe additional signs and symptoms that may occur later.
3. Describe the effects of nerve agent exposure by direct contact.
4. Describe what differential diagnosis is and how it is applied in treating persons exposed to nerve agents.

VOICE	SCREEN	NOTES

4.2 Usual first signs of nerve agent exposure

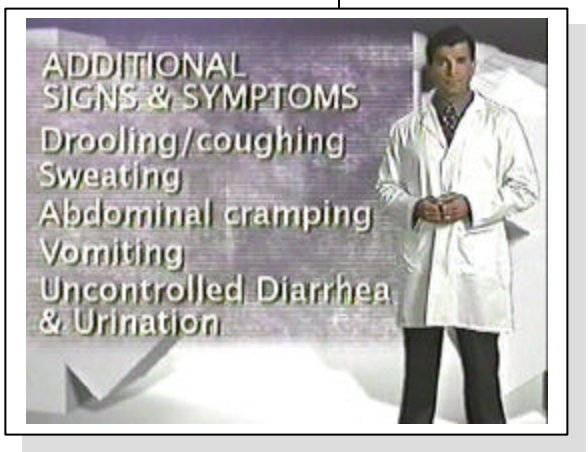
Since nerve agent vapors are colorless, odorless, and non-irritating to the skin, people can be lightly exposed without even knowing it.

The usual first signs of nerve agent vapor exposure are miosis, or pinpointing of pupils, dimming of vision, excessive tear formation (called lacrimation), runny nose (called rhinorrhea), and tightness in the chest.



4.3 Additional signs and symptoms of nerve agent exposure

If the amount or dose is high, these signs can be accompanied by drooling and coughing; sweating; abdominal cramping; vomiting; uncontrolled diarrhea, and urination. High doses can result in seizures and convulsions, loss of consciousness, respiratory failure, and death.



It's important to note that not all of these effects will occur in everyone exposed. It all depends on the dose received.

VOICE	SCREEN	NOTES

4.4 Peak effects

If the exposure route is vapor inhalation, and a high concentration of agent is present, effects can occur after a single breath. This response occurs within seconds. After the patient has been removed from the agent source, peak effects are likely to occur within 15 to 20 minutes. The effects do not usually worsen after this period of time.

Peak Effects Within 15-20 Minutes

If the nerve agent exposure route is through direct skin contact, effects may continue for hours after decontamination is completed. This is because decontamination removes agent from the skin surface only, and agent can be present inside skin layers where it is absorbed into the blood stream over an extended period of time. With a less than lethal skin exposure, effects may not appear for up to 18 hours. For this reason, anyone suspected of having liquid nerve agent (including aerosols) on the skin should be kept under medical observation for a least 18 hours. Effects that appear many hours after exposure are usually not lethal due to the smaller quantities of agent involved.

- ?? Effects may not appear for up to 18 hours
- ?? Keep patients under observation at least 18 hours

VOICE	SCREEN	NOTES
Though respiratory failure is the main cause of death in severely exposed people, breathing difficulty is not likely to occur unless exposure is moderate to severe. **4.5 Performing a differential diagnosis** Differential diagnosis—that is, differentiating between signs and symptoms of nerve agent exposure and other medical conditions—must be performed. Some signs and symptoms of nerve agent exposure are similar to more common medical conditions such as grand mal epileptic seizures, cerebrovascular accidents, emphysema, head trauma, or drug overdose. Knowing the medical history of a person or, if the person is unconscious, looking for medic-alert bracelets or cards may assist in deciding if he or she may have been exposed to nerve agent.	Perform a Differential Diagnosis	

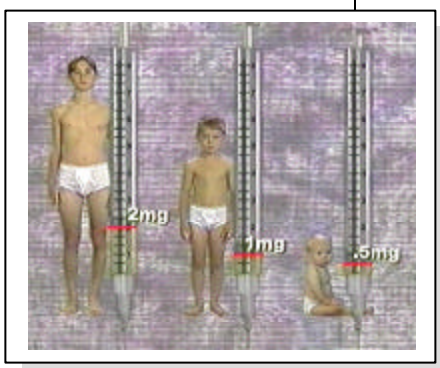
SECTION 5. TREATMENT FOR NERVE AGENT EXPOSURE

5.1 Objectives

At the end of this section on treatment for nerve agent exposure, the student should be able to:

1. Describe the recommended order of treatment.
2. Describe the recommended antidote treatments for nerve agent exposure.
3. Describe atropinization and how it applies to nerve agent exposure.

VOICE	SCREEN	NOTES
5.2 Sequence of treatment You must identify at least two signs and symptoms of nerve agent poisoning before beginning treatment. The order of treatment is administering an antidote, managing airways, and decontaminating the patient. If required, establish an airway, help with breathing, and ensure circulation.	Treatment ?? Administer Antidote ?? Manage Airways ?? Decontaminate	
5.3 Antidote administration As discussed earlier, the first treatment for nerve agent exposure is a two-part antidote. First, atropine stops the effect of the nerve agent by blocking the overstimulation of muscles, glands and nerves. This drug relieves the smooth muscle constriction in the lungs and GI tract and dries up respiratory tract secretions. Then, 2-PAM Chloride restores normal skeletal and respiratory muscle functions. The drugs may be administered intramuscularly, intravenously, or with a MARK I Chemical Agent Treatment kit. Auto-injector atropine and 2-PAM Chloride are also available commercially.	Atropine and 2-PAM Chloride Treatment Administration	**Note:** A job aid is provided in Appendix B that depicts the dose recommended for various age groups.

VOICE	SCREEN	NOTES
The way the drugs are administered depends on the qualifications of the emergency workers and State laws and local protocols. The recommended initial dosage of atropine is two, four, or six milligrams for adults depending on severity of exposure. **5.4 Atropine doses for children** The recommended atropine dosages differ for infants, children, and adolescents. The Army's medical experts recommend two milligrams as the maximum single dose for children over ten or adolescents. One milligram is the maximum single dose for children between two and ten. Half a milligram is the maximum single dose for infants under two. These doses may be repeated as clinically indicated. Treatment should be repeated until the patient is atropinized.		**Note:** Atropine doses for children are based on age.

VOICE	SCREEN	NOTES
5.5 Atropinization Atropinization is the term used to describe the noticeable signs of a patient who has received enough atropine to reverse the effects of nerve agent. Atropinization decreases respiratory signs and bronchospasms, relieves sweating, dries respiratory secretions, and relieves diarrhea and abdominal cramping. An excellent sign that the patient has been atropinized is the drying of secretions from the nose and mouth, and improved respiratory function. Pupil size should not be used as a guide to atropinization. Recognition of atropinization helps to determine that the patient is not underdosed, which is a common mistake made by providers. Withholding atropine when it is needed is a serious mistake that could result in the patient's death. If atropine is given when it's not needed, or if too much is given, you may see dilated pupils, dry mouth and skin, rapid pulse, flushed skin, confusion, diminished body temperature control, thirst and restlessness. If a patient exhibits signs and symptoms of atropine overdose, she or he should be kept cool and transported to a	Atropinization ?? Withholding Atropine May Result in Death ?? Effects of Atropine Overdose	**Note:** Pupil size should not be used as a guide to atropinization because pinpointing of pupils will last depending on dose and severity of exposure.

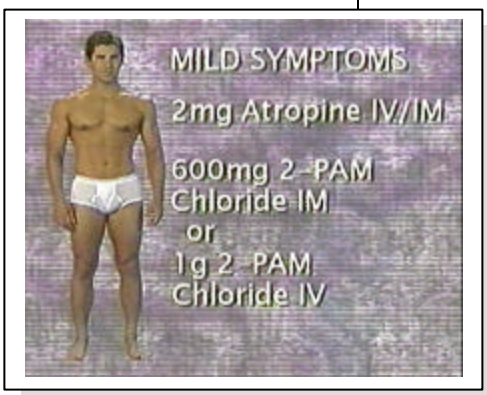
VOICE	SCREEN	NOTES
health care facility. Atropine overdose is not usually life threatening. The signs and symptoms usually disappear within four to twenty-four hours.		
5.6 2-PAM Chloride doses for adults, adolescents, children and infants For adults the recommended initial dosage for 2-PAM Chloride is 600 milligrams intramuscular—IM—or 1 gram intravenously—IV.	2-PAM Chloride Initial Dose Adult, 600 mg IM or 1 g IV	
For children and adolescents weighing more than 22 kilograms or 50 pounds, the recommended initial dosage for 2-PAM Chloride is six hundred milligrams IM or 15 milligrams per kilogram of body weight by slow IV.	2-PAM Chloride Initial Dose Children >50 lbs, 600 mg IM	**Note:** 2-PAM Chloride doses are based on weight.
For children weighing less than 22 kilograms or 50 pounds, the recommended initial dosage for 2-PAM Chloride is fifteen milligrams per kilogram of weight by slow IV.	2-PAM Chloride Initial Dose Children <22 kg or 50 lbs, 15 mg IV per kg weight	
Incremental 2-PAM Chloride dosages may be repeated until the maximum dose based on body weight is achieved.		**Note:** See Appendix B for maximum dosages.

VOICE	SCREEN	NOTES

5.7 Treatment of patients with mild signs and symptoms

If an adult patient shows mild signs of miosis and rhinorrhea after a vapor exposure, experts generally recommend observation only.

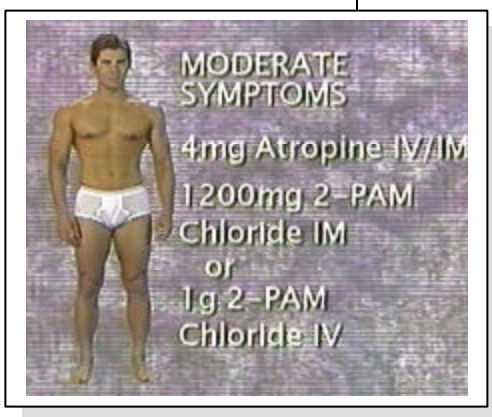
If the exposure was by direct contact to body tissues, sweating or muscle fasciculation at the site of exposure may indicate the development of more serious systemic effects.



Treatment should be 2 milligrams of atropine IV or IM followed by 600 milligrams 2-PAM Chloride IM or 1 gram of 2-PAM Chloride IV administered over 20 to 30 minutes in 250 milliliters of normal saline or 250 milliliters 5% D/W.

Note: D/W means a dextrose and water solution.

5.8 Treatment of patients with moderate symptoms



Moderate symptoms due to vapor exposure should be treated more aggressively. If signs and symptoms involve significant respiratory distress along with muscle weakness, fasciculations, or GI effects, an initial dose of 4 milligrams of atropine by IV or IM followed

VOICE	SCREEN	NOTES
by 1200 milligrams of 2-PAM Chloride IM (the contents of 2 MARK I kits) or 1 gram intravenously are recommended. These atropine doses may be repeated every 5 to 10 minutes as needed. 2-PAM Chloride delivered by slow IV can be repeated once hourly as necessary for up to a total of three grams in three hours. When the patient has been exposed by direct contact, repeat dosages of atropine and 2-PAM Chloride may be required. GI signs or symptoms, which occur more than 6 hours after direct contact, may be treated with 2 milligrams of atropine accompanied by 600 milligrams of 2-PAM Chloride. An atropine IV is preferred when treating patients who have systemic effects. But if the patient is hypoxemic, that is not getting enough oxygen to the bloodstream, IV atropine should be avoided until the patient is well oxygenated.	Direct Contact ?? GI symptoms after 6 hours ?? 2mg atropine IV/IM ?? 600g 2-PAM Chloride IM ?? Avoid using IV atropine in hypoxemic patients	

VOICE	SCREEN	NOTES
5.9 Treatment of patients with severe signs and symptoms Severely exposed adults with signs such as convulsions or breathing problems should be treated with 6 milligrams of atropine followed by 1 to 2 grams of 2-PAM Chloride. Diazepam should be administered as an anticonvulsant to patients who are experiencing convulsions and considered for non-convulsing patients who have signs of severe exposure. The dosage should be 10 milligrams IM or 5 milligrams slowly in an IV. The antidote should be administered aggressively to severely exposed adults to minimize secretions, reduce labored breathing, relieve bronchospasms, control convulsions, and improve respiratory muscle functions. For these adult patients, an initial dose of 6 milligrams of atropine IM should be given. Once hypoxemia is reversed, additional atropine in 2 milligram doses by IV should be given at 3-5 minutes intervals as required to support airways.	Severe Exposure ?? 6mg Atropine IM/IV ?? 1-2g 2-PAM Chloride IM/IV ?? Diazepam 10 mg IM or 5mg IV ?? Treat severely exposed patients aggressively ?? Follow initial 6 mg-atropine dose with additional 2 mg doses every 3-5 min.	**Note:** Diazepam may be given to infants over 30 days old and children who are experiencing convulsions. See Appendix B for dose information. **Note:** When adolescents (over 10 years old) are showing severe signs and symptoms, the adult treatment protocol should be followed.

SECTION 6. RESPIRATORY SUPPORT AND USE OF MARK I KITS

6.1 Objectives

At the end of Section 6, the student should be able to:

1. Describe the procedures for respiratory support of persons with severe nerve agent poisoning.
2. Describe the MARK I kit and how to administer the antidote in the kits.

VOICE	SCREEN	NOTES

6.2 Respiratory Support

In addition to administering atropine and 2-PAM Chloride, respiratory support may be required and should be anticipated as part of the treatment for severe nerve agent poisoning.

In cases of severe poisoning, it may not be possible to correct respiratory difficulty until enough atropine has been given to relieve bronchoconstriction and heavy secretions.

Respiratory failure is the main cause of death in cases of severe nerve agent poisoning. If the patient has been exposed to a moderate to heavy dose of nerve agent, it is likely that respiratory support will be necessary. This may include supplying oxygen, assisting ventilation, and suctioning secretions as needed.

If you are qualified, you may need to insert an endotracheal tube to provide ventilation for the patient. Remember that high pressures are required to overcome resistance of the narrowed airways and heavy secretions. Some respirating devices that are commonly found on ambulances pop off at 40 to 45 centimeters H_2O and will not deliver the pressure

VOICE	SCREEN	NOTES

needed. You may need to increase the pressure to over 70 centimeters H_2O to ventilate severely exposed patients.

If breathing has stopped, give artificial respiration using an approved mask-bag oxygen delivery system. If the symptoms don't abate after administration of the antidote, verify the effectiveness of decontamination and repeat if necessary.

6.3 Description of Mark I kit

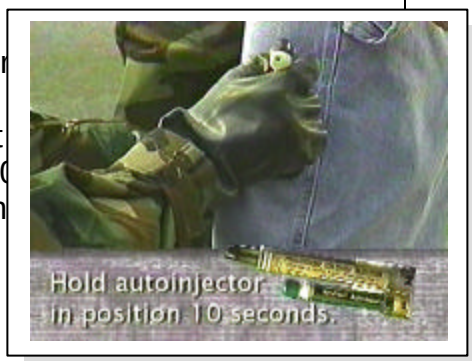
A MARK I Chemical Agent Treatment kit is an alternative way to administer atropine and 2-PAM Chloride.

A MARK I Chemical Agent Treatment kit contains two auto-injectors. One unit contains 2 milligrams of atropine, and the other contains 600 milligrams of 2-PAM Chloride. An auto-injector consists of a tube that contains a drug filled ampule, an unexposed hypodermic needle, and a spring. Protocols normally allow you to administer up to three MARK I kits IM to a patient who has been exposed to nerve agent. However, this protocol may vary from state to state.

Note: State and local protocols will determine who may administer the Mark I kit.

VOICE	SCREEN	NOTES

The injectors are in a plastic holder and numbered one and two. The atropine injector, Injector Number 1, is administered first. Then Injector Number 2, the 2-PAM Chloride follows. The injector units must be held in position for at least 10 seconds to allow the medication to be fully injected.



6.4 Needle disposal

Be careful handling used auto-injector units because communicable diseases such as hepatitis and HIV can be spread through accidental needle sticks. The usual procedure to reduce the chance of accidental needle sticks is to bend the needle back against a hard surface at a 180-degree angle.

Note: (continued from previous page)

The Mark I kit will be used primarily in areas outside of hospitals, clinical or research laboratories. It is prudent and a required procedure (i.e., using a one-handed technique) of the U.S. Army to bend the needle from the Mark I kit to permanently blunt the exposed sharp until they can be disposed of properly according to 1910.1030.

Note: Generally, medical protocols recommend that all sharps (needles) be placed in a sharps container for proper disposal to protect workers from exposures to bloodborne illnesses. Because needlestick injuries are a major cause of these exposures, it is important to recognize that there are work practices and engineering controls that help prevent needlesticks in environments outside of a hospital, clinical laboratory, or research laboratory. According to 1910.1030 (d)(2)(vii) through 1910.1030 (d)(2)(vii)(B), contaminated sharps can be bent if the employer can demonstrate that no alternative is feasible or that such action is required by a specific medical or dental procedure.

(continued on next page)

SECTION 7. BLISTER AGENTS

7.1 Objectives

At the end of Section 7, the student should be able to:

1. Describe the blister (vesicant) agents H, HD, HT and L.
2. Describe the effects of the agents on the human body.
3. Describe signs and symptoms of blister agent exposure.
4. Describe appropriate decontamination procedures for treatment of exposed persons.

VOICE	SCREEN	NOTES

7.2 Description of blister (vesicant) agents

Finally, let's see what could happen if a vesicant, or blister agent, accident occurs. The U.S. Army's chemical stockpile contains two blister agents; sulfur mustard and Lewisite. H, HT, and HD are the three types of sulfur mustard agents. Because Lewisite is only located in small quantities at Deseret Chemical Depot in Tooele, Utah, only sulfur mustard agents will be covered in this video.

- ?? H
- ?? HD
- ?? HT
- ?? L

7.3 Dose

The dose that would be lethal to 50% of the people exposed, or LD_{50} of H and HD, is 100 milligrams of liquid on the skin per kilogram of body weight. For example the LD_{50} for a 155 pound man is approximately 7 grams—or about a teaspoon—of liquid agent on the skin. Between 4 and 32 micrograms of agent per square centimeter of skin are enough to cause reddening of the skin and blistering. The dosage that would be lethal to 50% of the people exposed to vapors, or LCt_{50}, is 1500 milligram minutes per cubic meter.

- ?? H
- ?? HD
- ?? LD_{50}(skin) = 100 mg/kg
- ?? LCt_{50}(vapor) = 1500 mg min/m^3

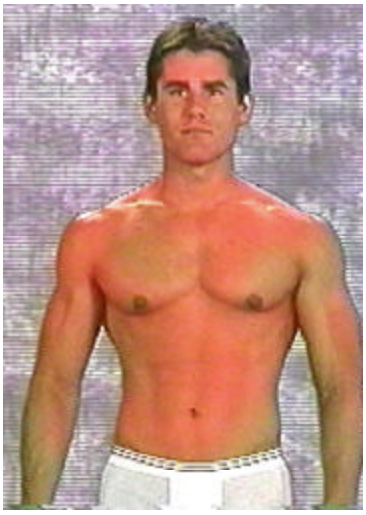
VOICE	SCREEN	NOTES

When inhaled, mustard vapor is approximately three times more toxic than cyanide gas.

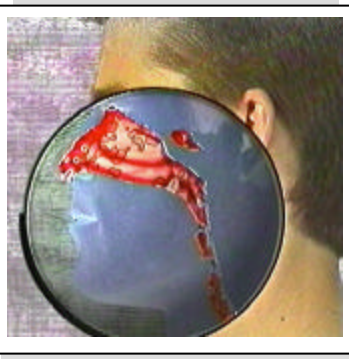
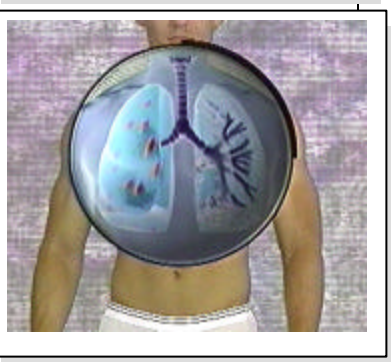
Like nerve agents, sulfur mustard vapor in pure form is colorless. It has an odor like garlic, horseradish, or mustard.

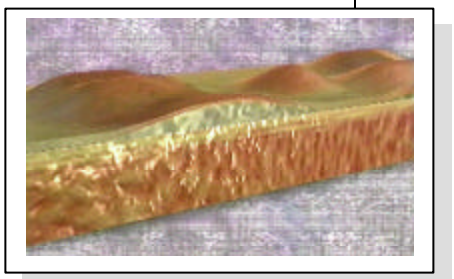
7.4 Effects of exposure on human body

The vapors from sulfur mustard can cause inflammation of the eyes and respiratory tract, and reddening of exposed skin. However, signs and symptoms from sulfur mustard are usually delayed. They appear 2 to 36 hours after exposure. There may not be any visible effects immediately after an exposure.



Often, the first sign of mustard agent exposure is irritation of the eyes—reddening, itching, tearing, sensitivity to light or the sensation of grit in the eye. Difficulty in breathing occurs only when exposure is severe, which is not likely at probable concentrations in a release.

VOICE	SCREEN	NOTES
Sulfur mustard agent is absorbed more rapidly in warm, moist areas of the body.		
When sulfur mustard agent is inhaled, it injures the lining of the nose, the throat, and the bronchial tubes.		
Prolonged exposure damages the mucous membrane lining, just as blisters damage the outer layer of skin. That causes internal inflammation and hemorrhaging and exposes the airways and lungs to infection. Sulfur mustard agent does the most damage to the upper airways. With a massive exposure, the air sacs in the lungs can be injured. In severe cases, the airway damage can be fatal.		

VOICE	SCREEN	NOTES
It is important to note that not all of these effects will occur in everyone who is exposed. It all depends on the dose and the length of time of exposure. While liquid deposition of agent or high concentrations of vapor are not expected off-site, it is necessary to recognize the signs and symptoms of more severe exposure. If the skin is exposed to sulfur mustard agent aerosols or droplets or high concentrations of vapor, the cells are destroyed. If not decontaminated, the skin may redden, then develop fluid-filled blisters within 12 to 24 hours. Blisters may develop in 4 to 6 hours in cases of severe exposure. If these blisters are broken they could become infected. However, if a blister breaks, the fluid within will not further contaminate the individual or others. Severe chemical burns will occur where skin is exposed to high concentrations of sulfur mustard vapor or to liquid sulfur mustard.		

VOICE	SCREEN	NOTES
7.5 Signs and symptoms of blister agent exposure Initial signs and symptoms for blister agent exposure may resemble the signs and symptoms of hay fever—red eyes and runny nose. Burns, sunburn, tear gas exposure, and contact allergens such as poison ivy can also cause reddening of the skin and blisters. It is important to determine whether or not a patient has actually been exposed. As with any chemical warfare agent accident, the installation will know what agent is involved and you will be informed about the type of agent before arriving at the scene.	May resemble hay fever or other conditions.	
7.6 Treatment - decontamination Decontamination treatment for sulfur mustard agent exposure must be immediate since there is no antidote available. The only immediate treatment is complete decontamination as rapidly and completely as possible. Sulfur mustard agents must be removed within one or two minutes after exposure to prevent injury. Because of the possibility of long periods of time passing before the patient comes into contact with a rescuer, injury		

VOICE	SCREEN	NOTES
will have already occurred where contamination is present on the patient's body. Hospital care will be necessary to manage patient injuries. If the eyes have been exposed to a mustard agent in any form, they must be flushed with large quantities of water. To do this, tilt the head to the side, pull the eyelids apart, and pour water slowly into the eyes. After several hours the patient may experience photophobia or sensitivity to light. Respiratory support may be required if the patient has inhaled significant amounts of sulfur mustard agent. Oxygen should be administered as needed. If breathing has stopped, you should resuscitate. Additional intravenous fluid may be needed, but not as much as for thermal burns. Hospital staff should be careful not to overload with intravenous fluids.		

SECTION 8. PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.1 Objectives

At the end of Section 8, the student should be able to:

1. Describe the types of PPE for use in CSEPP.
2. Describe the two types of powered air-purifying respirators (PAPRs) approved for CSEPP workers.
3. Understand the certification and maintenance requirements for the PPE issued to CSEPP workers.
4. Describe the procedures for donning and removing CSEPP approved PPE to avoid potential contamination from residual agent.

VOICE	SCREEN	NOTES

8.2 Predictions about chemical agent plume

Personal Protective Equipment (PPE)

If a chemical accident that could have off-site consequences occurs, an initial hazard prediction is conducted by Army personnel at the installation. This hazard prediction identifies the expected path of travel for the chemical agent plume. Recommendations for protective action are provided to local officials and the general public immediately.

Emergency response and medical treatment would be established at the appropriate locations outside potentially contaminated areas.

Remember, you must not enter an area known to be contaminated.

In CSEPP, PPE consist of the overgarment ensemble and the powered air purifying respirator, or PAPR worn to protect people from harmful contaminants in the environment.

VOICE	SCREEN	NOTES
8.3 Approved PPE for CSEPP emergency workers Two commercial protective coveralls have been approved by the Army and FEMA for use by CSEPP emergency workers - the Kappler Responder Coverall and CPF3 Coverall. The one-piece suits are designed to protect against chemical agent challenges. Both suits have a hood with elastic around the face, the cuffs of the sleeves, and the pant legs. Some models have attached booties. Suits can be stored on a hanger or in an opened shipping bag in the ready bag. Suits should be decontaminated before removal and must be properly disposed of after an actual incident according to state and local regulations. If you are an emergency worker who has been issued PPE, you must be certified as physically able to wear the appropriate level of PPE by a medical doctor. Before being allowed to use a PAPR, you must be trained in the restrictions and limitations of the equipment, know proper inspection techniques, and be able to put on and remove the	 	**Note:** A portion of the video shows the different parts of the CPF3 suit (the seams, zipper and velcro fasteners, etc.). This sequence does not describe "how" the suit must be worn. The PPE facilitator guide has checklists for PPE ensembles and the appropriate procedures for donning (including taping) and doffing PPE. **Note:** See Appendix A for photos of models demonstrating the various types of PPE approved for CSEPP workers.

VOICE	SCREEN	NOTES

PPE properly, and know proper maintenance techniques. These requirements are for your protection.

Before using, and on a monthly basis, each suit should be examined for integrity. Lay the suit on a clean flat surface and examine it carefully. There should be no abrasions, rips, tears, cracks or pinholes. The zipper should not be broken or inoperable.

Zippers can be lubricated using a small amount of paraffin. White spots on the suit may indicate ozone damage, which may compromise the integrity of the suit, and the suit should be discarded.

Examine the inside of the suit for damage and the seam tapes for lifts or delamination. A flashlight may be used to facilitate inspection.

Protection from liquids and vapors

The suits are worn with black, butyl rubber outer gloves over white cotton glove liners that absorb perspiration. The rubber gloves protect against liquid and vapor contamination and can be decontaminated. If gloves do become contaminated, they should be replaced within 24 hours. The gloves must also be replaced if they are exposed to a petroleum-based product.

VOICE	SCREEN	NOTES
Military issue vinyl overshoes with elastic fasteners protect the feet for up to 24 hours following contamination with agents or up to 14 days if not contaminated. Street shoes are worn inside the overshoes. The overshoes can be decontaminated but are not intended for use in civilian hazardous materials response efforts.		
Special chemical resistant tape is used to seal pant and sleeve cuffs and flaps. Duct tape is commonly used in training and exercises.	NOT for civilian HAZMAT response	
The Army has approved 2 types of Powered Air Purifying Respirators - called PAPRs - for CSEPP emergency workers - the tight-fitting PAPR and the loose-fitting PAPR. The hood for the tight-fitting PAPR has been designed to attach to the facepiece of the PAPR. The hoods are made of butyl rubber covered cloth that prevents airborne agents from contaminating the head and neck. The hoods are not intended for a civilian hazardous materials response. In the loose-fitting PAPR, the facepiece and hood are integrated into one unit.	Tight-fitting PAPR Loose-fitting PAPR	
		

VOICE	SCREEN	NOTES
Both types are attached with a breathing tube to a motor-blower unit that provides clean, filtered air to the facepiece. The tight-fitting PAPR provides greater protection than the loose-fitting, but is more complex to use. An Army issued waterproof apron is recommended for workers decontaminating people. When dressing out in PPE, use the buddy system. Some states recommend the use of a third assistant. This helps ensure emergency workers put on and remove the PPE correctly. Emergency workers dressed out in PPE should be regularly checked for signs of stress and agent exposure as well as dehydration. Provide relief from wearing PPE as soon as possible, especially when working in extreme temperatures. Use the CSEPP recommended work and rest times, slow work rates and minimize work intensity. Remember that frequent short breaks are effective in sustaining task performance.	Always use the buddy system  Follow work and rest times recommended by CSEPP 	The length of stay times and rest periods is based on ambient temperature. At temperatures between 50 and 70 degrees F personnel may work for 30 to 45 minutes at a time, followed by a 10 to 15 minute rest period. At temperatures between 70 and 85 degrees F, personnel may work for 20 to 30 minutes at a time, followed by a 40 to 60 minute rest period. At temperatures between 85 and 100 degrees F, personnel may work for 15 to 20 minutes followed by a rest period of indefinite length.

VOICE	SCREEN	NOTES
All pre-operational checks must be performed monthly or after each time the PAPR is used. At such time you should replace any missing or damaged components and ensure the filter cartridges are properly fitted. You should also confirm that the battery pack is fully charged and that the airflow is appropriate for the facepiece being used. These checks ensure proper operation of the PAPR should an emergency arise.	Follow manufacturer's checklist 	
PPE approved for CSEPP can be used in a variety of configurations. This video shows two of the possible combinations based on actual use in two of the CSEPP states. Procedures are described for the Responder suit with the tight-fitting PAPR, and the CPF3 suit with a loose fitting PAPR.	Loose-Fitting CPF3 Tight-Fitting Responder	
States are responsible for developing acceptable procedures for using PPE. While there are incorrect procedures, there are also multiple variations of acceptable procedures. The two sequences viewed in this video are examples of acceptable procedures.		

VOICE	SCREEN	NOTES

8.4 Donning the Tight-Fitting PAPR with the Responder Suit

Underclothing as a minimum is worn under the Responder suit. The manufacturer recommends wearing a long sleeve shirt and long pants or long underwear under the suit. If regular clothing is used, make sure that all personal effects that could damage the suit are removed from pockets. Tuck pant cuffs into socks to make putting on the coverall legs easier. Remember, shoes are worn under the vinyl overshoes.

Place both legs into the suit. This is most easily done while seated. Then, place both feet into the overshoes. Button the overshoes, pull down the elastic cuffs over the tops of the overshoes. Some states tape the pant leg to the overshoes.

A folded-over tab on the tape end will help when removing the tape from the suit later on.

Stand up and pull the suit up to the waist. Some states add communication equipment at this point.

There are two methods of putting on gloves. In the first method, the person puts on

VOICE	SCREEN	NOTES

the glove liners followed by the rubber gloves. With both gloves on, insert the arms into the suit, leaving the suit open. Next, tape the suit cuffs to the outside of the gloves.

The Kappler suits are designed to allow the user to facilitate arm movement when wearing the suit. Taping too tightly restricts this type of movement.

The second method is to insert the hands with the liners on into the suit and then place the rubber gloves over the elasticized wristbands, taping the gloves to the outside of the suit. To increase flexibility in arm movement, some states recommend raising the arms and bending the elbows before taping the gloves.

Next, close the zipper and secure the velcro flap or adhesive strip. Have a partner tape the Responder hood to the back of the suit when using a tight-fitting PAPR.

To put on the tight-fitting PAPR and hood, place the motor-blower back cover against the lower back with the breathing tube extended upward. Fasten the belt with the motor-blower around the waist. Turn on the battery. Hang the PAPR facepiece around the neck. After

VOICE	SCREEN	NOTES

loosening the head harness straps, place the thumbs inside the straps and the chin in the chin cup inside the facepiece. Next pull the harness over the back of the head and tighten all the straps - lower straps first, side straps second and top strap last. Pull the hood over the head and fasten the straps.

8.5 Positive Pressure-Fit Test

To perform a positive pressure fit test inhale, then place the palm of your hand over the exhalation valve cover and exhale slowly. A slight positive pressure should build up inside the facepiece. If any leakage is detected, readjust the headstraps and test again. If you cannot maintain a seal by adjusting the headstraps, check the facepiece for leaks.

8.6 Negative Pressure Fit Test

A negative pressure fit is another way to ensure the facepiece is correctly fitted. First block off the breathing tube with the palm of your hand. Breathe in and hold your breath for 10 seconds. If the seal is good, the facepiece will collapse and remain collapsed against the face. If the facepiece does not remain

VOICE	SCREEN	NOTES

collapsed or you notice any leakage, readjust straps and test again. Attach the breathing tube to the outlet on the motor-blower.

8.7 Removing the Tight-Fitting PAPR and Responder Suit

If the suit has been exposed to a chemical agent, the wearer needs to decontaminate before removing the suit. After decontamination is completed, those wearing the tight-fitting PAPR should loosen - but not remove - the hood straps. The motor-blower is then removed and set aside while the rest of the PPE is removed. Do not remove the tape from the sleeve cuffs. If needed have a buddy unseal and unfasten the front of the suit touching only the outside of the suit. Remove the arms from the rubber gloves through the sleeves, touching only the inside of the suit. The white glove liners can be left on but should never touch the outside of the suit.

Have a partner remove tape from the overshoes and unfasten the buttons.

Remove the entire suit by pushing the suit downward over the overshoes. Then step out of the overshoes into a clean area.

VOICE	SCREEN	NOTES

The PAPR is removed last. To remove the tight-fitting PAPR, place your hands beneath the hood and turn the hood wrong side out over the front of the PAPR. Holding your breath, loosen the bottom side straps and pull the PAPR away from your face while lifting it over your head.

CSEPP emergency workers are then advised to shower, making sure that all skin crevices and hair are cleaned thoroughly.

The suits are not designed for use after being contaminated with a chemical warfare agent and should be bagged and properly disposed of after such exposure.

8.8 Donning The Loose-Fitting PAPR and CPF3 Suit

Underclothing as a minimum is worn under the CPF-3 suit. The manufacturer recommends wearing a long sleeve shirt and long pants or long underwear under the suit. If regular clothing is used, make sure that all personal effects that could damage the suit are removed from pockets. Tuck pant cuffs into socks to make putting on the suit legs easier. Shoes are worn under the vinyl overshoes. If a suit with

VOICE	SCREEN	NOTES

booties is used, wearing a lightweight shoe under the booty and donning the overshoe over the booty is recommended.

Place both legs into the suit. This is most easily done while seated. Place both feet, with shoes on, into the overshoes. Button the overshoes, and pull down the splashguards over the tops of the overshoes. On suits without booties, you may tape the pant leg to the overshoe. In training, duct tape is commonly used.

A folded-over tab on the tape end will help when removing the tape from the suit later on.

You may stand up and pull the suit up to facilitate putting on the motor blower.

8.9 Donning the Loose-Fitting PAPR

To don the loose fitting PAPR and gloves, place the motor-blower back cover against the lower back with the breathing tube extended upward. Fasten the belt with the motor-blower around the waist. Turn on the battery. Verify air flow to the hood. Some states add life-vests or communication equipment at this point.

VOICE	SCREEN	NOTES
To put on gloves, first remove the arms from the suit. There are two methods of putting on gloves. In the first method, the person puts on the glove liners and the rubber gloves. With both gloves on, insert the arms into the suit, leaving the suit open. Tape suit cuffs to the outside of the gloves. The CPF3 suits are designed to allow the user to facilitate arm movement when wearing the suit. Taping to tightly restricts this type of movement.		
The second method is to insert the hands with the liners on into the suit and then place the rubber gloves over the elasticized wristbands, taping the gloves to the outside of the suit.		
Pull the hooded respirator over the head and adjust the headband wraps and the elastic neck seal so it fits under the chin, making sure the breathing tube is not twisted. Fully zip up the suit and make sure the velcro flap or adhesive strip over the zipper is sealed.		**Note:** While it is more comfortable to leave the turbo unit running at this point, it is still possible for the person to breathe while the turbo unit is turned off. The checklists provided in the PPE facilitator guide, are guidelines/procedures that each state may elect to use, or each state may modify them as they see fit.

VOICE	SCREEN	NOTES

8.10 Removing the Loose-Fitting PAPR and CPF3 Suit

If the suit has been exposed to a chemical agent, the wearer may have to decontaminate the suit before removing it.

After decontamination, the hooded PAPR and the motor blower should be removed and the overshoes unbuckled. Touching only the outside turn the hood inside out.

With butyl gloves on, unseal and unfasten the front of the suit touching only the outside of the suit. Remove one arm from the rubber gloves through the sleeve, touching only the inside of the suit. Remove the other arm in the same manner. The white glove liners may be left on but should never touch the outside of the suit. Roll the suit down your body from the inside out to the ankles, touching only the inside of the suit.

Remove one foot from the suit and overshoe and place the foot in a clean area. Remove the other overshoe and the glove liners and step into a clean area. Toss the gloves back out of the clean area.

VOICE	SCREEN	NOTES
CSEPP workers are then advised to shower, making sure that all skin crevices and hair are cleaned thoroughly. The suits are not designed for use after being contaminated with a chemical warfare agent and should be bagged and properly disposed of after such exposure. PAPRs should be sealed in a plastic bag prior to decontamination.		

SECTION 9. DECONTAMINATION

9.1 Objectives

At the end of Section 9, the student should be able to:

1. Understand why immediate and thorough decontamination is important in treating persons exposed to nerve and blister agents.
2. Describe the decontamination solutions recommended in CSEPP.
3. Describe the appropriate procedures for decontaminating persons exposed to nerve or blister agents.
4. Describe how to avoid potential for secondary contamination.

VOICE	SCREEN	NOTES

9.2 Decontamination solutions

Besides using PPE, ensuring your patients are decontaminated will further prevent the chemical agent from spreading and doing more harm.

Decontaminating quickly and correctly with undiluted household bleach neutralizes and removes the chemical agent.

Undiluted household bleach is the recommended CSEPP decontamination solution. However, at least one state has substituted soap and water as their decontamination solution for vapor releases.

Note:
Some jurisdictions may decide not to use a bleach solution. Decontaminating with bleach for surfaces above the neck should be carefully considered.

9.3 Appropriate decontamination procedures

Remove contaminated clothing and extraneous items, such as hearing aids, wigs, eyeglasses, or artificial limbs. Put the contaminated items in a labeled bag that is impermeable to the agent and seal the bag. Remove potentially contaminated bandages, but be very careful removing bandages that are there to control hemorrhages.

Note:
Standard practice generally dictates that clothing that would be removed by pulling over the head be cut away from the body. This avoids possible contamination from the clothing to the patient's face and neck.

VOICE	SCREEN	NOTES

Blot, don't wipe, the skin with household bleach. Make sure to get into crevices. Rinse with plain water. Flush eyes out with plain water. Wash face and hair with warm soapy water and rinse with plain lukewarm water.

Mark or tag everyone who has been decontaminated or had medical treatment with the specific treatment and completion time.

Apply fresh bandages where necessary and put the patient into a transport vehicle.

Emergency workers coming into contact with a contaminated patient could be exposed to residual chemical agent. Protect yourself by avoiding direct contact with undecontaminated patients and their belongings unless you're wearing the proper PPE. Remember, it is also important to decontaminate your PPE before taking it off.

Secondary contamination can be a problem, especially if exposure to sulfur mustard agent is not immediately recognized.

SECTION 10. SUMMARY

10.1 Objectives

Section 10 provides a brief overview of the important aspects of the Re-ACT FAST II refresher training. It is up to the individual state and CSEPP trainers to decide whether a student will be asked to certify his or her knowledge of the important elements of the training by remitting an evaluation.

VOICE	SCREEN	NOTES

10.2 Primary considerations for emergency response

O.K., let's summarize a few important points. What you do in the first few minutes can mean the difference between life and death for people exposed to chemical warfare agents.

Emergency Response

Treatment must be immediate—there's no time to transport the patient to a doctor or emergency room.

- ?? Must be immediate
- ?? Do not delay by transporting patients
- ?? Must include complete decontamination of exposed individuals
- ?? Must include procedures to protect emergency workers from contamination
- ?? Must be carefully planned

Although the signs and symptoms of sulfur mustard agent may not be immediately evident, decontamination for either nerve or sulfur mustard agent exposure should not be delayed.

10.3 Conclusion

The Number 1 rule for treating any patient exposed to a chemical warfare agent is to protect yourself and avoid contamination.

Safety and security programs at each of the eight disposal locations reduce the likelihood of a chemical agent accident, but planning for the possibility of an accident is still important. By knowing how the chemicals affect the body and what protective actions to take, you can be better prepared to deal

VOICE	SCREEN	NOTES
with chemical agent storage and disposal emergencies should they arise.		

APPENDIX A

PHOTOS OF MODELS DEMONSTRATING THE VARIOUS TYPES OF PPE APPROVED FOR CSEPP WORKERS

APPENDIX A


Kappler Responder Suit
with tight-fitting PAPR


Kappler Responder Suit
with loose-fitting PAPR


Kappler CPF-3
with loose-fitting PAPR


Kappler CPF-3
with tight-fitting PAPR


Mark IV Suit
with tight-fitting PAPR


BDO Suit
with tight-fitting PAPR

APPENDIX B

GUIDELINES FOR INITIAL ANTIDOTE TREATMENT OF NERVE AGENT VAPOR EXPOSURE

Note: These pages may be copied on cardstock material and/or laminated and secured together for an easy reference guide.

CSEPP RECOMMENDED GUIDELINES FOR ANTIDOTE TREATMENT FOR NERVE AGENT EXPOSURE

- Laws regulating the use of controlled drugs differ from state to state. In some states atropine or 2-PAM Chloride can only be administered under the direction of a physician. You should be familiar with the laws and local protocols governing drug administration in emergency situations in your state.

- A MARK I kit contains two auto-injectors: unit 1 contains 2 mg of atropine, and unit 2 contains 600 mg of 2-PAM Chloride.

- You should identify at least 2 signs and symptoms of nerve agent poisoning before beginning treatment. Doses may be repeated as clinically indicated. Atropine treatment should be repeated until the patient is atropinized. Incremental 2-PAM Chloride dosages may be repeated until the maximum dose based on body weight is achieved.

- If an adult patient shows mild signs of miosis and rhinorrhea after vapor exposure, experts generally recommend observation only.

- A slow IV should be administered over a 20 - 30 minute period in 250 ml of normal saline or 250 ml 5% D/W solution.

SIGNS AND SYMPTOMS

If an adult patient shows mild signs of miosis and rhinorrhea after vapor exposure, experts generally recommend observation only.

MILD SIGNS AND SYMPTOMS:

Miosis (pinpoint pupil)
Blurry vision
Chest tightness
Rhinorrhea (runny nose)
Lacrimation (tearing)

MODERATE SIGNS AND SYMPTOMS:

Above signs/symptoms plus
Significant respiratory distress
GI effects
Muscle weakness
Fasciculations
Excessive lacrimation
Nausea; vomiting; diarrhea; cramps

SEVERE SIGNS AND SYMPTOMS:

Above signs/symptoms plus
Convulsions
Respiratory failure
Loss of consciousness

TREATMENT OF ADULTS EXPOSED TO NERVE AGENT VAPOR

MILD SIGNS AND SYMPTOMS:

Atropine:
- 2 mg IV or IM (1 auto-injector)
- Repeat doses at 5 to 10 minute intervals until patient is atropinized.

2-PAM Chloride:
- 1 g by slow IV or 600 mg IM (1 auto-injector)

MODERATE SIGNS AND SYMPTOMS:

Atropine:
- 4 mg IV or IM (2 auto-injectors)
- Repeat doses at 5 to 10 minute intervals until patient is atropinized.

2-PAM Chloride:
- 1 g by slow IV (repeat hourly as needed for up to a total of 3 g in 3 hours) or 1200 mg IM (2 auto-injectors)

SEVERE SIGNS AND SYMPTOMS:

Atropine:
- 6 mg IV or IM (3 auto-injectors)
- Once hypoxemia is reversed, an additional 2 mg IV at 3 to 5 minute intervals may be required to support airways.

2-PAM Chloride:
- 1 to 2 g by slow IV (repeat hourly as needed for up to a total of 3 g in 3 hours) or 1800 mg IM (3 auto-injector)

Diazepam:
- 10 mg IM or 5 mg IV (repeat doses as required)

TREATMENT FOR DIRECT CONTACT EXPOSURE TO NERVE AGENT: ADULTS

A person exposed to liquid nerve agent should be treated according to the signs and symptoms as a person exposed to nerve agent vapor. Due to the slower uptake, however, onset of symptoms may be delayed for 1 to 2 hours and some symptoms may not appear until after 6 hours.

Mild signs and symptoms: Onset of sweating and muscle fasciculation at site of exposure 1 to 2 hours after exposure should be treated with:

Atropine:
2 mg IM (1 auto-injector)
2-PAM Chloride:
600 mg IM (1 auto-injector) or 1 g slow IV

Moderate signs and symptoms: Onset of GI symptoms more than 6 hours after exposure should be treated with:

Atropine:
2 mg IM (1 auto-injector)
2-PAM Chloride:
600 mg IM (1 auto-injector)

Severe signs and symptoms: Same as for vapor exposure.

Atropine:
6 mg IM (3 auto-injector)
2-PAM Chloride:
1 to 2g by slow IV (repeat hourly as necessary for up to 3g in 3 hrs)

TREATMENT OF ADOLESCENTS, CHILDREN, AND INFANTS

Treatment varies depending on age and body weight of child or adolescent. The adult- size atropine and 2-PAM Chloride auto-injectors should never be given to infants.

Atropine: (depends on age)

Repeat doses for all age groups as clinically indicated until patient is atropinized.

Less than 2 years:	0.5 mg IV or IM
2 to 10 years:	1 mg IV or IM
Over 10 years or adolescent:	2 mg IV or IM (1 auto-injector)

2-PAM Chloride: (depends on body weight)

Less than 50 lbs. (22.7 kg) :	15 mg per kg of body weight by slow IV
Over 50 lbs.:	600 mg IM (1 auto-injector) Repeat doses at hourly intervals as clinically indicated (no more than twice).

Diazepam: (depends on age)

Infants over 30 days to children age 5 years:
0.2 mg to 0.5 mg per kg of body weight slowly every 2 to 5 minutes, up to maximum total dose of 5 mg IV or IM

Children over 5 years:
1 mg every 2 to 5 minutes, up to maximum total dose of 10 mg

APPENDIX C

GUIDELINES FOR CSEPP RECOMMENDED SELF AND BUDDY DECON PROCEDURES

APPENDIX C

CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM (CSEPP)

SELF AND BUDDY DECON

Begin immediately. Don't wait to be "officially" decontaminated by special decon personnel. Buddy Decon is easier and allows for more thorough rinsing of places difficult to reach.

DECON STEPS:

- Remove all clothing, cutting off that normally removed over head. Decon hands using undiluted household bleach. Remove eyeglasses/contact lenses. If eyeglasses needed to evacuate, soak in bleach 5 minutes; rinse thoroughly with plain water.
- Remove hearing aids, artificial limbs, jewelry, watches, toupees, and wigs from body. If artificial limb needed to evacuate, remove it, wipe down with bleach, air it 5 min, rinse it, and reattach it.
- Flush eyes with lots of lukewarm water.
- Gently wash face & hair with soap/lukewarm water; thoroughly rinse with lukewarm water.

APPENDIX C

CHEMICAL STOCKPILE EMERGENCY PREPAREDNESS PROGRAM (CSEPP)

SELF AND BUDDY DECON (continued)

- Decon other body surfaces with bleach. Blot (not swab or wipe) with cloth soaked in bleach. If don't have bleach, wash and rinse with soap and lukewarm water.
- Put on uncontaminated clothing. Clothing stored in drawers/closets unlikely to be contaminated.
- Place contaminated items in plastic bags.
- Proceed to nearest decon station, carrying only critical items (in plastic bag).

APPENDIX D

GUIDELINES FOR CSEPP RECOMMENDED DECONTAMINATION PROCEDURES BY CSEPP EMERGENCY MEDICAL PERSONNEL

APPENDIX D

DECONTAMINATION BY CSEPP EMERGENCY MEDICAL PERSONNEL

Begin immediately to decon, even if person has already performed self or buddy decon. Must be trained, equipped, and clothed to decon injured person before placing into transport to care facility. Perform decon according to these priorities:

Priority 1: Contaminated and require prompt medical attention due to agent exposure or other severe injury

Priority 2: Exhibiting signs/symptoms of agent exposure

Priority 3: Contaminated but not exhibiting signs/symptoms and don't urgently require medical attention

Priority 4: Suspected of being contaminated but show no signs of agent toxicity.

DECON PROCEDURES:

1. Remove person's outer clothing by cutting clothing and lifting person free onto wire stretcher or one with non-absorbent surface.

2. Remove rest of clothing by cutting it and pulling it from underneath person and removing personal items such as billfolds

APPENDIX D

DECONTAMINATION BY CSEPP EMERGENCY MEDICAL PERSONNEL (continued)

or wigs, hearing aids and artificial limbs. Place in agent-impermeable bag, seal and label with person's name, other identification, and store for later disposition.

3. Remove eyeglasses and contact lenses; place in agent-impermeable bag labeled for later disposition.

4. Remove bandage material, exercising extreme care when removing bandages used to control hemorrhages.

5. Blot (not swab or wipe) body surfaces with lots of undiluted household bleach (5%) or with reagents from Army skin decon kit; wash face and eyes with clear water.

Carefully decon persons with suspected mustard exposure. Body crevices and warm, moist areas are very susceptible to effects of mustard.

6. Decon chemical protective clothing of care provider.

7. Mark person with casualty tag, hospital bracelet, or by writing directly on chest or forehead with indelible marker indicating specific treatment and completion time.

8. Apply fresh bandages where necessary to control bleeding and place injured person in transport vehicle.