CHAPTER 5

POISONING, DRUG ABUSE, AND HAZARDOUS MATERIAL EXPOSURE

As a Hospital Corpsman, you may encounter patients as the result of poisoning, drug overdose, or exposure to hazardous materials. Such patients may initially present with no symptoms or with varying degrees of overt intoxication. The asymptomatic patient may have been exposed to or ingested a lethal dose of a substance but not exhibit any manifestations of toxicity. A patient with mild symptoms may deteriorate rapidly, so observe them closely. Potentially significant exposures should be observed in an acute care facility whenever possible. Remember, though: We are not always in a hospital environment, and we must be prepared to deal with each situation when and wherever it should present itself.

In this chapter, we will discuss the assessment and treatment for ingested, inhaled, absorbed, and injected poisons. Drug abuse assessment and treatment procedures, patient handling techniques, and the recognition of hazardous material (HAZMAT) personal safety guidelines and information sources will also be covered. The last part of the chapter will cover rescue, patient care, and decontamination procedures for patients exposed to HAZMAT.

> **NOTE:** Prior to deployments and operational commitments, commands are strongly recommended to contact the area **Environmental Preventive Medicine Unit** (EPMU) for current, specific, medical intelligence, and surveillance data. With this information at hand, the local preventive medicine authority can identify, prevent, and treat conditions not common to the homeport area. The cognizant EPMU will provide data through MEDIC, (*Medical, Environmental, Diagnosis, Intelligence and Counter-measure*). Formally called a *Disease Risk Assessment Profile* (DISRAP), MEDIC is a comprehensive, constantly updated management tool. MEDIC is an invaluable aid for identifying at-risk communicable diseases, immunization requirements, and—as applies especially to this chapter—local pests and environmental dangers.

POISONING

LEARNING OBJECTIVE: *Recall assessment and treatment procedures for ingested, inhaled, absorbed, and injected poisons*

A **poison** is a substance that, when introduced into the body, produces a harmful effect on normal body structures or functions. Poisons come in solid, liquid, and gaseous forms, and they may be ingested, inhaled, absorbed, or injected into the system.

Every chemical in a sufficient dose can cause toxic effects in a human—or in any organism. The amount or concentration of a chemical and the duration of exposure to it are what determine the chemical's dose and toxicity. A 16th century quotation from Paracelsus states, "Dose alone makes a poison. . . .All substances are poisons, there is none which is not a poison. The right dose differentiates a poison and a remedy. "

A **poisoning** is defined as the presence of signs or symptoms associated with exposure or contact with a substance. If there are no clinical manifestations or toxic effects, the incident is simply an "exposure" or a contact with a potentially poisonous substance. Just being exposed to a chemical does not mean that a poisoning has or will occur. It is a matter of dose and a few other variables (e.g., age, sex, individual resistance, or state of health) that determine if, or what, toxic effects will occur.

ASSESSMENT AND TREATMENT OF PATIENT

In most cases, ASSESSMENT AND TREATMENT OF THE PATIENT IS MORE IMPORTANT THAN EFFORT TO IDENTIFY AND TREAT A SPECIFIC POISON. Supportive therapy—managing the **ABCs (Airway, Breathing,** and **Circulation)** of basic life support and treating the signs and symptoms—is safe and effective in the vast majority of poisonings. Extraordinary means to enhance elimination of the poison (hemodialysis and hemoperfusion) are seldom needed. Except for agents with a delayed onset of

toxicity (such as acetaminophen), most ingested poisons produce signs and symptoms in less than 4 hours, and most efforts to decontaminate the gut (remove an ingested poison) have little value more than 1 hour after ingestion.

In acute poisonings, prompt treatment is indicated. After the patient has been evaluated and stabilized, general poison management can be initiated. There are six steps in the initial evaluation and follow-on poison management:

1. **Stabilization**, which consists of a brief evaluation and assessment directed toward identifying the measures required to maintain life and prevent further deterioration of the patient.
    - Observe the **ABC + D & E** (**D**rug-induced central nervous system (CNS) depression, and undressing/uncovering to **E**xpose the patient for disabilities (injuries) to ensure areas of contact or exposure to a chemical can be seen.)
    - Check the pupils for size and reactivity to light, and do a basic neurologic exam.
    - Administer oxygen as needed, IV line for fluids.
    - Watch for signs and symptoms of anaphylaxis.
2. **Evaluation**, which must be performed once the patient is stabilized.
    - Include a full history, physical exam, and ordering of appropriate tests (i.e., labs, EKG, x-rays) directed toward identification of toxic agent, evaluating the severity of toxic effects, and searching for trauma and complications.
    - Periodically reassess the patient. Look for changes. Monitor vital signs, urine output, and cardiac rhythm.
    - Record your findings (including time), and respond to important changes appropriately.
3. **Prevention or limitation of absorption**, through skin decontamination, flushing of eyes, ventilation, stomach emptying, administration of charcoal and cathartics, and whole bowel irrigation.
4. **Elimination enhancement,** through serially administered activated charcoal, ion-trapping (pH adjustment of the urine to promote excretion of certain poisons), hemodialysis, and hemoperfusion (similar to hemodialysis, but used for larger size molecules).
5. **Administration of specific antidotes.** Less than 5 percent of poisons have specific antidotes. All patients who present should receive glucose, thiamine, and naloxone. Consider supplemental oxygen.
6. **Continuing care and disposition,** including a period of observation and education (i.e., poison prevention) or psychiatric counseling. Establish follow-up.

THE DIAGNOSIS OF POISONING

In most situations, the treatment of a poisoning victim will be under the direction of a medical officer. However, in isolated situations, a Hospital Corpsman must be ready to treat the victim.

Poisoning should be suspected in all cases of sudden, severe, and unexpected illness. You should investigate such situations by ascertaining, as quickly and thoroughly as possible, the answers to the following questions:

- What are the signs and symptoms of the illness?
- What was happening before the illness occurred? (Remember, there may have been a chronic exposure over time with the signs and symptoms just becoming apparent.)
- What substances were in use? Could more than one substance have been involved?
- Is there a container of the suspected substance? If so, how much was there initially, and how much is there now? (If possible, bring the container to the treatment facility. The label will often identify the contents and the recommended precautions and treatment. The label may also list a contact number for emergency advice. Remember, though, that other people—including you—may become contaminated through contact with the container. Handle it carefully.)
- What was the duration of exposure? When did it happen?
- What is the location of the bite or injury (if applicable)?
- Has this happened before?

- Are there other people involved?
- Does the patient have a significant past medical history?
- Is the patient's condition improving/ deteriorating?

The presence of a toxic syndrome or **toxidrome** can help establish that a poison has been involved by suggesting the class of poison(s) to which the patient may have been exposed. Table 5-1 provides a list of commonly encountered toxidromes, their sources and symptoms.

The "non-syndrome syndrome" is of special importance. The only method to recognize the potential for a delayed onset poisoning to occur is to suspect the possibility from the history or presentation of a person. In some cases, the individual's affect or behavior may provide a clue. In other cases, the examiner must rely on clinical experience or even a hunch.

GENERAL TREATMENT

Once poisoning has been established, the general rule is to quickly remove as much of the toxic substance from the victim as possible. The method of removal of the poison varies depending upon how the poison was introduced:

- **Ingested poisons**: There is a choice between emetics and gastric lavage, followed by adsorbents and cathartics.
- **Inhaled poisons**: Oxygen ventilation is the method of choice.
- **Absorbed poisons**: Removal of the poison is primarily attained by cleansing the skin.
- **Injected poisons**: Antidotal medications are recommended.

INGESTED POISONS

Ingested poisons are those poisons which have been consumed, whether accidentally or intentionally, by the victim. Ingestion is the most common route of exposure to toxic materials in the home.

The local actions of an ingested poison can have irritant, acidic (corrosive), or basic (caustic) effects at the site of contact.

Table 5-1.—Commonly Encountered Toxidromes

Syndrome	Sources	Signs & Symptoms
narcotic	opiates, benzodiazepines, barbiturates	"beady eyes," sunglasses, decreased blood pressure, CNS and respiratory depression
withdrawal	alcohol, barbiturates, benzodiazepines, narcotics, sedative-hypnotics	diarrhea, dilated pupils, goose bumps, increased heart rate, tearing, yawning, stomach cramps, hallucinations
sympathomimetic	theophylline, caffeine, LSD, PCP, amphetamine, cocaine, decongestants	CNS excitation (confusion, incoordination, agitation, hallucination, delirium, seizures), increased blood pressure and heart rate
anticholinergic	antihistamines, atropine, scopolamine, antidepressants, anti-Parkinson Rx, antipsychotics, antispasmodics, mush-rooms, hallucinogens, antidepressants	dry skin, increased heart rate, dilated pupils, fever, urinary retention, decreased bowel sounds, CNS excitation
cholinergic	organophosphates, carbamates, physostig-mine, neostigmine, endrophonium	"**SLUDGE**": increased **salivation**, **lacrimation**, **urination, defecation, GI** cramping, **emesis**; CNS (headache, restless, anxiety, confusion, coma, seizures); muscle weakness and fasciculations
non-syndrome syndrome	various chemicals with delayed onset due to biotransformation, depletion of natural detoxifying agent, accumulation of dose or effect	from "nothing" to minor complaints that initially appear to be trivial

NOTE

There are two important categories of substances which act locally on the skin, eyes, or mucous membranes and cause damage through direct contact. These are acids (**corrosives**) and bases (**caustics**). Although these two categories are distinct and there are significant differences in the physiological effects of contact with them, the term "corrosive" is recognized as a generic term for the action that occurs upon contact with either an acid or a base. The terms "corrosive" and "noncorrosive," as used in this chapter, should be understood to represent the generic and not the specific. When specifically discussing acids or bases in this chapter, the terms "acid" or "base" (or "alkali"), respectively, will be used.

Ingested substances can be absorbed into the body and transported to a distant site with systemic action(s). In such situations, the poisonous substance may cause few effects—or even no effect—at the site of contact or absorption, but it may have severe systemic effects.

Ingestion of substances that do not produce local effects can be divided into two types:

- nontoxic substances (latex paint, dirt, silica gel, spider plant), and
- potentially toxic substances (poisonous fish, medications, heavy metals (lead, mercury), pesticides, and personal care products).

Episodes involving the ingestion of non-toxic substances do not require decontamination of the gut. (Swallowing a non-toxic foreign body, however, like a coin or button battery in a child, may result in choking and require prompt medical intervention.)

The toxicity range of absorbed poisons extends from essentially non-toxic to extremely toxic (remember Paracelsus' "dose"). Ingestion of substances with a low order of toxicity may result in the production of only minor systemic effects (nausea, vomiting, diarrhea), effects that are mild, self-limiting, and do not require significant medical intervention.

NOTE: Do not induce unnecessary vomiting to discourage a patient from repeating a voluntary ingestion again.

Table 5-2.—Common Stomach Irritants and Possible Sources of Contact

Irritant	Sources of Contact
Arsenic	Dyes, insecticides, paint, printer's ink, wood preservatives
Copper	Antifoulant paint, batteries, canvas preservative, copper plating, electroplating, fungicides, insecticides, soldering, wood preservatives
Iodine	Antiseptics
Mercury	Bactericides, batteries, dental supplies and appliances, disinfectants, dyes, fungicides, ink, insecticides, laboratories, photography, wood preservatives
Phosphorus	Incendiaries, matches, pesticides, rat poison
Silver nitrate	Batteries, cleaning solutions, ink, photographic film, silver polish, soldering
Zinc	Disinfectants, electroplating, fungicides, galvanizing, ink, insecticides, matches, metal plating and cutting, paint, soldering, wood preservatives

Noncorrosives

The many different noncorrosive substances have the common characteristic of irritating the stomach. They produce nausea, vomiting, convulsions, and severe abdominal pain. The victim may complain of a strange taste, and the lips, tongue, and mouth may look different than normal. Shock may also occur. Examples of noncorrosives are listed in table 5-2.

First aid for most forms of noncorrosive poisoning centers on quickly emptying the stomach of the irritating substance. The following steps are suggested:

1. Maintain an open airway. Be prepared to give artificial ventilation.
2. Dilute the poison by having the conscious victim drink one to two glasses of water or milk.
3. Empty the stomach using emetic, gastric lavage, adsorbent, and/or cathartic.
   a. Giving an emetic is a preferred method for emptying the contents of the stomach. It is

quick and—except in cases of caustic or petroleum distillate poisoning, or when an antiemetic has been ingested—can be used in almost every situation when the victim is conscious. In most situations, a Hospital Corpsman will have access to syrup of Ipecac. This emetic acts locally by irritating the gastric mucosa and centrally by stimulating the medullary vomiting center in the brain. The usual adult dose is 15-30 cc, and the dose for a child (age 1 to 12 years) is 15 cc. The dosage should be followed immediately by a glass of water. Most people will vomit within 30 minutes. The amount of stomach contents (and poison) recovered will vary. In an emergency room, the medical officer can rapidly induce vomiting by the injection of various medications. If nothing else is available, tickle the back of the victim's throat with your finger or a blunt object. This procedure should induce vomiting.

b. Trained personnel may use gastric lavage by itself or after two doses of Ipecac syrup has failed to induce vomiting. After passing a large—caliber nasogastric tube, aspirate the stomach contents. Next, instill 100 ml of normal saline into the stomach, then aspirate it out again. Continue this flushing cycle until the returning fluid is clear. Gastric lavage is preferred when the victim is unconscious or—as in the case of strychnine poisoning—is subject to seizures.

c. Activated charcoal (AC) adsorbs many substances in the gut and prevents absorption into the body. After the substance is adsorbed to the AC, the bound substance moves through the gut and is eliminated with the production of a charcoal-black bowel movement. AC may be administered after emesis or lavage, or it may be used alone.

d. A cathartic (magnesium sulfate or sorbitol) may be used to "speed" the movement of the bound substance and minimize absorption.

4. Collect the vomitus for laboratory analysis.

5. Soothe the stomach with milk or milk of magnesia.

6. Transport the victim to a definitive care facility if symptoms persist.

Corrosives

Acids and alkalies (bases) produce actual chemical burning and corrosion of the tissues of the lips, mouth, throat, and stomach. Acids do most of their damage in the acidic stomach environment, while alkalies primarily destroy tissues in the mouth, throat, and esophagus. Stains and burns around the mouth, and the presence of characteristic odors provide clues as to an acid or base ingestion. Swallowing and breathing may be difficult, especially if any corrosive was aspirated into the lungs. Stridor, a high-pitched sound coming from the upper airway, may be heard. The abdomen may be tender and swollen with gas, and perforation of the esophagus or stomach may occur. **NEVER ATTEMPT TO TREAT AN ACID OR BASE INGESTION BY ADMINISTERING A NEUTRALIZING SOLUTION BY MOUTH. GIVE WATER ONLY, UNLESS DIRECTED BY A POISON CONTROL CENTER (PCC) OR MEDICAL OFFICER.** Monitor the **ABC+D&E**s, and watch for signs of shock.

Examples of corrosive agents and sources of contact are listed in table 5-3.

When providing treatment for the above poisons, **DO NOT INDUCE VOMITING**. The damage to the mouth and esophagus will be compounded. In addition, the threat of aspiration during vomiting is too great. Gastric lavage could cause perforation of the esophagus or stomach. Therefore, use it only on a doctor's order. First aid consists of diluting the corrosive and keeping alert for airway potency and shock. If spontaneous vomiting occurs, administer an antiemetic.

Irritants

Substances such as automatic dishwasher detergent, diluted ammonia, and chlorine bleach can produce local irritation to the mucous membranes and potentially cause mild chemical burns. The pH of irritants may be slightly acidic or basic. If a person has ingested an irritant, direct the patient to spit the product out and rinse the mouth repeatedly with water. Spit the rinse water out also. Do **NOT** administer anything other than water unless directed by a PCC or medical officer.

Petroleum Distillates or Hydrocarbons

Volatile petroleum products (such as kerosene, gasoline, turpentine, and related petroleum products

Table 5-3.—Examples of Common Acids, Alkalies, and Phenols, with Possible Sources of Contact

Agent		Sources of Contact
ACIDS	Hydrochloric	Electroplating, metal cleaners, photoengraving
	Nitric	Industrial cleaners, laboratories, photoengraving, rocket fuels
	Oxalic	Cleaning solutions, paint and rust removers, photo developer
	Sulfuric	Auto batteries, detergents, dyes, laboratories, metal cleaners
ALKALIES	Ammonia	Galvanizers, household cleaners, laboratories, pesticides, rocket fuels
	Lime	Brick masonry, cement, electroplating, insecticides, soap, water treatment
	Lye	Bleaches, degreasers, detergents, laboratories, paint and varnish removers
	Carbolic	Disinfectants, dry batteries, paint removers, photo materials, wood preservatives
PHENOLS	Creosol	Disinfectants, ink, paint and varnish removers, photo developer, stainers
	Creosote	Asbestos, carpentry, diesel engines, electrical shops, furnaces, lens grinders, painters, waterproofing, wood preservatives

like red furniture polish) usually cause severe chemical pneumonia as well as other toxic effects in the body. Symptoms include abdominal pain, choking, gasping, vomiting, and fever. Often these products may be identified by their characteristic odor. Mineral oil and motor oil are not as serious since they usually do nothing more than cause diarrhea.

When providing treatment for the ingestion of petroleum distillates, **DO NOT INDUCE VOMITING** unless told to do so by a physician or poison control center. Vomiting may cause additional poison to enter the lungs. However, the quantity of poison swallowed or special petroleum additives may make gastric lavage or the use of cathartics advisable. If a physician or poison control center cannot be reached, give the victim 30 to 60 ml of vegetable oil. Transport the victim immediately to a medical treatment facility.

Food Poisoning

Food poisoning can occur from ingesting animal or plant materials, or even from the chemicals that are used in raising, processing, or preserving crops and livestock. Although illness associated with a contaminated water supply could be considered a type of food poisoning, this issue will not be addressed.

Most bacterial and viral food poisonings appear within 8 hours of ingesting food. The signs and symptoms of poisoning include nausea, vomiting, diarrhea, muscle aches, and low-grade fever. The general treatment is supportive and directed at preventing dehydration through the administration of fluids. If diarrhea persists more than 24 hours, or if the patient is unable to keep fluids down, further definitive medical care is necessary. Food poisoning can also occur from ingestion of parasites.

Marine food-borne illnesses from ingesting fish and shellfish is a concern especially when traveling to new destinations. Wherever you are in the world, you should learn which local seafood is known to be safe and which present the potential for harm. Table 5-4 lists some of toxins found in fish and shellfish and their potential sources.

Mussels, clams, oysters, and other shellfish often become contaminated with bacteria during the warm months of March through November (in the northern hemisphere). Numerous varieties of shellfish should not be eaten at all. Therefore, wherever you are in the world, you should learn which local seafoods are known to be safe and which present the potential for harm.

Table 5-4.—Examples of Toxins from Fish Known to be Poisonous

Toxin	Source
Ciguatoxin (cholinergic effects)	tends to be found in fish from coral reefs, including barracuda, grouper, red snapper, parrot fish
Scombrotoxin (histamine-like reaction)	tuna, bonito, skipjack, mackeral, mahi mahi
Saxitoxin (neurologic effects)	bivalve shellfish (mussels, clams, scallops) accumulate toxin from dinoflagellate during red tides causing "paralytic shellfish poisoning"
***Tetrodotoxin** (neurotoxin)	bacteria found in puffer fish, California newt, eastern salamander
***Neurotoxin**	Moray eel

* toxic at all times

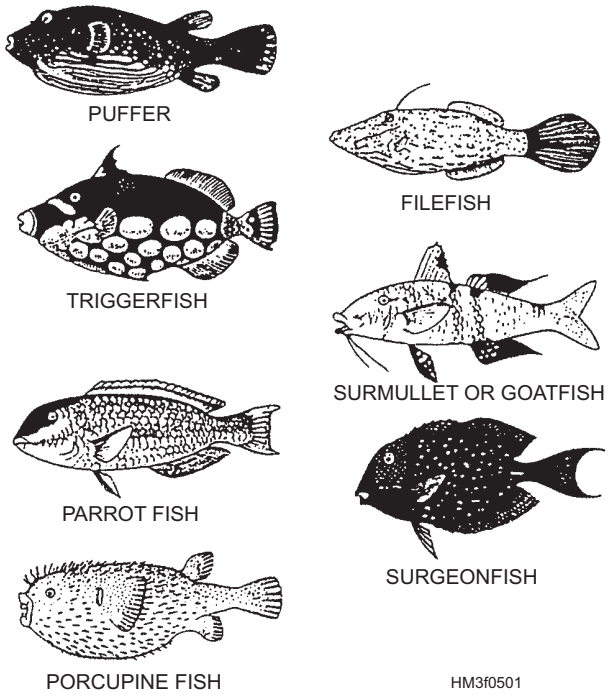

Figure 5-1.—Poisonous fish.

Most fish poisonings occur from eating fish that normally are considered to be safe to eat. However, fish can become poisonous at different times of the year because of their consumption of poisonous algae and plankton (red tide) that occur in certain locations. The signs and symptoms of red tide paralytic shellfish poisoning are tingling and numbness of the face and mouth, muscular weakness, nausea and vomiting, increased salivation, difficulty in swallowing, and respiratory failure. Primary treatment is directed at evacuating the stomach contents as soon as possible. If the patient has not vomited, select the appropriate method to remove the stomach contents by either syrup of Ipecac or gastric lavage. If respiratory failure develops, support ventilation and other life-sustaining systems as needed.

Examples of fish that are known to be poisonous **AT ALL TIMES** are shown in figure 5-1.

The symptoms of shellfish and fish poisoning are tingling and numbness of the face and mouth, muscular weakness, nausea and vomiting, increased salivation, difficulty in swallowing, and respiratory failure.

Primary treatment is directed toward evacuating the stomach contents. If the victim has not vomited, cause him to do so. Use syrup of Ipecac, gastric lavage, or manual stimulation; then administer a cathartic. If respiratory failure develops, give artificial ventilation and treat for shock.

INHALATION POISONS

In the Navy, and in other industrial settings in general, inhalation is the most common route of exposure to toxic substances. The irritants and corrosives mentioned in tables 5-2 and 5-3 are more often a source of poisoning by means of inhalation rather than by ingestion. An inhaled poison can act directly on the upper respiratory tract or lungs with immediate, delayed, or chronic effects, or the substance can use the pulmonary system to gain entry into the body, be absorbed into the blood, and cause toxic effects (systemic toxicity) at a distant site of action.

The handling of large quantities of petroleum products (fuel oil and gasoline, in particular) constitutes a special hazard, since all of these products give off hazardous vapors. Other poisonous gases are by-products of certain operations or processes: exhaust fumes from internal combustion engines; fumes or vapors from materials used in casting, molding, welding, or plating; gases associated with bacterial decomposition in closed spaces; and gases that accumulate in voids, double bottoms, empty fuel

tanks, and similar places. Some sources of inhalation chemical poisoning are listed in table 5-5.

> **NOTE:** Inhaled substances can cause **olfactory fatigue.** After a few minutes of exposure, the smell is no longer detected, fooling the individual into believing the substance is no longer there and, thus, no longer a danger.

Table 5-5.—Sources of Inhalation Poisoning

Inhaled Substance	Source of Exposure
Acetone, isopropyl alcohol, amyl acetate	Nail polish remover
Aliphatic hydrocarbons	Fuels, Stoddard solvent, PD-680, mineral spirits, naphtha
Butane	"Throw-away" lighters
Carbon dioxide	Fire suppression/fighting, evaporation of dry ice, wells and sewers
Carbon monoxide	Fires, lightning, heating and fuel exhausts
Chlorinated hydrocarbons	Shoe polish
Chlorine	Water purification, sewage treatment
Chlorofluorocarbons (CFCs)	Refrigerants, degreasers, propellants (old)
Hydrogen sulfide	Sewer, decaying materials, CHT system
Methylethylketone	Paint
Methylene chloride	Paint stripper, solvent, dyes
N-hexane	Rubber cement
Nitrous oxide	Aerosol can propellant
Tetrachloroethylene (perchloroethylene)	Dry cleaning
Toluene	Plastic adhesive, acrylic paint, shoe polish
Trichloroethane (methylchloroform)	Solvent, degreaser

Carbon monoxide is the most common agent of gas poisoning. It is present in exhaust gases of internal combustion engines as well as in sewer gas, lanterns, charcoal grills, and in manufactured gas used for heating and cooking. It gives no warning of its presence since it is completely odorless and tasteless. The victim may lose consciousness and suffer respiratory distress with no warning other than slight dizziness, weakness, and headache. The lips and skin of a victim of carbon monoxide poisoning are characteristically cherry red. Death may occur within a few minutes.

Most inhalation poisoning causes shortness of breath and coughing. The victim's skin will turn blue. If the respiratory problems are not corrected, cardiac arrest may follow.

Inhaling fine metal fumes can cause a special type of acute or delayed poisoning. These metal fumes are generated from heating metal to boiling and evaporation during hot metal work in such operations as metal cutting or welding. The resulting illness is called **metal fume fever (MFF).** In the Navy, the most common cause of MFF is the inhalation of vaporized zinc found in the galvanized covering of iron/steel. Proper local and general ventilation and/or the use of respiratory protection are necessary to prevent this illness.

The first stage of treatment for an inhalation poisoning is to remove the victim from the toxic atmosphere immediately. **WARNING**: Never try to remove a victim from the toxic environment if you do not have the proper protective mask or breathing apparatus, or if you are not trained in its use. Too often, well-intentioned rescuers become victims. If help is not immediately available, and if you know you can reach and rescue the victim, take a deep breath, hold it, enter the area, and pull the victim out. Next,

1. start basic life support (the ABC+D&Es);
2. remove or decontaminate the clothing (if chemical warfare agents or volatile fuels were the cause);
3. keep the victim quiet, treat for shock, and administer oxygen; and
4. transport the victim to a medical treatment facility for further treatment.

ABSORBED POISONS

Some substances may cause tissue irritation or destruction by contact with the skin, eyes, and lining of

the nose, mouth, and throat. These substances include acids, alkalies, phenols, and some chemical warfare agents. Direct contact with these substances will cause inflammation or chemical burns in the affected areas. Consult the "Chemical Burns" section of chapter 4 and the "Chemical Agents" section of chapter 8 of this manual for treatment.

INJECTED POISONS AND ENVENOMATIONS

Injection of venom by stings and bites from various insects and arthropods, while not normally life-threatening, can cause acute allergic reaction that can be fatal. Poisons may also be injected by snakes and marine animals.

Bee, Wasp, and Fire Ant Stings

Stings from bees, wasps, and ants account for more poisonings than stings from any other insect group. Fortunately, they rarely result in death. The vast majority of stings cause a minor local reaction at the injection site, with pain, redness, itching, and swelling. These symptoms usually fade after a short time. A small percentage of these stings can cause an allergic victim severe anaphylactic reactions, presenting with itching, swelling, weakness, headache, difficulty breathing, and abdominal cramps. Shock may follow quickly, and death may occur.

The following first aid measures are recommended for all but minor, local reactions to bites or stings:

1. Closely monitor vital signs (and the whole patient), and remove all rings, bracelets, and watches.
2. Remove stingers without squeezing additional venom (remaining in poison sacs attached to stingers) into the victim. To do this, scrape along the skin with a **dull** knife (as if you were shaving the person). The dull blade will catch the stinger and pull it out.
3. Place an ice cube or analgesic-corticosteroid cream or lotion over the wound site to relieve pain. Do **NOT** use "tobacco juice," saliva, or other concoctions.
4. For severe allergic reactions (generalized itching or swelling, breathing difficulty, feeling faint or clammy, unstable pulse or blood pressure), immediately give the victim a subcutaneous injection of 1:1000 aqueous solution of epinephrine. Dosage is 0.5 cc for adults and ranges from 0.1 to 0.3 cc for children.
5. Patients with severe allergic reactions should be evacuated immediately to a medical facility.

Scorpion Stings

About 40 species of scorpions (fig. 5-2) exist in America. *Centruroides exilicauda* may cause severe effects. Most dangerous species are found from North Africa to India. Scorpion stings vary in severity, depending on the species of the scorpion and the amount of poison actually injected. They cause severe pain in the affected area.

Mild reactions may include local swelling, skin discoloration, swollen lymph nodes near the sting area, itching, paresthesias ("pins and needles," numbness), and even nausea and vomiting. The duration of symptoms is less than 24 hours.

The following first aid treatment should be given for scorpion stings:

1. Place ice over the sting site (cool the area for up to 2 hours). Do **NOT** use tobacco juice, saliva, or other concoctions.
2. Elevate the affected limb to approximately heart level.
3. Give acetaminophen for minor pain.
4. Calcium gluconate, 10 ml of 10 percent solution, may be given intravenously to relieve muscle spasms.
5. Valium may be used to control excitability and convulsions.
6. An antivenom is available for severe bites by *Centruroides exilicauda* (also called "bark scorpion," it is the scorpion found in Mexico and the American southwest). It is available from the Antivenom Production Laboratory, Arizona State University, Tempe, Arizona 85281, phone (602) 965-6443 or (602) 965-1457, and from Poison Control in Phoenix, phone (602) 253-3334.

   CAUTION: Morphine and meperidine hydrochloride may worsen the respiratory depression from the venom of *Centruroides exilicauda*.

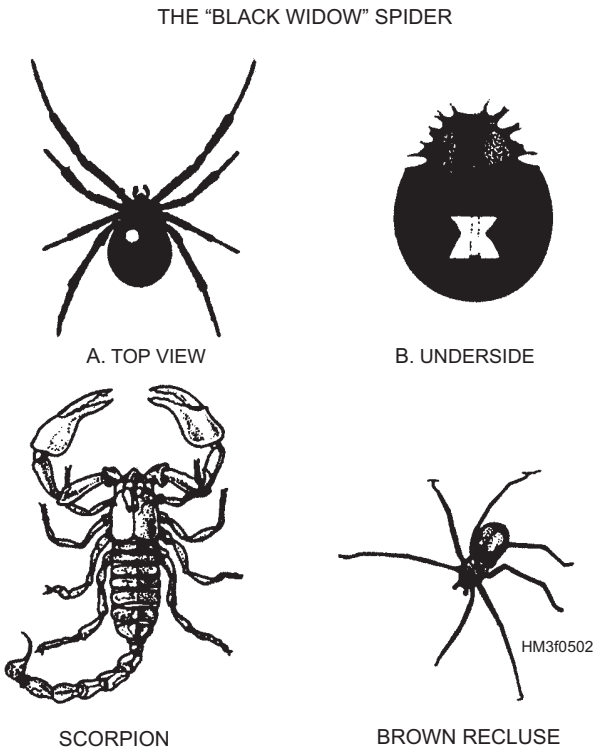

Figure 5-2.—Black widow and brown recluse spiders and scorpion.

Spider Bites

Spiders in the United States are generally harmless, with several exceptions. The most notable are the black widow (*Latrodectus mactans*) and brown recluse (*Loxosceles reclusa*, also found in South America) spiders. Their bites are serious but rarely fatal. Wandering spiders (*Phoneutria* species, found in South America), funnel web spiders (*Atrax* species, found in Australia), and more widely distributed spiders of the C*hiracanthium* species may also cause moderate to severe human reactions. Check current MEDIC CD-ROM for management of specific situations and venues.

The female black widow spider is usually identified by the red hourglass-shaped spot on its belly (fig. 5-2). Its bite causes a dull, numbing pain, which gradually spreads from the region of the bite to the muscles of the entire torso. The pain becomes severe, and a board-like rigidity of the abdominal muscles is common. Nausea, vomiting, headache, dizziness, difficulty in breathing, edema, rash, hypertension, and anxiety are frequently present. The bite site can be very hard to locate (there is little or no swelling at the site), and the victim may not be immediately aware of having been bitten. The buttocks and genitalia should be carefully examined for a bite site if the suspected victim has recently used an outside latrine. The following first aid treatment steps are suggested:

1. Place ice over the bite to reduce pain.
2. Hospitalize victims who are under 16 or over 65 (for observation).
3. Be prepared to give antivenom in severe cases.

The brown recluse spider (fig. 5-2) is identified by its violin-shaped marking. Its bite may initially go unnoticed, but after several hours, a bleb develops over the site, and rings of erythema begin to surround the bleb. Other symptoms include skin rash, fever and chills, nausea and vomiting, and pain. A progressively enlarging necrotic (dead tissue) ulcerating lesion (with a crusty black scab) eventually develops. Intravascular hemolysis (breakdown of the blood) is most often seen in children and may be fatal. Antivenom is not currently available.

Treatment for brown recluse spider bites includes the following:

- Debridement of lesion, followed by peroxide cleansing and Burrow's solution soaks
- Application of polymyxin-bacitracin-neomycin ointment and sterile dressing
- Dapsone 50-100 mg twice a day is used to promote healing in some cases, **but only after screening for G6PD deficiency.** Other antibiotics may be used to treat infection, and steroids to reduce inflammation

NOTE: Glucose-6-phosphate dehydrogenase (G6PD) deficiency is a common human enzyme deficiency. A G6PD deficiency can cause a harmful reaction to a number of medications, including dapsone.

- Based upon medical consultation, excision of the lesion and optional commencement of corticosteroid therapy

Centipede Bites

Centipedes can attain sizes of over one foot in length! Their bite, though rare, leaves two tiny red marks and causes redness and swelling. Severe pain, swelling, and inflammation may follow, and there may be headache, dizziness, vomiting, irregular pulse, muscle spasm, and swollen lymph nodes. No long-term effects are usually seen. Treat discomfort with acetaminophen, cool packs, and elevation of the affected limb to heart level.

Snakebites

Poisonous snakes are found throughout the world, with the exception of certain islands and the Antarctic. There are five venomous families of snakes.

- **Viperidae**–includes rattlesnakes, moccasins, South American lance-headed vipers and bushmaster, Asian pit vipers, African and Asian vipers and adders, the European adder, and saw-scaled viper (Middle-eastern). Kills mainly by coagulopathy (a blood clotting disorder) and shock.

- **Elapidae**–Includes cobras, kraits, mambas, and coral snakes. Kills from neurotoxic venom that can cause respiratory failure, paralysis, and cardiac failure.

- **Hydrophidae**–Includes sea snakes and venomous snakes from the islands of the southern Pacific Ocean, including Australia, New Zealand, and New Guinea. Also kills from neurotoxic venom.

- **Colubridae**–Includes most of the common nonvenomous species, as well as the boomslang, and vine/twig/bird snake (Africa); Japanese yamakagashi; Southeast Asian red-necked callback. Venom's method of toxic action varies according to type of snake.

- **Atractaspididae**–Includes the burrowing asps/mole vipers, stiletto snakes, and adders. Venom's method of toxic action varies according to type of snake.

Within the United States, poisonous snakes are Crotalids (rattlesnakes, copperheads, and moccasins) and the Elapids (coral snakes).

CROTALIDS.—Crotalids are of the *Viperidae* (viper) family and are called "pit vipers" because of the small, deep pits between the nostrils and the eyes (fig. 5-3). They have two long, hollow fangs. These fangs are normally folded against the roof of the mouth, but they can be extended when the snake strikes. Other identifying features of the Crotalids include thick bodies; slit-like pupils of the eyes; and flat, triangular heads. The most identifying feature of a pit viper is the relative width of the snake's head compared to the thickness of the body. The head will be much wider than the body, giving the appearance of an arrowhead. The difference in size is so obvious that identification of a snake as a pit viper can usually be made from a safe distance.

Further identification can be made by examining the wound for signs of fang entry in the bite pattern. Pit viper bites leave two puncture marks (sometimes only one, and sometimes more). Nonvenomous snakes (for example, garter snakes) leave a series, often in a curve or semi-circle, of tiny scratches or punctures. Individual identifying characteristics include rattles on the tails of most rattlesnakes, and the cotton-white interior of the mouths of moccasins.

ELAPIDS.—Coral snakes are of the family *Elipidae* and related to the cobra, kraits, and mamba snakes in other parts of the world (fig. 5-4). Corals, which are found in the Southeastern United States, are comparatively thin snakes with small bands of red, black, and yellow (or almost white). Some

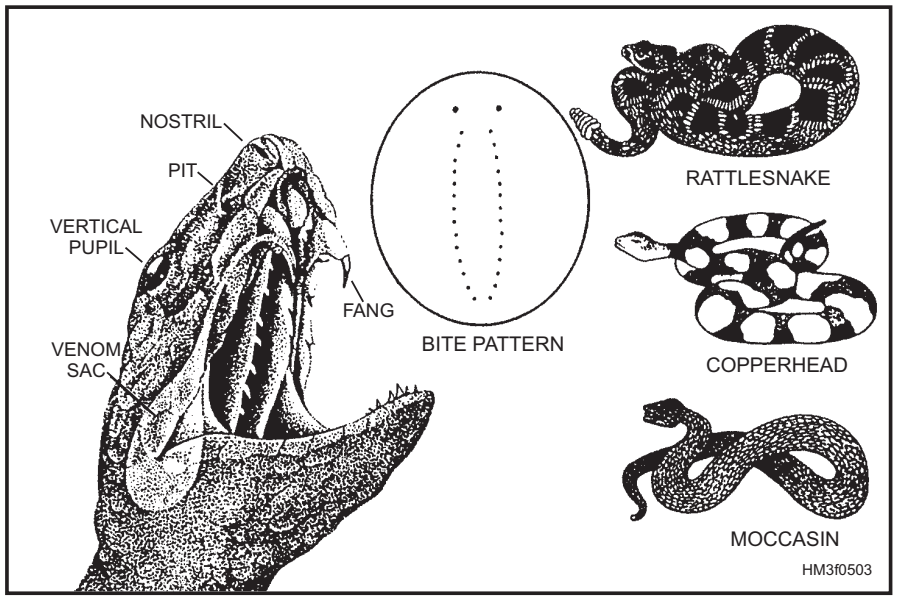

Figure 5-3.—American pit vipers.

nonpoisonous snakes have similar coloring, but in the North American coral snake, the red band always touches the yellow band, and the bands go all the way around the body. (In some of the nonvenomous, similarly colored varieties, the bands are only on the back and sides, not the belly.) There is an old saying that only applies to **NORTH** American coral snakes: "Red on yellow, kill a fellow; red on black, venom lack." The coral snake has short, hollow fangs that chew into its victim and introduce the poison. Coral snake venom is dangerous, so **if the skin is broken, give antivenom before envenomation is evidenced by symptoms or findings**.

Venom, which is stored in sacs in the snake's head, is introduced into a victim through hollow or grooved fangs. An important point to remember, however, is that a bitten patient has not necessarily received a dose of venom. The snake can control whether or not it will release the poison and how much it will inject. As a result, while symptoms in a poisonous snakebite incident may be severe, they may also be mild or not develop at all.

SIGNS AND SYMPTOMS OF SNAKEBITE.— In a snakebite situation, every reasonable effort should be made to positively identify the culprit, since treatment of a nonpoisonous bite is far simpler and less dangerous to the victim than treatment of a poisonous bite. However, unless the snake can be **POSITIVELY** identified as nonpoisonous, **CONSIDER ALL SNAKEBITES AS POISONOUS! SEEK CONSULTATION FROM EXPERT SOURCE.**

Signs and symptoms of venomous snakebite may include

- a visible bite on the skin (possibly no more than a local discoloration);
- pain and swelling in the bite area (may develop slowly, from 30 minutes to several hours);
- continued bleeding from site of bite (often seen with viper bites);
- rapid pulse;
- labored breathing;
- progressive weakness;
- dim or blurred vision;
- nausea and vomiting;
- seizures; or
- drowsiness (or loss of consciousness).

Usually enough symptoms present themselves within an hour of a poisonous snakebite to erase any doubt as to the victim's having been envenomated or

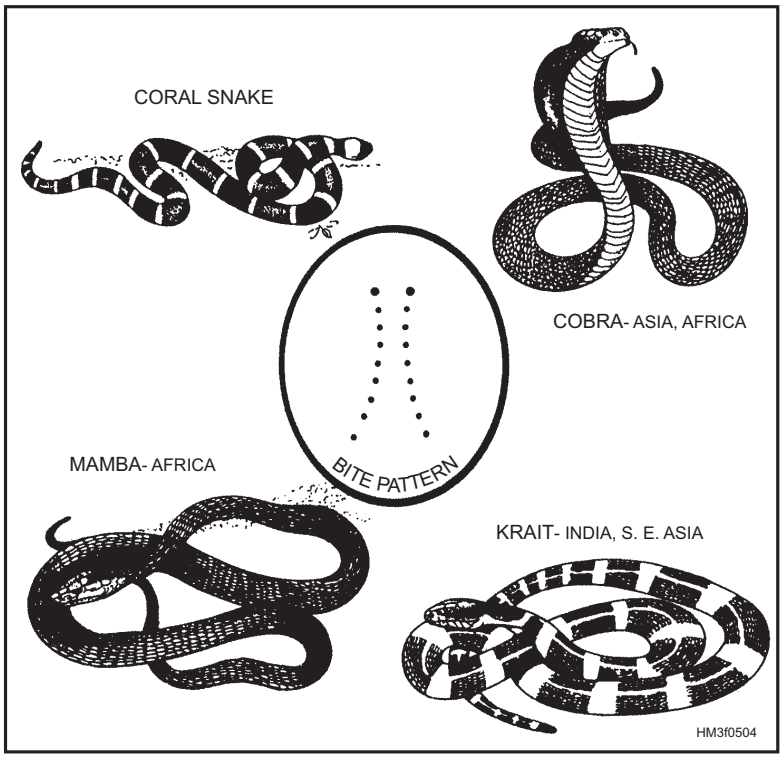

Figure 5-4.—Corals, cobras, kraits, and mambas.

not. The victim's condition provides the best information as to the seriousness of the situation.

The aims of first aid for envenomated snakebites are to reduce—**not stop—**the circulation of blood through the bite area, delay absorption of venom, prevent aggravation of the local wound, maintain vital signs, and transport the victim as soon as possible to an MTF with minimum movement.

TREATMENT OF SNAKEBITES.—The proper steps in the treatment of snakebites are listed below.

1. Try to identify the snake. Positive identification is important to selecting the correct antivenom for the treatment of the patient.

NOTE: Do not risk further injury by trying to kill the snake.

2. Certain suction extractors have benefit (for example, the Sawyer extractor), especially if used within the first 3 minutes. If available immediately, use the extractor and leave it on for 30 minutes. The cups may fill up. Empty and re-use them as necessary.
3. GENTLY wash the wound with soap and water (it may remove some of the venom). Do **NOT** rub vigorously, as it may cause the venom to be absorbed more rapidly.
4. Place the victim in a comfortable position.
5. Tell the patient to remove any jewelry (especially rings and bracelets, as these may impede blood flow if there is swelling of the extremities). Assist, if necessary.
6. Start an IV line.
7. Monitor vital signs (including ABC+D&Es) closely, responding appropriately as necessary.
8. Until evacuation or treatment is possible, ensure the victim lies quietly and does not move any more than necessary.
9. Do not allow the victim to smoke, eat, or drink any fluids. (Water is permissible if you anticipate more than several hours will pass before arriving at a hospital and being able to establish an IV line.)
10. Transport the victim to a hospital or other appropriate facility.
11. Place a **lymphatic** (light) constriction on the extremity (if the bite is on an extremity). The goal is to obstruct lymphatic—not blood-flow. (See instructions below.) **DO NOT USE A TOURNIQUET!**

LYMPHATIC CONSTRICTION INSTRUCTIONS

An appropriate lymphatic constriction device is a blood pressure cuff, inflated to the diastolic blood pressure (so the blood can be felt flowing past the cuff). Other devices may be used, but **IT IS IMPORTANT THAT BLOOD CIRCULATION TO THE BITE AREA BE MAINTAINED.**

Constriction should be fully released every 30 minutes for 15 seconds. If the constriction pressure cannot be carefully controlled, **THE MAXIMUM TOTAL TIME OF USE OF THE CONSTRICTION DEVICE IS 2 HOURS. (**Thus, three 15-second breaks, and the fourth time the cuff, belt, or band remains **OFF**.)

NOTE: If you use a blood pressure cuff (or device that you **KNOW** is not constricting more than an Ace® bandage on a sprain), you may continue to apply constriction until the patient reaches a hospital.

12. Splint the extremity at the level of the body (heart). **DO NOT ELEVATE THE EXTREMITY!**
13. Hospitalize and observe all snakebites for at least 24 hours.

In the case of spitting cobras (found in Africa, Thailand, Malaysia, Indonesia, and the Philippines), which attempt to spray venom into victims' eyes, rinse the eyes with large volumes of water (neither a blast nor a trickle, and not with hot water). Apply antibacterial (tetracycline or chloramphenicol) eye ointment, and apply a patch with just enough pressure to keep the eyelid from blinking.)

Other aid will be mainly supportive:

- Check pulse and respiration frequently. Give artificial ventilation, if necessary.
- Treat for shock, including IV fluids (normal saline or lactated Ringer's solution).
- When possible, clean the area of the bite with soap and water, and cover the wound to prevent further contamination.

- Give acetaminophen for pain if delay in hospital treatment is anticipated.

Antivenom.—Antivenom (also called antivenin) is available for many snakes, and is indicated for severe envenomations by *Viperidae* family snakes and most envenomations by snakes of the other poisonous families. Antivenom is best given as soon as possible after an envenomation, but may be of value up to a few days after a bite.

If possible, antivenom specific to the snake should be used. Otherwise, a "polyspecific" antivenom may be used. READ THE PACKAGE INSERT OF THE ANTIVENOM FOR VALUABLE INFORMATION. Epinephrine and diphenhydramine must be available, as allergic reactions (including anaphylaxis) to antivenom have occurred (they are often prepared from horse serum, which some people are allergic to).

Antivenom is diluted (for example, 1:10) and given at 5 ml/minute IV, and the dose is based on stopping the progression of signs and symptoms, not the victim's body weight (the children's dose is the same as the adult dose). For neurotoxic snakebites, if there is no improvement in 30 minutes, the dose should be repeated. For *Viperidae* (which can cause bleeding disorders), spontaneous bleeding should stop after sufficient antivenom is given; continue giving antivenom until bleeding stops and progression of swelling is retarded. Because you may need to administer antivenom a number of times, one vial may not be enough to treat a patient.

Antivenom is available via PCCs and hospitals. It may also be available at zoos and embassies.

The "Don'ts" of Snakebite Treatment.–The following are the "don'ts" when it comes to treatment of snakebite.

- **DO NOT** use any ice or cooling on the bite.
- **DO NOT** use a tourniquet. Obstructing blood flow can make local tissue injury much worse.
- **DO NOT** use electric shock.
- **DO NOT** make any cuts or incisions in the wound. Cuts at the bite site may impede circulation and promote infection and make local tissue injury much worse.
- **DO NOT** give victim alcohol or narcotics.

Further information may be obtained on an emergent basis from a PCC or from Arizona Poison Control, (520) 626-6016.

Bites, Stings, and Punctures from Sea Animals

A number of sea animals are capable of inflicting painful wounds by biting, stinging, or puncturing. Except under rare circumstances, these stings and puncture wounds are not fatal. Major wounds from sharks, barracuda, moray eels, and alligators can be treated by controlling the bleeding, preventing shock, giving basic life support, splinting the injury, and transporting the victim to a medical treatment facility. Minor injuries inflicted by turtles and stinging corals require only that the wound be thoroughly cleansed and the injury splinted.

JELLYFISH INJURIES.—Other sea animals inflict injury by means of stinging cells located in tentacles. This group includes the jellyfish and the Portuguese man-of-war (fig. 5-5). The tentacles (which may be impossible to see, even in relatively clear water) release poison or tiny stingers through which poison is injected into the victim. Jellyfish stings may cause symptoms ranging from minor irritation (pain and itching) to death. Contact with the tentacles produces burning pain, a rash with small hemorrhage in the skin, and, on occasion, shock, muscular cramping, nausea, vomiting, and respiratory and cardiac distress. Treatment for minor jellyfish injuries consists of pouring sea water over the injured area and then removing the tentacles with a towel or gloves. Next, pour rubbing alcohol, formalin, vinegar, meat tenderizer, or diluted ammonia over the affected area to neutralize any remaining nematocysts (minute stinging structures). Finally, cover the area with any dry powder (to which the last nematocysts will

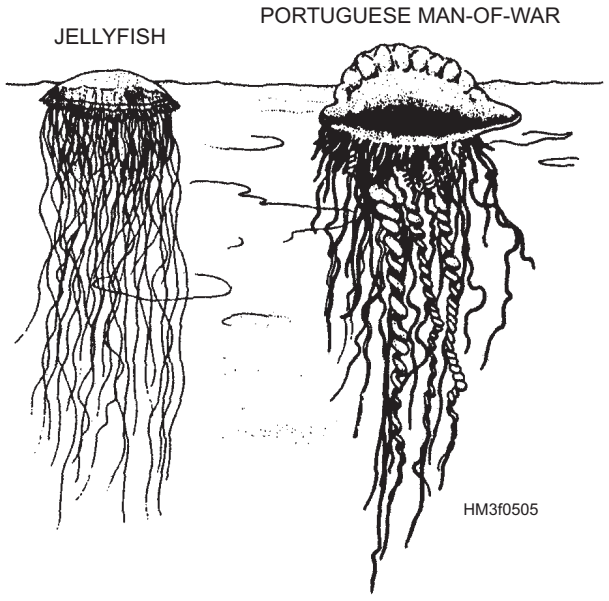

Figure 5-5.—Jellyfish and Portuguese Man-of-war.

adhere), and then scrape off with a dull knife. Apply cool packs and hydrocortisone cream.

Some jellyfish (notably, the Portuguese man-of-war, the box jellyfish, and certain jellyfish from northeastern Australia) may cause serious injuries and even have the potential to be lethal. In cases where the kind of jellyfish that caused the sting is either unknown or is known to have been from a box jellyfish or Portuguese man-of-war, the injury should be treated as a serious one, regardless of initial symptoms. The following steps should be taken in the case of serious jellyfish stings.

1. Retrieve the victim from the water if necessary.
2. Send others for an ambulance and antivenom. (Antivenom is available for box jellyfish stings. It is from sheep, and should be given in all serious stings.)
3. Pour vinegar liberally (2 liters) over the sting area for at least 30 seconds to inactivate stinging cells that may remain.
4. Remove any remaining tentacles carefully. (Excessive manipulation may cause rupture of nematocysts and further poison release.) Carefully (and gently) use a towel if necessary, or use a dull knife edge (as described above to remove arthropod stingers).
5. Apply a compression bandage to stings covering more than half of one limb or causing altered consciousness.
6. Start an IV.
7. Remain with the victim, and monitor vital signs (the ABCs and consciousness, responding appropriately (possibly including CPR) and as necessary).
8. Transport the patient to a hospital as quickly as possible.
9. Opiate analgesics (morphine or meperidine) may be necessary for pain relief.

"SPINE" INJURIES.—Spiny fish, stingrays, urchins, and cone shells inject their venom by puncturing with spines (fig. 5-6). General signs and symptoms include swelling, nausea, vomiting, generalized cramps, diarrhea, muscular paralysis, and shock. General emergency care consists of prompt flushing with cold sea water to remove the venom and to constrict hemorrhaging blood vessels. Next, debride the wound of any remaining pieces of the spine's venom-containing integumentary sheath. Soak

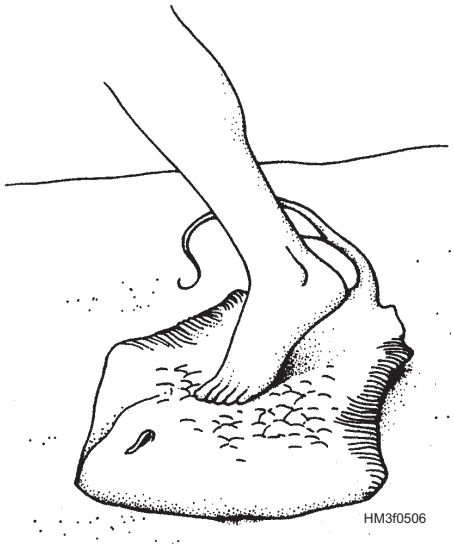

Figure 5-6.—Stingray sting.

the wound area in very hot water (110°F/43° C) for 30 to 60 minutes to neutralize the venom. Finally, completely debride the wound, control hemorrhage, suture, provide tetanus prophylaxis and a broad-spectrum antibiotic, and elevate the extremity. For minor injuries, a steroid cream to the wound area may relieve discomfort. For serious injuries—wounds that are deep, very painful, or causing the patient distress—stabilize the patient and transport immediately to a hospital.

In the case of contact with stonefish, scorpionfish, zebra, or lionfish, immerse the wound in very hot water for a **minimum** of 30 minutes until the pain is decreased. Inject emetine hydrochloride directly into the wound within 30 minutes, and provide meperidine (or other opiate) for pain. Monitor the victim's vital signs closely. Obtain antivenom (from local zoos or aquariums) for all serious cases.

SEA SNAKE INJURIES.—Sea snakes are found in the warm water areas of the Pacific and Indian Oceans. Their venom is **VERY** poisonous, but their fangs are only 1/4 inch long. The first aid outlined for land snakes also applies to sea snakes.

DRUG ABUSE

LEARNING OBJECTIVE: *Recall drug abuse assessment and treatment procedures and patient handling techniques.*

Drug abuse is the use of drugs for purposes or in quantities for which they were not intended. Drugs of

abuse may be swallowed, inhaled, snorted (or by nose drops), injected, or even absorbed through the skin, rectum, or vagina. When abused, therapeutic drugs become a source of "poison" to the body. Drug abuse can lead to serious illness, dependency, and death. Death is usually because of acute intoxication or overdoses.

Drugs of abuse can be classified in many different ways. This chapter will classify drugs of abuse based on the symptoms they produce: CNS depression, CNS stimulation, and hallucinations. The CNS depressants include narcotics, ethanol, barbiturates, non-barbiturate sedative-hypnotics (including benzo-diazepines). The CNS stimulants include caffeine, nicotine, amphetamines, and cocaine. The hallucinogens include LSD, PCP, and marijuana.

Table 5-6 lists many of the most frequently abused drugs with their recognizable trade names, some commonly used street names, and observable symptoms of abuse.

The following sections contain specific information about commonly abused drugs, as classified in table 5-6, including availability and methods of administration.

NARCOTIC INTOXICATION

Unfortunately, narcotic abuse is common, although it is rare among military personnel. This group of drugs includes the most effective and widely used pain killers in existence. Prolonged use of narcotic drugs, even under medical supervision, inevitably leads to physical and psychological dependence. The more commonly known drugs within this group are opium, morphine, heroin, codeine, and methadone (a synthetic narcotic). In addition, Darvon 7 and Talwin7 are included in this group because of their narcotic-like action. Next to cocaine (discussed later), heroin is the most popular narcotic drug because of its intense euphoria and long-lasting effect. It is far more potent than morphine but has no legitimate use in the United States. Heroin appears as a white, gray, or tan fluffy powder. The most common method of using heroin is by injection directly into the vein, although it can be sniffed. Codeine, although milder than heroin and morphine, is sometimes abused as an ingredient in cough syrup preparations. Symptoms of narcotic drug abuse include slow, shallow breathing; possible unconsciousness; constriction (narrowing) of the pupils of the eyes to pinpoint size; drowsiness; confusion; and slurred speech.

The narcotic user, suddenly withdrawn from drugs, may appear as a wildly disturbed person who is agitated, restless, and possibly hallucinating. Initial symptoms start within 2 to 48 hours and peak at about 72 hours. Although these signs and symptoms are not life-threatening, most users will state that they feel so bad they wish they were dead. The signs and symptoms of withdrawal immediately stop upon re-administering a narcotic and withdrawing the drug by tapering the dose over several days.

ALCOHOL INTOXICATION

Alcohol is the most widely abused drug today. Alcohol intoxication is so common that it often fails to receive the attention and respect it deserves. Although there are many other chemicals that are in the chemical grouping of "alcohols," the type consumed by people as a beverage (in wines, beers, and distilled liquors) is known as ethyl alcohol, ethanol, grain alcohol, or just "alcohol." It is a colorless, flammable, intoxicating liquid, classed as a drug because it depresses the central nervous system, affecting physical and mental activities.

Alcohol affects the body of the abuser in stages. Initially, there is a feeling of relaxation and well-being, followed by confusion with a gradual disruption of coordination, resulting in inability to accurately and efficiently perform normal activities and skills. Continued alcohol consumption leads to a stuporous state of inebriation that results in vomiting, an inability to walk or stand, and impaired consciousness (sleep or stupor). Excessive consumption can cause loss of consciousness, coma, and even—in extreme cases — death from alcohol poisoning.

The potential for physical and psychological addiction is very high when alcohol is abused. The severely intoxicated individual must be closely monitored to avoid inhalation of vomit (aspiration) and adverse behavioral acts to the patient or others. Withdrawal from alcohol is considered to be life-threatening and should be appropriately treated in a healthcare facility. Individuals withdrawing from alcohol are at a greater risk of serious complications or death than those withdrawing from narcotics. The effects of alcohol withdrawal include severe agitation, anxiety, confusion, restlessness, sleep disturbances, sweating, profound depression, delirium tremens ("DTs," a particular type of confusion and shaking), hallucinations, and seizures.

Table 5-6.—Classification of Abused Drugs

A. NARCOTICS			
Agent	**Trade Name**	**Some Street Names**	**Symptoms of Abuse**
Morphine	.....	"H", Miss Emma, smack	•Lethargy •Drowsiness •Confusion •Euphoria •Slurred speech •Flushing of the skin on face, neck, and chest •Nausea and vomiting •Pupils constricted to pinpoint size
Diacetylmorphine	Heroin	"H", horse, junk, smack, stuff, whack	
Codeine	.....		
Meperidine	Demerol		
Methadone	Dolphine	Dolly	
Propoxyphene	Darvon		
Pentazocine	Talwin		
B. ALCOHOL (Ethyl)			
Agent	**Trade Name**	**Some Street Names**	**Symptoms of Abuse**
Alcohol (ethyl)	Ethanol	Liquors, beer, wines	•Slurred speech •Incoordination •Confusion •Tremors •Drowsiness •Agitation •Nausea and vomiting •Respiratory depression •Hallucinations •Possible coma
C. STIMULANTS (Uppers)			
Agent	**Trade Name**	**Some Street Names**	**Symptoms of Abuse**
Amphetamine	Benzedrine	Bennies, pep pills, ups, cartwheels	•Excitability •Rapid and unclear speech •Restlessness •Tremors •Sweating •Dry lips and mouth •Dilated pupils •Loss of consciousness •Coma •Hallucinations
Cocaine	.....	Crack, coke, snow, gold dust, rock, freebase, snort, hubba hubba, flake	
Dextroamphetamine	Dexadrine	Dexies	
Methamphetamine	Methadrine	Speed, meth, crystal, diet pills, crank	
Methylphenidate	Ritalin		
D. BARBITURATES (Downers, dolls, barbs, rainbows)			
Agent	**Trade Name**	**Some Street Names**	**Symptoms of Abuse**
Phenobarbital	.....	Goofballs, phennies	Same as those noted in alcohol intoxication, plus pupils may be dilated.
Amobarbital	Amytal	Blues, blue birds, blue devils, downers	
Pentobarbital	Nembutal	Yellows, yellow jackets	
Secobarbital	Seconal	Reds, red devils, seggy	

Table 5-6.—Classification of Abused Drugs—Continued

E. OTHER SEDATIVES & HYPNOTICS (Downers)			
Agent	**Trade Name**	**Some Street Names**	**Symptoms of Abuse**
Glutethimide	Doriden	Goofers	Same as those noted in alcohol and barbiturate intoxication.
Chlordiazepoxide	Librium		
Meprobamate	Miltown, Equanil		
Methaqualone	Quaalude, Sopor	Ludes, sopors	
F. HALLUCINOGENS			
Agent	**Trade Name**	**Some Street Names**	**Symptoms of Abuse**
Lysergic acid diethylamide	.....	LSD, acid, sunshine	•Trance-like state •Anxiety •Confusion •Tremors •Euphoria •Depression •Hallucinations •Psychotic manifestations •Suicidal or homicidal tendencies
Mescaline	.....	Peyote, mesc	
Phencyclidine (PCP)		Angel dust, hog, peace pills	
Psilocin, psilocybin	Peyote	Buttons, mesc, magic mushrooms	
G. CANNABIS			
Agent	**Trade Name**	**Some Street Names**	**Symptoms of Abuse**
Cannabis	Marijuana	Pot, grass, weed, joint, tea, reefer, rope, Jane, hay, dope	•Euphoria •Excitability •Increased appetite •Dryness of mouth •Odor of burned rope on breath •Intoxication •Laughter •Mood swings •Increase in heart rate •Reddening of eyes •Loss of memory •Distortion of time and spatial perception
H. INHALANTS			
Agent	**Trade Name**	**Some Street Names**	**Symptoms of Abuse**
Amyl nitrate		Snappers, poppers	•Dazed, temporary loss of contact with reality •Possible coma •Swollen membranes in mouth and nose •"Funny numb feeling" •"Tingling" inside the head •Changes in heart rhythm •Possible death
Butyl nitrate		Locker room, rush	
Other volatile chemicals: Cleaning fluid, furniture polish, gasoline, glue, hair spray, nail polish remover, paint thinner, correction fluid			

BARBITURATE INTOXICATION

Benzodiazepines have largely replaced barbiturates, or "downers," as sedatives, hypnotics (sleeping pills), or anxiolytic (anti-anxiety) agents. Barbiturates are still used to treat various seizure disorders. They are classified based on their duration of action: ultra-short acting, short acting, intermediate acting, and long acting. Barbiturate use classically causes various degrees of CNS depression with nystagmus (eyes moving up and down, or side-to-side involuntarily), vertigo (sensation of the room spinning), slurred speech, lethargy, confusion, ataxia (difficulty walking) and respiratory depression. Severe overdose may result in coma, shock, apnea (stopped breathing), and hypothermia. In combination with ethanol or other CNS depressants, there are additive CNS and respiratory depression effects.

Prolonged use of barbiturates can lead to a state of physical and psychological dependence. Upon discontinued use, the dependant person may go into withdrawal. Unlike narcotic (opiate) withdrawal, barbiturate withdrawal is **LIFE THREATENING**! Depending on type of barbiturate, signs and symptoms start within 24 hours. The withdrawal syndrome includes nausea, vomiting, sweating, tremors (trembling or shaking), weakness, insomnia, and restlessness. These clinical findings progress to apprehension, acute anxiety, fever, increased blood pressure, and increased heart rate. If untreated, severe and life-threatening effects include delirium, hallucinations, and seizures. The signs and symptoms will stop upon re-administration of the barbiturate and by tapering the dose slowly over several days.

NONBARBITURATE SEDATIVE-HYPNOTIC INTOXICATION

Nonbarbiturate sedative-hypnotics (a "hypnotic" is a sleeping pill) have actions very similar to the barbiturates. However, they have a higher margin of safety; overdose and addiction require larger doses and addiction requires a longer time period to occur. Like the barbiturates, when combined with ethanol or other depressants, there are addictive CNS- and respiratory-depression effects. Most of the traditional, nonbarbiturate sedative-hypnotics are either no longer available (Methaquaalone, Ethchlorovynol, Glutethimide) or rarely used today (chloral hydrate) because of their profound "hangover effect." Newer sedative-hypnotics are emerging for the temporary treatment of insomnia. Benzodiazepines are widely used to treat seizure disorders, anxiety, muscle spasms, and insomnia.

STIMULANT INTOXICATION

The stimulants ("uppers") directly affect the central nervous system by increasing mental alertness and combating drowsiness and fatigue. One group of stimulants, called amphetamines, is legitimately used in the treatment of conditions such as mild depression, obesity, and narcolepsy (sleeping sickness).

Amphetamines are also commonly abused. Usually referred to as stimulants, speed, or uppers, amphetamines can be taken orally, intravenously, or smoked as "ice." Amphetamines directly affect the central nervous system by increasing mental alertness and combating drowsiness and fatigue. They are abused for their stimulant effect, which lasts longer than cocaine.

Amphetamines cause central nervous system stimulation with euphoria, increased alertness, intensified emotions, aggressiveness, altered self-esteem, and increased sexuality. In higher doses, unpleasant CNS effects of agitation, anxiety, hallucinations, delirium, psychosis, and seizures can occur. When stimulants are combined with alcohol ingestion, patients have increased psychological and cardiac effects.

Signs and symptoms associated with amphetamine use include mydriasis (dilated pupils), sweating, increased temperature, tachycardia (rapid pulse), and hypertension. Patients seeking medical attention usually complain of chest pain, palpitations, and shortness of breath.

"Heavy use" (involving large quantities) of amphetamines is physically addicting, and even "light use" (involving small amounts) can cause psychological dependence. Tolerance to increasingly higher doses develops and withdrawal can occur from these levels. Abruptly stopping chronic amphetamine use does not cause seizures or present a life-threatening situation. The withdrawal is typically characterized by apathy, lethargy, muscle aches, stomachaches, increased appetite, anxiety, sleep disturbances, and depression with suicidal tendencies.

Cocaine, although classified as a narcotic, acts as a stimulant and is commonly abused. It is relatively ineffective when taken orally; therefore, the abuser either injects it into the vein or "snorts" it through the

nose. Its effect is much shorter than that of amphetamines, and occasionally the abuser may inject or snort cocaine every few minutes in an attempt to maintain a constant stimulation and prevent depression experienced during withdrawal (come-down). Overdose is very possible, often resulting in convulsion and death.

The physical symptoms observed in the cocaine abuser will be the same as those observed in the amphetamine abuser.

HALLUCINOGEN INTOXICATION

The group of drugs that affect the central nervous system by altering the user's perception of self and environment are commonly known as hallucinogens. Included within this group are lysergic acid diethylamide (LSD), mescaline, dimethoxymethyl-amphetamine (STP), phencyclidine (PCP), and psilocybin. They appear in several forms: crystals, powders, and liquids.

The symptoms of hallucinogenic drugs include dilated pupils, flushed face, increased heartbeat, and a chilled feeling. In addition, the person may display a distorted sense of time and self, show emotions ranging from ecstasy to horror, and experience changes in visual depth perception.

Although no deaths have resulted from the drugs directly, hallucinogen-intoxicated persons have been known to jump from windows, walk in front of automobiles, or injure themselves in other ways because of the vivid but unreal perception of their environment.

Even though no longer under the direct influence of a hallucinogenic drug, a person who has formerly used one of the drugs may experience a spontaneous recurrence (flashback) of some aspect of the drug experience. The most common type of flashback is the recurrence of perceptual distortion; however, victims of flashback may also experience panic or disturbing emotion. Flashback may be experienced by heavy or occasional users of hallucinogenic drugs, and its frequency is unpredictable and its cause unknown.

CANNABIS INTOXICATION

Cannabis sativa, commonly known as marijuana, is widely abused and may be classified as a mild hallucinogen. The most common physical appearance of marijuana is as ground, dried leaves, and the most common method of consumption is smoking, but it can be taken orally. A commercially prepared product of the active ingredient in marijuana, tetrahydro-cannabinol (THC), is dronabinol (Marinol R) available in the U.S. as a controlled Schedule II drug. Dronabinol is used for the treatment of nausea and vomiting in chemotherapy patients. It may also be useful in the treatment of acute glaucoma, asthma, and nausea and vomiting from other chronic illnesses. The individual response to the recreational use of marijuana varies and depends on the dose, the personality and expectation of the user, and the setting. Unexpected ingestion, emotional stress, or underlying psychiatric disorders can increase the possibility of an unfavorable reaction.

After a single inhaled dose of marijuana, a subjective "high" begins in several minutes and is gone within four hours. Marijuana causes decreased pupil size and conjunctivitis (reddening of the white of the eye). Smoking marijuana can increase the heart rate (tachycardia) for about two hours. It can slightly increase systolic blood pressure in low doses and can lower blood pressure in high doses. An increased appetite and dry mouth are common complaints after marijuana use.

Social setting influences the psychological effects associated with "usual doses" of marijuana smoking. Smoking in a solitary setting may produce euphoria, relaxation, and sleep. In a group setting, increased social interaction, friendliness, and laughter or giddiness may be produced. Subjectively, time moves slower, images appear more vivid, and hearing seems keener. High doses can cause lethargy, depersonalization, pressured speech, paranoia, hallucinations, and manic psychosis (imagining everything is wonderful in a way that is out of reality).

INHALANT INTOXICATION

Inhalants are potentially dangerous, volatile chemicals that are not meant for human consumption. They are found in consumer, commercial, and industrial products intended for use in well-ventilated areas. The vapors they produce can be extremely dangerous when inhaled inadvertently or by design.

Substances in this category include adhesives (synthetic "glues"), paint, wet markers, lighter fluids, solvents, and propellants in aerosol spray cans, and air fresheners. Inhalants can be abused by "sniffing"

(inhaling through the nose directly over an open container), "bagging" (holding an open bag or container over the head), or "huffing" (pouring or spraying material on a cloth that is held over the mouth and inhaling through the mouth). These methods usually use a bag or other container to concentrate and retain the propellant thereby producing a quick "high" for the abuser.

Persons who regularly abuse inhalants risk permanent and severe brain damage and even sudden death. The vapors from these volatile chemicals can react with the fatty tissues in the brain and literally dissolve them. Additionally, inhalants can reduce the availability and use of oxygen. Acute and chronic damage may also occur to the heart, kidneys, liver, peripheral nervous system, bone marrow, and other organs. Sudden death can occur from respiratory arrest or irregular heart rhythms that are often difficult to treat even if medical care is quickly available.

Signs and symptoms of inhalant abuse closely resemble a combination of alcohol and marijuana intoxication. Acute symptoms are very short-lived and are completely gone within two hours. Physical symptoms of withdrawal from inhalants include hallucinations, nausea, excessive sweating, hand tremors, muscle cramps, headaches, chills and delirium tremens. Thirty to forty days of detoxification is required, and relapse is frequent.

HANDLING DRUG-INTOXICATED PERSONS

As in any emergency medical situation, priorities of care must be established. Conditions involving respiratory or cardiac failure must receive immediate attention before specific action is directed to the drug abuse symptom. General priorities of care are outlined below:

- The **ABCs + D & E**: check for adequacy of airway, breathing, and circulation, signs of drug/chemical **("D")** induced altered mental status, and hidden injuries or contact with a poison revealed by exposing **("E")** parts of the body covered with clothing or other articles. Watch for shock! Give appropriate treatment.

- If the victim cannot be aroused, place him on his side so secretions and vomitus can drain from the mouth and not be aspirated into the lungs.

- All adult patients with an altered mental status should receive dextrose after blood sugar testing, thiamine, naloxone, and oxygen.

- If recommended by the PCC or medical officer, place the patient on a cardiac monitor and/or obtain specimens for comprehensive laboratory work-up (blood and urine).

- If recommended by the PCC or medical officer, decontaminate the gut. (This decontamination should be accomplished ONLY if the victim is conscious and the drug was RECENTLY TAKEN ORALLY.)

- Prevent the victim from self-injury while highly excited or lacking coordination. Use physical restraints only if absolutely necessary (i.e., upon failure of chemical restraints).

- Calm and reassure the excited patient by "talking them down" in a quiet, relaxed, and sympathetic manner.

- Gather materials and information to assist in identifying and treating the suspected drug problem. Spoons, paper sacks, eyedroppers, hypodermic needles, and vials are excellent identification clues.

- The presence of capsules, pills, drug containers, needle marks (tracks) on the patient's body, or paint or other substance around the mouth and nose, are also important findings of substance abuse.

- A personal history of drug use from the patient or those accompanying the patient is very important and may reveal how long the victim has been abusing drugs, approximate amounts taken, and time between doses. Knowledge of past medical problems, including history of convulsions (with or without drugs) is also important.

- Transport the patient and the materials collected to a medical treatment facility.

- Inform MTF personnel and present the materials collected at the scene upon arrival at the facility.

HAZARDOUS MATERIAL EXPOSURE

LEARNING OBJECTIVE: *Recognize hazardous material personal safety guidelines and hazardous material information sources.*

Hazardous materials are substances with the potential of harming people or the environment. Hazardous materials can be gaseous, liquid, or solid, and can include chemical or radioactive materials. (Radiological exposure will be covered in depth in chapter 8 of this manual. Radioactive materials are regulated by specific instructions/directives.) The most common substances involved in incidents of hazardous material (HAZMAT) exposure are volatile organic compounds, pesticides, ammonia, chlorine, petroleum products, and acids.

Your initial action at the scene of a hazardous materials incident must be to assess the situation, since your safety—as well as that of the public and any patients—is of primary concern. You must first determine the nature of the HAZMAT, then establish a safety zone. Only after these things have been accomplished can a victim who has been exposed to hazardous materials be rescued, transported to an appropriate facility, and properly decontaminated.

The Department of Transportation (DOT) publication, *Emergency Response Guidebook* (ERG series, published every four years), RSPA P5800.8, is a useful tool for first responders during the initial phase of a hazardous materials/dangerous goods incident. ERG series addresses labeling, identification, toxicity, safety/contamination zones, and decontamination procedures. **IT IS IMPERATIVE THAT ALL PERSONNEL INVOLVED WITH HAZMAT INCIDENT RESPONSE BE FAMILIAR WITH THIS PUBLICATION.** It is also available on the Internet at http://hazmat.dot.gov/gydebook.htm.

DETERMINING THE NATURE OF THE HAZARDOUS MATERIAL

When an incident involving the exposure of hazardous material occurs, it is of prime importance to any rescue operation to determine the nature of the substance(s) involved. All facilities that produce HAZMAT are required by law to prominently display this information, as is any vehicle transporting it. Any carton or box containing such material must also be properly labeled. The name of the substance may also be displayed, along with a required four-digit identification number (sometimes preceded by the letters **UN** or **NA**).

The various kinds of hazardous materials usually have different labels to assist in their identification. These are generally diamond-shaped signs that have specific colors to identify the type of HAZMAT involved. Table 5-7 provides a list of the Department of Transportation (DOT)-mandated classifications of hazardous materials.

The ERG series provides a list of hazardous materials and appropriate emergency response actions. The Guidebook is primarily a tool to enable first responders to quickly identify the specific or generic classification of the material(s) involved in the incident, and to protect themselves and the general public during the initial phase of the incident.

SAFETY GUIDELINES

Your first objective should be to try to read the labels and identification numbers **FROM A DISTANCE**. If necessary, use binoculars. **DO NOT** go into the area unless you are absolutely certain that has been no hazardous spill. Relay any and all information available to your dispatch center where it can be used to identify the HAZMAT.

Once the HAZMAT has been identified, it can be classified as to the danger it presents (i.e., toxicity level). Based on this classification, the appropriate specialized equipment (known as personal protective equipment, or PPE) can be determined to provide adequate protection (i.e., protection level) from

Table 5-7.—Hazardous Materials Warning Labels

HAZMAT Type	Label Description
Explosives	solid orange color
Nonflammable gases	solid green color
Flammable liquids	solid red color
Flammable solids	white and red stripes
Oxidizers & peroxides	solid yellow color
Poisons & biohazards	solid white color
Radioactive materials	half white/half yellow with black radiation symbol
Corrosives	half white/half black
Other	usually white

secondary contamination to rescue personnel and healthcare providers.

Toxicity Levels

The National Fire Protection Association (NFPA) has developed a system for indicating the health, flammability, and reactivity hazards of chemicals. It is called the **NFPA 704 Labeling System** and is made up of symbols arranged in squares to comprise a diamond-shaped label (fig. 5-7). Each of the four hazards is indicated by a different colored square:

- **Red** indicates the flammability.
- **Yellow** indicates the reactivity.
- **White** indicates any special hazards.
- **Blue** indicates health hazards.
- The health hazard levels are
- **4** - deadly,
- **3** - extreme danger,
- **2** - hazardous,
- **1** - slightly hazardous, and
- **0** - normal material.

Protection Levels

The protection levels, B, C, and D—indicate the type and amount of protective equipment required in a given hazardous circumstance, with level A being the most hazardous.

- **Level A** - positive pressure-demand, full-face piece self-contained breathing apparatus (SCBA) or positive pressure-demand supplied air respirator with escape SCBA; fully encapsulating, chemical-resistant suit; inner chemical-resistant gloves; chemical-resistant safety boots/shoes; and two-way radio communication.
- **Level B** - positive pressure-demand, full-face piece SCBA or positive pressure-demand supplied air respirator with escape SCBA; chemical-resistant clothing (overalls and long-sleeved jacket with hooded one- or two-piece chemical splash suit or disposable chemical-resistant one-piece suit); chemical-resistant safety boots/shoes; hard hat; and two-way communication.
- **Level C** - full-face piece, air-purifying canister-equipped respirator; chemical-resistant clothing (overalls and long-sleeved jacket with hooded one- or two-piece chemical splash suit or disposable chemical-resistant one-piece suit); inner and outer chemical-resistant gloves; chemical-resistant safety boots/shoes; hard hat; and two-way communication.
- **Level D** - Coveralls, safety boots/shoes, safety glasses or chemical splash goggles, and hard hat.

You are required to wear gloves at all four protection levels. If the correct type of glove to be used is not known, use neoprene or rubber, and avoid using latex or vinyl. In any instance, contact with HAZMAT should be avoided or minimized, and proper

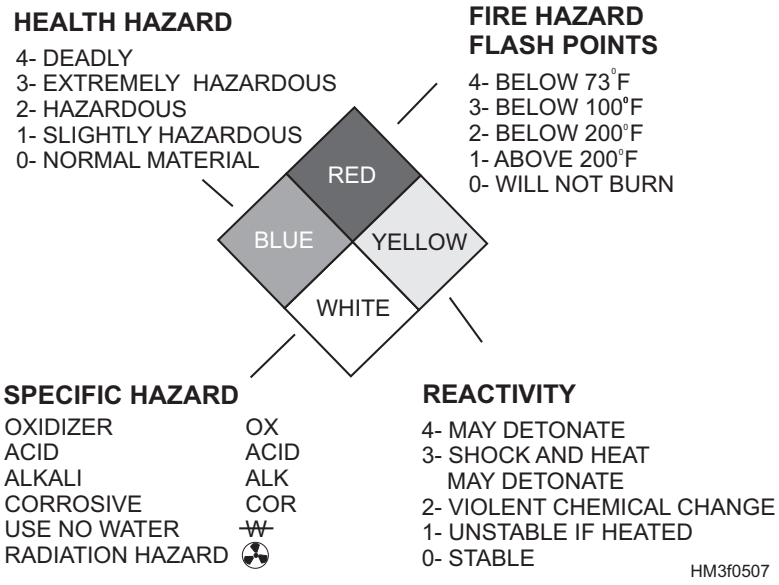

Figure 5-7.—NFPA 704 labeling system.

decontamination should be performed promptly. Protect feet from contact with chemical by using a disposable boot/shoe cover made from appropriate material.

Site Control

For management purposes, site control is divided up into three sections.

- **Exclusion Zone (Hot Zone)**: The area where the contamination has occurred. The outer boundary of the exclusion zone should be marked either by lines, placards, hazard tape and/or signs, or enclosed by physical barriers. Access control points should be established at the periphery of the exclusion zone to regulate the flow of personnel and equipment. Remember also to remain **upwind** of the danger area, and avoid low areas where toxic gases/vapors may tend to settle.
- **Contamination-Reduction Zone (Warm Zone)**: The transition area between the contaminated area and the clean area. This zone is designed to prevent the clean support zone from becoming contaminated or affected by other site hazards. Decontamination of personnel/equipment takes place in a designated area within the contamination-reduction zone called the "contamination-reduction corridor."
- **Support Zone**: The location of the administrative and other support functions needed to keep the operations in the exclusion and contamination- reduction zones running smoothly. The command post supervisor should be present in the support zone. Personnel may wear normal work clothes within this zone.

Figure 5-8 shows the three management sections of a hazard zone.

RESCUE AND PATIENT CARE PROCEDURES

LEARNING OBJECTIVE: *Recall rescue, patient care, and decontamination procedures for patients exposed to hazardous material.*

After a safety zone has been established—and regardless of your level of training—you should follow the procedures outlined below:

- Help isolate the incident site and keep the area clear of unauthorized and unprotected personnel.
- Establish and maintain communications with your dispatcher.
- Stay upwind and upgrade from the site, and monitor wind and weather changes.
- Don't breathe any smoke, vapors, or fumes.

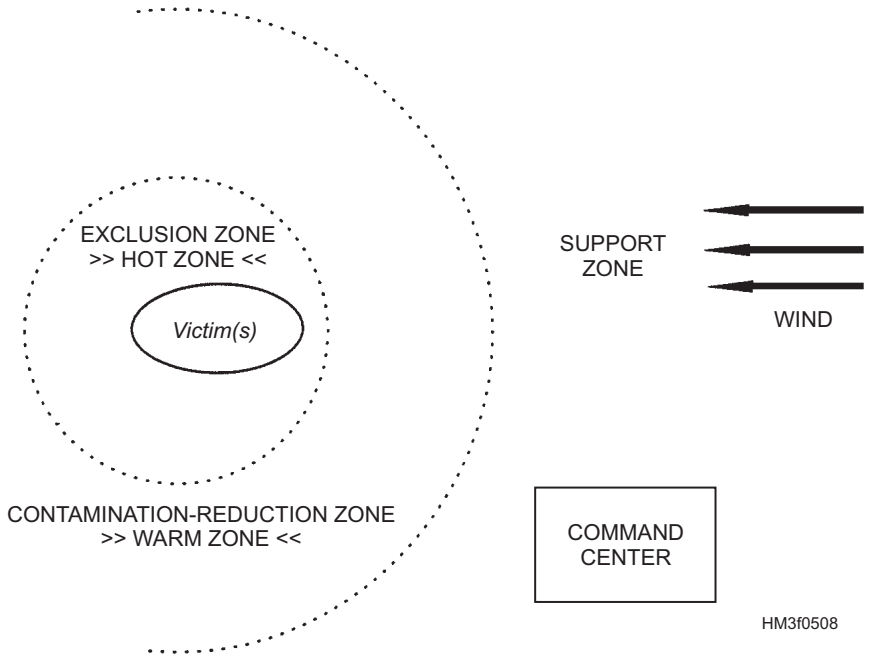

Figure 5-8.—Hazard zone management sections

- Don't touch, walk, or drive through the spilled materials, since these will increase the area of the spill.
- Don't eat, drink, or smoke at the site; don't touch your face, nose, mouth, or eyes. (These are all direct routes of entry into your body.)
- Eliminate any possible source of ignition (e.g., flares, flames, sparks, smoking, flashes, flashlights, engines, portable radios).
- Notify your dispatcher and give your location. Request the assistance of the HAZMAT response team.
- If possible, identify the hazardous material and report it to the dispatcher.
- Observe all safety precautions and directions given by the on-site HAZMAT expert. **All orders should be given and received face to face.**
- Stay clear of restricted areas until the on-site HAZMAT expert declares them to be safe.

Rescue from Exclusion Zone (Hot Zone)

The most dangerous element of any HAZMAT incident—both to the exposed victims and the rescuers—is the rescue from the hot zone. Rescue operations should always be performed using appropriate protective equipment (PPE). **You must never enter the area unless you have been appropriately trained to do so.** Let the experts handle this aspect of the rescue, but be prepared to provide supportive care once the victim is clear of the contaminated area.

As soon as the patient has been removed to safety, you should follow normal primary and secondary survey procedures, including interviews of the patient and bystanders. Observe the patient and provide basic life support. Give the patient supplemental oxygen, and monitor vital signs closely.

Patient Decontamination Procedures

Decontamination is the process of removing or neutralizing and properly disposing of contaminants that have accumulated on personnel and equipment. Decontamination protects site personnel by minimizing the transfer of contaminants, helps to prevent the mixing of incompatible chemicals, and protects the community by preventing uncontrolled transportation of contaminants from the site. All personnel, clothing, and equipment that leave the contamination area (exclusion zone) must be decontaminated to remove any harmful chemicals that may have adhered to them. Some decontamination methods include those listed below.

- **Dilution**: the flushing of the contaminated person or equipment with water.
- **Absorption**: the use of special filters and chemicals to absorb the hazardous material.
- **Chemical washes**: specific chemicals used to neutralize the hazardous material.
- **Disposal and isolation**: the proper disposal of contaminated materials instead of attempting to decontaminate them.

Dilution is the most frequently appropriate method of decontamination.

Decontamination requires the use of PPE, although the level of protection required may be less once the victim is out of the hot zone. A victim who is exposed to a gas may not require actual "decontamination" after rescue and only require cessation of exposure and an opportunity to breathe fresh air. However, if a victim is soaked with a liquid, the HAZMAT may pose an ongoing risk to the victim and to the rescuers or medical personnel. **IT IS IMPORTANT TO ALWAYS ASSUME THAT THE VICTIM HAS BEEN CONTAMINATED WITH SOMETHING THAT COULD HARM YOU AND OTHERS UNTIL DETERMINED OTHERWISE.** Do not be foolish or bold and presume that you or others will not be exposed and harmed!

Once the victim is medically evaluated, carefully remove any solid material that remains on the patient's clothing. Be alert not to get any on yourself. If the material is dry, immediately remove the victim's clothing while avoiding or minimizing contact with the HAZMAT or loss of the HAZMAT from the clothing. Unless specifically contraindicated by the hazardous nature of the HAZMAT and directed by the incident commander or the supporting medical advisor, flush the patient's skin, clothing, and eyes with water. To the maximum extent possible, control or retain the runoff (which is contaminated) which will be containerized for proper disposal. Remove all of the victim's clothing, shoes, and jewelry. Place everything that may have contacted the HAZMAT in a special container. Mark the container as contaminated. Continue flushing the skin with water for at least 20

minutes. Again, try to retain the runoff. Using available items like towels or clean rags, mechanically remove the HAZMAT by wiping; avoid rubbing the skin too vigorously. Dry the skin and provide uncontaminated dry clothing or coverings.

The nature of the HAZMAT involved and the threat to the health of others (rescue team, other victims, medical personnel, transport crew) determines the degree of decontamination necessary before treatment or transporting the patient. Generally, it is preferred that decontamination be accomplished before treatment or transport. However, the patient's immediate medical condition may be more serious than the contamination itself. For example, ingested HAZMAT may pose little immediate threat to nearby personnel, but be an imminent threat to the victim's life. Therefore, the consequences of delaying the emergency care of the patient's injuries to accomplish gut decontamination must be carefully evaluated. In some cases, decontamination and emergency medical care can be carried out simultaneously. In rare instances of great urgency, the victim may require transportation to the hospital before decontamination. In these unusual cases, notify both the hospital and transportation crew of the patient's medical condition and contamination. Depending on the situation, the transportation crew will have to appropriately prepare to carry and care for the contaminated victim; otherwise, the crew themselves could be contaminated and/or be affected by the contamination. For example, the transport crew may need to wear level A or B suits and/or respirators. Remember, if the victim is contaminated and the transport requires personal protective devices, it is likely that the vehicle will be contaminated and require appropriate decontamination. There is also a potential to contaminate the receiving medical facility and its staff.

Diagnosis, Treatment, and Transport

As soon as the victim has been removed to safety, follow normal primary and secondary survey procedures, including interviews of the patient and bystanders. Observe the patient and provide the ABCs of basic life support (airway, breathing, circulation) and add "D" and "E" for disability and exposure. Look for signs of trauma and provide proper exposure (i.e., remove clothing) to fully assess the victim. Monitor vital signs and the victim closely! As a guideline, give the patient supplemental oxygen (4 to 6 liters per minute), and start an IV at an area of skin not exposed to the hazardous material (or at least that has been thoroughly decontaminated).

If the HAZMAT victim has swallowed a known or identified toxic material, treat the victim as a poisoned patient using the information provided above. Dress wounds and prepare the patient for transport to a medical treatment facility.

Finally, transport the victim to a medical treatment facility for complete medical evaluation and treatment. Care should be taken during transport to stabilize the victim by maintaining normal body temperature, administering oxygen, and treating shock.

SUMMARY

In this chapter, we discussed the assessment and treatment for poisoning, drug abuse, and hazardous material exposure, along with the rescue and decontamination procedures for patients exposed to HAZMAT. In our rapidly changing environment, we must be up to date on the latest changes in assessment and treatment for these conditions. You may stay informed through contact with the local Poison Control Center, MEDIC releases, or via the World Wide Web on the Internet.