CHAPTER 7

EMERGENCY FIRST AID FOR FIELD ACTIVITIES

1. Introduction

Every person who engages in field activities should be able to recognize injuries and exposures that require immediate emergency action. Most injuries and illnesses are not life threatening, but it is important to recognize those that are and be prepared to take emergency action to prevent serious consequences or death.

In many field activities, DNR personnel can receive injuries or chemical exposures that could cause serious illness or death unless immediate action is taken to control the emergency. If DNR personnel are remote from immediately medical emergency treatment, they will have to depend on the training and preparation of other members of their team.

DNR employees should have knowledge of first aid and cardiopulmonary resuscitation. CPR training is available through the American Red Cross, American Heart Association, and at local fire stations.

Every DNR employee engaged in field activities should carry a wallet card with important medical information such as blood type, allergies, medication being taken, and any physical condition, which may cause a problem in regular activities or emergency situations.

This section will describe medical emergencies that may occur in field activities, describe the general course of action for any type of medical emergency, and review the procedures for treating such emergencies.

This section does not take the place of a first aid course or hands-on training in first aid, chemical splash procedures or CPR. This section does, however, emphasize a different range of emergencies than a basic Red Cross first aid course.

2. Background

a. Serious and Life-Threatening Medical Emergencies

Medical emergencies may occur during field activities as a result of accidents, work stress, individual medical conditions, or exposure to toxic or corrosive chemicals. Nine different conditions are so serious that they are considered life threatening. Three conditions in particular require immediate action because death will result in minutes if no effort is made to help the victim.

The three medical emergency conditions that require immediate action to prevent death are listed in ascending order of their seriousness:
• Bleeding severely
• Breathing stopped
• Circulation stopped.

Bleeding severely from traumatic injuries can lead to an irreversible state of shock in which death is inevitable.

Breathing can be stopped because of:

• An obstructed airway
• Allergic reactions to insect stings
• Drowning
• An electrical shock
• Exposure to an oxygen-deficient atmosphere
• Exposure to a toxic gas with immediate paralytic effects

Circulation can be stopped because of:

• Heart attack
• Electrical shock
• Paralysis from chemical exposure

If a victim is unconscious, it is important to determine if he has stopped breathing, if the victim’s heart has stopped beating and circulating blood throughout the body, or if the person is suffering from some other life-threatening emergency. Always check for an open airway, breathing and circulation.

Other medical emergencies which are extremely serious, or which can become life-threatening, include:

• Traumatic injuries to head neck or back
• Shock resulting from injuries
• Over-exposure to heat or cold
• Thermal burns that are deep or extensive
• Inhalation of toxic gas
• Chemical contact that is concentrated or extensive.

b. General Emergency Procedures

When a person is seriously injured or exposed to large amounts of hazardous chemicals, there are three activities that must be carried out quickly. These activities can be carried out by one person, but if several people are available it is much more effective if all three activities can be carried out at the same time:

• Size up the Scene.
• Perform an initial assessment.
• Summon advanced medical personnel.
c. Size up the Scene.

1. Determine if the scene is safe for you, other rescuers, the victim(s) and any bystanders.
2. Look for dangers, such as traffic, unstable structures, downed power lines, swift moving water, violence, explosions or toxic gas exposure.
3. Put on appropriate personal protective equipment.
4. Determine the mechanism of injury or nature of illness. Try to find out what happened and what caused the injury or illness.
5. Determine the number of victims.
6. Determine what additional help may be needed.

d. Perform an initial assessment to identify any life-threatening conditions.

Check the victim for consciousness and obtain consent if the victim is conscious:

1. Check for signs of life (movement and breathing).
2. Check for a pulse.
3. Check for severe bleeding.

e. Summon advanced medical personnel if you find any of the following life-threatening conditions.

1. Unconsciousness or disorientation.
2. Breathing problems (difficulty breathing or no breathing).
3. Chest discomfort, pain or pressure lasting more than 3 to 5 minutes.
4. No pulse.
5. Severe bleeding.
6. Persistent abdominal pain or pressure.
7. Suspected head, neck, or back injuries.
8. Severe allergic reactions.
9. Stroke (weakness on one side of the face, weakness or numbness in one arm, slurred speech or trouble getting words out).
10. Seizures that occur in water.
11. Seizures that last more than 5 minutes or cause injury.
12. Repeated seizures (one after another).
13. Seizures involving a victim who is pregnant, diabetic or who does not regain consciousness.
14. Vomiting blood or passing blood.
15. Severe (critical) burns.
17. Suspected poisoning.
18. Sudden severe headache.

Call first or care first? If you are alone, you will have to decide weather to call first or care first.
Call first means to call for advanced medical personnel before providing care. Always call first if you suspect a cardiac emergency – a situation in which time is critical. Examples include sudden cardiac arrest or the sudden collapse of a child that has been witnessed. In these situations, call first. Next obtain an automated external defibrillator (AED) if available and then return to the victim to use the AED or begin CPR if an AED is not available. Also, call first for –

1. An unconscious adult (12 years or older).
2. An unconscious child or infant known to be at high risk for heart problems.

Care First situations are likely to be related to breathing emergencies rather than cardiac emergencies. In these situations, provide support for airway, breathing and circulation through rescue breaths and chest thrusts, as appropriate. Care first, that is provided 2 minutes of care, and then summon advanced medical personnel for—

1. An unconscious infant or child (younger than 12 years old).
2. Any victim of a drowning or nonfatal submersion.
3. Any victim who has suffered cardiac arrest associated with trauma.
4. Any victim who has taken a drug overdose.

Someone must administer first aid to reduce the severity of any life-threatening medical emergency. This person should have recent first aid training and practice. If there is no one available with recent training, a team member can carry out the most important steps guided by a first aid manual. Be sure that a good manual is available in a readily accessible location. The American Red Cross Standard First Aid and Personal Safety Manual is an excellent reference (ref. 3). Another good reference is the American Academy of Orthopedic Surgeons manual Emergency Care and Transportation of the Sick and Injured (ref. 4).

First aid is generally defined as the immediate and temporary care given the victim of an injury or sudden illness until medical assistance can be obtained. In this section the term “first aid” is used to include any immediate and temporary care, including chemical splash treatment and cardio-pulmonary resuscitation. The objectives of first aid are to:

- Care for life-threatening conditions
- Minimize further injury and complications, such as infection
- Obtain medical assistance

e. Arranging for Transportation

Someone must arrange for medical assistance for further treatment of serious medical emergencies. Medical assistance can be obtained in some areas from paramedic teams from local hospitals or fire departments. In other areas, medical assistance can be obtained most readily by taking the injured person directly to a medical treatment facility such as a hospital.
Find out in advance how to call for medical assistance and how to reach the emergency medical facility. Have a map and directions readily available and make a practice run if your field activities are particularly hazardous.

In many cases, you will care for the person where you find them. Do not move the victim unless it is necessary. Move an injured victim only if –

- The scene is unsafe or becoming unsafe.
- You have to reach another victim with a more serious injury or illness.
- You need to provide proper care (e.g., someone has collapsed on a stairway and needs CPR, which must be performed on a firm, flat surface).

If necessary to transport an injured person to a medical facility, try not to complicate the injury or subject the victim to unnecessary discomfort. If necessary to transport an injured or ill person without the assistance of specially trained personnel, there are some important considerations before starting to move the person. If the medical emergency is one in which movement can cause further injury, be sure that the move is planned and carried out so that it does not harm the injured person more than waiting for help. If the emergency is one that requires uninterrupted treatment, such as cooling thermal or chemical burns, plan the movement so that the emergency treatment can be continued. If the emergency resulted from a chemical splash, be sure that preliminary washing has been thorough enough to minimize the injury and to prevent serious contamination of other people. Reference 3 Chapter 15 and reference 4 Section XI contains supplementary information on emergency transportation.

3. Medical Emergency Supplies

Every vehicle should be equipped with a first aid kit and supplies for emergencies likely to be encountered. In cold or wet weather, the team should have blankets and supplies needed for treating cold stress, and in hot weather the team should have water or replacement fluids needed for prevention and treatment of heat stress. (See Section H of this chapter for more information.) If the team may be exposed to contact with hazardous chemicals, their vehicle should be equipped with a pressurized supply of potable water that can be used for flushing chemicals from the eye and body in case of splash. The volume of the pressurized water supply should be at least eight gallons. (The water can also be used for washing skin areas that may be contaminated during field operations.)

References 3 and 4 provide detailed information on the three life-threatening emergencies that can occur during field activities; severe bleeding, stopped breathing, and stopped circulation, as well as many other related topics.

4. Emergency Treatment for Inhalation of Toxic Gas

The first step in emergency treatment for inhalation of toxic gas is to get the exposed person out of the toxic atmosphere, without exposing anyone else, or yourself
multiplying the problem. Unless the toxic gas exposure was the result of a sudden localized leak or a passing cloud of gas (a transient exposure), rescue will require two people equipped and trained to use self-contained breathing apparatus. In some very unusual atmosphere that might exist within a chemical plant, fully encapsulating suits may also be required for safe rescue.

Death or serious injury may be prevented by removing the exposed person from the exposure area and by providing mouth-to-mouth resuscitation. If there is an antidote for the chemical exposure, it should be available if there has been adequate preparation.

Once a person exposed to a toxic gas or vapor has been removed from the exposure, it is safe to administer mouth-to-mouth resuscitation. Use some form of breathing barrier, which include resuscitation masks, face shields, and bag-valve mask resuscitators. There will be very little gas or vapor in the respiratory system of the exposed person and what there is will be exhaled gradually (in dilute concentrations) only after the rescuer has forced air into the victim and taken his mouth away from the victim’s mouth.

Inhalation of a few breaths of concentrated toxic gases or vapors, of some chemicals, is likely to be followed by almost instantaneous collapse and cessation of breathing (examples are hydrogen sulfide and hydrogen cyanide). However, even if breathing stops because of such an exposure, the heart will usually continue beating for some time. Therefore, immediate mouth-to-mouth resuscitation and emergency medical treatment are very effective in preventing death.

If a person exposed to a toxic gas or vapor is not breathing, give mouth-to-mouth resuscitation (or some other form of artificial respiration) until normal breathing resumes or until a resuscitator is available. If a toxic liquid has been splashed in the victim’s face, wash it off quickly before you begin mouth-to-mouth resuscitation.

Continuing emergency treatment of a person exposed to a toxic gas or vapor should include treatment for shock and keeping the exposed person as quiet as possible. Do not give the exposed person any alcoholic beverage.

5. **Emergency Treatment for Chemical Contact by Splashes**

Chemicals in contact with the eye and skin can cause serious or life threatening emergencies that must be treated quickly. One drop of corrosive chemical in an eye can cause permanent blindness, and splashes of corrosive chemicals on skin can cause permanent tissue destruction. Some chemicals splashed on a large portion of the body can cause death if they are not washed off quickly.

Washing splashed chemicals from the eyes and body is the most important emergency treatment. It takes precedence over seeking medical assistance.

If chemicals come in contact with the eyes or body, flush the chemical off quickly and as thoroughly as possible. Use copious amounts of potable water and wash for at least 15 minutes. Splashes of hot, concentrated or corrosive chemicals will usually require
washing for a longer period, up to several hours. In case of chemical splashes in the eyes or on more than a small area of the skin, emergency treatment by flushing with water should always be followed by medical examination. Make sure that the medical facility knows as much as possible about the chemicals splashed or contacted, particularly if the chemical may have been absorbed, so that further diagnosis and treatment are provided as needed. (There have been deaths as the result of material absorbed from massive splashes with chromates and nitrates).

A. Emergency Treatment for Chemical Splashes in the Eyes

The most important emergency measure, if chemicals are splashed in the eyes, is immediate washing of the eyes with large quantities of potable water. To wash the eyes and exposed surfaces effectively, hold the eyelids open and try to get the injured person to roll his eyes while you are irrigating with water. The eyes and the inside of the eyelids should be washed for at least 15 minutes before any effort is made to go to a medical facility for follow-up treatment.

Immediate washing with water is essential, and only a few seconds delay can result in some permanent damage. Washing the eyes thoroughly is more important than reaching a medical facility, and washing should not be delayed for any reason. A victim should be transported for medical attention only after a thorough washing.

Chemical burns to the eyes may be aggravated by soft or extended wear contact lenses that can accumulate some chemicals. Hard contact lenses may complicate effective irrigation of the eyes, even though they may not aggravate a chemical injury.

Eyes should not be irrigated with any neutralizing agents as an emergency treatment. Any neutralizing solution is less effective than plain water, because of the physiological characteristics of the eye. Any acid in a neutralizing solution will tend to react with the protein in the cornea to form an insoluble barrier that will prevent washing out of any alkaline solution trapped under the barrier. Medical tests have shown that washing with potable water is the most effective emergency treatment available in field situations.

B. Emergency Treatment for Chemical Splashes on the Skin

The most important emergency measure, in the event chemicals are splashed on the skin, is immediate washing with large quantities of potable water. To keep chemicals splashed on clothing from being washed through the cloth or onto the skin, remove splashed clothing and wash the chemicals from skin with large quantities of water. Speed and thorough washing are important to reduce the extent of injury.

If the chemical has been splashed on the victim’s face or inhaled, it will be important to see that there is an open airway so the victim can breathe.
Remove all contaminated clothing and shoes, and all clothing that may accumulate contaminated wash water. In case of a splash on the body, it will usually be necessary to remove all clothing.

Removal of splashed chemicals can be accelerated through use of a washcloth and/or detergent. In no case, however, should any attempt be made to neutralize splashed chemicals.

Since washing chemicals off of a person will dilute and spread the chemicals, rescuers should recognize the potential spread of contamination to themselves and the immediate environment. If gloves and protective clothing are available within a few seconds the rescuers may want to wear the protection to reduce contact with splashed chemicals. After the victim has been washed, rescuers will have to wash themselves to prevent any injury from chemicals washed off the victim.

The cold water from a hose or safety shower will reduce chemical activity and burning during the initial 15-minute flushing. For prolonged washing it will be desirable to find a source of water in which the temperature can be adjusted to prevent traumatic shock.

If the area of chemical contact is extensive or the period of washing has to be prolonged, the victim will have to be treated for shock. If the splashed person is conscious and can swallow, give them plenty of nonalcoholic liquids to drink.

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