

CHAPTER 7

FIRST AID IN TOXIC ENVIRONMENTS

INTRODUCTION

American forces have not been exposed to high levels of toxic substances on the battlefield since World War I. In future conflicts and wars we can expect the use of such agents. Chemical weapons will degrade unit effectiveness rapidly by forcing troops to wear hot protective clothing and by creating confusion and fear. Through training in protective procedures and first aid, units can maintain their effectiveness on the integrated battlefield.

Section I. INDIVIDUAL PROTECTION AND FIRST AID

EQUIPMENT FOR TOXIC SUBSTANCES

7-1. Toxic Substances

a. Gasoline, chlorine, and pesticides are examples of common toxic substances. They may exist as *solids*, *liquids*, or *gases* depending upon temperature and pressure. Gasoline, for example, is a vaporizable *liquid*; chlorine is a *gas*; and Warfarin, a pesticide, is a *solid*. Some substances are more injurious to the body than others when they are inhaled or eaten or when they contact the skin or eyes. Whether they are solids, liquids, or gases (vapors and aerosols included), they may irritate, inflame, blister, burn, freeze, or destroy tissue such as that associated with the respiratory tract or the eyes. They may also be absorbed into the bloodstream, disturbing one or several of the body's major functions.

b. You may come in contact with toxic substances in combat or in everyday activities. Ordinarily, brief exposures to common household toxic substances, such as disinfectants and bleach solutions, do not cause injuries. Exposure to toxic chemical agents in warfare, even for a few seconds, could result in death, injury, or incapacitation. Remember that toxic substances employed by an enemy could persist for hours or days. To survive and operate effectively in a toxic environment, you must be prepared to protect yourself from the effects of chemical agents and to provide first aid to yourself and to others.

7-2. Protective and First Aid Equipment

You are issued equipment for protection and first aid treatment in a toxic environment. You must know how to use the items described in a through e. It is equally important that you know when to use them. Use your protective clothing and equipment when you are ordered to and when you

are under a nuclear, biological, or chemical (NBC) attack. Also, use your protective clothing and equipment when you enter an area where NBC agents have been employed.

a. Field Protective Mask With Protective Hood. Your field protective mask is the most important piece of protective equipment. You are given special training in its use and care.

b. Field Protective Clothing. Each soldier is authorized three sets of the following field protective clothing:

- Overgarment ensemble (shirt and trousers), chemical protective.
- Footwear cover (overboots), chemical protective.
- Glove set, chemical protective.

c. Nerve Agent Pyridostigmine Pretreatment (NAPP). You will be issued a blister pack of pretreatment tablets when your commander directs. When ordered to take the pretreatment you must take one tablet every eight hours. This must be taken prior to exposure to nerve agents, since it may take several hours to develop adequate blood levels.

NOTE

Normally, one set of protective clothing is used in acclimatization training that uses various mission-oriented protective posture (MOPP) levels.

d. M258A1 Skin Decontamination Kit. The M258A1 Skin Decontamination (decon) Kit contains three each of the following:

- DECON-1 packets containing wipes (pads) moistened with decon solution.
- DECON-2 packets containing dry wipes (pads) previously moistened with decon solution and sealed glass ampules. Ampules are crushed to moisten pads.

WARNING

The *decon solution* contained in both DECON-1 and DECON-2 packets is a *poison and caustic hazard* and can permanently damage the eyes. Keep wipes out of the eyes, mouth, and open wounds. Use *WATER* to wash toxic agent out of eyes and wounds and seek medical aid.

e. Nerve Agent Antidote Kit, Mark I (NAAK MKI). Each soldier is authorized to carry three Nerve Agent Antidote Kits, Mark I, to treat nerve agent poisoning. When NAPP has been taken several hours (but no greater than 8 hours) prior to exposure, the NAAK MKI treatment of nerve agent poisoning is much more effective.

Section II. CHEMICAL-BIOLOGICAL AGENTS

7-3. Classification

a. Chemical agents may be classified according to the primary physiological effects they produce, such as nerve, blister, blood, choking, vomiting, and incapacitating agents.

b. Biological agents may be classified according to the effect they have on man. These include blockers, inhibitors, hybrids, and membrane active compounds. These agents are found in living organisms such as fungi, bacteria and viruses.

WARNING

Ingesting water or food contaminated with nerve, blister, and other chemical agents and with some biological agents can be fatal. NEVER consume water or food which is suspected of being contaminated until it has been tested and found safe for consumption.

7-4. Conditions for Masking Without Order or Alarm

Once an attack with a chemical or biological agent is detected or suspected, or information is available that such an agent is about to be used, you must **STOP** breathing and mask immediately. **DO NOT WAIT** to receive an order or alarm under the following circumstances:

- Your position is hit by artillery or mortar fire, missiles, rockets, smokes, mists, aerial sprays, bombs, or bomblets.
- Smoke from an unknown source is present or approaching.
- A suspicious odor, liquid, or solid is present.
- A toxic chemical or biological attack is present.
- You are entering an area known or suspected of being contaminated.
- During any motor march, once chemical warfare has begun.
- When casualties are being received from an area where chemical or biological agents have reportedly been used.
- You have one or more of the following symptoms:
 - An unexplained runny nose.
 - A feeling of choking or tightness in the chest or throat.
 - Dimness of vision.
 - Irritation of the eyes.
 - Difficulty in or increased rate of breathing without obvious reasons.
 - Sudden feeling of depression.
 - Dread, anxiety, restlessness.
 - Dizziness or light-headedness.
 - Slurred speech.
- Unexplained laughter or unusual behavior is noted in others.

- Numerous unexplained ill personnel.
- Buddies suddenly collapsing without evident cause.
- Animals or birds exhibiting unusual behavior and/or sudden unexplained death.

For further information, see FM 3-4.

7-5. First Aid for a Chemical Attack (081-831-1030 and 081-831-1031)

Your field protective mask gives protection against chemical as well as biological agents. Previous practice enables you to mask in 9 seconds or less or to put on your mask with hood within 15 seconds.

a. Step ONE (081-831-1030 and 081-831-1031). Stop breathing. Don your mask, seat it properly, clear and check your mask, and resume breathing. Give the alarm, and continue the mission. Keep your mask on until the “all clear” signal has been given.

NOTE

Keep your mask on until the area is no longer hazardous and you are told to unmask.

b. Step TWO (081-831-1030). If symptoms of nerve agent poisoning (paragraph 7-7) appear, immediately give yourself a nerve agent antidote. You should have taken NAPP several hours prior to exposure which will enhance the action of the nerve agent antidote.

CAUTION

Do not inject a nerve agent antidote until you are sure you need it.

c. Step THREE (081-831-1031). If your eyes and face become contaminated, you must immediately try to get under cover. You need this shelter to prevent further contamination while performing decon procedures on areas of the head. If no overhead cover is available, throw your poncho or shelter half over your head before beginning the decon

process. Then you should put on the remaining protective clothing. (See Appendix F for decon procedure.) If vomiting occurs, the mask should be lifted momentarily and drained—while the eyes are closed and the breath is held—and replaced, cleared, and sealed.

d. Step FOUR. If nerve agents are used, mission permitting, watch for persons needing nerve agent antidotes and immediately follow procedures outlined in paragraph 7-8 *b*.

e. STEP FIVE. When your mission permits, decon your clothing and equipment.

Section III. NERVE AGENTS

7-6. Background Information

a. Nerve agents are among the deadliest of chemical agents. They can be delivered by artillery shell, mortar shell, rocket, missile, landmine, and aircraft bomb, spray, or bomblet. Nerve agents enter the body by inhalation, by ingestion, and through the skin. Depending on the route of entry and the amount, nerve agents can produce injury or death within minutes. Nerve agents also can achieve their effects with small amounts. Nerve agents are absorbed rapidly, and the effects are felt immediately upon entry into the body. You will be issued three Nerve Agent Antidote Kits, Mark I. Each kit consists of one atropine autoinjector and one pralidoxime chloride (2 PAM Cl) autoinjector (also called injectors) (Figure 7-1).

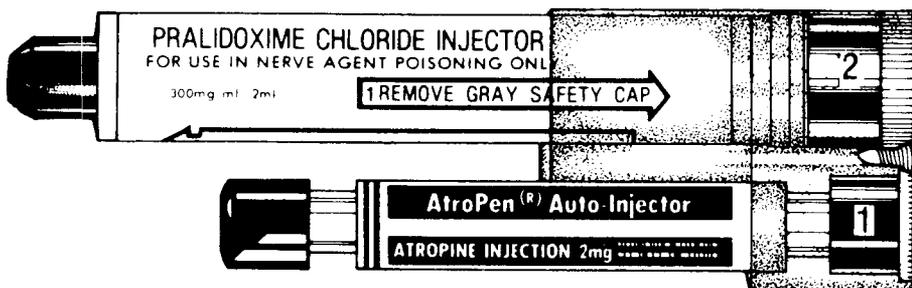


Figure 7-1. Nerve Agent Antidote Kit, Mark I.

b. When you have the signs and symptoms of nerve agent poisoning, you should immediately put on the protective mask and then inject yourself with one set of the Nerve Agent Antidote Kit, Mark I. You should inject yourself in the outside (lateral) thigh muscle or if you are thin, in the upper outer (lateral) part of the buttocks.

c. Also, you may come upon an unconscious chemical agent casualty who will be unable to care for himself and who will require your aid. You should be able to successfully—

- (1) Mask him if he is unmasked.
- (2) Inject him, if necessary, with all his autoinjectors.
- (3) Decontaminate his skin.
- (4) Seek medical aid.

7-7. Signs/Symptoms of Nerve Agent Poisoning (081-831-1030 and 081-831-1031)

The symptoms of nerve agent poisoning are grouped as MILD—those which you recognize and for which you can perform self-aid, and SEVERE—those which require buddy aid.

a. MILD Symptoms (081-831-1030).

- Unexplained runny nose.
- Unexplained sudden headache.
- Sudden drooling.
- Difficulty seeing (blurred vision).
- Tightness in the chest or difficulty in breathing.
- Localized sweating and twitching (as a result of small amount of nerve agent on skin).
- Stomach cramps.
- Nausea.

b. SEVERE Signs/Symptoms (081-831-1031).

- Strange or confused behavior.
- Wheezing, difficulty in breathing, and coughing.
- Severely pinpointed pupils.
- Red eyes with tearing (if agent gets into the eyes).
- Vomiting.
- Severe muscular twitching and general weakness.
- Loss of bladder/bowel control.
- Convulsions.
- Unconsciousness.
- Stoppage of breathing.

7-8. **First Aid for Nerve Agent Poisoning (081-831-1030) and (081-831-1031)**

The injection site for administering the Nerve Agent Antidote Kit, Mark I (see Figure 7-1), is normally in the outer thigh muscle (see Figure 7-2). It is important that the injections be given into a large muscle area. If the individual is thinly-built, then the injections must be administered into the upper outer quarter (quadrant) of the buttocks (see Figure 7-3). This avoids injury to the thigh bone.

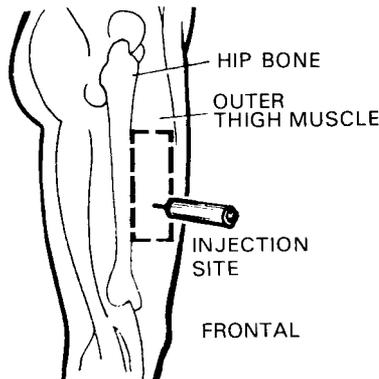


Figure 7-2. *Thigh injection site.*

WARNING

There is a nerve that crosses the buttocks, so it is important to inject *only* into the upper outer quadrant (see Figure 7-3). This will avoid injuring this nerve. Hitting the nerve can cause paralysis.

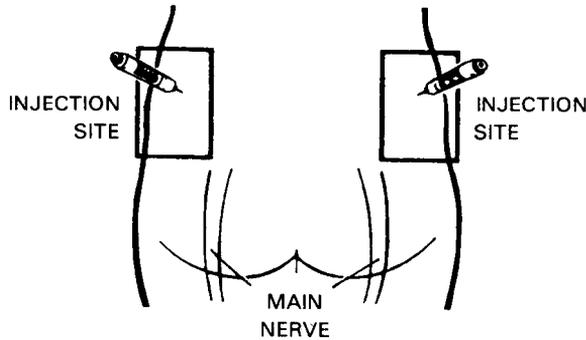


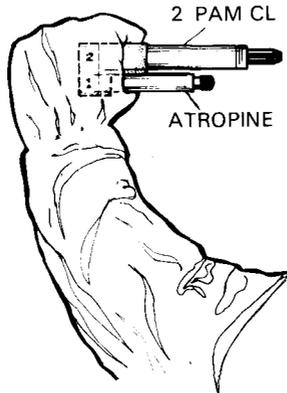
Figure 7-3. Buttocks injection site.

a. Self-Aid (081-831-1030).

(1) Immediately put on your protective mask after identifying any of the signs/symptoms of nerve agent poisoning (paragraph 7-7).

(2) Remove one set of the Nerve Agent Antidote Kit, Mark I.

(3) With your nondominant hand, hold the autoinjectors by the plastic clip so that the larger autoinjector is on top and both are positioned in front of you at eye level (see Figure 7-4).



7-4. *Holding the set of autoinjectors by the plastic clip.*

(4) With the other hand, check the injection site (thigh or buttocks) for buttons or objects in pockets which may interfere with the injections.

(5) Grasp the atropine (smaller) autoinjector with the thumb and first two fingers (see Figure 7-5).

CAUTION

DO NOT cover/hold the green (needle) end with your hand or fingers—you might accidentally inject yourself.



Figure 7-5. *Grasping the atropine autoinjector between the thumb and first two fingers of the hand.*

(6) Pull the injector out of the clip with a smooth motion (see Figure 7-6).

WARNING

The injector is now armed. DO NOT touch the green (needle) end.

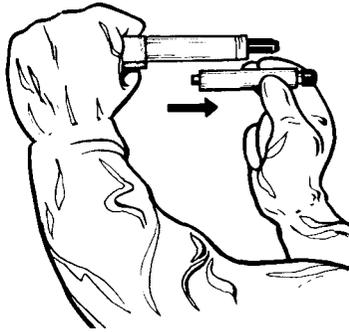


Figure 7-6. Removing the atropine autoinjector from the clip.

(7) Form a fist around the autoinjector. BE CAREFUL NOT TO INJECT YOURSELF IN THE HAND!

(8) Position the green end of the atropine autoinjector against the injection site (thigh or buttocks):

(a) On the outer thigh muscle (see Figure 7-7).



Figure 7-7. Thigh injection site for self-aid.

OR

Figure 7-8). (b) On the upper outer portion of the buttocks (see



Figure 7-8. Buttocks injection site for self-aid.

(9) Apply firm, even pressure (not a jabbing motion) to the injector until it pushes the needle into your thigh (or buttocks).

WARNING

Using a jabbing motion may result in an improper injection or injury to the thigh or buttocks.

NOTE

Firm pressure automatically triggers the coiled spring mechanism. This plunges the needle through the clothing into the muscle and injects the fluid into the muscle tissue.

(10) Hold the injector firmly in place for at least ten seconds. The ten seconds can be estimated by counting “one thousand and one, one thousand and two,” and so forth.

(11) Carefully remove the autoinjector.

(12) Place the used atropine injector between the little finger and the ring finger of the hand holding the remaining autoinjector and the clip (see Figure 7-9). **WATCH OUT FOR THE NEEDLE!**

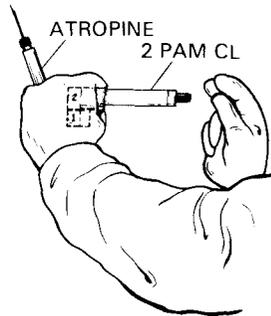


Figure 7-9. Used atropine autoinjector placed between the little finger and ring finger.

(13) Pull the 2 PAM C1 autoinjector (the larger of the two injectors) out of the clip (see Figure 7-10) and inject yourself in the same manner as steps (7) through (11) above, holding the black (needle) end against your thigh (or buttocks).

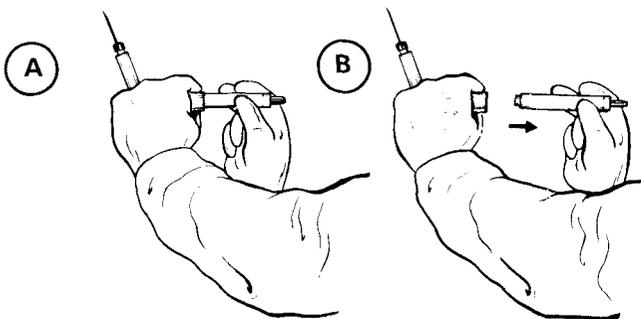


Figure 7-10. Removing the 2 PAM C1 autoinjector.

(14) Drop the empty injector clip without dropping the used autoinjectors.

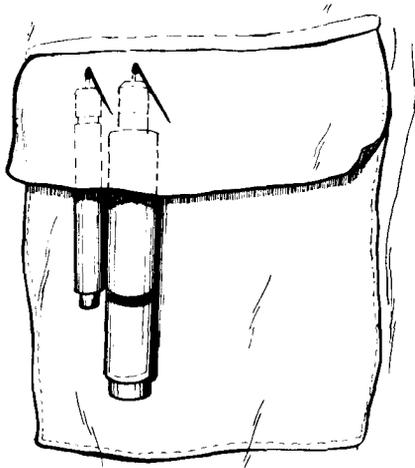
(15) Attach the used injectors to your clothing (see Figure 7-11). Be careful NOT to tear your protective gloves/clothing with the needles.

(a) Push the needle of each injector (one at a time) through one of the pocket flaps of your protective overgarment.

(b) Bend each needle to form a hook.

WARNING

It is important to keep track of all used autoinjectors so that medical personnel can determine how much antidote has been given and the proper follow-up treatment can be provided, if needed.



7-11. One set of used autoinjectors attached to pocket flap.

(16) Massage the injection site if time permits.

WARNING

If within 5 to 10 minutes after administering the first set of injections, your heart begins to beat rapidly and your mouth becomes very dry, **DO NOT** give yourself another set of injections. You have already received enough antidote to overcome the dangerous effects of the nerve agent. If you are able to walk without assistance (ambulate), know who you are and where you are, you **WILL NOT** need the second set of injections. (If not needed, giving yourself a second set of injections may create a nerve agent antidote overdose, which could cause incapacitation.) If, however, you continue to have symptoms of nerve agent poisoning for 10 to 15 minutes after receiving one set of injections, seek a buddy to check your symptoms. If your buddy agrees that your symptoms are worsening, administer the second set of injections.

NOTE (081-831-1030)

While waiting between sets (injections), you should decon your skin, if necessary, and put on the remaining protective clothing.

b. Buddy aid (081-831-1031).

A soldier exhibiting SEVERE signs/symptoms of nerve agent poisoning will not be able to care for himself and must therefore be given buddy aid as quickly as possible. Buddy aid will be required when a soldier is totally and immediately incapacitated prior to being able to apply self-aid, and all three sets of his Nerve Agent Antidote Kit, Mark I, need to be given by a buddy. Buddy aid may also be required after a soldier attempted to counter the nerve agent by self-aid but became incapacitated after giving himself one set of the autoinjectors. Before initiating buddy aid, a buddy should determine if one set of injectors has already been used so that no more than three sets of the antidote are administered.

(1) Move (roll) the casualty onto his back (face up) if not already in that position.

WARNING

Avoid unnecessary movement of the casualty so as to keep from spreading the contamination.

- (2) Remove the casualty's protective mask from the carrier.
- (3) Position yourself above the casualty's head, facing his feet.

WARNING

Squat, DO NOT kneel, when masking a chemical agent casualty. Kneeling may force the chemical agent into or through your protective clothing, which will greatly reduce the effectiveness of the clothing.

- (4) Place the protective mask on the casualty.
- (5) Have the casualty clear the mask.
- (6) Check for a complete mask seal by covering the inlet valves. If properly sealed the mask will collapse.

NOTE

If the casualty is unable to follow instructions, is unconscious, or is not breathing, he will not be able to perform steps (5) or (6). It may, therefore, be impossible to determine if the mask is sealed. But you should still *try* to check for a good seal by placing your hands over the valves.

- (7) Pull the protective hood over the head, neck, and shoulders of the casualty.
- (8) Position yourself near the casualty's thigh.
- (9) Remove one set of the casualty's autoinjectors.

NOTE (081-831-1031)

Use the *CASUALTY'S* autoinjectors. **DO NOT** use *YOUR* autoinjectors for buddy aid; if you do, you may not have any antidote if/when needed for self-aid.

(10) With your nondominant hand, hold the set of autoinjectors by the plastic clip so that the larger autoinjector is on top and both are positioned in front of you at eye level (see Figure 7-4).

(11) With the other hand, check the injection site (thigh or buttocks) for buttons or objects in pockets which may interfere with the injections.

(12) Grasp the atropine (smaller) autoinjector with the thumb and first two fingers (see Figure 7-5).

CAUTION

DO NOT cover/hold the green (needle) end with your hand or fingers—you may accidentally inject yourself.

(13) Pull the injector out of the clip with a smooth motion (see Figure 7-6).

WARNING

The injector is now armed. **DO NOT** touch the green (needle) end.

(14) Form a fist around the autoinjector. **BE CAREFUL NOT TO INJECT YOURSELF IN THE HAND.**

WARNING

Holding or covering the needle (green) end of the autoinjector may result in accidentally injecting yourself.

(15) Position the green end of the atropine autoinjector against the injection site (thigh or buttocks):

(a) On the casualty's outer thigh muscle (see Figure 7-12).

NOTE

The injections are normally given in the casualty's thigh.

WARNING

If this is the injection site used, be careful not to inject him close to the hip, knee, or thigh bone.



Figure 7-12. Injecting the casualty's thigh.

OR

(b) On the upper outer portion of the casualty's buttocks (see Figure 7-13).

NOTE

If the casualty is thinly built, reposition him onto his side or stomach and inject the antidote into his buttocks.

WARNING

Inject the antidote only into the upper outer portion of his buttocks (see Figure 7-13). This avoids hitting the nerve that crosses the buttocks. Hitting this nerve can cause paralysis.



Figure 7-13. Injecting the casualty's buttocks.

(16) Apply firm, even pressure (not a jabbing motion) to the injector to activate the needle. This causes the needle to penetrate both the casualty's clothing and muscle.

WARNING

Using a jabbing motion may result in an improper injection or injury to the thigh or buttocks.

(17) Hold the injector firmly in place for at least ten seconds. The ten seconds can be estimated by counting “one thousand and one, one thousand and two, ” and so forth.

(18) Carefully remove the autoinjector.

(19) Place the used autoinjector between the little finger and ring finger of the hand holding the remaining autoinjector and the clip (see Figure 7-9). **WATCH OUT FOR THE NEEDLE!**

(20) Pull the 2 PAM Cl autoinjector (the larger of the two injectors) out of the clip (see Figure 7-10) and inject the casualty in the same manner as steps (9) through (19) above, holding the black (needle) end against the casualty’s thigh (or buttocks).

(21) Drop the clip *without* dropping the used autoinjectors.

(22) Carefully lay the used injectors on the casualty’s chest (if he is lying on his back), or on his back (if he is lying on his stomach), pointing the needles toward his head.

(23) Repeat the above procedure immediately (steps 9 through 22), using the second and third set of autoinjectors.

(24) Attach the three sets of used autoinjectors to the casualty’s clothing (see Figure 7-14). Be careful **NOT** to tear either your or the casualty’s protective clothing/gloves with the needles.

(a) Push the needle of each injector (one at a time) through one of the pocket flaps of his protective overgarment.

(b) Bend each needle to form a hook.

WARNING

It is important to keep track of all used autoinjectors so that medical personnel will be able to determine how much antidote has been given and the proper follow-up/treatment can be provided, if needed.

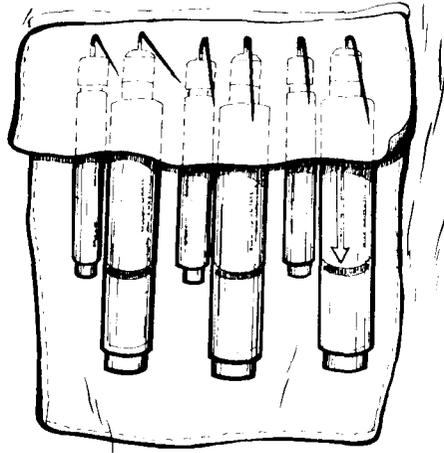


Figure 7-14. Three sets of used autoinjectors attached to pocket flap.

(25) Massage the area if time permits.

Section IV. OTHER AGENTS

7-9. Blister Agents

Blister agents (vesicants) include mustard (HD), nitrogen mustards (HN), lewisite (L), and other arsenicals, mixtures of mustards and arsenical, and phosgene oxime (CX). Blister agents act on the eyes, mucous membranes, lungs, and skin. They burn and blister the skin or any other body parts they contact. Even relatively low doses may cause serious injury. Blister agents damage the respiratory tract (nose, sinuses and windpipe) when inhaled and cause vomiting and diarrhea when absorbed. Lewisite and phosgene oxime cause immediate pain on contact. However, mustard agents are deceptive and there is little or no pain at the time of exposure. Thus, in some cases, signs of injury may not appear for several hours after exposure.

a. Protective Measures. Your protective mask with hood and protective overgarments provide you protection against blister agents. If it is known or suspected that blister agents are being used, STOP BREATHING, put on your mask and all your protective overgarments.

CAUTION

Large drops of liquid vesicants on the protective overgarment ensemble may penetrate it if allowed to stand for an extended period. Remove large drops as soon as possible.

b. Signs/Symptoms of Blister Agent Poisoning.

(1) *Immediate and intense pain upon contact (lewisite and phosgene oxime).* No initial pain upon contact with mustard.

(2) *Inflammation and blisters (burns)–tissue destruction.* The severity of a chemical burn is directly related to the concentration of the agent and the duration of contact with the skin. The longer the agent is in contact with the tissue, the more serious the injury will be.

(3) *Vomiting and diarrhea.* Exposure to high concentrations of vesicants may cause vomiting and diarrhea.

(4) *Death.* The blister agent vapors absorbed during ordinary field exposure will probably not cause enough internal body (systemic) damage to result in death. However, death may occur from prolonged exposure to high concentrations of vapor or from extensive liquid contamination over wide areas of the skin, particularly *when decon is neglected or delayed.*

c. First Aid Measures.

(1) Use your M258A1 decon kit to decon your skin and use water to flush contaminated eyes. Decontamination of vesicants must be done immediately (within 1 minute is best).

(2) If blisters form, cover them loosely with a field dressing and secure the dressing.

CAUTION

Blisters are actually burns. DO NOT attempt to decon the skin where blisters have formed.

(3) If you receive blisters over a wide area of the body, you are considered seriously burned. SEEK MEDICAL AID IMMEDIATELY.

(4) If vomiting occurs, the mask should be lifted momentarily and drained—while the eyes are closed and the breath is held—and replaced, cleared, and sealed.

(5) Remember, if vomiting or diarrhea occurs after having been exposed to blister agents, SEEK MEDICAL AID IMMEDIATELY.

7-10. Choking Agents (Lung-Damaging Agents)

Chemical agents that attack lung tissue, primarily causing fluid buildup (pulmonary edema), are classified as choking agents (lung-damaging agents). This group includes phosgene (CG), diaphosgene (DP), chlorine (CL), and chloropicrin (PS). Of these four agents, phosgene is the most dangerous and is more likely to be employed by the enemy in future conflict.

a. Protective Measures. Your protective mask gives adequate protection against choking agents.

b. Signs/Symptoms. During and immediately after exposure to choking agents (depending on agent concentration and length of exposure), you may experience some or all of the following signs/symptoms:

- Tears (lacrimation).
- Dry throat.
- Coughing.
- Choking.
- Tightness of chest.
- Nausea and vomiting.
- Headaches.

c. First Aid Measures.

(1) If you come in contact with phosgene, your eyes become irritated, or a cigarette becomes tasteless or offensive, STOP BREATHING and put on your mask immediately.

(2) If vomiting occurs, the mask should be lifted momentarily and drained—while the eyes are closed and the breath is held—replaced, cleared, and sealed.

(3) Seek medical assistance if any of the above signs/symptoms occur.

NOTE

If you have no difficulty breathing, do not feel nauseated, and have no more than the usual shortness of breath on exertion, then you inhaled only a minimum amount of the agent. You may continue normal duties.

d. Death. With ordinary field exposure to choking agents, death will probably not occur. However, prolonged exposure to high concentrations of the vapor and *neglect or delay in masking can be fatal.*

7-11. Blood Agents

Blood agents interfere with proper oxygen utilization in the body. Hydrogen cyanide (AC) and cyanogen chloride (CK) are the primary agents in this group.

a. Protective Measures. Your protective mask with a fresh filter gives adequate protection against field concentrations of blood agent vapor. The protective overgarment as well as the mask are needed when exposed to liquid hydrogen cyanide.

b. Signs/Symptoms. During and immediately after exposure to blood agents (depending on agent concentration and length of exposure), you may experience some or all of the following signs/symptoms:

- Eye irritation.
- Nose and throat irritation.
- Sudden stimulation of breathing.
- Nausea.
- Coughing.
- Tightness of chest.

- Headache.
- Unconsciousness.

c. First Aid Measures.

(1) *Hydrogen cyanide.* During any chemical attack, if you get a sudden stimulation of breathing or notice an odor like bitter almonds, PUT ON YOUR MASK IMMEDIATELY. Speed is absolutely essential since this agent acts so rapidly that within a few seconds its effects will make it impossible for individuals to put on their mask by themselves. *Stop breathing until the mask is on, if at all possible. This may be very difficult since the agent strongly stimulates respiration.*

(2) *Cyanogen chloride.* PUT ON YOUR MASK IMMEDIATELY if you experience any irritation of the eyes, nose, or throat.

d. Medical Assistance. If you suspect that you have been exposed to blood agents, seek medical assistance immediately.

7-12. Incapacitating Agents

Generally speaking, an incapacitating agent is any compound which can interfere with your performance. The agent affects the central nervous system and produces muscular weakness and abnormal behavior. It is likely that such agents will be disseminated by smoke-producing munitions or aerosols, thus making breathing their means of entry into the body. The protective mask is, therefore, essential.

a. There is no special first aid to relieve the symptoms of incapacitating agents. Supportive first aid and physical restraint may be indicated. If the casualty is stuporous or comatose, be sure that respiration is unobstructed; then turn him on his stomach with his head to one side (in case vomiting should occur). Complete cleansing of the skin with soap and water should be done as soon as possible; or, the M258A1 Skin Decontamination Kit can be used if washing is impossible. Remove weapons and other potentially harmful items from the possession of individuals who are suspected of having these symptoms. Harmful items include cigarettes, matches, medications, and small items which might be swallowed accidentally. Delirious persons have been known to attempt to eat items bearing only a superficial resemblance to food.

b. Anticholinergic drugs (BZ - type) may produce alarming dryness and coating of the lips and tongue; however, there is usually no danger of immediate dehydration. Fluids should be given sparingly, if at

all, because of the danger of vomiting and because of the likelihood of temporary urinary retention due to paralysis of bladder muscles. An important medical consideration is the possibility of heatstroke caused by the stoppage of sweating. If the environmental temperature is above 78° F, and the situation permits, remove excessive clothing from the casualty and dampen him to allow evaporative cooling and to prevent dehydration. If he does not readily improve, apply first aid measures for heatstroke and seek medical attention.

7-13. Incendiaries

Incendiaries can be grouped as white phosphorus, thickened fuel, metal, and oil and metal. You must learn to protect yourself against these incendiaries.

a. White phosphorus (WP) is used primarily as a smoke producer but can be used for its incendiary effect to ignite field expedients and combustible materials. The burns from WP are usually multiple, deep, and variable in size. When particles of WP get on the skin or clothing, they continue to burn until deprived of air. They also have a tendency to stick to a surface and must be brushed off or picked out.

(1) If burning particles of phosphorus strike and stick to your clothing, quickly take off the contaminated clothing before the phosphorus burns through to the skin.

(2) If burning phosphorus strikes your skin, smother the flame by submerging yourself in water or by dousing the WP with water from your canteen or any other source. Urine, a wet cloth, or mud can also be used.

NOTE

Since WP is poisonous to the system, DO NOT use grease or oil to smother the flame. The WP will be absorbed into the body with the grease or oil.

(3) Keep the WP particles covered with wet material to exclude air until you can remove them or get them removed from your skin.

(4) Remove the WP particles from the skin by brushing them with a wet cloth and by picking them out with a knife, bayonet, stick, or other available object.

(5) Report to a medical facility for treatment as soon as your mission permits.

b. Thickened fuel mixtures (napalm) have a tendency to cling to clothing and body surfaces, thereby producing prolonged exposure and severe burns. The first aid for these burns is the same as for other heat burns. The heat and irritating gases given off by these combustible mixtures may cause lung damage, which must be treated by a medical officer.

c. Metal incendiaries pose special problems. Thermite and thermate particles on the skin should be immediately cooled with water and then removed. Even though thermate particles have their own oxygen supply and continue to burn under water, it helps to cool them with water. The first aid for these burns is the same as for other heat burns. Particles of magnesium on the skin burn quickly and deeply. Like other metal incendiaries, they must be removed. Ordinarily, the complete removal of these particles should be done by trained personnel at a medical treatment facility, using local anesthesia. Immediate medical treatment is required.

d. Oil and metal incendiaries have much the same effect on contact with the skin and clothing as those discussed (*b* and *c* above). Appropriate first aid measures for burns are described in Chapter 3.

7-14. First Aid for Biological Agents

We are concerned with victims of biological attacks and with treating symptoms after the soldier becomes ill. However, we are more concerned with preventive medicine and hygienic measures taken before the attack. By accomplishing a few simple tasks we can minimize their effects.

a. Immunizations. In the military we are accustomed to keeping inoculations up to date. To prepare for biological defense, every effort must be taken to keep immunizations current. Based on enemy capabilities and the geographic location of our operations, additional immunizations may be required.

b. Food and Drink. Only approved food and water should be consumed. In a suspected biological warfare environment, efforts in monitoring food and water supplies must be increased. Properly treated water and properly cooked food will destroy most biological agents.

c. Sanitation Measures.

(1) *Maintain high standards of personal hygiene.* This will reduce the possibility of catching and spreading infectious diseases.

(2) *Avoid physical fatigue.* Physical fatigue lowers the body's resistance to disease. This, of course, is complemented by good physical fitness.

(3) *Stay out of quarantined areas.*

(4) *Report sickness promptly.* This ensures timely medical treatment and, more importantly, early diagnosis of the disease.

d. Medical Treatment of Casualties. Once a disease is identified, standard medical treatment commences. This may be in the form of first aid or treatment at a medical facility, depending on the seriousness of the disease. Epidemics of serious diseases may require augmentation of field medical facilities.

7-15. Toxins

Toxins are alleged to have been used in recent conflicts. Witnesses and victims have described the agent as toxic rain (or yellow rain) because it was reported to have been released from aircraft as a yellow powder or liquid that covered the ground, structures, vegetation, and people.

a. Protective Measures. Individual protective measures normally associated with persistent chemical agents will provide protection against toxins. Measures include the use of the protective mask with hood, and the overgarment ensemble with gloves and overboots (mission-oriented protective posture level-4 [MOPP 4]).

b. Signs/Symptoms. The occurrence of the symptoms from toxins may appear in a period of a few minutes to several hours depending on the particular toxin, the individual susceptibility, and the amount of toxin inhaled, ingested, or deposited on the skin. Symptoms from toxins usually involve the nervous system but are often preceded by less prominent symptoms, such as nausea, vomiting, diarrhea, cramps, or burning distress of the stomach region. Typical neurological symptoms often develop rapidly in severe cases, for example, visual disturbances, inability to swallow, speech difficulty, muscle coordination, and sensory abnormalities (numbness of mouth, throat, or extremities). Yellow rain (mycotoxins) also may have hemorrhagic symptoms which could include any/all of the following:

- Dizziness.
- Severe itching or tingling of the skin.
- Formation of multiple, small, hard blisters.

- Coughing up blood.
- Shock (which could result in death).

c. *First Aid Measures.* Upon recognition of an attack employing toxins or the onset (start) of symptoms listed above, you must immediately take the following actions:

(1) *Step ONE.* STOP BREATHING, put on your protective mask with hood, then resume breathing. Next, put on your protective clothing.

(2) *Step TWO.* Should severe itching of the face become unbearable, quickly—

- Loosen the cap on your canteen.
- Remove your helmet. Take and hold a deep breath and remove your mask.
- While holding your breath, close your eyes and flush your face with generous amounts of water.

CAUTION

DO NOT rub or scratch your eyes. Try not to let the water run onto your clothing or protective overgarments.

- Put your protective mask back on, seat it properly, clear it, and check it for seal; then resume breathing.
- Put your helmet back on.

NOTE

The effectiveness of the M258A1 Skin Decon Kit for biological agent decon is unknown at this time; however, flushing the skin with large amounts of water will reduce the effectiveness of the toxins.

(3) *Step THREE.* If vomiting occurs, the mask should be lifted momentarily and drained—while the eyes are closed and the breath is held—and replaced, cleared, and sealed.

d. Medical Assistance. If you suspect that you have been exposed to toxins, you should seek medical assistance immediately.

7-16. Radiological

There is no direct first aid for radiological casualties. These casualties are treated for their apparent conventional symptoms and injuries.