■ DEPARTMENT OF HEALTH AND HUMAN SERVICES
■ CENTERS FOR DISEASE CONTROL AND PREVENTION

Health and Safety Manual for Hurricane Disaster Relief Workers

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Health and Safety Manual for Hurricane Disaster Relief Workers

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Hurricane Recovery

Hurricane Recovery

Interim Health Recommendations for Relief Workers

This information is current as of September 4, 2005 **Released:** September 2, 2005

On August 29, 2005 a category 4-5 hurricane (Katrina) struck coastal areas of the states of Alabama, Florida, Louisiana, and Mississippi, causing numerous deaths, massive infrastructure damage, and flooding. Along the Gulf Coast of Louisiana and Mississippi, the two hardest hit areas, hundreds of people remain missing. In addition, because of massive flooding, a large-scale evacuation effort is underway to relocate the population of several parishes of Louisiana.

Because of their potential exposures relief workers are at increased risk for developing illness and injuries. In addition, they should be aware of potential hazards such as, downed power lines and security measures that may be imposed such as, curfews to prevent looting. Those who provide assistance should also pay attention to their mental health needs before, during, and after their time in the field. Moreover, because relief workers' services are desperately needed, it is essential that workers remain healthy during their trip. This notice provides additional advice specific to the needs of relief workers.

Relief workers should plan for travel with the knowledge that there may be shortages of electricity, safe water, or food distribution systems in areas affected by the hurricane. They should try to pack to be as self-sufficient as possible and bring only those items necessary for their trip. In addition to a basic travel health kit, relief workers should bring the following items:

Toiletries

Alcohol-based hand sanitizer
Toilet paper
Sunblock (SPF 15 or higher)
Insect repellent containing DEET
Menstrual supplies
Extra pair of prescription glasses, copy of prescription
Eyeglasses repair kit
Contact lenses, lens cleaner, eye glasses protective case
Toothbrush/toothpaste
Skin moisturizer
Soap, shampoo
Lip balm
Razor, extra blades*
Scissors*
Nail clippers/tweezers*
Q-tips, cotton swabs

Clothing

Comfortable, light weight clothing
Long pants
Long sleeved shirts
Hat
Boots
Shower shoes
Rain gear
Bandana/handkerchief
Towel (highly absorbent, travel towels if possible)
Gloves (Leather gloves if physical labor will be performed; rubber gloves if handling blood or body fluids)

Activities of daily living

Sunglasses
Safety goggles
Water proof watch
Flashlight
Spare batteries
Knife, such as a Swiss Army Knife or Leatherman*

Security

Money belt
Cash
Cell phone (with charger)
Candles, matches, lighter in a Ziploc bag*
Ziploc bags
An item of comfort (i.e., family photo, spiritual or religious material)

**packed in checked baggage, will be confiscated from carry-on on commercial airliners*

Interim Health Recommendations for Relief Workers

Risk and Health Recommendations

The response to the recent hurricane will probably be both immediate and long term. Relief workers should ideally be assessed by a health-care professional at least 4-6 weeks before travel so recommended vaccines can be completed and provide maximum benefit. These recommendations apply even if travel is imminent. All relief workers with a history of incomplete or lapsed routine, "childhood" immunization schedules should be brought up-to-date for these vaccines.

Tetanus/diphtheria (Td) Tetanus and diphtheria toxoid (receipt of primary series, and Td booster within 10 years). Persons with high likelihood of exposure to blood and body fluids such as healthcare workers:

Hepatitis B vaccine series for persons who will be performing direct patient care or otherwise expected to have contact with bodily fluids.

Risks from Injury

The risk for injury during and after a natural disaster is high. Persons who anticipate the need to travel in hurricane-affected areas should be advised to wear sturdy footwear to protect their feet from widespread debris present in these areas. Tetanus is a potential health threat for persons who sustain wound injuries. Any wound or rash has the potential for becoming infected and such wounds or rashes should be assessed by a health-care provider as soon as possible. Any wounds, cuts, or animal bites should be immediately cleansed with soap and clean water. Familiarity with basic first aid is advised to self-treat any injury until medical attention can be obtained.

Preventing Electrocutions

Relief workers should be careful to avoid downed power lines. During power outages, many people use portable electrical generators (http://www.bt.cdc.gov/poweroutage/workersafety.asp). If the portable generator is improperly sized, installed, or operated, it can send power back to the electrical lines. This problem is called backfeed or feedback in the electrical energy in power lines. Backfeed can seriously injure or kill repair workers or people in neighboring buildings. In addition, electrical power and natural gas or propane tanks should be shut off to avoid fire, electrocution, or explosions. Battery-powered flashlights and lanterns, rather than candles, gas lanterns, or torches, should be used.

Risks from Food and Water

Natural disasters contribute to the spread of many serious food and water-borne diseases, especially since water supplies and sewage systems have been disrupted. Diarrheal diseases, due to bacteria, parasites or hepatitis A can possibly occur. If a trusted source of bottled water is not available, water should be boiled or disinfected. For more details, see http://www.cdc.gov/travel/foodwater.htm.

An antibiotic for self-treatment of acute diarrhea, such as a fluoroquinolone (e.g. ciprofloxacin), can be given. Azithromycin can be used as an alternative. This medication should be taken until symptoms subside (typically 3 days). Anti-motility agents such as loperamide and diphenoxylate and/or bismuth subsalicylate (Pepto-Bismol) can reduce bowel movement frequency.

Seek medical attention for diarrhea accompanied by a high fever or blood. Additionally, replacement of lost fluids by drinking clean water is the most important means of maintaining wellness, although oral rehydration solutions are ideal for the treatment of severe diarrhea.

Cleaning your hands often, using soap and water (or waterless alcohol-based hand rubs when soap is not available and hands are not visibly soiled), removes potentially infectious material from your skin and helps prevent disease transmission.

Risks from Insect Bites

Because of standing water in these areas, mosquito breeding can become a problem. The first mosquitoes to appear and the majority will be a nuisance and likely not transmit disease. The potential exists for outbreaks of West Nile, St. Louis Encephalitis, and dengue; however this has not been typical of similar events in the U.S. Prevention of mosquito bites is recommended through combined use of insect repellent containing DEET or picardin, and wearing long sleeved shirts and long pants when outdoors. For more details see http://www.cdc.gov/ncidod/dvbid/westnile/mosquitorepellent.htm

Risks from Snake Bites

Displaced reptiles, such as snakes, are likely to be found following flooding and other natural disasters. The venom of a small or immature snake can be even more concentrated than that of larger ones; therefore, all snakes should be left alone. Fewer than half of all snakebite wounds actually contain venom, however, medical attention should be immediately sought any time a bite wound breaks the skin.

If medical care is rapidly available,then initial treatment should include immobilization of the affected limb and minimizing physical activity as much as possible (ideally of the entire patient) while transport to a medical facility occurs. If care is delayed, then a loose fitting pressure bandage that does not restrict arterial and venous flow (but does limit lymphatic flow) is the recommended first-aid measure while the victim is moved as quickly as possible to a medical facility. Tourniquets that impair blood flow to the affected limb are generally contraindicated.

Specific therapy for snakebites is controversial, and should be left to the judgment of local emergency medical personnel. Snakes tend to be active at night and in warm weather. As a precaution, boots and long pants should be worn when walking outdoors at night in areas possibly inhabited by venomous snakes. Proper protection such as the aforementioned clothing, careful attention to one's surroundings and overall avoidance of contact are the best measures that can be taken to avoid injury.

Other Health Risks

Leptospirosis may occur in individuals who wade, swim, or bathe in waters contaminated by animal urine. In addition, exposure to animal bites, most notably bats or skunks in the South Central U.S., pose a potential risk for rabies and other infections. Individuals who sustain a bit should seek immediate medical attention for both appropriate management of the bite wound and assessment regarding post-exposure propyhylaxis.

During natural disasters, technological malfunctions may release hazardous materials (e.g., release of toxic chemicals from a point source displaced by winds or rapidly moving water). Natural disasters may also lead to air pollution. Lung infections may occur after inhalation of sea water. Disasters resulting in massive structural collapse can cause the release of chemical or biologic contaminants (e.g., asbestos or arthrospores leading to fungal infections). Persons with chronic pulmonary disease may be more susceptible to adverse effects from these exposures.

There are health risks related to extremely hot temperatures such as found in these areas (heatstroke) and the effects of the sun on the eyes (cataracts) and skin (skin cancer, sunburn), see also http://www.cdc.gov/chooseyourcover/SunDay-brochure.htm. Wraparound sunglasses that provide 100 percent UV ray protection should be worn for eye protection. A broad-spectrum (protection against both UVA and UVB rays) sunscreen and lip screen with at least SPF 15 should be used. Become familiar with the signs of illness related to extreme heat and what to do, see http://www.bt.cdc.gov/disasters/extremeheat/heat_guide.asp#def for more details.

Psychological/Emotional

Because of the tremendous loss of life, serious injuries, missing and separated families, and destruction of whole areas, it is important that relief workers recognize the situation they encounter may be extremely stressful. Keeping an item of comfort, such as a family photo, favorite music, or religious material nearby can often offer comfort in such situations. Checking in with family members and close friends from time-to-time is another means of support. For additional mental health resources, see http://www.bt.cdc.gov/masstra/copingpub.asp.

On return from one of the affected areas, relief workers who are unwell or who have become injured for any reason should receive a medical evaluation. This should include psychological support and counseling as necessary. Returning relief workers should seek health care in the event of fever, rash, respiratory illness or any other unusual symptoms.

Additional information about hurricane Katrina relief efforts can be found at the Federal Emergency Management Agency (FEMA) website, http://www.fema.gov/ and CDC Emergency Preparedness and Response website, http://www.bt.cdc.gov/.

Key Facts About Recovery: Protect Your Health & Safety After a Hurricane

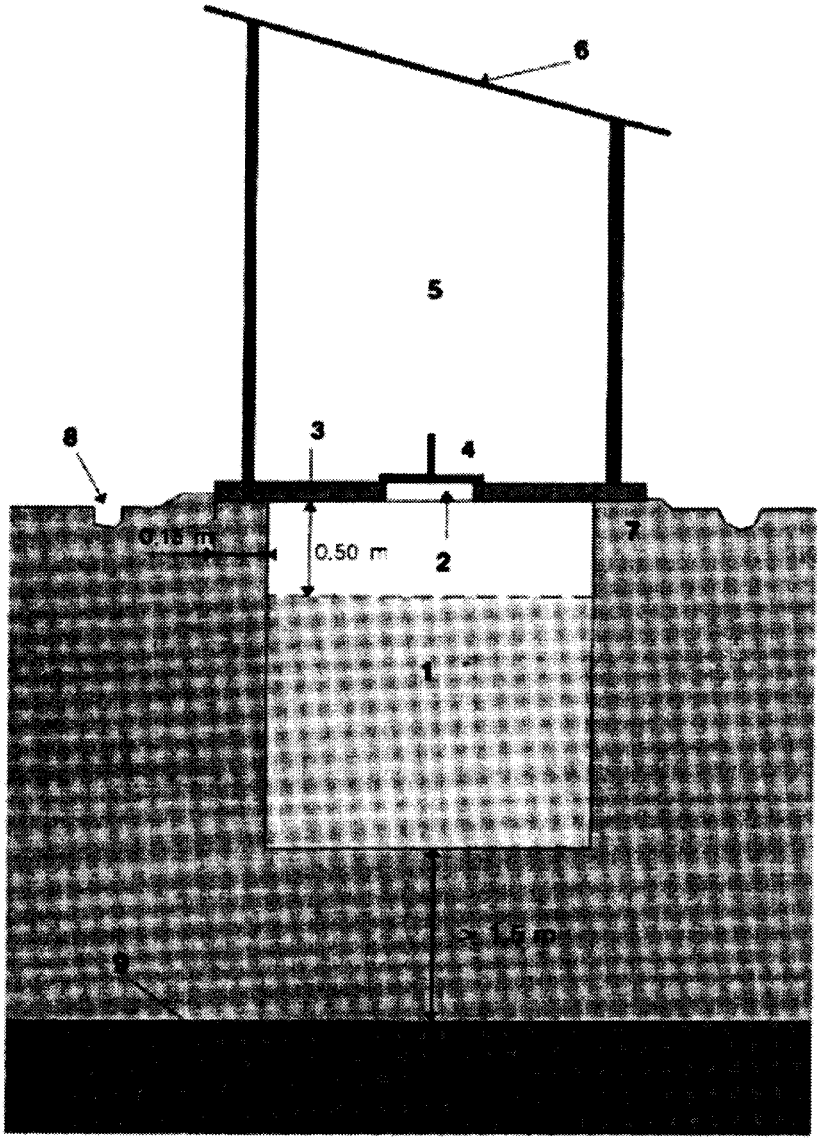
Worker Safety After a Flood

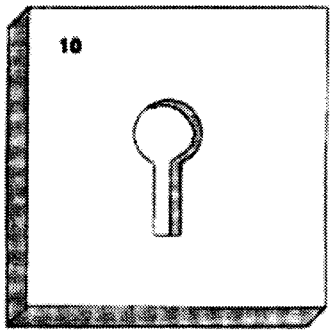
The danger of a flood does not end when the rains cease. Cleanup crews must work together and look out one another to ensure safety. First aid, even for minor cuts and burns, is very important during flood cleanup. Immediately clean out all open wounds and cuts with soap and clean water. Most cuts, except minor scratches, will require treatment to prevent tetanus. Talk to a doctor to find out what treatment you need. For most work in flooded areas, workers will need hard hats, goggles, heavy work gloves, and watertight boots with steel toe and insole (not just steel shank). Excessive noise from equipment such as chain saws, backhoes, tractors, pavement breakers, blowers, and dryers may cause ringing in the ears and subsequent hearing damage. If you must shout over noise to be heard, you should wear earplugs or other hearing protection devices. For more information call 888-246-2675 or see NIOSH's Storm and Flood Cleanup site at www.cdc.gov/niosh/topics/flood.

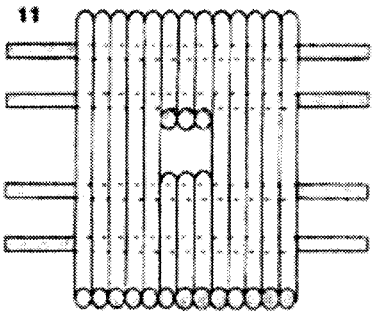
Personal Hygiene in the Field

Personal Hygiene in the Field

Learn More About Latrines (Les Medecins Sans Frontieres)







Key

1 Effective volume of pit
2 Defecation hole
3 Slab
4 Cover
5 Superstructure
6 Roof
7 Slab seating
8 Drainage channel
9 Water table

Example of a concrete slab (see brief)

Possible alternative: slab of logs (covered with soil to make maintenance easier; quality of wood is important: aging + termites = danger)

Learn More About Latrines

Resources Needed

- Shovel, pick, miner's bar
- Slab (see technical brief)
- Cover (wood, metal or concrete)
- Material for superstructure and door

Method

The simple pit latrine is one of the simplest and cheapest means of disposing of human wastes. If well designed and built, correctly sited and well maintained, it contributes significantly to the prevention of feco-orally transmitted diseases.

Construction

- Choose a site downhill from groundwater abstraction points and at least 30m away; the latrine (or group of latrines) should be not less than 5 m and not more than 50 m from the dwellings.
- Dig a pit, assuming that the solids accumulation rate will be about 0.04m3 per person per year. Thus, for a group of 25 people (the maximum number per latrine recommended by WHO), it needs a pit of at least 0.04 x 25 = 1 m3 per year of use.
- If a cement slab is to be used, it should extend at least 15 cm beyond each side of the pit to ensure a secure seating.
- Make a slab and place it over the pit. If the soil is unstable it may be necessary to build a foundation to strengthen the pit walls before placing the slab.
- Construct the superstructure. It may be built with bricks, earth, wood, plastic sheeting, etc., but preferably local materials. The superstructure should have a door if local habits dictate. Otherwise a spiral form may be used.
- Fix a roof with the slope towards the back of the structure.
- Dig a drainage channel around the latrine to prevent run-off entering and to protect the walls of the pit.

IMPORTANT

- Try to ensure that the cover is always replaced to avoid breeding of flies and bad smells around and inside the latrine.
- The slab and surroundings should be cleaned every day.
- If possible, provide lighting for use at night.
- Never put disinfectants (chlorine products, Lysol, etc.) in the pit: this only serves to inhibit the natural decomposition of fecal material. The only situation in which it is recommended to pour disinfectants into a latrine pit is during a cholera epidemic.

  On the other hand it is recommended that fire ashes be put into the pit after each use. This gives a perceptible reduction of odors and accelerates decomposition.
- When the pit is nearly full (20 in. [50 cm] from the surface), demolish it, or move the superstructure and slab to a neighboring place and fill the pit with soil. Do not dig this place again for at least two years.

Important: Allow for the spare 20 in. [50 cm] of depth in the calculation of pit size. It is not part of the effective pit volume.

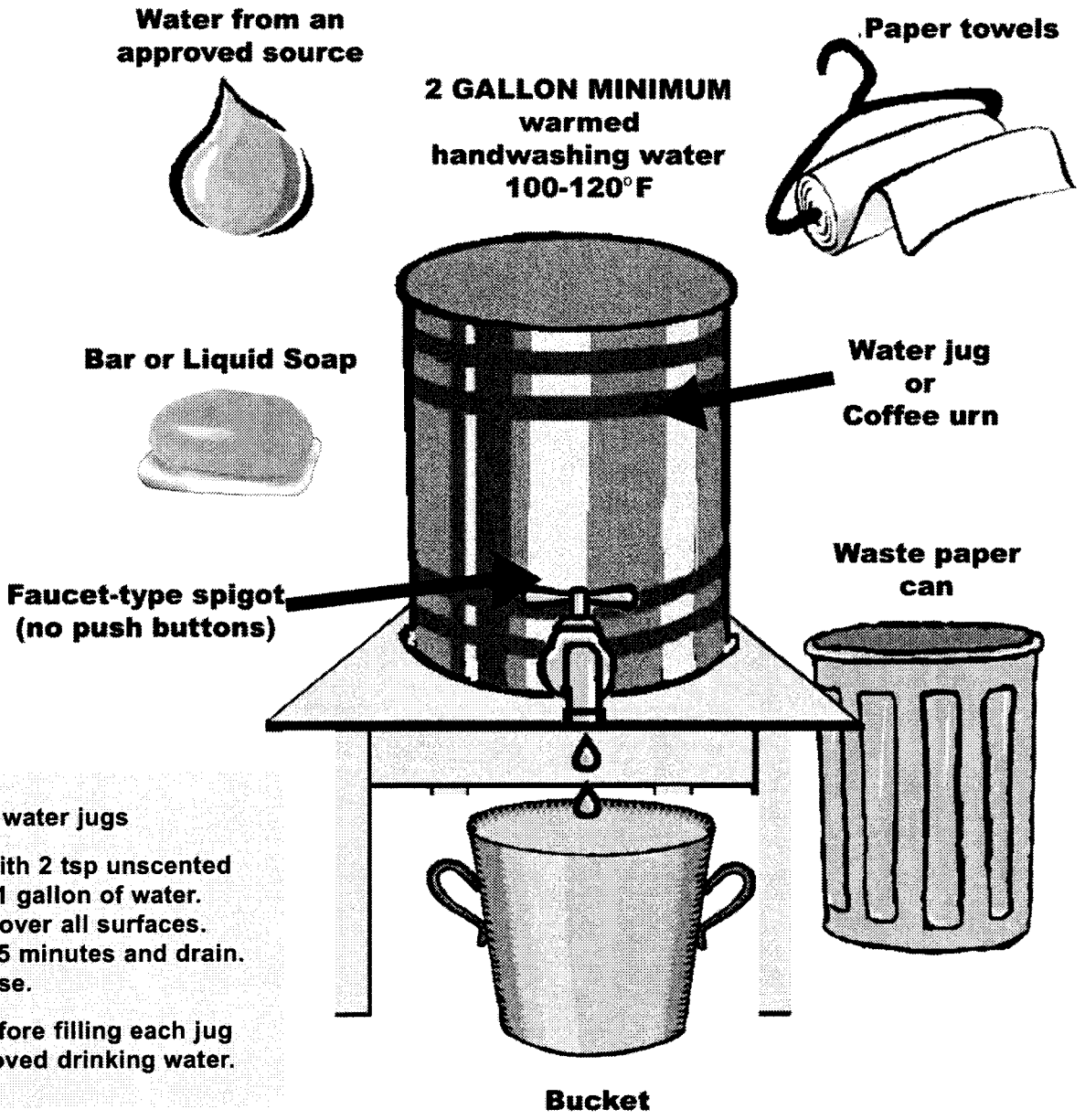
Alternative method: If the subsoil is very rocky or the water table is very high and it is not possible to leave 4.9ft [1.5m] between the bottom of the pit and the groundwater level, the pit may be partially dug in a very well-compacted earth mound. In this case the above-ground part should be lined with bricks or stones.

Improvements: ventilated improved pit (VIP) latrine, twin pit latrine

Handwashing Station (State of Alaska)

Handwashing Station

Use It Often!



Use clean water jugs

Sanitize with 2 tsp unscented bleach in 1 gallon of water. Slosh to cover all surfaces. Let stand 5 minutes and drain. Do not rinse.

Repeat before filling each jug with approved drinking water.

Handwashing In Emergency Situations (CDC)

After an emergency, it can be difficult to find running water. However, it is still important to wash your hands to avoid illness. It is best to wash your hands with soap and water but when water isn't available, you can use alcohol-based products made for washing hands. Below are some tips for washing your hands with soap and water and with alcohol-based products.

When should you wash your hands?

- Before preparing or eating food.
- After going to the bathroom.
- After cleaning up a child who has gone to the bathroom.
- Tending to someone who is sick.
- After handling uncooked foods, particularly raw meat, poultry, or fish.
- After blowing your nose, coughing, or sneezing.
- After handling an animal or animal waste.
- After handling garbage.
- Treating a cut or wound.

Techniques for Hand Washing with Alcohol-Based Products

- When hands are visibly dirty, they should be washed with soap and water when available.
- However, if soap and water are not available, use an alcohol-based product for washing your hands. When using an alcohol-based handrub, apply product to palm of one hand and rub hands together, covering all surfaces of hands and fingers, until hands are dry. Note that the volume needed to reduce the number of bacteria on hands varies by product.
- Alcohol-based handrubs significantly reduce the number of germs on skin, are fast acting.

Techniques for Hand Washing with Soap and Water

- Place your hands together under water (warm water if possible).
- Rub your hands together for at least 10 seconds (with soap if possible). Wash all surfaces well, including wrists, palms, backs of hands, fingers, and under the fingernails.
- Clean the dirt from under your fingernails.
- Rinse the soap from your hands.
- Dry your hands completely with a clean towel if possible (this helps remove the germs). However, if towels are not available it is okay to air dry your hands.
- Pat your skin rather than rubbing to avoid chapping and cracking.
- If you use a disposable towel, throw it in the trash.

Floods: Sanitation and Hygiene (CDC)

It is critical for you to remember to practice basic hygiene during the emergency period. Always wash your hands with soap and water that has been boiled or disinfected:

- before preparing or eating food;
- after toilet use;
- after participating in flood cleanup activities; and
- after handling articles contaminated with flood water or sewage.

Flood waters may contain fecal material from overflowing sewage systems, and agricultural and industrial byproducts. Although skin contact with flood water does not, by itself, pose a serious health risk, there is some risk of disease from eating or drinking anything contaminated with flood water. If you have any open cuts or sores that will be exposed to flood water, keep them as clean as possible by washing well with soap to control infection. If a wound develops redness, swelling, or drainage, seek immediate medical attention.

In addition, parents need to help children avoid waterborne illness. Do not allow children to play in flood water areas, wash children's hands frequently (always before meals), and do not allow children to play with flood-water contaminated toys that have not been disinfected. You can disinfect toys using a solution of one cup of bleach in 5 gallons of water.

Food and Drinking Water Safety

Food and Drinking Water Safety

Keep Food and Water Safe after a Natural Disaster or Power Outage (from CDC)

Food

Food may not be safe to eat during and after an emergency. Safe water for drinking, cooking, and personal hygiene includes bottled, boiled, or treated water. Your state or local health department can make specific recommendations for boiling or treating water in your area.

Identify and throw away food that may not be safe to eat.

- Throw away food that may have come in contact with flood or storm water.
- Throw away food that has an unusual odor, color, or texture.
- Throw away perishable foods (including meat, poultry, fish, eggs and leftovers) that have been above 40 degrees Fahrenheit (F) for 2 hours or more.
- Thawed food that contains ice crystals or is 40 degree F or below can be refrozen or cooked.
- Throw away canned foods that are bulging, opened, or damaged.
- Food containers with screw-caps, snap-lids, crimped caps (soda pop bottles), twist caps, flip tops, snap-open, and home canned foods should be discarded if they have come into contact with floodwater because they cannot be disinfected.
- If cans have come in contact with floodwater or storm water, remove the labels, wash the cans, and dip them in a solution of 1 cup of bleach in 5 gallons of water. Relabel the cans with a marker.
- Do not use contaminated water to wash dishes, brush your teeth, wash and prepare food, wash your hands, make ice, or make baby formula.
- Breastfed infants should continue breastfeeding. For formula-fed infants, use ready-to-feed formula if possible. If using ready-to-feed formula is not possible, it is best to use bottled water to prepare powdered or concentrated formula. If bottled water is not available, use boiled water. Use treated water to prepare formula only if you do not have bottled or boiled water.
- If you prepare formula with boiled water, let the formula cool sufficiently before giving it to an infant.
- Clean feeding bottles and nipples with bottled, boiled, or treated water before each use.
- Wash your hands before preparing formula and before feeding an infant. You can use alcohol-based hand sanitizer for washing your hands if the water supply is limited.

Store food safely.

- While the power is out, keep the refrigerator and freezer doors closed as much as possible.
- Add block ice or dry ice to your refrigerator if the electricity is expected to be off longer than 4 hours. Wear heavy gloves when handling ice.

Water

Water may not be safe to drink, clean with, or bathe in after an emergency such as a hurricane or flood. During and after a disaster, water can become contaminated with microorganisms, such as bacteria, sewage, agricultural or industrial waste, chemicals, and other substances that can cause illness or death. This fact sheet offers the following guidance to help you make sure water is safe to use:

- Listen to and follow public announcements. Local authorities will tell you if tap water is safe to drink or to use for cooking or bathing. If the water is not safe to use, follow local instructions to use bottled water or to boil or disinfect water for cooking, cleaning, or bathing.

- Use only bottled, boiled, or treated water for drinking (however, see guidance in the Food section for infants), cooking or preparing food, washing dishes, cleaning, brushing your teeth, washing your hands, making ice, and bathing until your water supply is tested and found safe. If your water supply is limited, you can use alcohol-based hand sanitizer for washing your hands.

- If you use bottled water, be sure it came from a safe source. If you do not know that the water came from a safe source, you should boil or treat it before you use it.

- Boiling water, when practical, is the preferred way to kill harmful bacteria and parasites. Bringing water to a rolling boil for 1 minute will kill most organisms. Boiling will not remove chemical contaminants. If you suspect or are informed that water is contaminated with chemicals, seek another source of water, such as bottled water.

- If you can't boil water, you can treat water with chlorine tablets, iodine tablets, or unscented household chlorine bleach (5.25% sodium hypochlorite). If you use chlorine tablets or iodine tablets, follow the directions that come with the tablets. If you use household chlorine bleach, add 1/8 teaspoon (~0.75 milliliter [mL]) of bleach per gallon of water if the water is clear. For cloudy water, add 1/4 teaspoon (~1.50 mL) of bleach per gallon. Mix the solution thoroughly and let it stand for about 30 minutes before using it. Treating water with chlorine tablets, iodine tablets, or liquid bleach will not kill many parasitic organisms. Boiling is the best way to kill these organisms.

- Do not rely on water disinfection methods or devices that have not been recommended or approved by local health authorities. Contact your local health department for advice about water treatment products that are being advertised.

- Use water storage tanks and other types of containers with caution. For example, fire truck storage tanks and previously used cans or bottles may be contaminated with microbes or chemicals. Water containers should be thoroughly cleaned, then rinsed with a bleach solution before use.

- Clean surfaces thoroughly with soap and water, then rinse.

- For gallon- or liter-sized containers, add approximately 1 teaspoon (4.9 mL) household bleach (5.25%) with 1 cup (240 mL) water to make a bleach solution.

- Cover the container and agitate the bleach solution thoroughly, allowing it to contact all inside surfaces. Cover and let stand for 30 minutes, then rinse with potable water.

- Flooded, private water wells will need to be tested and disinfected after flood waters recede. If you suspect that your well may be contaminated, contact your local or state health department or agriculture extension agent for specific advice. See Disinfecting Wells after an Emergency (http://www.bt.cdc.gov/disasters/wellsdisinfect.asp) for general instructions.

- Practice basic hygiene. Wash your hands with soap and bottled water or water that has been boiled or disinfected. Wash your hands before preparing food or eating, after toilet use, after participating in clean-up activities, and after handling articles contaminated with floodwater or sewage. Use an alcohol-based hand sanitizer to wash your hands if you have a limited supply of clean water.

Emergency Disinfection of Drinking Water (EPA)

EPA 810-F-93-002: July 1993

In times of extreme crisis, local health departments may urge consumers to use more caution or to follow additional measures. If local public health department information differs from this advice, the local information should prevail.

When the home water supply is interrupted by natural or other forms of disaster, you can obtain limited amounts of water by draining your hot water tank or melting ice cubes. In most cases, well water is the preferred source of drinking water. If it is not available and river or lake water must be used, avoid sources containing floating material and water with a dark color or an odor.

When emergency disinfection is necessary, examine the physical condition of the water. Disinfectants are less effective in cloudy water. Filter murky or colored water through clean cloths or allow it to settle, and draw off the clean water for disinfection. Water prepared for disinfection should be stored only in clean, tightly covered, containers, not subject to corrosion.

There are two general methods by which small quantities of water can be effectively disinfected. One method is boiling. It is the most positive method by which water can be made bacterially safe to drink. Another method is chemical treatment. If applied with care, certain chemicals will make most water free from harmful or pathogenic organisms.

Methods Of Emergency Disinfection

Boiling: Vigorous boiling for one minute will kill any disease-causing microorganisms present in water (at altitudes above one mile, boil for three minutes). The flat taste of boiled water can be improved by pouring it back and forth from one container to another (called aeration), by allowing it to stand for a few hours, or by adding a small pinch of salt for each quart of water boiled.

Chemical treatment: When boiling is not practical, chemical disinfection should be used. The two chemicals commonly used are chlorine and iodine. Chlorine and iodine are somewhat effective in protecting against exposure to Giardia, but may not be effective in controlling Cryptosporidium. Therefore, use iodine or chlorine only to disinfect well water (as opposed to surface water sources such as rivers, lakes, and springs), because well water is unlikely to contain these disease causing organisms. Chlorine is generally more effective than iodine in controlling Giardia, and both disinfectants work much better in warmer water.

Chlorine Methods

Chlorine Bleach: When boiling is not practical, chemical disinfection should be used. Common household bleach contains a chlorine compound that will disinfect water. The procedure to be followed is usually written on the label. When the necessary procedure is not given, find the percentage of available chlorine on the label and use the information in the following tabulation as a guide.

Available Chlorine	Drops per Quart of Clear Water
1%	10
4-6%	2
7-10%	1

(If strength is unknown, add ten drops per quart of water. Double amount of chlorine for cloudy or colored water or water that is extremely cold.)

The treated water should be mixed thoroughly and allowed to stand, preferably covered, for 30 minutes. The water should have a slight chlorine odor; if not, repeat the dosage and allow the water to stand for an additional 15 minutes. If the treated water has too strong a chlorine taste, it can be made more pleasing by allowing the water to stand exposed to the air for a few hours or by pouring it from one clean container to another several times.

Granular Calcium Hypochlorite. Add and dissolve one heaping teaspoon of high-test granular calcium hypochlorite (approximately 1/4 ounce) for each two gallons of water. The mixture will produce a stock chlorine solution of approximately 500 mg/L, since the calcium hypochlorite has an available chlorine equal to 70 percent of its weight. To disinfect water, add the chlorine solution in the ratio of one part of chlorine solution to each 100 parts of water to be treated. This is roughly equal to adding 1 pint (16 oz.) of stock chlorine to each 12.5 gallons of water to be disinfected. To remove any objectionable chlorine odor, aerate the water as described above.

Chlorine Tablets. Chlorine tablets containing the necessary dosage for drinking water disinfection can be purchased in a commercially prepared form. These tablets are available from drug and sporting goods stores and should be used as stated in the instructions. When instructions are not available, use one tablet for each quart of water to be purified.

Tincture of Iodine

Common household iodine from the medicine chest or first aid kit may be used to disinfect water. Add five drops of 2 percent United States Pharmacopeia (U.S.P.) Tincture of iodine to each quart of clear water. For cloudy water add ten drops and let the solution stand for at least 30 minutes.

Iodine Tablets. Commercially prepared iodine tablets containing the necessary dosage for drinking water disinfection can be purchased at drug and sporting goods stores. They should be used as stated. When instructions are not available, use one tablet for each quart of water to be purified.

WATER TO BE USED FOR DRINKING, COOKING, MAKING ANY PREPARED DRINK, OR BRUSHING THE TEETH SHOULD BE PROPERLY DISINFECTED.

First Aid

Basic First Aid: Script

AgSafe, Coalition for Health and Safety in Agriculture[1]

The following safety module is intended to be used as a refresher safety awareness session and is in no way to be used as a substitute for job training nor for proper equipment use.

GET MEDICAL ATTENTION FOR ALL INJURIES

It is very important for you to get immediate treatment for *every* injury, regardless how small you may think it is. (See Figure 1.) Many cases have been reported where a small unimportant injury, such as a splinter wound or a puncture wound, quickly led to an infection, threatening the health and limb of the employee. Even the smallest scratch is large enough for dangerous germs to enter, and in large bruises or deep cuts, germs come in by the millions. Immediate examination and treatment is necessary for *every* injury.

Figure 1. Get medical attention for all injuries

What is first aid? It is simply those things you can do for the victim before medical help arrives. The most important procedures are described below.

CONTROL BLEEDING WITH PRESSURE

Bleeding is the most visible result of an injury. Each of us has between five and six quarts of blood in our body. Most people can lose a small amount of blood with no problem, but if a quart or more is quickly lost, it could lead to shock and/or death. One of the best ways to treat bleeding is to place a clean cloth on the wound and apply pressure with the palm of your hand until the bleeding stops. You should also elevate the wound above the victim's heart, if possible, to slow down the bleeding at the wound site. (See Figure 2.) Once the bleeding stops, do not try to remove the cloth that is against the open wound as it could disturb the blood clotting and restart the bleeding. If the bleeding is very serious, apply pressure to the nearest major pressure point, located either on the inside of the upper arm between the shoulder and elbow, or in the groin area where the leg joins the body. Direct pressure is better than a pressure point or a tourniquet because direct pressure stops blood circulation only at the wound. Only use the pressure points if elevation and direct pressure haven't controlled the bleeding. Never use a tourniquet (a device, such as a bandage twisted tight with a stick, to control the flow of blood) except in response to an extreme emergency,

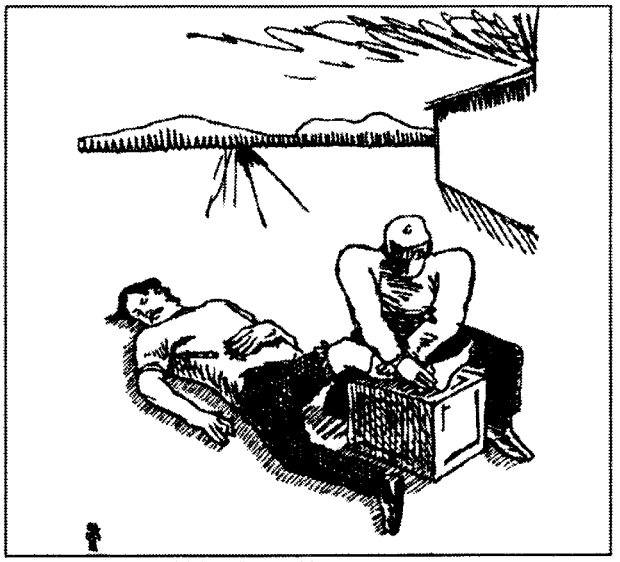


Figure 2. Control bleeding with pressure

such as a severed arm or leg. Tourniquets can damage nerves and blood vessels and can cause the victim to lose an arm or leg.

TREAT PHYSICAL SHOCK QUICKLY

Shock can threaten the life of the victim of an injury if it is not treated quickly. (See Figure 3.) Even if the injury doesn't directly cause death, the victim can go into shock and die. Shock occurs when the body's important functions are threatened by not getting enough blood or when the major organs and tissues don't receive enough oxygen. Some of the symptoms of shock are a pale or bluish skin color that is cold to the touch, vomiting, dull and sunken eyes, and unusual thirst. Shock requires medical treatment to be reversed, so all you can do is prevent it from getting worse. You can maintain an open airway for breathing, control any obvious bleeding and elevate the legs about 12 inches unless an injury makes it impossible. You can also prevent the loss of body heat by covering the victim (over and under) with blankets. Don't give the victim anything to eat or drink because this may cause vomiting. Generally, keep the victim lying flat on the back.

A victim who is unconscious or bleeding from the mouth should lie on one side so breathing is easier. Stay with the victim until medical help arrives.

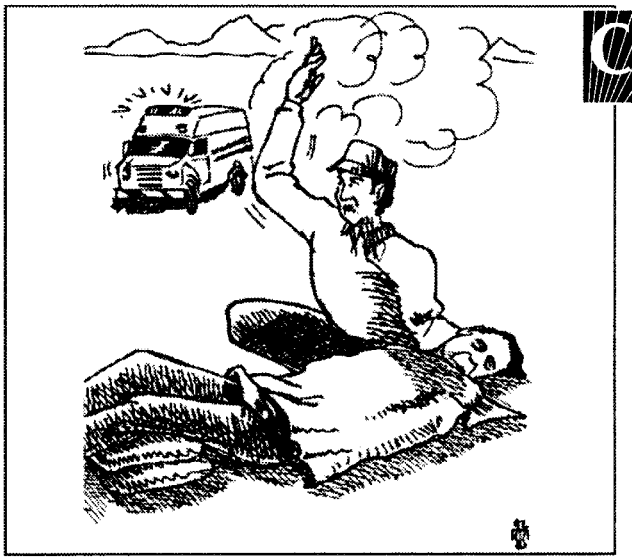


Figure 3. Treat physical shock quickly

MOVE THE INJURED PERSON ONLY WHEN ABSOLUTELY NECESSARY

Never move an injured person unless there is a fire or when explosives are involved. The major concern with moving an injured person is making the injury worse, which is especially true with spinal cord injuries. If you must move an injured person, try to drag him or her by the clothing around the neck or shoulder area. If possible, drag the person onto a blanket or large cloth and then drag the blanket. (See Figure 4.)

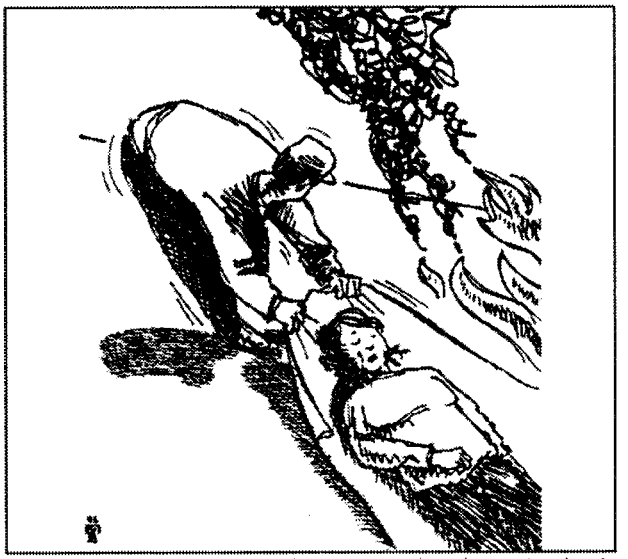


Figure 4. Move the injured person only when absolutely necessary

PERFORM THE HEIMLICH MANEUVER ON CHOKING VICTIMS

Ask the victim to cough, speak, or breathe. If the victim can do none of these things, stand behind the victim and locate the bottom rib with your hand. Move your hand across the abdomen to the area above the navel then make a fist and place your thumb side on the stomach. Place your other hand over your fist and press into the victim's stomach with a quick upward thrust until the food is dislodged. (See Figure 5.)

Figure 5. Perform the Heimlich maneuver on choking victims

FLUSH BURNS IMMEDIATELY WITH WATER

There are a many different types of burns. They can be thermal burns, chemical burns, electrical burns or contact burns. Each of the burns can occur in a different way, but treatment for them is very similar. For thermal, chemical or contact burns, the first step is to run cold water over the burn for a *minimum* of 30 minutes. (See Figure 6.) If the burn is small enough, keep it completely under water. Flushing the burn takes priority over calling for help. Flush the burn FIRST. If the victim's clothing is stuck to the burn, don't try to remove it. Remove clothing that is not stuck to the burn by cutting or tearing it. Cover the burn with a clean, cotton material. If you do not have clean, cotton material, do not cover the burn with anything. Do not scrub the burn and do not apply any soap, ointment, or home remedies. Also, don't offer the burn victim anything to drink or eat, but keep the victim covered with a blanket to maintain a normal body temperature until medical help arrives.

If the victim has received an electrical burn, the treatment is a little different. Don't touch a victim who has been in contact with electricity unless you are clear of the power source. If the victim is still in contact with the power source, electricity will travel through the victim's body and electrify you when you reach to touch. Once the victim is clear of the power source, your priority is to check for any airway obstruction, and to check breathing and circulation. Administer CPR if necessary. Once the victim is stable, begin to run cold water over the burns for a minimum of 30 minutes. Don't move the victim and don't scrub the burns or apply any soap, ointment, or home remedies. After flushing the burn, apply a clean, cotton cloth to the burn. If cotton is not available, don't use anything. Keep the victim warm and still and try to maintain a normal body temperature until medical help arrives.

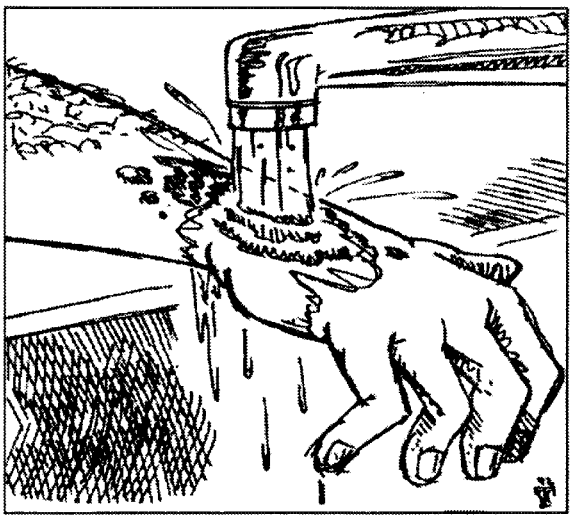


Figure 6. Flush burns immediately with water

USE COOL TREATMENT FOR HEAT EXHAUSTION OR STROKE

Heat exhaustion and heat stroke are two different things, although they are commonly confused as the same condition. Heat exhaustion can occur anywhere there is poor air circulation, such as around an open furnace or heavy machinery, or even if the person is poorly adjusted to very warm temperatures. The body reacts by increasing the heart rate and strengthening blood circulation. Simple heat exhaustion can occur due to loss of body fluids and salts. The symptoms are usually excessive fatigue, dizziness and disorientation, normal skin temperature but a damp and clammy feeling. To treat heat exhaustion, move to the victim to a cool spot and encourage drinking of cool water and rest. (See Figure 7.)

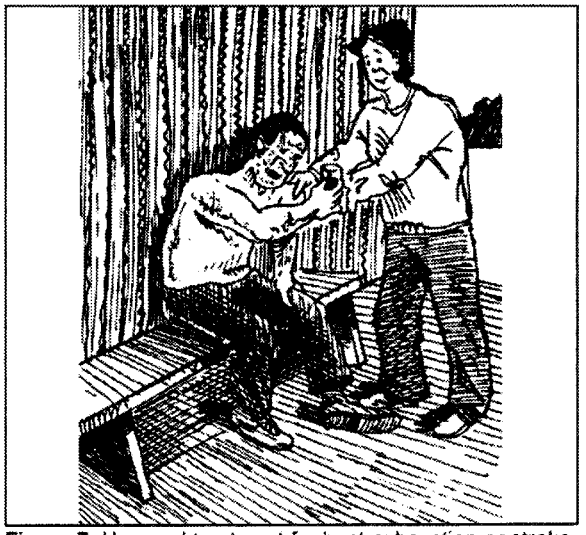


Figure 7. Use cool treatment for heat exhaustion or stroke

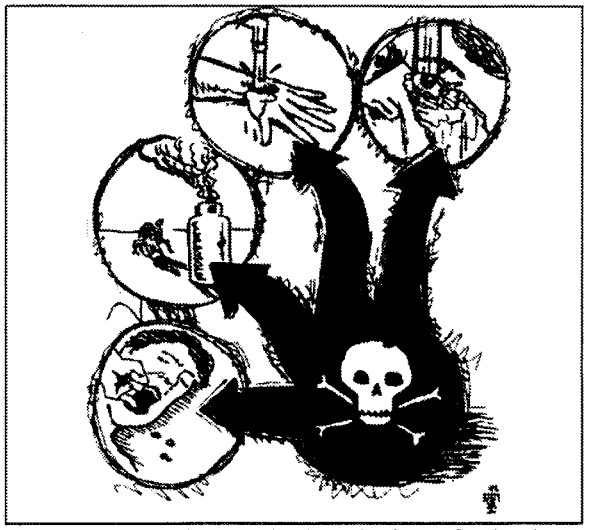


Figure 8. Respond appropriately to the form of poisoning

Heat stroke is much more serious and occurs when the body's sweat glands have shut down. Some symptoms of heat stroke are mental confusion, collapse, unconsciousness, fever with dry, mottled skin. A heat stroke victim will die quickly, so don't wait for medical help to arrive--assist immediately. The first thing you can do is move the victim to a cool place out of the sun and begin pouring cool water *over* the victim. Fan the victim to provide good air circulation until medical help arrives.

RESPOND APPROPRIATELY TO THE FORM OF POISONING

The first thing to do is get the victim away from the poison. Then use provide treatment appropriate to the form of the poisioning. (See Figure 8.) If the poison is in solid form, such as pills, remove it from the victim's mouth using a clean cloth wrapped around your finger. Don't try this with infants because it could force the poison further down their throat. If the poison is a gas, you may need a respirator to protect yourself. After checking the area first for your safety, remove the victim from the area and take to fresh air. If the poison is corrosive to the skin, remove the clothing from the affected area and flush with water for 30 minutes. Take the poison container or label with you when you call for medical help because you will need to be able to answer questions about the poison. Try to stay calm and follow the instructions you are given. If the poison is in contact with the eyes, flush the victim's eyes for a minimum of 15 minutes with clean water.

KEEP A FIRST AID KIT CHECKLIST

In order to administer effective first aid, it is important to maintain adequate supplies in each first aid kit. (See Figure 9.) First aid kits can be purchased commercially already stocked with the necessary supplies, or one can be made by including the following items:

- **Adhesive bandages**: available in a large range of sizes for minor cuts, abrasions and puncture wounds
- **Butterfly closures**: these hold wound edges firmly together.

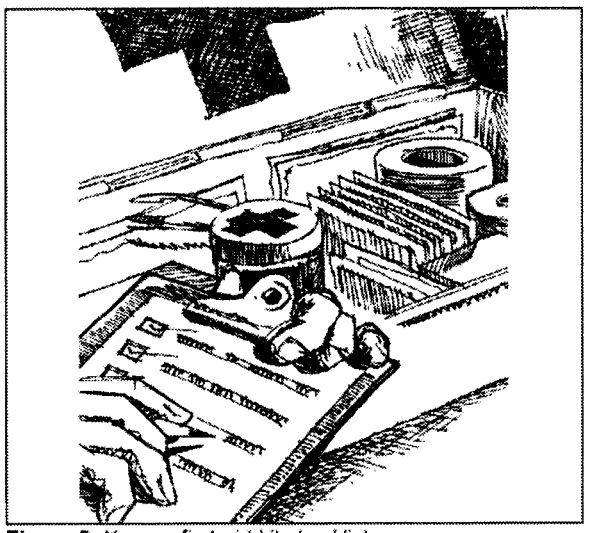


Figure 9. Keep a first aid kit checklist

- **Rolled gauze**: these allow freedom of movement and are recommended for securing the dressing and/or pads. These are especially good for hard-to-bandage wounds.

- **Nonstick Sterile Pads**: these are soft, superabsorbent pads that provide a good environment for wound healing. These are recommended for bleeding and draining wounds, burns, infections.

- **First Aid Tapes**: Various types of tapes should be included in each kit. These include *adhesive*, which is waterproof and extra strong for times when rigid strapping is needed; *clear*, which stretches with the body's movement, good for visible wounds; *cloth*, recommended for most first aid taping needs, including taping heavy dressings (less irritating than adhesive); and *paper*, which is recommended for sensitive skin and is used for light and frequently changed dressings.

- **Items that also can be included** in each kit are tweezers, first aid cream, thermometer, an analgesic or equivalent, and an ice pack.

REPORT ALL INJURIES TO YOUR SUPERVISOR

As with getting medical attention for all injuries, it is equally important that you report all injuries to your supervisor. (See Figure 10.) It is critical that the employer check into the causes of every job-related injury, regardless how minor, to find out exactly how it happened. There may be unsafe procedures or unsafe equipment that should be corrected.

Figure 10. Report all injuries to your supervisor

How to Prevent or Respond to a Snakebite (CDC)

http://www.bt.cdc.gov/disasters/pdf/snakebite.pdf.

After a natural disaster, snakes may have been forced from their natural habitats and move into areas where they would not normally be seen or expected. When you return to your home, be cautious of snakes that may have sought shelter in your home. If you see a snake in your home immediately call the animal control agency in your county.

How to prevent snake bites.

Be aware of snakes that may be swimming in the water to get to higher ground and those that may be hiding under debris or other objects. If you see a snake, back away from it slowly and do not touch it.

Signs of snake bites.

If you have to walk in high water, you may feel a bite, but not know that you were bitten by a snake. You may think it is another kind of bite or scratch. Pay attention to the following snake bite signs.

- Depending on the type of snake, the signs and symptoms may include:
- A pair of puncture marks at the wound;
- Redness and swelling around the bite;
- Severe pain at the site of the bite;
- Nausea and vomiting;
- Labored breathing (in extreme cases, breathing may stop altogether);
- Disturbed vision;
- Increased salivation and sweating.
- Numbness or tingling around your face and/or limbs.

WHAT TO DO **if you or someone else is bitten by a snake.**

- If you or someone you know are bitten, try to see and remember the color and shape of the snake, which can help with treatment of the snake bite.
- Keep the bitten person still and calm. This can slow down the spread of venom if the snake is poisonous.
- Seek medical attention as soon as possible.
- Dial 911 or call local Emergency Medical Services (EMS).
- Apply first aid if you can not get the person to the hospital right away.
- Lay or sit the person down with the bite below the level of the heart.
- Tell him/her to stay calm and still.
- Cover the bite with a clean, dry dressing.

WHAT NOT TO DO **if you or someone else is bitten by a snake.**

- Do not pick up the snake or try to trap it (this may put you or someone else at risk for a bite).
- Do not apply a tourniquet.
- Do not slash the wound with a knife.
- **Do not suck out the venom.**
- Do not apply ice or immerse the wound in water.
- Do not drink alcohol as a pain killer.

Protecting Yourself from Infectious Disease

Animal Disposal Following an Emergency (CDC)

Most states have their own guidelines on disposal of dead animals, so people with questions regarding the specific situation in their state are highly encouraged to contact local or state health and agricultural officials for clarification.

FAQs (Frequently Asked Questions)

Are there any special health risks I need to be aware of when disposing of dead animals?

The risk to humans from animal carcasses is low if proper precautions are taken.

- Practice proper hand washing to prevent infection with certain pathogens that may be transmitted from farm animals, including *Salmonella* and *E. coli*.
- Secure all food sources and remove any animal carcasses to avoid attracting rats.
- Wear insect repellant when outdoors. Emergencies such as natural disasters may lead to more mosquitoes, which can carry disease.
- People working to clean up areas containing swine or poultry carcasses should take the following precautions:
- Wear protective clothing, including waterproof gloves, waterproof boots, and protective eyewear (cover any open wounds).
- Use duct tape to seal tops of gloves and boots to prevent water seepage.
- Wear respiratory protection—an N-95 respirator or better.
- If you smell hydrogen sulfide (a rotten egg smell), get out of the building and call your county extension office.
- Clean and disinfect all clothing and boots after handling carcass-contaminated materials.
- Wash work clothes separately from street clothes.
- Wash hands thoroughly before placing fingers in mouth (nail biting, etc.).
- Shower and wash hair thoroughly after handling carcass-contaminated materials.

How do I dispose of a dead animal on my property during flood cleanup?

It is usually the responsibility of the owner or person in charge of domesticated animals to appropriately dispose of dead animals in accordance with local or state ordinances within 24 hours after knowledge of the death. It can be the responsibility of the municipal or county government to designate appropriate people to dispose of any domestic dead animals whose owner cannot be identified.

Contact your local animal control department, local health department, or state veterinarian for specific disposal guidance.

My pet was killed in the flood. Can I bury it on my property?

Several cities require Animal Care and Control agencies to manage the disposal of family pets and other dead animals, except for livestock. Check with your local authorities for more information.

If not, how do I dispose of the remains?

- Wear gloves.
- Cover your gloved hand with a plastic trash bag, pick up the remains, then invert the trash bag over the remains and seal the bag.
- For larger animals, use a shovel to place remains inside a plastic trash bag, then rinse off the shovel with water.
- Call your local animal care and control agency for further instructions and to request pickup.
- Wash your hands.

I am a farmer and I lost a lot of livestock during the flood. How do I dispose of multiple animal remains?

Each farm operation should have specific plans for animal disposal in the event of an emergency. Farm operations should check with state and local authorities to ensure their plan meets local requirements.

In addition, the **US Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS)** (http://www.aphis.usda.gov/) can provide technical advice and assistance on the effective disposal of animal carcasses. The main phone number for the APHIS Emergency Management Staff in Riverdale, Maryland is 301-734-8073. Local phone numbers may be established in the event of an emergency response.

These guidelines are intended to address dead animal disposal during a declared emergency. They do not take the place of the dead animal disposal that occurs under the normal permitted operation of a farm.

Related Links and Resources

US Department of Agriculture (http://www.nalusda.gov/awic/pubs/carcass.htm) For articles regarding disposal of dead animal production

Minnesota Board of Animal Health (http://www.bah.state.mn.us/animals/carcass%20disposal/carcass_disposal.htm) For comparative methods of carcass disposal in animal production

For local assistance available without a Major Determination of Disaster, contact the Animal Diseases and Plant Pests Control section of the **USDA Animal and Plant Health Inspection Service (APHIS)** (http://www.aphis.usda.gov/) Emergency Management Staff in Riverdale, Maryland, at 301-734-8073. Local phone numbers would be established in the event of an emergency response.

American Veterinary Medical Association (AVMA) Disaster Preparedness Series (http://www.avma.org/disaster/resources.asp) Lists several disaster preparedness sites link to state and local resources related to animals.

Interim Health Recommendations for Workers Who Handle Human Remains (CDC)

There is no direct risk of contagion or infectious disease from being near human remains for people who are not directly involved in recovery or other efforts that require handling dead bodies. Individuals in affected areas should instead exercise caution to avoid well documented threats to health and safety, such as injury hazards from sharp debris and from unidentified structural damage to buildings, power lines, roads, and industrial facilities. Loss of sanitary infrastructure may result in exposure to raw sewage, loss of local drinking water treatment capacity, and inability to maintain refrigeration for food and medical supplies.

Recommendations for individuals who must have direct contact with human remains

Human remains may contain blood-borne viruses such as hepatitis B and C viruses and HIV, and bacteria that cause diarrheal diseases, such as shigella and salmonella. These viruses and bacteria do not pose a risk to someone walking nearby, nor do they cause significant environmental contamination. Bacteria and viruses from human remains in flood water are a minor part of the overall contamination that can include uncontrolled sewerage, a variety of soil and water organisms, and household and industrial chemicals. There are no additional practices or precautions for flood water related to human remains, beyond what is normally required for safe food and drinking water, standard hygiene and first aid.

However, for people who must directly handle remains, such as recovery personnel, or persons identifying remains or preparing the remains for burial or cremation, there can be a risk of exposure to such viruses or bacteria.

Workers who handle human remains should use the following precautions:

1. Protect your face from splashes of body fluids and fecal material. You can use a plastic face-shield or a combination of eye protection (indirectly vented safety goggles are a good choice if available; safety glasses will only provide limited protection) and a surgical mask. In extreme situations, a cloth tied over the nose and mouth can be used to block splashes.

2. Protect your hands from direct contact with body fluids, and also from cuts, puncture wounds, or other injuries that break the skin that might be caused by sharp environmental debris or bone fragments. A combination of a cut-proof inner layer glove and a latex or similar outer layer is preferable. Footwear should similarly protect against sharp debris.

3. Maintain hand hygiene to prevent transmission of diarrheal and other diseases from fecal materials on your hands. Wash your hands with soap and water or with an alcohol-based hand cleaner immediately after you remove your gloves.

4. Give prompt care--including immediate cleansing with soap and clean water, and a tetanus booster if indicated --to any wounds sustained during work with human remains.

5. In addition to guarding physical safety, participate in available programs to provide psychological and emotional support for workers handling human remains. Agencies coordinating the management of human remains are encouraged to develop programs providing psychological and emotional support and care for workers during and after recovery activities.

Other Considerations

From the public health perspective of lowering the risk of possible infectious disease transmission, there is no requirement for mass burials or cremation. Response workers should assist local communities to identify a safe location for holding remains awaiting identification. This location should be shielded from public view if possible, and remains should be protected from scavenging animals.

If available, use body bags to contain remains. If available, refrigeration can reduce the rate of decay and facilitate identification.

The sight and smell of decay are unpleasant, but they do not create a public health hazard.

For additional information regarding health risks related to human remains see PAHO's web site at http://www.paho.org/English/DD/PIN/pr040923.htm and WHO's web site at http://www.who.int/hac/techguidance/ems/flood_cds/en/.

After a Hurricane: Key Facts About Infectious Disease (CDC)

Although infectious diseases are a frightening prospect, widespread outbreaks of infectious disease after hurricanes are not common in the United States. Rare and deadly exotic diseases, such as cholera or typhoid, do not suddenly break out after hurricanes and floods in areas where such diseases do not naturally occur.

Communicable disease outbreaks of diarrhea and respiratory illness can occur when water and sewage systems are not working and personal hygiene is hard to maintain as a result of a disaster. However, no disease outbreaks have been reported as of September 3, 2005 in areas affected by Hurricane Katrina.

Decaying bodies create very little risk for major disease outbreaks.

Outbreaks of infectious diseases following hurricanes are rare in developed countries (such as the United States) and only slightly more common in the developing world.

Numbers of short-term, self-limiting gastrointestinal illnesses and respiratory infections sometimes increase in developed countries. However, numbers of communicable diseases (including gastrointestinal and respiratory illnesses as well as cholera and typhoid) more typically **do not increase** in either developed or developing countries.

Unless a disease is brought into a disaster area from elsewhere, any outbreaks that occur are almost always from diseases that were already in the disaster-affected area before the disaster struck.

Because cholera and typhoid are not commonly found in the U.S. Gulf States area, it is very unlikely that they would occur after Hurricane Katrina.

Communicable disease outbreaks can occur when sanitation and hygiene are compromised as a result of a disaster. However, no disease outbreaks have been reported to date in areas affected by Hurricane Katrina.

As has been the case in past hurricanes, the U.S. Department of Health and Human Services quickly sets up tracking systems that monitor illnesses in hurricane-affected areas. In the unlikely event that a disease outbreak occurs, these systems provide an early warning that enables prompt public health response.

Hazards from Flood Waters

Hazards from Flood Waters

Parasitic Infections

Cryptosporidium Infection FAQs (CDC)

What is cryptosporidiosis? (KRIP-toe-spo-rid-ee-OH-sis)

Cryptosporidiosis is a diarrheal disease caused by microscopic parasites of the genus *Cryptosporidium*. Once an animal or person is infected, the parasite lives in the intestine and passes in the stool. The parasite is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it very resistant to

chlorine-based disinfectants. Both the disease and the parasite are commonly known as "crypto." During the past two decades, crypto has become recognized as one of the most common causes of waterborne disease within humans in the United States. The parasite may be found in drinking water and recreational water in every region of the United States and throughout the world.

How is cryptosporidiosis spread?

Cryptosporidium lives in the intestine of infected humans or animals. Millions of crypto germs can be released in a bowel movement from an infected human or animal. Consequently, *Cryptosporidium* is found in soil, food, water, or surfaces that have been contaminated with infected human or animal feces. If a person swallows the parasite they become infected. You **cannot** become infected through contact with blood. The parasite can be spread by:

Accidentally putting something into your mouth or swallowing something that has come into contact with feces of a person or animal infected with *Cryptosporidium*.

Swallowing recreational water contaminated with *Cryptosporidium* (Recreational water includes water in swimming pools, hot tubs, jacuzzis, fountains, lakes, rivers, springs, ponds, or streams that can be contaminated with sewage or feces from humans or animals.)

Note: *Cryptosporidium* can survive for days in swimming pools with adequate chlorine levels.

Eating uncooked food contaminated with *Cryptosporidium*. Thoroughly wash with clean, safe water all vegetables and fruits you plan to eat raw. See below for information on making water safe.

Accidentally swallowing *Cryptosporidium* picked up from surfaces (such as bathroom fixtures, changing tables, diaper pails, or toys) contaminated with feces from an infected person.

What are the symptoms of cryptosporidiosis?

The most common symptom of cryptosporidiosis is watery diarrhea. Other symptoms include:

- Dehydration
- Weight loss
- Stomach cramps or pain
- Fever
- Nausea
- Vomiting

Some people with crypto will have no symptoms at all. While the small intestine is the site most commonly affected, *Cryptosporidium* infections could possibly affect other areas of the digestive or the respiratory tract.

How long after infection do symptoms appear?

Symptoms of cryptosporidiosis generally begin 2 to 10 days (average 7 days) after becoming infected with the parasite.

How long will symptoms last?

In persons with healthy immune systems, symptoms usually last about 1 to 2 weeks. The symptoms may go in cycles in which you may seem to get better for a few days, then feel worse again before the illness ends.

If I have been diagnosed with Cryptosporidium, should I worry about spreading the infection to others?

Yes, *Cryptosporidium* can be very contagious. Follow these guidelines to avoid spreading the disease to others:

Wash your hands with soap and water after using the toilet, changing diapers, and before eating or preparing food.

Do not swim in recreational water (pools, hot tubs, lakes or rivers, the ocean, etc.) if you have cryptosporidiosis and for at least 2 weeks after diarrhea stops. You can pass *Cryptosporidium* in your stool and contaminate water for several weeks after your symptoms have ended. This has resulted in outbreaks of cryptosporidiosis among recreational water users. **Note:** Cryptosporidium can be spread in a chlorinated pool because it is resistant to chlorine and, therefore, can live for days in chlorine-treated swimming pools.

Avoid fecal exposure during sexual activity.

Who is most at risk for cryptosporidiosis?

People who are most likely to become infected with *Cryptosporidium* include:

Children who attend day care centers, including diaper-aged children

Child care workers

Parents of infected children

International travelers

Backpackers, hikers, and campers who drink unfiltered, untreated water

Swimmers who swallow water while swimming in swimming pools, lakes, rivers, ponds, and streams

People who drink from shallow, unprotected wells

People who swallow water from contaminated sources.

Contaminated water includes water that has not been boiled or filtered. Several community-wide outbreaks of cryptosporidiosis have been linked to drinking municipal water or recreational water contaminated with *Cryptosporidium.*

Who is most at risk for getting seriously ill with cryptosporidiosis?

Although Crypto can infect all people, some groups are more likely to develop more serious illness.

Young children and pregnant women may be more susceptible to the dehydration resulting from diarrhea and should drink plenty of fluids while ill.

If you have a severely weakened immune system, you are at risk for more serious disease. Your symptoms may be more severe and could lead to serious or life threatening illness. Examples of persons with weakened immune systems include those with HIV/AIDS; cancer and transplant patients who are taking certain immunosuppressive drugs; and those with inherited diseases that affect the immune system.

What should I do if I think I may have cryptosporidiosis?

If you suspect that you have cryptosporidiosis, see your health care provider.

How is a cryptosporidiosis diagnosed?

Your health care provider will ask you to submit stool samples to see if you are infected. Because testing for Crypto can be difficult, you may be asked to submit several stool specimens over several days. Tests for Crypto are not routinely done in most laboratories; therefore, your health care provider should specifically request testing for the parasite.

If you have a severely weakened immune system, talk to your health care provider for additional guidance. You can also call the CDC AIDS HOTLINE toll-free at 1-800-342-2437. Ask for more information on cryptosporidiosis, or go to the CDC fact sheet Preventing Cryptosporidiosis: A Guide for People with Compromised Immune Systems available by visiting http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/factsht_crypt

What is the treatment for cryptosporidiosis?

A new drug, nitazoxanide, has been approved for treatment of diarrhea caused by *Cryptosporidium* in people with healthy immune systems. Consult with your health care provider for more information. Most people who have a healthy immune system will recover without treatment. The symptoms of diarrhea can be treated. If you have diarrhea, drink plenty of fluids to prevent dehydration. Rapid loss of fluids from diarrhea may be especially life threatening to babies; therefore, parents should talk to their health care provider about fluid replacement therapy options for infants. Anti-diarrheal medicine may help slow down diarrhea, but talk to your health care provider before taking it. People who are in poor health or who have a weakened immune system are at higher risk for more severe and more prolonged illness. The effectiveness of nitazoxanide in immunosuppressed individuals is unclear. For persons with AIDS, anti-retroviral therapy that improves immune status will also decrease or eliminate symptoms of Crypto. However, even if symptoms disappear, cryptosporidiosis is usually not curable and the symptoms may return if the immune status worsens. See your health care provider to discuss anti-retroviral therapy used to improve your immune status.

How can I prevent cryptosporidiosis?

Practice good hygiene.

1. Wash hands thoroughly with soap and water. a. Wash hands after using the toilet and before handling or eating food (especially for persons with diarrhea). b. Wash hands after every diaper change, especially if you work with diaper-aged children, even if you are wearing gloves.
2. Protect others by not swimming if you are experiencing diarrhea (essential for children in diapers).

Avoid water that might be contaminated.

- Do not swallow recreational water.
- Do not drink untreated water from shallow wells, lakes, rivers, springs, ponds, and streams.
- Do not drink untreated water during community-wide outbreaks of disease caused by contaminated drinking water.
- Do not use untreated ice or drinking water when traveling in countries where the water supply might be unsafe.

In the United States, nationally distributed brands of bottled or canned carbonated soft drinks are safe to drink. Commercially packaged non-carbonated soft drinks and fruit juices that do not require refrigeration until after they are opened (those that are stored unrefrigerated on grocery shelves) also are safe. If you are unable to avoid using or drinking water that might be contaminated, then you can make the water safe to drink by doing one of the following:

Heat the water to a rolling boil for at least 1 minute. OR
Use a filter that has an absolute pore size of at least 1 micron or one that has been NSF rated for "cyst removal." Do not rely on chemicals to disinfect water and kill *Cryptosporidium*. Because it has a thick outer shell, this particular parasite is highly resistant to disinfectants such as chlorine and iodine.

Avoid food that might be contaminated.

- Wash and/or peel all raw vegetables and fruits before eating.
- Use safe, uncontaminated water to wash all food that is to be eaten raw.
- Avoid eating uncooked foods when traveling in countries with minimal water treatment and sanitation systems.

Take extra care when traveling.

If you travel to developing nations, you may be at a greater risk for *Cryptosporidium* infection because of poorer water treatment and food sanitation. Warnings about food, drinks, and swimming are even more important when visiting developing countries. Avoid foods and drinks, in particular raw fruits and vegetables, tap water, or ice made from tap water, unpasteurized milk or dairy products, and items purchased from street vendors. These items may be contaminated with *Cryptosporidium*. Steaming-hot foods, fruits you peel yourself, bottled and canned processed drinks, and hot coffee or hot tea are probably safe. Talk with your health care provider about other guidelines for travel abroad.

Giardia Infection FAQs (CDC)

What is giardiasis?

Giardiasis (GEE-are-DYE-uh-sis) is a diarrheal illness caused by a one-celled, microscopic parasite, *Giardia intestinalis* (also known as *Giardia lamblia*). Once an animal or person has been infected with *Giardia intestinalis*, the parasite lives in the intestine and is passed in the stool. Because the parasite is protected by an outer shell, it can survive outside the body and in the environment for long periods of time. During the past 2 decades, *Giardia* infection has become recognized as one of the most common causes of waterborne disease (found in both drinking and recreational water) in humans in the United States. *Giardia* are found worldwide and within every region of the United States.

How do you get giardiasis and how is it spread?

The *Giardia* parasite lives in the intestine of infected humans or animals. Millions of germs can be released in a bowel movement from an infected human or animal. *Giardia* is found in soil, food, water, or surfaces that have been contaminated with the feces from infected humans or animals. You **can** become infected after accidentally swallowing the parasite; you **cannot** become infected through contact with blood. *Giardia* can be spread by:

Accidentally putting something into your mouth or swallowing something that has come into contact with feces of a person or animal infected with *Giardia*.
Swallowing recreational water contaminated with *Giardia*. Recreational water includes water in swimming pools, hot tubs, jacuzzis, fountains, lakes, rivers, springs, ponds, or streams that can be contaminated with sewage or feces from humans or animals.
Eating uncooked food contaminated with *Giardia*.
Accidentally swallowing *Giardia* picked up from surfaces (such as bathroom fixtures, changing tables, diaper pails, or toys) contaminated with feces from an infected person.

What are the symptoms of giardiasis?

Giardia infection can cause a variety of intestinal symptoms, which include
Diarrhea
Gas or flatulence
Greasy stools that tend to float
Stomach cramps
Upset stomach or nausea.

These symptoms may lead to weight loss and dehydration. Some people with giardiasis have no symptoms at all.

How long after infection do symptoms appear?

Symptoms of giardiasis normally begin 1 to 2 weeks (average 7 days) after becoming infected.

How long will symptoms last?

In otherwise healthy persons, symptoms of giardiasis may last 2 to 6 weeks. Occasionally, symptoms last longer.

Who is most likely to get giardiasis?

Anyone can get giardiasis. Persons more likely to become infected include

Children who attend day care centers, including diaper-aged children
Child care workers
Parents of infected children
International travelers
People who swallow water from contaminated sources.

Backpackers, hikers, and campers who drink unfiltered, untreated water
Swimmers who swallow water while swimming in lakes, rivers, ponds, and streams
People who drink from shallow wells

Contaminated water includes water that has not been boiled, filtered, or disinfected with chemicals. Several community-wide outbreaks of giardiasis have been linked to drinking municipal water or recreational water contaminated with *Giardia*.

What should I do if I think I may have giardiasis?

See your health care provider.

How is a Giardia infection diagnosed?

Your health care provider will likely ask you to submit stool samples to check for the parasite. Because *Giardia* can be difficult to diagnose, your provider may ask you to submit several stool specimens over several days.

What is the treatment for giardiasis?

Several prescription drugs are available to treat *Giardia*. Although *Giardia* can infect all people, young children and pregnant women may be more susceptible to dehydration resulting from diarrhea and should, therefore, drink plenty of fluids while ill.

My child does not have diarrhea, but was recently diagnosed as having giardiasis. My health care provider says treatment is not necessary. Is this true?

Treatment is not necessary when the child has no symptoms. However, there are a few exceptions. If your child does not have diarrhea, but is having nausea, fatigue (very tired), weight loss, or a poor appetite, you and your health care provider may wish to consider treatment. If your child attends a day care center where an outbreak is continuing to occur despite efforts to control it, screening and treating children who have no obvious symptoms may be a good idea. The same is true if several family members are ill, or if a family member is pregnant and therefore not able to take the most effective anti-*Giardia* medications.

If I have been diagnosed with giardiasis, should I worry about spreading the infection to others?

Yes, a *Giardia* infection can be very contagious. Follow these guidelines to avoid spreading giardiasis to others:
Wash your hands with soap and water after using the toilet, changing diapers, and before eating or preparing food.
Do not swim in recreational water (pools, hot tubs, lakes or rivers, the ocean, etc.) if you have *Giardia* and for at least 2 weeks after diarrhea stops. You can pass *Giardia* in your stool and contaminate water for several weeks after your symptoms have ended. This has resulted in outbreaks of *Giardia* among recreational water users.
Avoid fecal exposure during sexual activity.

How can I prevent a Giardia infection?

Practice good hygiene.

Wash hands thoroughly with soap and water.
Wash hands after using the toilet and before handling or eating food (especially for persons with diarrhea).
Wash hands after every diaper change, especially if you work with diaper-aged children, even if you are wearing gloves.
2. Protect others by not swimming if you are experiencing diarrhea (essential for children in diapers).

Avoid water that might be contaminated.

Do not swallow recreational water.
Do not drink untreated water from shallow wells, lakes, rivers, springs, ponds, and streams.
Do not drink untreated water during community-wide outbreaks of disease caused by contaminated drinking water.
Do not use untreated ice or drinking water when traveling in countries where the water supply might be unsafe. In the United States, nationally distributed brands of bottled or canned carbonated soft drinks are safe to drink. Commercially packaged non-carbonated soft drinks and fruit juices that do not require refrigeration until after they are opened (those that are stored unrefrigerated on grocery shelves) also are safe.

If you are unable to avoid using or drinking water that might be contaminated, then you can make the water safe to drink by doing one of the following:
Heat the water to a rolling boil for at least 1 minute, OR
Use a filter that has an absolute pore size of at least 1 micron or one that has been NSF rated for "cyst removal."
If you cannot heat the water to a rolling boil or use a recommended filter, then try chemically treating the water by chlorination or iodination.

Using chemicals may be less effective than boiling or filtering because the amount of chemical required to make the water safe is highly dependent on the temperature, pH, and cloudiness of the water.

Avoid food that might be contaminated.
Wash and/or peel all raw vegetables and fruits before eating.
Use safe, uncontaminated water to wash all food that is to be eaten raw.
Avoid eating uncooked foods when traveling in countries with minimal water treatment and sanitation systems.

Avoid fecal exposure during sexual activity.

If my water comes from a well, should I have my well water tested?

You should consider having your well water tested if you can answer "yes" to any of the following questions:

Are members of your family or others who use your well water becoming ill? If yes, your well may be the source of infection.

Is your well located at the bottom of a hill or is it considered shallow? If so, runoff from rain or flood water may be draining directly into your well causing contamination.

Is your well in a rural area where animals graze? Well water can become contaminated with feces if animal waste seepage contaminates the ground water. This can occur if your well has cracked casings, is poorly constructed, or is too shallow.

Tests used to specifically identify *Giardia* are often expensive, difficult, and usually require hundreds of gallons of water to be pumped through a filter. If you answered "yes" to the above questions, consider generally testing your well for fecal contamination by testing it for the presence of coliforms or *E. coli* instead of *Giardia*. Although tests for fecal coliforms or *E.coli* do not specifically tell you whether *Giardia* is present, these tests will show whether your well water has been contaminated by fecal matter.

These tests are only useful if your well is not routinely disinfected with chlorine, since chlorine kills fecal coliforms and *E. coli*. If the tests are positive, it is possible that the water may also be contaminated with *Giardia* or other harmful bacteria and viruses. Contact your county health department, your county cooperative extension service, or a local laboratory to find out who offers water testing in your area. If the fecal coliform test comes back positive, indicating that your well is fecally contaminated, discontinue drinking the well water and contact your local water authority for instructions on how to disinfect your well.

This fact sheet is for information only and is not meant to be used for self-diagnosis or as a substitute for consultation with a health care provider. If you have any questions about the disease described above or think that you may have a parasitic infection, consult a health care provider.

Toxoplasma Infection (CDC)

What is toxoplasmosis (TOX-o-plaz-MO-sis)?

A single-celled parasite called *Toxoplasma gondii* causes a disease known as toxoplasmosis. While the parasite is found throughout the world, more than 60 million people in the United States may be infected with the *Toxoplasma* parasite. Of those who are infected, very few have symptoms because a healthy person's immune system usually keeps the parasite from causing illness. However, pregnant women and individuals who have compromised immune systems should be cautious; for them, a *Toxoplasma* infection could cause serious health problems.

How do people get toxoplasmosis?

A *Toxoplasma* infection occurs by:

Accidentally swallowing cat feces from a Toxoplasma-infected cat that is shedding the organism in its feces. This might happen if you were to accidentally touch your hands to your mouth after gardening, cleaning a cat's litter box, or touching anything that has come into contact with cat feces.

Eating contaminated raw or partly cooked meat, especially pork, lamb, or venison; by touching your hands to your mouth after handling undercooked meat.

Contaminating food with knives, utensils, cutting boards and other foods that have had contact with raw meat

Drinking water contaminated with Toxoplasma

Receiving an infected organ transplant or blood transfusion, though this is rare.

What are the symptoms of toxoplasmosis?

Symptoms of the infection vary.

Most people who become infected with *Toxoplasma* are not aware of it.

Some people who have toxoplasmosis may feel as if they have the "flu" with swollen lymph glands or muscle aches and pains that last for a month or more.

Severe toxoplasmosis, causing damage to the brain, eyes, or other organs, can develop from an acute *Toxoplasma* infection or one that had occurred earlier in life and is now reactivated. Severe cases are more likely in individuals who have weak immune systems, though occasionally, even persons with healthy immune systems may experience eye damage from toxoplasmosis.

Most infants who are infected while still in the womb have no symptoms at birth, but they may develop symptoms later in life. A small percentage of infected newborns have serious eye or brain damage at birth.

Who is at risk for developing severe toxoplasmosis?

People who are most likely to develop severe toxoplasmosis include:

Infants born to mothers who became infected with *Toxoplasma* for the first time during or just before pregnancy.

Persons with severely weakened immune systems, such as individuals with HIV/AIDS, those taking certain types of chemotherapy, and those who have recently received an organ transplant.

What should I do if I think I am at risk for severe toxoplasmosis?

If you are planning to become pregnant, your health care provider may test you for *Toxoplasma*. If the test is positive it means you have already been infected sometime in your life. There usually is little need to worry about passing the infection to your baby. If the test is negative, take necessary precautions to avoid infection (See below).

If you are already pregnant, you and your health care provider should discuss your risk for toxoplasmosis. Your health care provider may order a blood sample for testing.

If you have a weakened immune system, ask your doctor about having your blood tested for *Toxoplasma*. If your test is positive, your doctor can tell you if and when you need to take medicine to prevent the infection from reactivating. If your test is negative, it means you have never been infected and you need to take precautions to avoid infection.

What should I do if I think I may have toxoplasmosis?

If you suspect that you may have toxoplasmosis, talk to your health care provider. Your provider may order one or more varieties of blood tests specific for toxoplasmosis. The results from the different tests can help your provider determine if you have a *Toxoplasma* infection and whether it is a recent (acute) infection.

What is the treatment for toxoplasmosis?

Once a diagnosis of toxoplasmosis is confirmed, you and your health care provider can discuss whether treatment is necessary. In an otherwise healthy person who is not pregnant, treatment usually is not needed. If symptoms occur, they typically go away within a few weeks to months. For pregnant women or persons who have weakened immune systems, medications are available to treat toxoplasmosis.

How can I prevent toxoplasmosis?

There are several general sanitation and food safety steps you can take to reduce your chances of becoming infected with Toxoplasma.

Wear gloves when you garden or do anything outdoors that involves handling soil. Cats, which may pass the parasite in their feces, often use gardens and sandboxes as litter boxes. Wash your hands well with soap and water after outdoor activities, especially before you eat or prepare any food.

When preparing raw meat, wash any cutting boards, sinks, knives, and other utensils that might have touched the raw meat thoroughly with soap and hot water to avoid cross-contaminating other foods. Wash your hands well with soap and water after handling raw meat.

Cook all meat thoroughly; that is, to an internal temperature of 160° F and until it is no longer pink in the center or until the juices become colorless. Do not taste meat before it is fully cooked.

For further information on safe food handling to help reduce food borne illness visit the Fight BAC!® Web site at http://www.fightbac.org/main.cfm.

If I am at risk, would I be able to keep my cat?

Yes, you may keep your cat if you are a person at risk for a severe infection (e.g., you have a weakened immune system or are pregnant); however, there are several safety precautions to avoid being exposed to *Toxoplasma*:

Keep your cat healthy and help prevent it from becoming infected with *Toxoplasma*. Keep your cat indoors and feed it dry or canned cat food rather than allowing it to have access to wild birds and rodents or to food scraps. A cat can become infected by eating infected prey or by eating raw or undercooked meat infected with the parasite.

Do not bring a new cat into your house that might have spent time out of doors or might have been fed raw meat. Avoid stray cats and kittens and the area they have adopted as their "home." Your veterinarian can answer any other questions you may have regarding your cat and risk for toxoplasmosis.

Have someone who is healthy and not pregnant change your cat's litter box daily. If this is not possible, wear gloves and clean the litter box every day, because the parasite found in cat feces needs one or more days after being passed to become infectious. Wash your hands well with soap and water afterwards.

Once infected with Toxoplasma is my cat always able to spread the infection to me?

No, cats only spread *Toxoplasma* in their feces for a few weeks following infection with the parasite. Like humans, cats rarely have symptoms when first infected, so most people do not know if their cat has been infected. The infection will go away on its own; therefore it does not help to have your cat or your cat's feces tested for *Toxoplasma*.

Treating Symptoms

Guidelines for the Management of Acute Diarrhea (CDC)

Increased incidence of acute diarrhea may occur in post-disaster situations where access to electricity, clean water, and sanitary facilities are limited. In addition, usual hygiene practices may be disrupted and healthcare seeking behaviors may be altered. The following are general guidelines for healthcare providers for the evaluation and treatment of patients presenting with acute diarrhea in these situations. However, specific patient treatment should be determined based on the healthcare provider's clinical judgment. Any questions should be directed to the local health department.

Children

Indications for medical evaluation of infants and toddlers with acute diarrhea

- Young age (e.g., aged <6 months or weight <18 lbs.)
- Premature birth, history of chronic medical conditions or concurrent illness
- Fever ?38 °C (100.4 °F) for infants aged <3 months or ?39 °C (102.2 °F) for children aged 3—36 months
- Visible blood in stool
- High output diarrhea, including frequent and substantial volumes of stool
- Persistent vomiting
- Caregiver's report of signs consistent with dehydration (e.g., sunken eyes or decreased tears, dry mucous membranes, or decreased urine output)
- Change in mental status (e.g., irritability, apathy, or lethargy)
- Suboptimal response to oral rehydration therapy already administered or inability of the caregiver to administer oral rehydration therapy

Principles of appropriate treatment for INFANTS AND TODDLERS with diarrhea and dehydration

- Oral rehydration solutions (ORS) such as Pedialyte ® or Gastrolyte ® or similar commercially available solutions containing sodium, potassium and glucose should be used for rehydration whenever patient can drink the required volumes; otherwise appropriate intravenous fluids may be used.
- Oral rehydration should be taken by patient in small, frequent volumes (spoonfuls or small sips); see attached table for recommended volumes and time period.
- For rapid realimentation, an age-appropriate, unrestricted diet is recommended as soon as dehydration is corrected
- For breastfed infants, nursing should be continued
- Additional ORS or other rehydration solutions should be administered for ongoing losses through diarrhea
- No unnecessary laboratory tests or medications should be administered.

The decision to treat with antimicrobial therapy should be made on a patient-by-patient basis, on clinical grounds, which may include:

- Fever
- Bloody or mucoid stool
- Suspicion of sepsis

Older Children and Adults

Indications for medical evaluation of children > 3 years old and adults with acute diarrhea

- Elderly age
- History of chronic medical conditions or concurrent illness
- Fever ?39 °C (102.2 °F)
- Visible blood in stool
- High output of diarrhea, including frequent and substantial volumes of stool
- Persistent vomiting
- Signs consistent with dehydration (e.g., sunken eyes or decreased tears, dry mucous membranes, orthostatic hypotension or decreased urine output)
- Change in mental status (e.g., irritability, apathy, or lethargy)
- Suboptimal response to oral rehydration therapy already administered or inability to administer oral rehydration therapy

Principles of appropriate treatment for ADULTS with diarrhea and dehydration

- Oral rehydration solutions (ORS) such as Pedialyte ® or Gastrolyte ® or similar commercially available solutions containing sodium, potassium and glucose should be used for rehydration whenever patient can drink the required volumes; otherwise appropriate intravenous fluids may be used.
- Oral rehydration should be taken by patient in small, frequent volumes (spoonfuls or small sips); see attached table for recommended volume and time period.
- For rapid realimentation, unrestricted diet is recommended as soon as dehydration is corrected
- Additional ORS or other rehydration solutions should be administered for ongoing losses through diarrhea
- No unnecessary laboratory tests or medications should be administered
- Antimotility agents such as Lomotil ® or Immodium ® should be considered only in patients who are NOT febrile or having bloody/mucoid diarrhea. Antimotility agents may reduce diarrheal output and cramps, but do not accelerate cure.

The decision to treat with antimicrobial therapy should be made on a patient-by-patient basis, on clinical grounds, which may include

- Fever
- Bloody or mucoid stool
- Suspicion of sepsis

Treatment based on degree of dehydration

Degree of dehydration	Rehydration therapy	Replacement of ongoing losses	Nutrition
Minimal or none	Not applicable	<10 kg body wt.: 60-120 mL oral rehydration solution (ORS) for each diarrheal stool or vomiting episode >10 kg body weight: 120-240 mL ORS for each diarrheal stool or vomiting episode	Continue breast feeding or resume age-appropriate normal diet after initial rehydration, including adequate caloric intake for maintenance
Mild to moderate	ORS, 50-100 mL/kg body weight over 3-4 hours	Same	Same
Severe	Ringers lactate Lactated Ringers solution or normal saline * in 20 mL/kg body weight intravenous amounts until perfusion and mental status improve: then administer 100 mL/kg body weight ORS over 4 hours or 5% dextrose ½ normal saline intravenously at twice maintenance fluid rates	Same: if unable to drink, administer through nasogastric tube or administer 5% dextrose ¼ normal saline with 20 mEq/L potassium chloride intravenously	Same

* In severe dehydrating diarrhea, normal saline is less effective for treatment because it contains no bicarbonate or potassium. Use normal saline only if Ringers lactate solution is not available, and supplement with ORS as soon as the patient can drink. Plain glucose in water is ineffective and should not be used.

NOTE: Restrictive diets should be avoided during acute diarrheal episodes. Breastfed infants should continue to nurse ad libitum even during acute rehydration. Infant too weak to eat can be given breastmilk or formula through nasogastric tube. Lactose-containing formulas are usually well-tolerated. If lactose malabsorption appears clinically substantial, lactose-free formulas can be used. Complex carbohydrates, fresh fruits, lean meats, yogurt, and vegetables are all recommended. Carbonated drinks or commercial juices with a high concentration of simple carbohydrates should be avoided.

Chemical Contaminants

(These chemicals can also contaminate mud and household objects that have been saturated with contaminated flood waters)

How to Deal With Chemical Hazards

Be aware of potential chemical hazards you may encounter during flood recovery. Flood waters may have buried or moved hazardous chemical containers of solvents or other industrial chemicals from their normal storage places. If any propane tanks (whether 20-lb. tanks from a gas grill or household propane tanks) are discovered, do not attempt to move them yourself. These represent a very real danger of fire or explosion, and if any are found, police or fire departments or your State Fire Marshal's office should be contacted immediately. Car batteries, even those in flood water, may still contain an electrical charge and should be removed with extreme caution by using insulated gloves. Avoid coming in contact with any acid that may have spilled from a damaged car battery.

Hydrogen Fluoride/Hydrofluoric Acid (CDC)

What is hydrogen fluoride?

Hydrogen fluoride is a chemical compound that contains fluorine. It can exist as a colorless gas or as a fuming liquid, or it can be dissolved in water.
When hydrogen fluoride is dissolved in water, it may be called hydrofluoric acid.
Hydrogen fluoride also can be released when some other fluoride-containing compounds such as ammonium fluoride are combined with water.

Where hydrogen fluoride is found and how it is used

Hydrogen fluoride is used to make refrigerants, herbicides, pharmaceuticals, high-octane gasoline, aluminum, plastics, electrical components, and fluorescent light bulbs. Sixty percent of the hydrogen fluoride used in manufacturing is for processes to make refrigerants.
Hydrogen fluoride is also used for etching glass and metal.

How you could be exposed to hydrogen fluoride

In a natural disaster, you could be exposed to high levels of hydrogen fluoride when storage facilities or containers are damaged and the chemical is released. This release could occur at an industrial site or even a retail location.
You could be exposed to hydrogen fluoride if it is used as a chemical terrorism agent.
If you work in an occupation that uses hydrogen fluoride, you may be exposed to this chemical.
You may be exposed to hydrogen fluoride as part of a hobby.

How hydrogen fluoride works

Hydrogen fluoride goes easily and quickly through the skin and into the tissues in the body. There it damages the cells and causes them to not work properly.
The seriousness of poisoning caused by hydrogen fluoride depends on the amount, route, and length of time of exposure, as well as the age and preexisting medical condition of the person exposed.
Breathing hydrogen fluoride can burn lung tissue and cause swelling and fluid accumulation in the lungs (pulmonary edema).
Skin contact with hydrogen fluoride may cause severe burns that develop after several hours and form skin ulcers.

Immediate signs and symptoms of exposure to hydrogen fluoride

Hydrogen fluoride gas, even at low levels, can irritate the eyes, nose, and respiratory tract. Breathing in hydrogen fluoride at high levels or in combination with skin contact can cause death from irregular heartbeat or from fluid buildup in the lungs. Even splashes of hydrogen fluoride on the skin can be fatal. Skin contact with hydrogen fluoride may cause no immediate signs of exposure.
Swallowing only a small amount of highly concentrated hydrogen fluoride will affect major internal organs and may be fatal.
Often, patients exposed to low concentrations of hydrogen fluoride on the skin do not show effects right away. Severe pain at the exposure site may be the only symptom for several hours. Visible damage may not be shown until 12 to 24 hours after the exposure.
Depending on the concentration of the chemical and the length of time of exposure, skin contact may cause severe pain at the point of contact; a rash; and deep, slow-healing burns. Severe pain can occur even if no burns can be seen.
Showing these signs and symptoms does not necessarily mean that a person has been exposed to hydrogen fluoride. Other chemicals also can cause these effects.

Long-term health effects of acute exposure to hydrogen fluoride

People who survive after being severely injured by breathing in hydrogen fluoride may suffer lingering chronic lung disease.
Burns caused by concentrated hydrogen fluoride may take a long time to heal and may result in severe scarring.
Fingertip injuries from hydrogen fluoride may result in persistent pain, bone loss, and injury to the nail bed.
Eye exposure to hydrogen fluoride may cause prolonged or permanent visual defects, blindness, or total destruction of the eye.
Swallowing hydrogen fluoride can damage the esophagus and stomach. The damage may progress for several weeks, resulting in gradual and lingering narrowing of the esophagus.

How you can protect yourself, and what to do if you are exposed to hydrogen fluoride

First, if the hydrogen fluoride was released into the air, get fresh air by leaving the area where the chemical was released.
If the hydrogen fluoride release was outside, move away from the area where the chemical was released.
If the hydrogen fluoride release occurred indoors, get out of the building.
If you are near a release of fluorine or hydrogen fluoride, emergency coordinators may tell you to either evacuate the area or .shelter in place. inside a building to avoid being exposed to the chemical. For more information on evacuation during a chemical emergency, see .Facts About Evacuation. At http://www.bt.cdc.gov/planning/evacuationfacts.asp. For more information on sheltering in place during a chemical emergency, see .Facts About Sheltering in Place. at http://www.bt.cdc.gov/planning/Shelteringfacts.asp.
If you think you may have been exposed to hydrogen fluoride, you should remove your clothing, rapidly wash your entire body with water, and get medical care as quickly as possible.

Removing your clothing

Quickly take off clothing that may have hydrogen fluoride on it. Any clothing that has to be pulled over the head should be cut off the body.
If you are helping other people remove their clothing, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.

Washing yourself

As quickly as possible, wash any hydrogen fluoride from your skin with large amounts of water.
If your eyes are burning or your vision is blurred, rinse your eyes with plain water.
If you wear contacts, remove them after washing your hands and put them with the contaminated clothing. Do not put the contacts back in your eyes (even if they are not disposable contacts). If you wear eyeglasses, wash them with soap and water. You can put your eyeglasses back on after you wash them.

Disposing of your clothes

After you have washed yourself, place your clothing inside a plastic bag. Avoid touching contaminated areas of the clothing. If you can't avoid touching contaminated areas, or you aren't sure which areas are contaminated, put the clothing in the bag using tongs, tool handles, sticks, or similar objects. Anything that touches contaminated clothing should also be placed in the bag.
Seal the bag, and then seal that bag inside another plastic bag. Disposing of your clothing in this way will help protect you and other people from any chemicals that might be on your clothes.
When local or state health department or emergency personnel arrive, tell them what you did with your clothes. The health department or emergency personnel will arrange for further disposal. Do not handle the plastic bags yourself.
For more information about cleaning your body and disposing of your clothes after a chemical release, see Chemical Agents: Facts About Personal Cleaning and Disposal of Contaminated Clothing at http://www.bt.cdc.gov/planning/personalcleaningfacts.asp.

If someone has swallowed hydrogen fluoride, do not induce vomiting. Do not give the person activated charcoal. If the person is alert and able to swallow, have them chew several calcium- or magnesiumcontaining antacid tablets or take a magnesium-containing liquid antacid along with 1 to 2 glasses of water or 1 to 2 glasses of milk to dilute their stomach contents.

Seek medical attention immediately. Dial 911 and explain what has happened.

If you are sure the person has swallowed hydrogen fluoride, do not attempt CPR unless you are able to take appropriate measures to protect yourself from exposure to hydrogen fluoride. Performing CPR on someone who has swallowed hydrogen fluoride could expose you to the chemical.

How hydrogen fluoride poisoning is treated

The most important thing is for exposed people to seek medical treatment as soon as possible. Your doctor may recommend or use products to help neutralize the effects of poisoning. Calcium gluconate (a calcium sugar) gels, solutions, and medications are used to neutralize the effects.

How you can get more information about hydrogen fluoride:

Regional Poison Control Center (1-800-222-1222)

Centers for Disease Control and Prevention
Public Response Hotline (CDC)
English (888) 246-2675
Español (888) 246-2857
TTY (866) 874-2646

Emergency Preparedness and Response Web site (http://www.bt.cdc.gov/)
E-mail inquiries: cdcresponse@ashastd.org

Facts About Hydrogen Fluoride
Mail inquiries:
Public Inquiry c/o BPRP
Bioterrorism Preparedness and Response Planning
Centers for Disease Control and Prevention
Mailstop C-18
1600 Clifton Road
Atlanta, GA 30333

Agency for Toxic Substances and Disease Registry (ATSDR) (1-888-422-8737)
E-mail inquiries: atsdric@cdc.gov
Mail inquiries:
Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop E-29
Atlanta, GA 30333

Centers for Disease Control and Prevention (CDC), National Institute for Occupational Safety and Health (NIOSH), Pocket Guide to Chemical Hazards (http://www.cdc.gov/niosh/npg/npgd0289.html or http://www.cdc.gov/niosh/npg/npgd0334.html)

Benzene (CDC)

What is benzene

- Benzene is a chemical that is a colorless or light yellow liquid at room temperature. It has a sweet odor and is highly flammable.
- Benzene evaporates into the air very quickly. Its vapor is heavier than air and may sink into low-lying areas.
- Benzene dissolves only slightly in water and will float on top of water.

Where benzene is found and how it is used

- Benzene is formed from both natural processes and human activities.
- Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.
- Benzene is widely used in the United States. It ranks in the top 20 chemicals for production volume.

Some industries use benzene to make other chemicals that are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of lubricants, rubbers, dyes, detergents, drugs, and pesticides.

How you could be exposed to benzene

- Outdoor air contains low levels of benzene from tobacco smoke, gas stations, motor vehicle exhaust, and industrial emissions.
- Indoor air generally contains levels of benzene higher than those in outdoor air. The benzene in indoor air comes from products that contain benzene such as glues, paints, furniture wax, and detergents.
- The air around hazardous waste sites or gas stations can contain higher levels of benzene than in other areas.
- Benzene leaks from underground storage tanks or from hazardous waste sites containing benzene can contaminate well water.
- People working in industries that make or use benzene may be exposed to the highest levels of it.
- A major source of benzene exposure is tobacco smoke.

How benzene works

Benzene works by causing cells not to work correctly. For example, it can cause bone marrow not to produce enough red blood cells, which can lead to anemia. Also, it can damage the immune system by changing blood levels of antibodies and causing the loss of white blood cells.

The seriousness of poisoning caused by benzene depends on the amount, route, and length of time of exposure, as well as the age and preexisting medical condition of the exposed person.

Immediate signs and symptoms of exposure to benzene

People who breathe in high levels of benzene may develop the following signs and symptoms within minutes to several hours:

- Drowsiness
- Dizziness
- Rapid or irregular heartbeat
- Headaches
- Tremors
- Confusion
- Unconsciousness
- Death (at very high levels)

Eating foods or drinking beverages containing high levels of benzene can cause the following symptoms within minutes to several hours:

- Vomiting
- Irritation of the stomach
- Dizziness
- Sleepiness
- Convulsions
- Rapid or irregular heartbeat
- Death (at very high levels)

- If a person vomits because of swallowing foods or beverages containing benzene, the vomit could be sucked into the lungs and cause breathing problems and coughing.
- Direct exposure of the eyes, skin, or lungs to benzene can cause tissue injury and irritation.
- Showing these signs and symptoms does not necessarily mean that a person has been exposed to benzene.

Long-term health effects of exposure to benzene

The major effect of benzene from long-term exposure is on the blood. (Long-term exposure means exposure of a year or more.) Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells, leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

The Department of Health and Human Services (DHHS) has determined that benzene causes cancer in humans. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

How you can protect yourself, and what to do if you are exposed to benzene

- First, if the benzene was released into the air, get fresh air by leaving the area where the benzene was released. Moving to an area with fresh air is a good way to reduce the possibility of death from exposure to benzene in the air.
- If the benzene release was outside, move away from the area where the benzene was released.
- If the benzene release was indoors, get out of the building.
- If you are near a release of benzene, emergency coordinators may tell you to either evacuate the area or to "shelter in place" inside a building to avoid being exposed to the chemical. For more information on evacuation during a chemical emergency, see "Facts About Evacuation" at http://www.bt.cdc.gov/planning/evacuationfacts.asp. For more information on sheltering in place during a chemical emergency, see "Facts About Sheltering in Place" at http://www.bt.cdc.gov/planning/Shelteringfacts.asp.
- If you think you may have been exposed to benzene, you should remove your clothing, rapidly wash your entire body with soap and water, and get medical care as quickly as possible.

Removing your clothing

- Quickly take off clothing that may have benzene on it. Any clothing that has to be pulled over the head should be cut off the body instead of pulled over the head.
- If you are helping other people remove their clothing, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.

Washing yourself

- As quickly as possible, wash any benzene from your skin with large amounts of soap and water. Washing with soap and water will help protect people from any chemicals on their bodies.
- If your eyes are burning or your vision is blurred, rinse your eyes with plain water for 10 to 15 minutes. If you wear contacts, remove them after washing your hands and put them with the contaminated clothing. Do not put the contacts back in your eyes (even if they are not disposable contacts). If you wear eyeglasses, wash them with soap and water. You can put your eyeglasses back on after you wash them.

Disposing of your clothes

- After you have washed yourself, place your clothing inside a plastic bag. Avoid touching contaminated areas of the clothing. If you can't avoid touching contaminated areas, or you aren't sure where the contaminated areas are, wear rubber gloves or put the clothing in the bag using tongs, tool handles, sticks, or similar objects. Anything that touches the contaminated clothing should also be placed in the bag.
- Seal the bag, and then seal that bag inside another plastic bag. Disposing of your clothing in this way will help protect you and other people from any chemicals that might be on your clothes.
- When the local or state health department or emergency personnel arrive, tell them what you did with your clothes. The health department or emergency personnel will arrange for further disposal. Do not handle the plastic bags yourself.
- For more information about cleaning your body and disposing of your clothes after a chemical release, see "Chemical Agents: Facts About Personal Cleaning and Disposal of Contaminated Clothing" at http://www.bt.cdc.gov/planning/personalcleaningfacts.asp.
- If you think your water supply may have benzene in it, drink bottled water until you are sure your water supply is safe.
- If someone has swallowed benzene, do not try to make them vomit or give them fluids to drink. Also, if you are sure the person has swallowed benzene, do not attempt CPR. Performing CPR on someone who has swallowed benzene may cause them to vomit. The vomit could be sucked into their lungs and damage their lungs.
- Seek medical attention right away. Dial 911 and explain what has happened.

How benzene poisoning is treated

Benzene poisoning is treated with supportive medical care in a hospital setting. No specific antidote exists for benzene poisoning. The most important thing is for victims to seek medical treatment as soon as possible.

How to get more information about benzene:

Regional Poison Control Center (1-800-222-1222)

Centers for Disease Control and Prevention
Public Response Hotline (CDC)
English (888) 246-2675
Español (888) 246-2857
TTY (866) 874-2646
Emergency Preparedness and Response Web site (http://www.bt.cdc.gov/)
E-mail inquiries: cdcresponse@ashastd.org

Mail inquiries:
Public Inquiry c/o BPRP

Bioterrorism Preparedness and Response Planning
Centers for Disease Control and Prevention
Mailstop C-18
1600 Clifton Road
Atlanta, GA 30333

Agency for Toxic Substances and Disease Registry (ATSDR) (1-888-422-8737)
E-mail inquiries: atsdric@cdc.gov
Mail inquiries:
Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop E-29
Atlanta, GA 30333

Centers for Disease Control and Prevention (CDC), National Institute for Occupational Safety and Health (NIOSH), Pocket Guide to Chemical Hazards (http://www.cdc.gov/niosh/npg/npgd0289.html or http://www.cdc.gov/niosh/npg/npgd0334.html)

This fact sheet is based on CDC's best current information. It may be updated as new information becomes available.

Worker Safety after a Flood (CDC)

The danger of a flood does not end when the rains cease. Cleanup crews must work together and look out for one another to ensure safety.

First aid, even for minor cuts and burns, is very important during flood cleanup. Immediately clean out all open wounds and cuts with soap and clean water. Most cuts, except minor scratches, will require treatment to prevent tetanus. Talk to a doctor to find out what treatment you need.

For most work in flooded areas, workers will need hard hats, goggles, heavy work gloves, and watertight boots with steel toe and insole (not just steel shank).

Excessive noise from equipment such as chain saws, backhoes, tractors, pavement breakers, blowers, and dryers may cause ringing in the ears and subsequent hearing damage. If you must shout over noise to be heard, you should wear earplugs or other hearing protection devices.

For more information call 888-246-2675 or see NIOSH's Storm and Flood Cleanup site at www.cdc.gov/niosh/topics/flood

Electrical Hazards

Electrical Hazards

How to Protect Yourself and Others from Electrical Hazards Following a Natural Disaster (CDC)

- After a hurricane, flood or other natural disaster you need to be careful to avoid electrical hazards both in your home and elsewhere.
- *Never* touch a fallen power line. Call the power company to report fallen power lines.
- Avoid contact with overhead power lines during cleanup and other activities.
- Do not drive through standing water if downed powerlines are in the water.
- If a powerline falls across your car while you are driving, stay inside the vehicle and continue to drive away from the line. If the engine stalls, do not turn off the ignition. Warn people not to touch the car or the line. Call or ask someone to call the local utility company and emergency services. Do not allow anyone other than emergency personnel to approach your vehicle.
- If electrical circuits and electrical equipment have gotten wet or are in or near water, turn off the power at the main breaker or fuse on the service panel. If you must enter standing water to access the main power switch, then call an electrician to turn it off.
- Never turn power on or off yourself or use an electric tool or appliance while standing in water. Do not turn the power back on until electrical equipment has been inspected by a qualified electrician. All electrical equipment and appliances must be completely dry before returning them to service. Have a certified electrician check these items if there is any question.
- If you see frayed wiring or sparks when you restore power, or if there is an odor of something burning but no visible fire, you should immediately shut off the electrical system at the main circuit breaker. Consult your utility company about using electrical equipment, including power generators. Do not connect generators to your home's electrical circuits without the approved, automatic-interrupt devices. If a generator is on line when electrical service is restored, it can become a major fire hazard and it may endanger line workers helping to restore power in your area.

If you believe someone has been electrocuted take the following steps:

- Look first. Don't touch. The person may still be in contact with the electrical source. Touching the person may pass the current through you.
- Call or have someone else call 911 or emergency medical help.
- Turn off the source of electricity if possible. If not, move the source away from you and the affected person using a nonconducting object made of cardboard, plastic or wood.
- Once the person is free of the source of electricity, check the person's breathing and pulse. If either has stopped or seems dangerously slow or shallow, begin cardiopulmonary resuscitation (CPR) immediately.
- If the person is faint or pale or shows other signs of shock, lay him or her down with the head slightly lower than the trunk of the body and the legs elevated.
- Don't touch burns, break blisters, or remove burned clothing. Electrical shock may cause burns inside the body, so be sure the person is taken to a doctor.

Worker Safety in a Power Outage

Preventing Electrocutions by Undetected Feedback Electrical Energy Present in Power Lines (CDC)

During power outages, many people use portable electrical generators. If the portable generator is improperly sized, installed, or operated, it can send power back to the electrical lines. This problem is called backfeed or feedback in the electrical energy in power lines. **Backfeed can seriously injure or kill repair workers or people in neighboring buildings.**

This fact sheet provides workers with information on how to restore power safely to local communities when a portable generator is being used in a home or homes in the area.

Effects of Backfeed

The problem of backfeed in electrical energy is a constant risk for electrical energy workers. Electrocutions are the fifth leading cause of all reported occupational deaths.

Understanding the Process

When power lines are down, residents can restore energy to their homes by another power source such as a portable generator. If the generator is plugged into a household circuit, the electrical current could reverse, go back through the circuit to the power grid, and then increase in voltage. If a worker attempts to repair power lines when this happens, the worker could be electrocuted. Following certain safety guidelines can reduce this risk.

Safeguards against Backfeed

Workers should treat all power lines as "hot" unless the lines have been de-energized and grounded. Because of the possibility of a feedback circuit, the worker should ground all lines on both sides of the work area unless he/she is wearing the proper personal protective equipment.

Prevent electrocutions by conducting standard tests to decide if there is high voltage in the power lines. Low voltage includes voltages from 50 to 600 volts. High voltage includes voltages of 601 volts to 230,000. Extra high voltage is any voltage over 230,000 volts.

Workers should also use low voltage testing equipment such as glowing a neon light or light-emitting diode type equipment to determine whether there is low voltage present. High voltage tests may not identify lower voltage levels. Lower voltages are also deadly.

Power lines should not be repaired or otherwise accessed without adequate personal protective equipment such as NEC rated and approved gloves and sleeves.

How the Public Can Help

Have a trained, qualified electrician install a portable generator.

Be sure that the main circuit breaker is **OFF** and locked out prior to starting the generator. This will help protect utility workers from possible electrocution.

Protect Yourself from Carbon Monoxide Poisoning after an Emergency (CDC)

NEVER use generators, grills, camp stoves, or other gasoline, propane, natural gas, or charcoal-burning devices inside your home, basement, garage, or camper-or even outside near an open window.

Carbon monoxide (CO) is an odorless, colorless gas that can cause sudden illness and death if you breathe it. When power outages occur during emergencies such as hurricanes or winter storms, you may try to use alternative sources of fuel or electricity for heating, cooling, or cooking. CO from these sources can build up in your home, garage, or camper and poison the people and animals inside.

Every year, more than 500 people die from accidental CO poisoning. CO is found in combustion fumes, such as those produced by small gasoline engines, stoves, generators, lanterns, and gas ranges, or by burning charcoal and wood. CO from these sources can build up in enclosed or partially enclosed spaces.

People and animals in these spaces can be poisoned and can die from breathing CO in an enclosed or partially enclosed space.

If you are too hot or too cold, or you need to prepare food, don't put yourself and your family at risk-- look to friends or a community shelter for help. If you must use an alternative source of fuel or electricity, be sure to use it only outside and away from open windows.

How to Recognize CO Poisoning

Exposure to CO can cause loss of consciousness and death. The most common symptoms of CO poisoning are headache, dizziness, weakness, nausea, vomiting, chest pain, and confusion. People who are sleeping or who have been drinking alcohol can die from CO poisoning before ever having symptoms. If you think you may have CO poisoning, consult a health care professional right away.

Important Tips

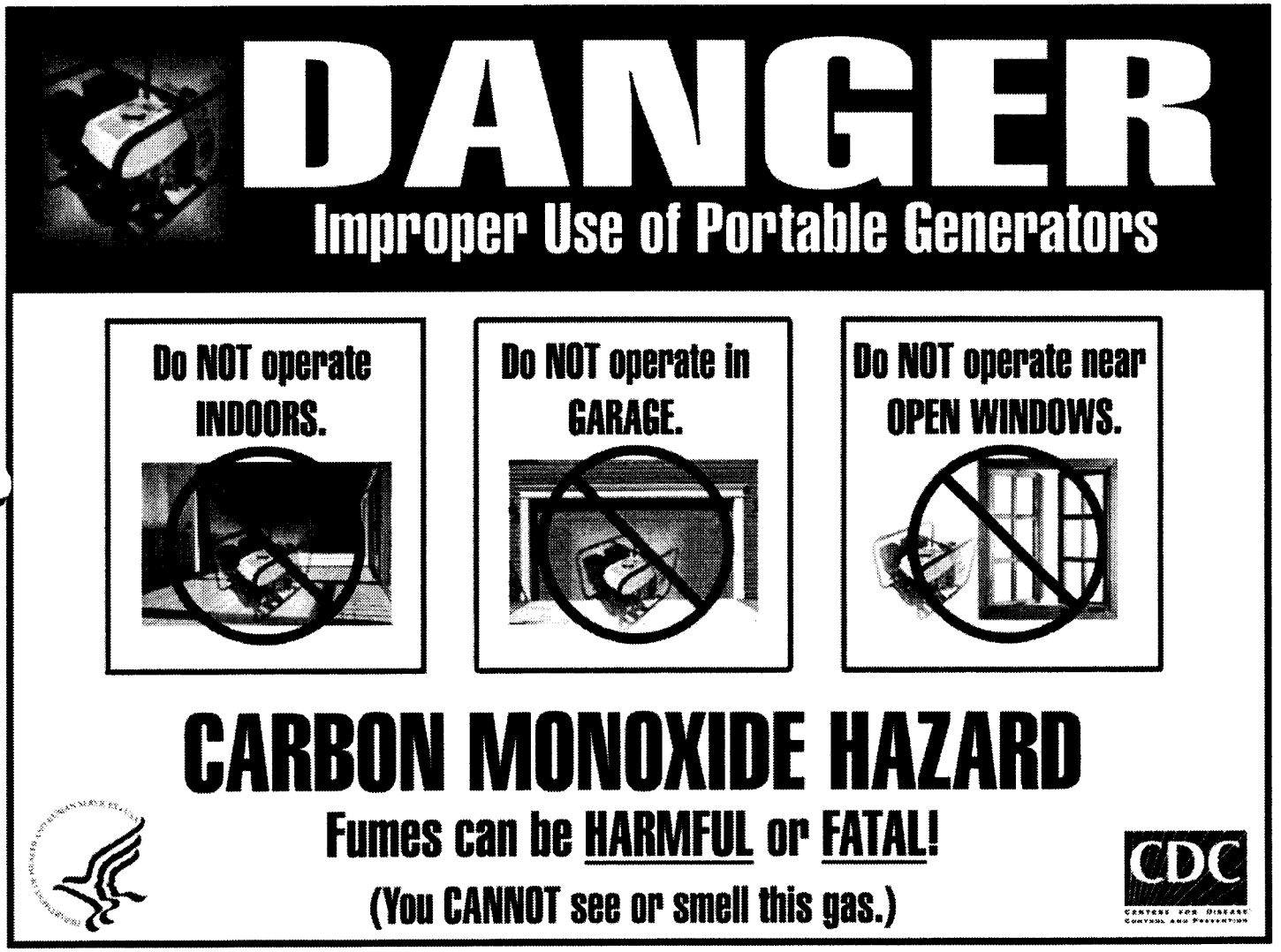
Never use a gas range or oven to heat a home.

Never use a charcoal grill, hibachi, lantern, or portable camping stove inside a home, tent, or camper.

Never run a generator, pressure washer, or any gasoline-powered engine inside a basement, garage, or other enclosed structure, even if the doors or windows are open, unless the equipment is professionally installed and vented. Keep vents and flues free of debris, especially if winds are high. Flying debris can block ventilation lines.

Never run a motor vehicle, generator, pressure washer, or any gasoline-powered engine outside an open window or door where exhaust can vent into an enclosed area.

Never leave the motor running in a vehicle parked in an enclosed or partially enclosed space, such as a closed garage.


DANGER
Improper Use of Portable Generators
Do NOT operate INDOORS.
Do NOT operate in GARAGE.
Do NOT operate near OPEN WINDOWS.
CARBON MONOXIDE HAZARD
Fumes can be HARMFUL or FATAL!
(You CANNOT see or smell this gas.)
CDC

Mold

Mold

Protect Yourself from Mold (CDC)

After natural disasters such as hurricanes, tornadoes, and floods, excess moisture and standing water contribute to the growth of mold in homes and other buildings. When returning to a home that has been flooded, be aware that mold may be present and may be a health risk for your family.

People at Greatest Risk from Mold

People with asthma, allergies, or other breathing conditions may be more sensitive to mold. People with immune suppression (such as people with HIV infection, cancer patients taking chemotherapy, and people who have received an organ transplant) are more susceptible to mold infections.

Possible Health Effects of Mold Exposure

People who are sensitive to mold may experience stuffy nose, irritated eyes, wheezing, or skin irritation. People allergic to mold may have difficulty in breathing and shortness of breath. People with weakened immune systems and with chronic lung diseases, such as obstructive lung disease, may develop mold infections in their lungs. If you or your family members have health problems after exposure to mold, contact your doctor or other health care provider.

Recognizing Mold

You *may* recognize mold by:

Sight (Are the walls and ceiling discolored, or do they show signs of mold growth or water damage?)

Smell (Do you smell a bad odor, such as a musty, earthy smell or a foul stench?)

Safely Preventing Mold Growth

Clean up and dry out the building quickly (within 24 to 48 hours). Open doors and windows. Use fans to dry out the building.

When in doubt, take it out! Remove all porous items that have been wet for more than 48 hours and that cannot be thoroughly cleaned and dried. These items can remain a source of mold growth and should be removed from the home. Porous, noncleanable items include carpeting and carpet padding, upholstery, wallpaper, drywall, floor and ceiling tiles, insulation material, clothing, leather, paper, wood, and food. Removal and cleaning are important because even dead mold may cause allergic reactions in some people.

To *prevent* mold growth, clean wet items and surfaces with detergent and water.

Homeowners may want to temporarily store items outside of the home until insurance claims can be filed. See recommendations by the Federal Emergency Management Agency (FEMA) (http://www.fema.gov/hazards/floods/whatshouldidoafter.shtm).

If you wish to disinfect, refer to the U.S. Environmental Protection Agency (EPA) document, A Brief Guide to Mold and Moisture in Your Home at http://www.epa.gov/iaq/molds/images/moldguide.pdf.

If there is mold growth in your home, you should clean up the mold and fix any water problem, such as leaks in roofs, walls, or plumbing. Controlling moisture in your home is the mocritical factor for preventing mold growth.

To remove mold growth from hard surfaces use commercial products, soap and water, or a bleach solution (http://www.cdc.gov/mold/faqs.htm) of 1 cup of bleach in 1 gallon of water. Use a stiff brush on rough surface materials such as concrete.

If you choose to use bleach to remove mold:

- Never mix bleach with ammonia. Mixing bleach and ammonia can produce dangerous, toxic fumes.
- Open windows and doors to provide fresh air.
- Wear non-porous gloves and protective eye wear.
- If the area to be cleaned is more than 10 square feet, consult the U.S. Environmental Protection Agency (EPA) guide titled Mold Remediation in Schools and Commercial Buildings. Although focused on schools and commercial buildings, this document also applies to other building types. You can get it free by calling the EPA Indoor Air Quality Information Clearinghouse at (800) 438-4318, or by going to the EPA web site at http://www.epa.gov/mold/mold_remediation.html.
- Always follow the manufacturer's instructions when using bleach or any other cleaning product.

More information on personal safety while cleaning up after a natural disaster is available at http://www.bt.cdc.gov/disasters/workers.asp.

For more information on mold, visit CDC's Mold Web site at **http://www.cdc.gov/mold**

Reentering Your Flooded Home

When returning to a home that's been flooded after natural disasters such as hurricanes, tornadoes, and floods, be aware that your house may be contaminated with mold or sewage, which can cause health risks for your family.

When You First Reenter Your Home

If you have standing water in your home and can turn off the main power from a dry location, then go ahead and turn off the power, even if it delays cleaning. If you must enter standing water to access the main power switch, then call an electrician to turn it off. **NEVER turn power on or off yourself or use an electric tool or appliance while standing in water.**

Have an electrician check the house's electrical system before turning the power on again.

If the house has been closed up for several days, enter briefly to open doors and windows to let the house air out for awhile (at least 30 minutes) before you stay for any length of time.

If your home has been flooded and has been closed up for several days, presume your home has been contaminated with mold.

If your home has been flooded, it also may be contaminated with sewage. (See After a Hurricane or Flood: Cleanup of Flood Water at www.bt.cdc.gov/disasters/floods/cleanupwater.asp.)

Dry Out Your House

If flood or storm water has entered your home, dry it out as soon as possible. Follow these steps:

If you have electricity and an electrician has determined that it's safe to turn it on, use a "wet-dry" shop vacuum (or the vacuum function of a carpet steam cleaner), an electric-powered water transfer pump, or sump pump to remove standing water. If you are operating equipment in wet areas, be sure to wear rubber boots.

If you do not have electricity, or it is not safe to turn it on, you can use a portable generator to power equipment to remove standing water.

Note: If you must use a gasoline-powered pump, generator, pressure washer, or any other gasoline-powered tools to clean your home, NEVER operate the gasoline engine inside a home, basement, garage, carport, porch, or other enclosed or partially enclosed structures, even if the windows and doors are open. Such improper use can create dangerously high levels of carbon monoxide and cause carbon monoxide poisoning.

If weather permits, open windows and doors of the house to aid in the drying-out process.

Use fans and dehumidifiers to remove excess moisture. Fans should be placed at a window or door to blow the air outwards rather than inwards, so not to spread the mold.

Have your home heating, ventilating, and air-conditioning (HVAC) system checked and cleaned by a maintenance or service professional who is experienced in mold clean-up **before you turn it on**. If the HVAC system was flooded with water, turning on the mold-contaminated HVAC will spread mold throughout the house. Professional cleaning will kill the mold and prevent later mold growth. When the service determines that your system is clean and if it is safe to do so, you can turn it on and use it to help remove excess moisture from your home.

Prevent water outdoors from reentering your home. For example, rain water from gutters or the roof should drain away from the house; the ground around the house should slope away from the house to keep basements and crawl spaces dry.

Ensure that crawl spaces in basements have proper drainage to limit water seepage. Ventilate to allow the area to dry out.

Tree Removal

Tree Removal

Preventing Chain Saw Injuries During Tree Removal After a Hurricane

Be Aware Of The Risk Of Chain Saw Injury During Tree Removal

Each year, approximately 36,000 people are treated in hospital emergency departments for injuries from using chain saws. The potential risk of injury increases after hurricanes and other natural disasters, when chain saws are widely used to remove fallen or partially fallen trees and tree branches.

Safeguards against injury while using a chain saw

Operate, adjust, and maintain the saw according to manufacturer's instructions provided in the manual accompanying the chain saw.

Properly sharpen chain saw blades and properly lubricate the blade with bar and chain oil. Additionally, the operator should periodically check and adjust the tension of the chain saw blade to ensure good cutting action.

Choose the proper size of chain saw to match the job, and include safety features such as a chain brake, front and rear hand guards, stop switch, chain catcher and a spark arrester.

Wear the appropriate protective equipment, including hard hat, safety glasses, hearing protection, heavy work gloves, cut-resistant legwear (chain saw chaps) that extend from the waist to the top of the foot, and boots which cover the ankle.

Avoid contact with power lines until the lines are verified as being de-energized.

Always cut at waist level or below to ensure that you maintain secure control over the chain saw.

Bystanders or coworkers should remain at least 2 tree lengths (at least 150 feet) away from anyone felling a tree and at least 30 feet from anyone operating a chain saw to remove limbs or cut a fallen tree.

If injury occurs, apply direct pressure over site(s) of heavy bleeding; this act may save lives.

Beware of injury from the release of bent trees or branches

Take extra care in cutting "spring poles": trees or branches that have gotten bent, twisted, hung up on, or caught under another object during a high wind. If the tree or the branch is suddenly released, it may strike the person cutting it, or a bystander, with enough force to cause serious injury or death. Even a seemingly small tree or branch (2 inches in diameter, for example) may pose a hazard when it is released from tension.

To avoid injury:

Identify the maximum point of tension on the spring pole

Slowly shave the underside of the tree rather than cut through to allow the tree or branch to release tension slowly

How the public can help

• **It is best to have a chain saw** operator who has training and experience in safe chain saw use and cutting techniques to fell and remove limbs from trees.

• **Be sure that bystanders are at a safe distance from cutting activities,** the chain saw operator uses personal protective equipment, and workers follow safety guidelines.

For more information

See the review of chainsaw safety from the National Agriculture Safety Database at http://www.cdc.gov/nasd/docs/d000901-d001000/d000999/d000999.html

Confined Space Entry

Confined Space Hazards

- The hazards encountered and associated with entering and working in confined spaces are capable of causing bodily injury, illness, and death to the worker.
- It should always be considered that the most unfavorable situation exists in every confined space and that the danger of explosion, poisoning, and asphyxiation will be present at the onset of entry.
- Before forced ventilation is initiated, information such as restricted areas within the confined space, voids, the nature of the contaminants present, the size of the space, the type of work to be performed, and the number of people involved should be considered.
- The ventilation air should not create an additional hazard due to recirculation of contaminants, improper arrangement of the inlet duct, or by the substitution of anything other than fresh (normal) air (approximately 20.9% oxygen, 78.1% nitrogen, and 1% argon with small amounts of various other gases).
- The terms air and oxygen are sometimes considered synonymous. However, this is a *dangerous* assumption, since the use of oxygen in place of fresh (normal) air for ventilation will expand the limits of flammability and increase the hazards of fire and explosion.

Types of Confined Spaces (cont'd)

- Hazards specific to a confined space are dictated by:
  1. the material stored or used in the confined space; as an example, damp activated carbon in a filtration tank will absorb oxygen, thus creating an oxygen deficient atmosphere;
  2. the activity carried out, such as the fermentation of molasses that creates ethyl alcohol vapors and decreases the oxygen content of the atmosphere; or
  3. the external environment, as in the case of sewer systems that may be affected by high tides, heavier than air gases, or flash floods.
- The most hazardous kind of confined space is the type that combines limited access and mechanical devices. Digesters and boilers usually contain power-driven equipment which, unless properly isolated, may be inadvertently activated after entry.

Types of Confined Spaces

- Confined spaces can be categorized generally as those with open tops and with a depth that will restrict the natural movement of air, and enclosed spaces with very limited openings for entry. (In either case, the space may contain mechanical equipment with moving parts.)
- Degreasers, pits, and certain types of storage tanks may be classified as open topped confined spaces that usually contain no moving parts. However, gases that are heavier than air (butane, propane, and other hydrocarbons) remain in depressions and will flow to low points where they are difficult to remove.
- Other hazards may develop due to the work performed in the confined space or because of corrosive residues that accelerate the decomposition of scaffolding supports and electrical components.
- Confined spaces such as sewers, casings, tanks, silos, vaults, and compartments of ships usually have limited access which increases the risk of injury.

Reasons for Entering Confined Spaces

- Usually done to perform a necessary function, such as inspection, repair, maintenance (cleaning or painting), or similar operations which would be an infrequent or irregular function of the total industrial activity.
- Entry may also be made during new construction. When the area meets the criteria for a confined space, all ventilation and other requirements should be enforced.
- One of the most difficult entries to control is that of unauthorized entry, especially when there are large numbers of workers and trades involved, such as welders, painters, electricians, and safety monitors.
- A final and most important reason for entry would be emergency rescue. The standby person and all rescue personnel should be aware of the structural design of the space, emergency exit procedures, and life support systems required.

Flammable Atmospheres

- Generally arise from enriched oxygen atmospheres, vaporization of flammable liquids, byproducts of work, chemical reactions, concentrations of combustible dusts, and desorption of chemical from inner surfaces of the confined space.
- Flammable gases such as acetylene, butane, propane, hydrogen, methane, natural or manufactured gases or vapors from liquid hydrocarbons can be trapped in confined spaces, and since many gases are heavier than air, they will seek lower levels as in pits, sewers, and various types of storage tanks and vessels.
- In a closed top tank, lighter than air gases may rise and develop a flammable concentration if trapped above the opening.
- The byproducts of work procedures such as spray painting can generate flammable or explosive conditions within a confined space.
- Welding in a confined space is a major cause of explosions in areas that contained combustible gas.
- Combustible dust concentrations are usually found during the process of loading, unloading, and conveying grain products, nitrated fertilizers, finely ground chemical products, and any other combustible material.

Toxic Atmospheres (cont'd)

  - Early stages of CO intoxication are nausea and headache. May be fatal at 1000 ppm in air, and is considered dangerous at 200 ppm, because it forms carboxyhemoglobin in the blood which prevents the distribution of oxygen in the body.
- A safe reading on a combustible gas indicator does not ensure that CO is not present. Carbon monoxide must be tested for specifically.
- The formation of CO may result from chemical reactions or work activities, therefore fatalities due to CO poisoning are not confined to any particular industry. Examples:
  - Sewage treatment plants due to decomposition products and lack of ventilation in confined spaces
  - Formation of silo gas in grain storage elevators

Toxic Atmospheres

- The sources of toxic atmospheres encountered in confined spaces may arise from the following:
  1. The manufacturing process (for example, in producing polyvinyl chloride, hydrogen chloride is used as will as vinyl chloride monomer, which is carcinogenic).
  2. The product stored [removing decomposed organic material from a tank can liberate toxic substances, such as hydrogen sulfide (H_2S)].
  3. The operation performed in the confined space (for example, welding or brazing with metals capable of producing toxic fumes).
- During loading, unloading, formulation, and production, mechanical and/or human error may also produce toxic gases which are not part of the planned operation.
- Carbon monoxide (CO) is a hazardous gas that may build up in a confined space.
  - Odorless, colorless gas approximately the same density as air is formed from incomplete combustion of organic materials such as wood, coal, gas, oil, and gasoline; can be formed from microbial decomposition of organic matter in sewers, silos, and fermentation tanks.

Irritant (Corrosive) Atmospheres

- Irritant or corrosive atmospheres can be divided into primary and secondary groups.
- The primary irritants exert no systemic toxic effects (effects on the entire body). Examples include chlorine, ozone, hydrochloric acid, hydrofluoric acid, sulfuric acid, nitrogen dioxide, ammonia, and sulfur dioxide.
- A secondary irritant is one that may produce systemic toxic effects in addition to surface irritation. Examples include benzene, carbon tetrachloride, ethyl chloride, trichloroethane, trichloroethylene, and chloropropene.
- Irritant gases vary widely among all areas of industrial activity. They can be found in plastics plants, chemical plants, the petroleum industry, tanneries, refrigeration industries, paint manufacturing, and mining operations.
- Prolonged exposure at irritant or corrosive concentrations in a confined space may produce little or no evidence of irritation but may result in a general weakening of the defense reflexes from changes in sensitivity. The danger in this situation is that the worker is usually not aware of any increase in his/her exposure to toxic substances.

Asphyxiating Atmospheres

The normal atmosphere is composed approximately of 20.9% oxygen, 78.1% nitrogen, and 1% argon with small amounts of various other gases.

Decreased oxygen levels (below the atmospheric level of 20.9% by volume) can cause various effects including:

- Level of 17%: increased breathing volume and accelerated heartbeat
- Between 14-16%: increased breathing volume, accelerated heartbeat, very poor muscular coordination, rapid fatigue, and intermittent respiration
- Between 6-10%: nausea, vomiting, inability to perform, and unconsciousness
- Less than 6%: spasmatic breathing, convulsive movements, and death in minutes

General Safety Hazards
Mechanical

- If activation of electrical or mechanical equipment would cause injury, each piece of equipment should be manually isolated to prevent inadvertent activation before workers enter or while they work in a confined space.
- To prevent vapor leaks, flashbacks, and other hazards, workers should completely isolate the space.
  - The closing of valves is not sufficient - all pipes must be physically disconnected or isolation blanks bolted in place.
  - Where flammable liquids or vapors may re-contaminate the confined space, the blanked or disconnected pipes should be inspected and tested for leakage.
- Other areas of concern are steam valves, pressure lines, and chemical transfer pipes.

Asphyxiating Atmospheres (cont'd)

Reduction of oxygen in a confined space may be the result of either consumption or displacement.

Consumption of oxygen:

- Takes place during combustion of flammable substances, as in welding, heating, cutting, and brazing
- During bacterial action, as in the fermentation process
- During chemical reactions as in the formation of rust on the exposed surface of the confined space (iron oxide)
- Rate of consumption influenced by the number of people working in a confined space and the amount of their physical activity

Displacement of oxygen by another gas:

- Examples of gases that are used to displace air, and therefore reduce the oxygen level, are helium, argon, and nitrogen. Carbon dioxide may also be used to displace air and can occur naturally in sewers, storage bins, wells, tunnels, wine vats, and grain elevators.
- Gases such as nitrogen, argon, helium, and carbon dioxide are used as inerting agents to displace flammable substances and retard pyrophoric reactions, resulting in oxygen deficient atmospheres.

General Safety Hazards
Communication Problems

- Communication between the worker inside and the standby person outside is of utmost importance.
- When visual monitoring of the worker is not possible because of the design of the confined space or location of the entry hatch, a voice or alarm-activated explosion proof type of communication system will be necessary.
- Suitable illumination of an approved type is required to provide sufficient visibility for work in accordance with the recommendations made in the Illuminating Engineering Society Lighting Handbook.

General Safety Hazards
Entry and Exit

Entry and exit time is of major significance as a physical limitation and is directly related to the potential hazard of the confined space.

The extent of precautions taken and the standby equipment needed to maintain a safe work area will be determined by the means of access and rescue.

The following should be considered:

- Type of confined space to be entered
- Access to the entrance
- Number and size of openings
- Barriers within the space
- Occupancy load
- Time requirement for exiting in event of fire or vapor incursion
- Time required to rescue injured workers

Physical Hazards
Noise

- Noise problems are usually intensified in confined spaces because the interior tends to cause sound to reverberate and thus expose the worker to higher sound levels than those found in an open environment.
- This intensified noise increases the risk of hearing damage to workers which could result in temporary or permanent loss of hearing.
- Noise in a confined space which may not be intense enough to cause hearing damage may still disrupt verbal communication with the emergency standby person on the exterior of the confined space.

Physical Hazards
Thermal Effects

When a body temperature of approximately 102F is exceeded, workers are less efficient, and are prone to heat exhaustion, heat cramps, or heat stroke.

Special precautions must be taken in cold environments to prevent frostbite, trench foot, and general hypothermia.

Protective insulated clothing for both hot and cold environments will add additional bulk to the worker and must be considered in allowing for movement in the confined space and exit time.

Physical Hazards
Vibration

- Whole body vibration may affect multiple body parts and organs depending upon the vibration characteristics.
- Segmental vibration, unlike whole body vibration, appears to be more localized in creating injury to the fingers and hands of workers using tools, such as pneumatic hammers, rotary grinders or other hand tools which cause vibration.

Physical Hazards

General/Physical

- Some physical hazards such as scaffolding, surface residues, and structural hazards cannot be eliminated because of the nature of the confined space or the work to be performed.
- The use of scaffolding in confined spaces has contributed to many accidents caused by workers or materials falling, improper use of guard rails, and lack of maintenance to insure worker safety.
- Surface residues in confined spaces can increase the already hazardous conditions of electrical shock, reaction of incompatible materials, liberation of toxic substances, and bodily injury due to slips and falls. Without protective clothing, additional hazards to health may arise due to surface residues.
- Structural hazards within a confined space such as baffles in horizontal tanks, trays in vertical towers, bends in tunnels, overhead structural members, or scaffolding installed for maintenance constitute physical hazards, which are exacerbated by the physical surroundings.
- Rescue procedures may require withdrawal of an injured or unconscious person. Careful planning must be given to the relationship between the internal structure, the exit opening, and the worker.

Confined Space Pre-Entry Checklist (OSHA)

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9801&p_text_version=FALSE

OSHA

U.S. Department of Labor
Occupational Safety & Health Administration

Regulations (Standards - 29 CFR)
Confined Space Pre-Entry Check List - 1910.146 App D

Regulations (Standards - 29 CFR) - Table of Contents

- Part Number: 1910
- Part Title: Occupational Safety and Health Standards
- Subpart: J
- Subpart Title: General Environmental Controls
- Standard Number: 1910.146 App D
- Title: Confined Space Pre-Entry Check List

Heat Stress and Sunburn

Extreme Heat: A Prevention Guide to Promote Your Personal Health and Safety (CDC)

EXTREME HEAT

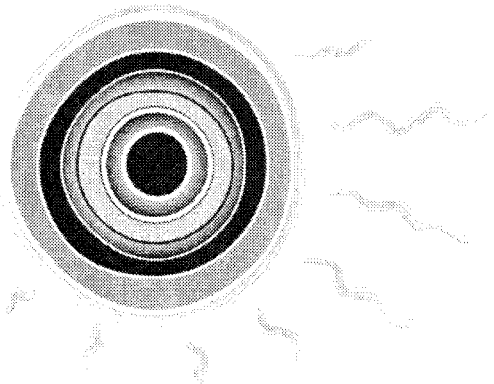
Heat-related deaths and illness are preventable yet annually many people succumb to extreme heat. Historically, from 1979 to 1999, excessive heat exposure caused 8,015 deaths in the United States. During this period, more people in this country died from extreme heat than from hurricanes, lightning, tornadoes, floods, and earthquakes combined. In 2001, 300 deaths were caused by excessive heat exposure.

People suffer heat-related illness when their bodies are unable to compensate and properly cool themselves. The body normally cools itself by sweating. But under some conditions, sweating just isn't enough. In such cases, a person's body temperature rises rapidly. Very high body temperatures may damage the brain or other vital organs.

Several factors affect the body's ability to cool itself during extremely hot weather. When the humidity is high, sweat will not evaporate as quickly, preventing the body from releasing heat quickly. Other conditions related to risk include age, obesity, fever, dehydration, heart disease, mental illness, poor circulation, sunburn, and prescription drug and alcohol use.

Because heat-related deaths are preventable, people need to be aware of who is at greatest risk and what actions can be taken to prevent a heat-related illness or death. The elderly, the very young, and people with mental illness and chronic diseases are at highest risk. However, even young and healthy individuals can succumb to heat if they participate in strenuous physical activities during hot weather. Air-conditioning is the number one protective factor against heat-related illness and death. If a home is not air-conditioned, people can reduce their risk for heat-related illness by spending time in public facilities that are air-conditioned.

Summertime activity, whether on the playing field or the construction site, must be balanced with measures that aid the body's cooling mechanisms and prevent heat-related illness. This pamphlet tells how you can prevent, recognize, and cope with heat-related health problems.



What Is Extreme Heat?

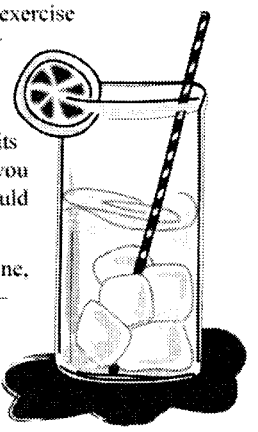
Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.

During Hot Weather

To protect your health when temperatures are extremely high, remember to keep cool and use common sense. The following tips are important:

Drink Plenty of Fluids

During hot weather you will need to increase your fluid intake, regardless of your activity level. Don't wait until you're thirsty to drink. During heavy exercise in a hot environment, drink two to four glasses (16–32 ounces) of cool fluids each hour.



Warning: If your doctor generally limits the amount of fluid you drink or has you on water pills, ask how much you should drink while the weather is hot.

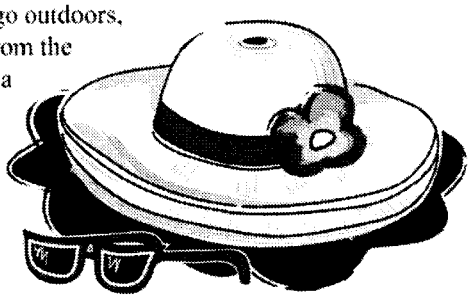
Don't drink liquids that contain caffeine, alcohol, or large amounts of sugar—these actually cause you to lose more body fluid. Also avoid very cold drinks, because they can cause stomach cramps.

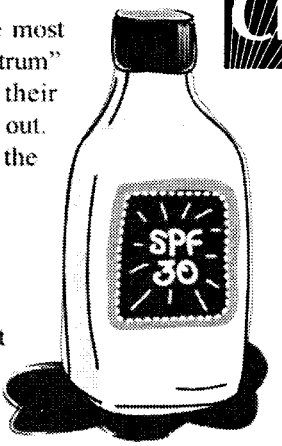
Replace Salt and Minerals

Heavy sweating removes salt and minerals from the body. These are necessary for your body and must be replaced. If you must exercise, drink two to four glasses of cool, non-alcoholic fluids each hour. A sports beverage can replace the salt and minerals you lose in sweat. However, if you are on a low-salt diet, talk with your doctor before drinking a sports beverage or taking salt tablets.

Wear Appropriate Clothing and Sunscreen

Wear as little clothing as possible when you are at home. Choose lightweight, light-colored, loose-fitting clothing. Sunburn affects your body's ability to cool itself and causes a loss of body fluids. It also causes pain and damages the skin. If you must go outdoors, protect yourself from the sun by wearing a wide-brimmed hat (also keeps you cooler) along with sunglasses, and by putting on sunscreen of SPF 15 or higher (the most effective products say "broad spectrum" or "UVA/UVB protection" on their labels) 30 minutes prior to going out. Continue to reapply it according to the package directions.





Schedule Outdoor Activities Carefully

If you must be outdoors, try to limit your outdoor activity to morning and evening hours. Try to rest often in shady areas so that your body's thermostat will have a chance to recover.

Pace Yourself

If you are not accustomed to working or exercising in a hot environment, start slowly and pick up the pace gradually. If exertion in the heat makes your heart pound and leaves you gasping for breath, STOP all activity. Get into a cool area or at least into the shade, and rest, especially if you become lightheaded, confused, weak, or faint.

Stay Cool Indoors

Stay indoors and, if at all possible, stay in an air-conditioned place. If your home does not have air conditioning, go to the shopping mall or public library—even a few hours spent in air conditioning can help your body stay cooler when you go back into the heat. Call your local health department to see if there are any heat-relief shelters in your area. Electric fans may provide comfort, but when the temperature is in the high 90s, fans will not prevent heat-related illness. Taking a cool shower or bath or moving to an air-conditioned place is a much better way to cool off. Use your stove and oven less to maintain a cooler temperature in your home.

Use a Buddy System

When working in the heat, monitor the condition of your co-workers and have someone do the same for you. Heat-induced illness can cause a person to become confused or lose consciousness. If you are 65 years of age or older, have a friend or relative call to check on you twice a day during a heat wave. If you know someone in this age group, check on them at least twice a day.

Monitor Those at High Risk

Although any one at any time can suffer from heat-related illness, some people are at greater risk than others.

- Infants and children up to four years of age are sensitive to the effects of high temperatures and rely on others to regulate their environments and provide adequate liquids.
- People 65 years of age or older may not compensate for heat stress efficiently and are less likely to sense and respond to change in temperature.
- People who are overweight may be prone to heat sickness because of their tendency to retain more body heat.
- People who overexert during work or exercise may become dehydrated and susceptible to heat sickness.
- People who are physically ill, especially with heart disease or high blood pressure, or who take certain medications, such as for depression, insomnia, or poor circulation, may be affected by extreme heat.

Visit adults at risk at least twice a day and closely watch them for signs of heat exhaustion or heat stroke. Infants and young children, of course, need much more frequent watching.

Adjust to the Environment

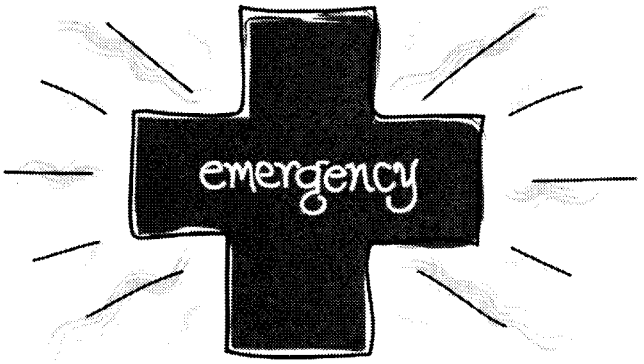
Be aware that any sudden change in temperature, such as an early summer heat wave, will be stressful to your body. You will have a greater tolerance for heat if you limit your physical activity until you become accustomed to the heat. If you travel to a hotter climate, allow several days to become acclimated before attempting any vigorous exercise, and work up to it gradually.

Use Common Sense

Remember to keep cool and use common sense:

- Avoid hot foods and heavy meals—they add heat to your body.
- Drink plenty of fluids and replace salts and minerals in your body.
- Dress infants and children in cool, loose clothing and shade their heads and faces with hats or an umbrella.
- Limit sun exposure during mid-day hours and in places of potential severe exposure such as beaches.
- Do not leave infants, children, or pets in a parked car.
- Provide plenty of fresh water for your pets, and leave the water in a shady area.

"Keep cool and use common sense."



Hot Weather Health Emergencies

Even short periods of high temperatures can cause serious health problems. Doing too much on a hot day, spending too much time in the sun or staying too long in an overheated place can cause heat-related illnesses. Know the symptoms of heat disorders and overexposure to the sun, and be ready to give first aid treatment.

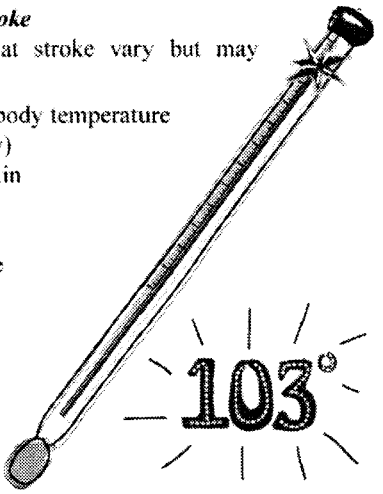
Heat Stroke

Heat stroke occurs when the body is unable to regulate its temperature. The body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. Body temperature may rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Recognizing Heat Stroke

Warning signs of heat stroke vary but may include the following:

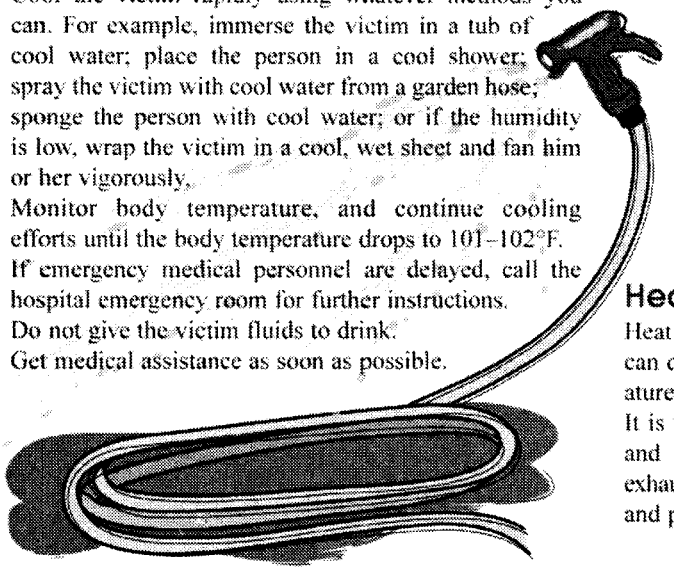
- An extremely high body temperature (above 103°F, orally)
- Red, hot, and dry skin (no sweating)
- Rapid, strong pulse
- Throbbing headache
- Dizziness
- Nausea
- Confusion
- Unconsciousness



What to Do

If you see any of these signs, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the victim. Do the following:

- Get the victim to a shady area.
- Cool the victim rapidly using whatever methods you can. For example, immerse the victim in a tub of cool water; place the person in a cool shower; spray the victim with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the victim in a cool, wet sheet and fan him or her vigorously.
- Monitor body temperature, and continue cooling efforts until the body temperature drops to 101–102°F.
- If emergency medical personnel are delayed, call the hospital emergency room for further instructions.
- Do not give the victim fluids to drink.
- Get medical assistance as soon as possible.



Sometimes a victim's muscles will begin to twitch uncontrollably as a result of heat stroke. If this happens, keep the victim from injuring himself, but do not place any object in the mouth and do not give fluids. If there is vomiting, make sure the airway remains open by turning the victim on his or her side.

"Have someone call for immediate medical assistance while you begin cooling the victim."

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids. It is the body's response to an excessive loss of the water and salt contained in sweat. Those most prone to heat exhaustion are elderly people, people with high blood pressure, and people working or exercising in a hot environment.

Recognizing Heat Exhaustion

Warning signs of heat exhaustion include the following:

- Heavy sweating
- Paleness
- Muscle cramps
- Tiredness
- Weakness
- Dizziness
- Headache
- Nausea or vomiting
- Fainting

The skin may be cool and moist. The victim's pulse rate will be fast and weak, and breathing will be fast and shallow. If heat exhaustion is untreated, it may progress to heat stroke. Seek medical attention immediately if any of the following occurs:

- Symptoms are severe
- The victim has heart problems or high blood pressure

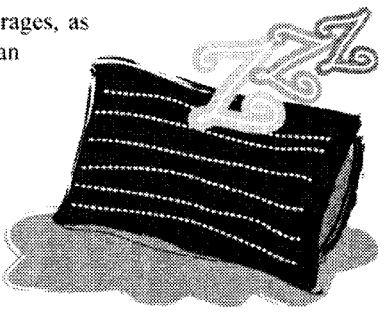
Otherwise, help the victim to cool off, and seek medical attention if symptoms worsen or last longer than 1 hour.

"...seek medical attention if symptoms worsen or last longer than 1 hour."

What to Do

Cooling measures that may be effective include the following:

- Cool, nonalcoholic beverages, as directed by your physician
- Rest
- Cool shower, bath, or sponge bath
- An air-conditioned environment
- Lightweight clothing



Heat Cramps

Heat cramps usually affect people who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture. The low salt level in the muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

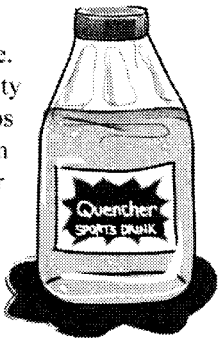
Recognizing Heat Cramps

Heat cramps are muscle pains or spasms—usually in the abdomen, arms, or legs—that may occur in association with strenuous activity. If you have heart problems or are on a low-sodium diet, get medical attention for heat cramps.

What to Do

If medical attention is not necessary, take these steps:

- Stop all activity, and sit quietly in a cool place.
- Drink clear juice or a sports beverage.
- Do not return to strenuous activity for a few hours after the cramps subside, because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention for heat cramps if they do not subside in 1 hour.



Sunburn

Sunburn should be avoided because it damages the skin. Although the discomfort is usually minor and healing often occurs in about a week, a more severe sunburn may require medical attention.

Recognizing Sunburn

Symptoms of sunburn are well known: the skin becomes red, painful, and abnormally warm after sun exposure.

"Consult a doctor if the sunburn affects an infant younger than 1 year of age."

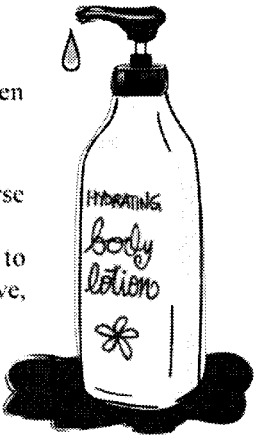
What to Do

Consult a doctor if the sunburn affects an infant younger than 1 year of age or if these symptoms are present:

- Fever
- Fluid-filled blisters
- Severe pain

Also, remember these tips when treating sunburn:

- Avoid repeated sun exposure.
- Apply cold compresses or immerse the sunburned area in cool water.
- Apply moisturizing lotion to affected areas. Do not use salve, butter, or ointment.
- Do not break blisters.



Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather. It can occur at any age but is most common in young children.

Recognizing Heat Rash

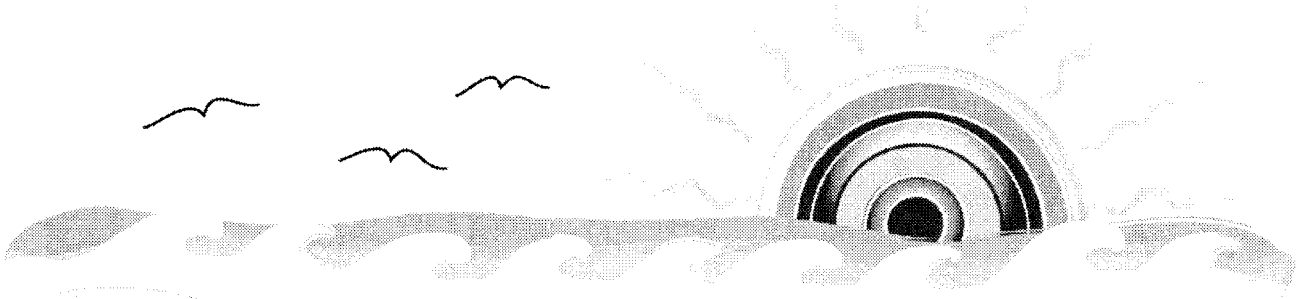
Heat rash looks like a red cluster of pimples or small blisters. It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

What to Do

The best treatment for heat rash is to provide a cooler, less humid environment. Keep the affected area dry. Dusting powder may be used to increase comfort, but avoid using ointments or creams—they keep the skin warm and moist and may make the condition worse.

Treating heat rash is simple and usually does not require medical assistance. Other heat-related problems can be much more severe.

"Treating heat rash is simple and usually does not require medical assistance."



One Last Hot Tip...

These self-help measures are not a substitute for medical care but may help you t recognize and respond promptly to warning signs of trouble. Your best defense against heat-related illness is prevention. Staying cool and making simple changes in your fluid intake, activities, and clothing during hot weather can help you to remain safe and healthy.

Heat Stress in the Elderly (CDC)

Includes useful advice for people of all ages

Elderly people (that is, people aged 65 years and older) are more prone to heat stress than younger people for several reasons:

- Elderly people do not adjust as well as young people to sudden changes in temperature.
- They are more likely to have a chronic medical condition that upsets normal body responses to heat.
- They are more likely to take prescription medicines that impair the body's ability to regulate its temperature or that inhibit perspiration.

Heat Stroke

Heat stroke is the most serious heat-related illness. It occurs when the body becomes unable to control its temperature: the body's temperature rises rapidly, the body loses its ability to sweat, and it is unable to cool down. Body temperatures rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not provided.

Signs and Symptoms of Heat Stroke

Warning signs vary but may include the following:

- An extremely high body temperature (above 103°F)
- Red, hot, and dry skin (no sweating)
- Rapid, strong pulse
- Throbbing headache
- Dizziness
- Nausea

Heat Exhaustion

Heat exhaustion is a milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids.

Signs and Symptoms of Heat Exhaustion. Warning signs vary but may include the following:

- Heavy sweating
- Muscle Cramps
- Weakness
- Headache
- Fainting
- Pulse rate: fast and weak
- Paleness
- Tiredness
- Dizziness
- Nausea or vomiting
- Skin: may be cool and moist
- Breathing: fast and shallow

What You Can Do to Protect Yourself

You can follow these prevention tips to protect yourself from heat-related stress:

- Drink cool, nonalcoholic, noncaffeinated beverages. (If your doctor generally limits the amount of fluid you drink or has you on water pills, ask him how much you should drink when the weather is hot. Also, avoid extremely cold liquids because they can cause cramps.)
- Rest.
- Take a cool shower, bath, or sponge bath.
- If possible, seek an air-conditioned environment. (If you don't have air conditioning, consider visiting an air-conditioned shopping mall or public library to cool off.)
- Wear lightweight clothing.
- If possible, remain indoors in the heat of the day.
- Do not engage in strenuous activities.

What You Can Do to Help Protect Elderly Relatives and Neighbors

If you have elderly relatives or neighbors, you can help them protect themselves from heat related stress:

- Visit older adults at risk at least twice a day and watch them for signs of heat exhaustion or heat stroke.
- Take them to air-conditioned locations if they have transportation problems.
- Make sure older adults have access to an electric fan whenever possible.

What You Can Do for Someone With Heat Stress

If you see any signs of severe heat stress, you may be dealing with a life-threatening emergency. Have someone call for immediate medical assistance while you begin cooling the affected person. Do the following:

- Get the person to a shady area.
- Cool the person rapidly, using whatever methods you can. For example, immerse the person in a tub of cool water; place the person in a cool shower; spray the person with cool water from a garden hose; sponge the person with cool water; or if the humidity is low, wrap the person in a cool, wet sheet and fan him or her vigorously.
- Monitor body temperature and continue cooling efforts until the body temperature drops to 101°–102°F
- If emergency medical personnel are delayed, call the hospital emergency room for further instructions.
- Do not give the person alcohol to drink.
- Get medical assistance as soon as possible.

Sunburn

Sunscreen for Your Sun Day (CDC)

What is sunscreen?

Sunscreen filters out the sun's dangerous UV (ultraviolet) rays. These invisible rays can cause skin cancer. Some skin cancers can cause death if not found and treated early.

Who should wear sunscreen?

People of all skin colors can get skin cancer from the sun's UV rays. Those who are most likely to get skin cancer from these rays have:

- Lighter natural skin color.
- Skin that burns, freckles, gets red easily, or becomes painful from the sun.
- Blond or red hair.
- Blue or green eyes.
- A family member who has had skin cancer.

Also, people who spend a lot of time outdoors, either for work or play, are more likely to get skin cancer from UV rays.

Which sunscreen should I use?

Use a sunscreen with a Sun Protection Factor (SPF) of 15 or higher. Sunscreens come in many forms, including ointments, creams, gels, lotions, wax sticks, and sprays.

Follow the directions on the package for using a sunscreen product on babies less than 6 months old. All products do not have the same ingredients; if your or your child's skin reacts badly to one product, try another one or call a doctor.

When do I need to apply sunscreen?

The sun's UV rays can damage your skin in as little as 15 minutes. Put sunscreen on before you go outside, even on slightly cloudy or cool days. Don't forget to put a thick layer on all parts of exposed skin. Get help for hard-to-reach places like your back.

Sunscreen wears off. Put it on again if you stay out in the sun for more than 2 hours, and after you swim or do things that make you sweat.

Protecting Yourself in the Sun (OSHA)

Protecting Yourself in the Sun

Sunlight contains ultraviolet (UV) radiation, which causes premature aging of the skin, wrinkles, cataracts, and skin cancer. The amount of damage from UV exposure depends on the strength of the light, the length of exposure, and whether the skin is protected. *There are no safe UV rays or safe suntans.*

Skin Cancer

Sun exposure at any age can cause skin cancer. Be especially careful in the sun if you burn easily, spend a lot of time outdoors, or have any of the following physical features:

- Numerous, irregular, or large moles.
- Freckles.
- Fair skin.
- Blond, red, or light brown hair.

Self-Examination

It's important to examine your body monthly because skin cancers detected early can almost always be cured. The most important warning sign is a spot on the skin that is changing in size, shape, or color during a period of 1 month to 1 or 2 years.

Skin cancers often take the following forms:

- Pale, wax-like, pearly nodules.
- Red, scaly, sharply outlined patches.
- Sores that don't heal.
- Small, mole-like growths—melanoma, the most serious type of skin cancer.

If you find such unusual skin changes, see a health care professional immediately.

Block Out UV Rays

- **Cover up.** Wear tightly-woven clothing that blocks out light. Try this test: Place your hand between a single layer of the clothing and a light source. If you can see your hand through the fabric, the garment offers little protection.
- **Use sunscreen.** A sun protection factor (SPF) of at least 15 blocks 93 percent of UV rays. You want to block both UVA and UVB rays to guard against skin cancer. Be sure to follow application directions on the bottle.
- **Wear a hat.** A wide brim hat (not a baseball cap) is ideal because it protects the neck, ears, eyes, forehead, nose, and scalp.
- **Wear UV-absorbent shades.** Sunglasses don't have to be expensive, but they should block 99 to 100 percent of UVA and UVB radiation.
- **Limit exposure.** UV rays are most intense between 10 a.m. and 4 p.m. If you're unsure about the sun's intensity, take the shadow test: If your shadow is shorter than you, the sun's rays are the day's strongest.

OSHA 3166-06R 2003

Preventing Skin Cancer

For more information about preventing,detecting, and treating skin cancer, check out these sources:

American Cancer Society
www.cancer.org
1-800-ACS-2345

Centers for Disease Control and Prevention
www.cdc.gov/ChooseYourCover
1-888-842-6355

The Skin Cancer Foundation
www.skincancer.org
1-800-SKIN-490

OSHA **Occupational Safety and Health Administration**

www.osha.gov U.S. Department of Labor

Mosquito Control Insecticide Use

Mosquito Control and Insecticide Use

Protect Yourself from Animal- and Insect-Related Hazards after a Natural Disaster

General

- Avoid wild or stray animals.
- Call local authorities to handle animals.
- Secure all food sources and remove any animal carcasses to avoid attracting rats.
- Get rid of dead animals, according to guidelines from your local animal control authority, as soon as you can. See Animal Disposal (http://www.bt.cdc.gov/disasters/animaldisposal.asp) for answers to frequently asked questions.
- For more information, contact your local animal shelter or services, a veterinarian, or the Humane Society for advice on dealing with pets or stray or wild animals after an emergency. Also see Resources for Planning How to Protect Your Pets in an Emergency (http://www.bt.cdc.gov/disasters/petprotect.asp).

Avoid Mosquitoes

■ Rain and flooding in a hurricane area may lead to an increase in numbers of mosquitoes, which can carry diseases such as West Nile virus or dengue fever. In most cases, the mosquitoes will be pests but will not carry communicable diseases. Local, state, and federal public health authorities will be actively working to control the spread of any mosquito-borne diseases. For more information on West Nile virus, see CDC's West Nile virus Web site (http://www.cdc.gov/ncidod/dvbid/westnile/).

■ To protect yourself from mosquitoes, use screens on dwellings; wear long pants, socks, and long-sleeved shirts; and use insect repellents that contain DEET or Picaridin. Follow directions on the product label and take care when using DEET on small children. More information about these and other recommended repellents can be found in the fact sheet Updated Information Regarding Insect Repellents (http://www.cdc.gov/ncidod/dvbid/westnile/RepellentUpdates.htm). •

■ To help control mosquito populations, drain all standing water left outdoors in open containers, such as flower pots, tires, pet dishes, or buckets.

Prevent or Respond to a Snake Bite

- Be aware of snakes that may be swimming in the water to get to higher ground and those that may be hiding under debris or other objects.
- If you see a snake, back away from it slowly and do not touch it.
- If you or someone you know are bitten, try to see and remember the color and shape of the snake, which can help with treatment of the snake bite.
- Keep the bitten person still and calm. This can slow down the spread of venom if the snake is poisonous. Seek medical attention as soon as possible. Dial 911 or call local Emergency Medical Services. Apply first aid if you can not get the person to the hospital right away.
  - Lay or sit the person down with the bite below the level of the heart.
  - Tell him/her to stay calm and still.
  - Cover the bite with a clean, dry dressing.

For more information, see How to Prevent or Respond to a Snake Bite (**http://www.bt.cdc.gov/disasters/snakebite.asp**).

For more information, see the following:

- **Centers for Disease Control and Prevention**
  Avoid Contact with Wild Animals (http://www.cdc.gov/ncidod/op/animals.htm)
  - Dog Bite Prevention (http://www.cdc.gov/ncipc/duip/biteprevention.htm)
  - Healthy Pets, Healthy People (http://www.cdc.gov/healthypets/)
  - Rabies Web Site (http://www.cdc.gov/ncidod/dvrd/rabies/)
  - Rat-Bite Fever: Frequently Asked Questions (http://www.cdc.gov/ncidod/dbmd/diseaseinfo/ratbitefever_g.htm)
- **American Veterinary Association**
  - Dog Bite Prevention Message Points (http://www.avma.org/press/publichealth/dogbite/messpoints.asp)
  - Education Resources for Dog Bite Prevention (http://www.cdc.gov/ncipc/duip/biteprevention.htm)
- Texas A&M University
  - Medical Problems and Treatment Considerations for the Red Imported Fire Ant (http://fireant.tamu.edu/materials/factsheets/FAPFS023.2002rev.Medical.pdf)

What You Need to Know About Mosquito Repellent (CDC)

Why You Should Use Mosquito Repellent

Insect repellent helps reduce your exposure to mosquito bites that may carry West Nile virus or other diseases, and allows you to continue to play, work, and enjoy the outdoors with a lower risk of disease.

When You Should Use Mosquito Repellent

Use repellent when you go outdoors. You should use repellent even if you're only going outside for a few minutes-it only takes one bite to get West Nile virus. Many of the mosquitoes that carry the West Nile virus bite between dusk and dawn. If you're outside during these hours pay special attention to using repellent.

Which Mosquito Repellents Work Best

A wide variety of insect repellent products are available. CDC recommends the use of products containing active ingredients which have been registered with the U.S. Environmental Protection Agency (EPA) for use as repellents applied to skin and clothing.

When EPA registers a repellent, they evaluate the product for efficacy and potential effects on human beings and the environment. EPA registration means that EPA does not expect a product, when used according to the instructions label, to cause unreasonable adverse effects to human health or the environment.

Of the active ingredients registered with the EPA, two have demonstrated a higher degree of efficacy in the peer-reviewed, scientific literature.* Products containing these active ingredients typically provide longer-lasting protection than others:

- DEET (N,N-diethyl-m-toluamide)
- Picaridin (KBR 3023)

Oil of lemon eucalyptus [p-menthane 3,8-diol (PMD)], a plant based repellent, is also registered with EPA. In two recent scientific publications, when oil of lemon eucalyptus was tested against mosquitoes found in the US it provided protection similar to repellents with low concentrations of DEET.

These recommendations are for domestic use in the United States. See CDC Travelers' Health website for specific recommendations concerning protection from insects when traveling outside the United States.

In addition, certain products which contain permethrin are recommended for use on clothing, shoes, bed nets, and camping gear, and are registered with EPA for this use. Permethrin is highly effective as an insecticide and as a repellent. Permethrin-treated clothing repels and kills ticks, mosquitoes, and other arthropods and retains this effect after repeated laundering. The permethrin insecticide should be reapplied following the label instructions. Some commercial products are available pretreated with permethrin. Permethrin is not to be used directly on skin.

How Often You Should Re-apply Repellents

Follow the directions on the product you are using. Sweating or getting wet may mean that you need to re-apply more frequently.

How the Percentage of Active Ingredient in a Product Relates to Protection Time

In general, the more active ingredient (higher percentage) it has, the longer a repellent will protect you from mosquitoes. For example, DEET products are available in many formulations--something with 30% DEET will protect you longer than one with 5% DEET. You cannot directly compare the percentage of one active ingredient to another, however.

Use your common sense. Re-apply repellent if you start to get bitten and follow the label instructions.

As a rule of thumb:

- For many hours outside (over 3-4 hours) and/or where biting is very intense-look for a repellent containing more than 20% DEET. Products with more than 50% DEET do not offer additional protection.
- For shorter periods of time, repellents containing less than 20% DEET, the repellent currently available with 7% picaridin or one of the products containing oil of lemon eucalyptus may provide adequate protection. There are other products available, but they may not protect as long as those named here.
- Even if you're going out for 10 minutes use a repellent -that's long enough to get bitten!

Hint: Applying permethrin to your clothing ahead of time will give you even greater protection.

Remember-if you're getting bitten, do something about it!

Choose a repellent that you will use consistently. Also, choose a product that will provide sufficient protection for the amount of time that you will be spending outdoors. Product labels often indicate the length of time that you can expect protection from a product. If you are concerned about using insect repellent, consult your health care provider for advice.

The National Pesticide Information Center (NPIC) can also provide information through a toll-free number, 1-800-858-7378 or http://npic.orst.edu.

General Considerations for Using Repellents Safely

- Always follow the instructions on the product label.
- Apply repellents only to exposed skin and/or clothing (as directed on the product label.) Do not use repellents under clothing.
- Never use repellents over cuts, wounds or irritated skin.
- Do not apply to eyes or mouth, and apply sparingly around ears. When using sprays, do not spray directly on face-spray on hands first and then apply to face.
- Do not allow children to handle the product. When using on children, apply to your own hands first and then put it on the child. You may not want to apply to children's hands.
- Use just enough repellent to cover exposed skin and/or clothing. Heavy application and saturation are generally unnecessary for effectiveness. If biting insects do not respond to a thin film of repellent, then apply a bit more.
- After returning indoors, wash treated skin with soap and water or bathe. This is particularly important when repellents are used repeatedly in a day or on consecutive days. Also, wash treated clothing before wearing it again. (This precaution may vary with different repellents-check the product label.)
- If you or your child get a rash or other bad reaction from an insect repellent, stop using the repellent, wash the repellent off with mild soap and water, and call a local poison control center for further guidance. If you go to a doctor because of the repellent, take the repellent with you to show the doctor.

Note that the label for products containing oil of lemon eucalyptus specifies that they should not to be used on children under the age of three years.

Other than those listed above, EPA does not recommend any additional precautions for using registered repellents on pregnant or lactating women, or on children.

For additional information regarding the use of repellent on children, please see CDC's Frequently Asked Questions about Repellent Use.

DEET-based repellents applied according to label instructions may be used along with a separate sunscreen. No data are available at this time regarding the use of other active repellent ingredients in combination with a sunscreen.

See **http://www.epa.gov/pesticides/factsheets/insectrp.htm** for additional information on using EPA-registered repellents.

In addition to wearing repellent, you can protect yourself and your family by taking these precautions:

- Wear clothing with long pants and long sleeves while outdoors. Apply permethrin or another EPA-registered repellent to clothing, as mosquitoes may bite through thin fabric. (Remember: don't use permethrin on skin.)
- Use mosquito netting over infant carriers.
- Reduce the number of mosquitoes in your area by getting rid of containers with standing water that provide breeding places for the mosquitoes.

Updated Information Regarding Insect Repellents (CDC)

Repellents are an important tool to assist people in protecting themselves from mosquito-borne diseases.

A wide variety of insect repellent products are available. CDC recommends the use of products containing active ingredients which have been registered with the U.S. Environmental Protection Agency (EPA) for use as repellents applied to skin and clothing. EPA registration of repellent active ingredients indicates the materials have been reviewed and approved for efficacy and human safety when applied according to the instructions on the label.

Of the active ingredients registered with the EPA, two have demonstrated a higher degree of efficacy in the peer-reviewed, scientific literature *. Products containing these active ingredients typically provide longer-lasting protection than others:

- DEET (N,N-diethyl-m-toluamide)
- Picaridin (KBR 3023)

Oil of lemon eucalyptus [p-menthane 3,8-diol (PMD)], a plant based repellent, is also registered with EPA. In two recent scientific publications, when oil of lemon eucalyptus was tested against mosquitoes found in the US it provided protection similar to repellents with low concentrations of DEET.

Oil of lemon eucalyptus has not been tested against mosquitoes that spread malaria and some other diseases which occur internationally. See CDC Travelers' Health website (http://www.cdc.gov/travel/bugs.htm) for specific recommendations concerning protection from insects when traveling outside the United States.

In addition, certain products which contain permethrin are recommended for use on clothing, shoes, bed nets, and camping gear, and are registered with EPA for this use. Permethrin is highly effective as an insecticide and as a repellent. Permethrin-treated clothing repels and kills ticks, mosquitoes, and other arthropods and retains this effect after repeated laundering. The permethrin insecticide should be reapplied following the label instructions. Some commercial products are available pretreated with permethrin.

Length of protection from mosquito bites varies with the amount of active ingredient, ambient temperature, amount of physical activity/perspiration, any water exposure, abrasive removal, and other factors. For long duration protection use a long lasting (micro-encapsulated) formula and re-apply as necessary, according to label instructions.

EPA recommends the following precautions when using insect repellents:

- Apply repellents only to exposed skin and/or clothing (as directed on the product label.) Do not use repellents under clothing.
- Never use repellents over cuts, wounds or irritated skin.
- Do not apply to eyes or mouth, and apply sparingly around ears. When using sprays, do not spray directly on face—spray on hands first and then apply to face.
- Do not allow children to handle the product. When using on children, apply to your own hands first and then put it on the child. You may not want to apply to children's hands.

- Use just enough repellent to cover exposed skin and/or clothing. Heavy application and saturation are generally unnecessary for effectiveness. If biting insects do not respond to a thin film of repellent, then apply a bit more.
- After returning indoors, wash treated skin with soap and water or bathe. This is particularly important when repellents are used repeatedly in a day or on consecutive days. Also, wash treated clothing before wearing it again. (This precaution may vary with different repellents—check the product label.)
- If you or your child get a rash or other bad reaction from an insect repellent, stop using the repellent, wash the repellent off with mild soap and water, and call a local poison control center for further guidance. If you go to a doctor because of the repellent, take the repellent with you to show the doctor.

Note that the label for products containing oil of lemon eucalyptus specifies that they should not to be used on children under the age of three years. Other than those listed above, EPA does not recommend any additional precautions for using registered repellents on pregnant or lactating women, or on children. For additional information regarding the use of repellent on children, please see CDC's Frequently Asked Questions about Repellent Use.
[http://www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm]

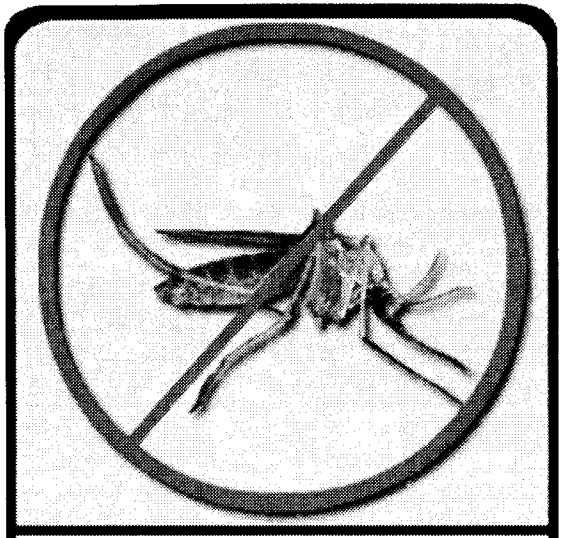
DEET-based repellents applied according to label instructions may be used along with a separate sunscreen. No data are available at this time regarding the use of other active repellent ingredients in combination with a sunscreen.

See http://www.epa.gov/pesticides/factsheets/insectrp.htm for additional information on using EPAregistered repellents.

*Fradin MS, Day JF. Comparative efficacy of insect repellents against mosquito bites. N Engl J Med. 2002;347(1):13-8.

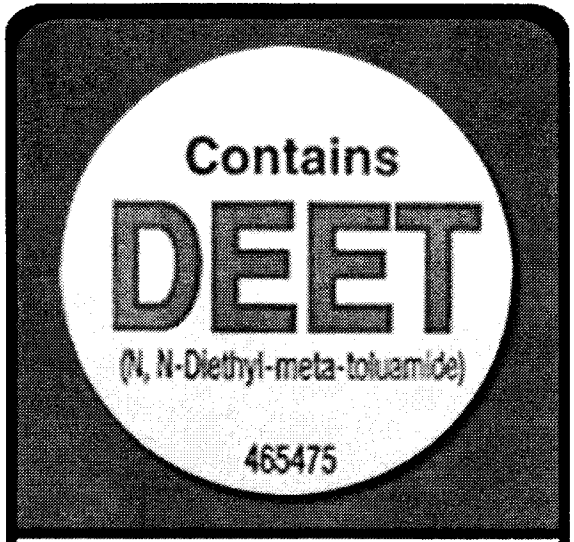
Barnard DR, Xue RD. Laboratory evaluation of mosquito repellents against Aedes albopictus, Culex nigripalpus, and Ochlerotatus triseriatus (Diptera: Culicidae). J Med Entomol. 2004 Jul;41(4):726-30.

West Nile Virus Can Make You So Sick You Can Miss Work or Even Die



Do not let mosquitoes bite you.

Wear long pants, long sleeves, and socks when you are outside.



Use spray with DEET in it on your clothes and bare skin.

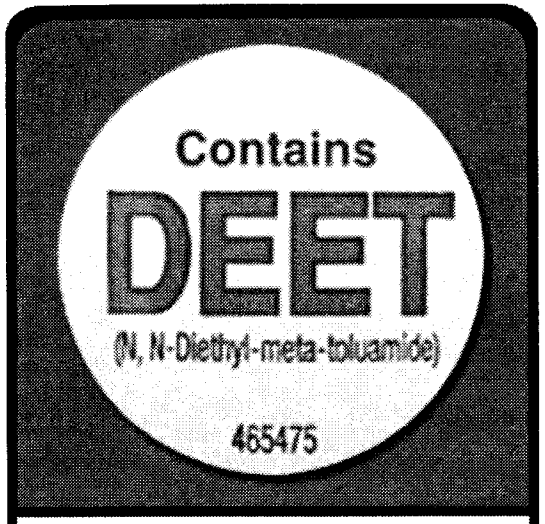
Use spray with DEET on your clothes and bare skin.

Use spray with DEET on your hands and rub on your face. Do not get into your eyes or mouth.

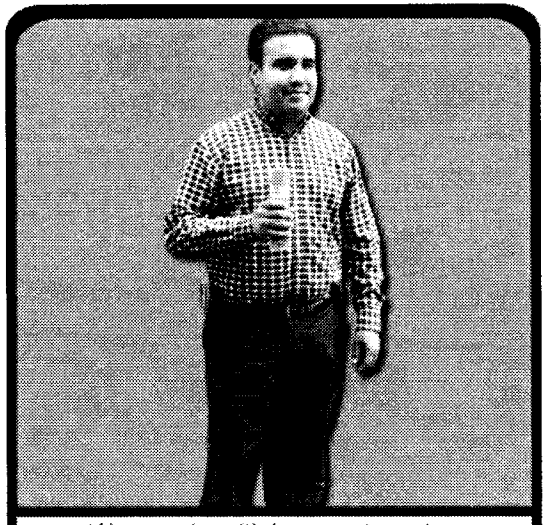
Wash your skin after you come inside.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION

You Need to Protect Your Family From West Nile Virus



Use spray that has DEET in it so mosquitoes do not bite your family.



Wear socks with long pants and sleeves outside and use spray with DEET on your clothes and bare skin.

Put spray with DEET on your hands and rub on your kid's skin. Do not get in eyes and mouth.

People over 50 can die from West Nile Virus. Be sure to have them use spray with DEET.

Mosquitoes lay eggs in standing water in your yard. Pour it out.

If you see a dead bird do not touch it with your bare hands.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION

Mental Health

Traumatic Incident Stress: Information for Emergency Response Workers

From the National Institute for Occupational Safety and Health

Disasters take many forms and demand quick response from emergency workers. They may include natural disasters such as earthquakes or hurricanes, or they may involve manmade disasters such as technological failures or terrorist attacks. As a member of an emergency response team, you and your team members are at risk of experiencing what psychologists refer to as a traumatic incident—an incident that may involve exposure to catastrophic events, severely injured children or adults, dead bodies or body parts, or the loss of colleagues, for instance.

Traumatic incidents can produce unusually strong emotional reactions that may interfere with your ability to function at the scene or later:

You may experience any of the physical, cognitive, emotional, or behavioral symptoms listed below in Table 1. Some people experience emotional aftershocks weeks or months after they have passed through a traumatic event. Others may experience these reactions while still at the scene, where they must stay clearly focused on constantly changing hazards to maintain their own safety and to rescue injured victims.

Remember that strong emotions are normal reactions to an abnormal situation!

Table 1.—Symptoms of stress that may be experienced during or after a traumatic incident

Physical*	Cognitive	Emotional	Behavioral
Chest pain*	Confusion	Anxiety	Intense anger
Difficulty breathing*	Nightmares	Guilt	Withdrawal
Shock symptoms*	Disorientation	Grief	Emotional outburst
Fatigue	Heightened or lowered alertness	Denial	Temporary loss or increase of appetite
Nausea/vomiting	Poor concentration	Severe panic (rare)	Excessive alcohol consumption
Dizziness	Memory problems	Fear	Inability to rest, pacing
Profuse sweating	Poor problem solving	Irritability	Change in sexual functioning
Rapid heart rate	Difficulty identifying familiar objects or people	Loss of emotional control	
Thirst		Depression	
Headaches		Sense of failure	
Visual difficulties		Feeling overwhelmed	
Clenching of jaw		Blaming others or self	
Nonspecific aches and pains			

***Seek medical attention immediately** if you experience chest pain, difficulty breathing, severe pain, or symptoms of shock (shallow breathing, rapid or weak pulse, nausea, shivering, pale and moist skin, mental confusion, and dilated pupils).

Additional Resources

Disaster Mental Health Services, Substance Abuse and Mental Health Services Administration (SAMHSA).
http://www.mentalhealth.org/cmhs/EmergencyServices/index.htm
Tips for Talking About Disasters, SAMHSA.
http://www.mentalhealth.org/cmhs/EmergencyServices/after.htm
Self-Care Tips for Emergency and Disaster Response Workers, SAMHSA.
http://www.mentalhealth.org/cmhs/EmergencyServices/response.htm
Related Links, SAMHSA.
http://www.mentalhealth.org/cmhs/EmergencyServices/links.htm

National Center for Post Traumatic Stress Disorder (PTSD), Department of Veterans Affairs.
http://www.ncptsd.org/
Disaster Mental Health: Dealing with the Aftereffects of Terrorism. Brief Information for the Public and the Professional.
National Center for PTSD, Veterans Affairs
http://www.ncptsd.org/disaster.html

St. Laurent, D. (1996). The nutritional needs of rescue teams. Emergency Preparedness Digest, April-June, pp. 26–27.

What You Can Do On-site

Taking care of yourself will help you to stay focused on hazards at the site and to maintain the constant vigilance you need for your own safety. Often responders do not recognize the need to take care of themselves and to monitor their own emotional and physical health—especially when recovery efforts stretch into several weeks. The following guidelines contain simple methods for helping yourself. Read them while you are at the site and again after you return home.

- Pace yourself. Rescue and recovery efforts at the site may continue for days or weeks.
- Take frequent rest breaks. Rescue and recovery operations take place in extremely dangerous work environments. Mental fatigue over long shifts can place emergency workers at greatly increased risk for injury.
- Watch out for each other. Co-workers may be intently focused on a particular task and may not notice a hazard nearby or behind.
- Be conscious of those around you. Responders who are exhausted, feeling stressed, or even temporarily distracted may place themselves and others at risk.
- Maintain as normal a schedule as possible: ***regular eating and sleeping are crucial***. Adhere to the team schedule and rotation.
- Make sure that you drink plenty of fluids such as water and juices.
- Try to eat a variety of foods and increase your intake of complex carbohydrates (for example, breads and muffins made with whole grains, granola bars).
- Whenever possible, take breaks away from the work area. Eat and drink in the cleanest area available.
- Recognize and accept what you cannot change—the chain of command, organizational structure, waiting, equipment failures, etc.
- Talk to people when ***YOU*** feel like it. You decide when you want to discuss your experience. Talking about an event may be reliving it. Choose your own comfort level.
- If your employer provides you with formal mental health support, use it!
- Give yourself permission to feel rotten: You are in a difficult situation.
- Recurring thoughts, dreams, or flashbacks are normal—do not try to fight them. They will decrease over time.
- Communicate with your loved ones at home as frequently as possible.

What You Can Do at Home

Over time, your impressions and understanding of your experience will change. This process is different for everyone. No matter what the event or your reaction to it, you can follow some basic steps to help yourself adjust to the experience:

- Reach out—people really do care.
- Reconnect with family, spiritual, and community supports.
- Consider keeping a journal.
- Do not make any big life decisions.
- Make as many daily decisions as possible to give yourself a feeling of control over your life.
- Spend time with others or alone doing the things you enjoy to refresh and recharge yourself.
- Be aware that you may feel particularly fearful for your family. This is normal and will pass in time.
- Remember that "getting back to normal" takes time. Gradually work back into your routine. Let others carry more weight for a while at home and at work.
- Be aware that recovery is not a straight path but a matter of two steps forward and one back. You will make progress.
- Appreciate a sense of humor in yourself and others. It is OK to laugh again.
- Your family will experience the disaster along with you. You need to support each other. This is a time for patience, understanding, and communication.
- Avoid overuse of drugs or alcohol. You do not need to complicate your situation with a substance abuse problem.
- Get plenty of rest and normal exercise. Eat well-balanced, regular meals.

FACT SHEET FOR PROVIDERS

Center for the Study of Traumatic Stress

Understanding the Effects of Trauma and Traumatic Events to Help Prevent, Mitigate and Foster Recovery for Individuals, Organizations and Communities

A Program of Uniformed Services University, Our Nation's Federal Medical School, Bethesda, Maryland • www. usuhs.mil/csts/

Psychological First Aid

Helping Victims in the Immediate Aftermath of Disaster

As a healthcare provider, first responder, leader or manager of disaster operations, this fact sheet describes an evidence-informed approach for helping victims cope in the immediate aftermath of a disaster known as *Psychological First Aid*, and explains how to administer it.

Psychological First Aid aims to mollify the painful range of emotions and physical responses experienced by people exposed to disaster. These reactions include combinations of confusion, fear,

hopelessness, helplessness, sleeplessness, physical pain, anxiety, anger, grief, shock, aggressiveness, mistrustfulness, guilt, shame, shaken religious faith, and loss of confidence in self or others.

There is consensus among international disaster experts and researchers that *Psychological First Aid* can help alleviate these painful emotions and reduce further harm that can result from initial reactions to disasters. Please share this fact sheet with your disaster outreach colleagues.

Do's and Don'ts for Promoting an Environment of Safety, Calm, Connectedness, Self-Efficacy and Hope

The primary objective of *Psychological First Aid* is to create and sustain an environment of 1) safety, 2) calm, 3) connectedness to others, 4) self-efficacy or empowerment, and 5) hope.

DO:

Promote Safety

- Help people meet basic needs for food & shelter, and obtain emergency medical attention.
- Provide repeated, simple and accurate information on how to obtain these.

Promote Calm

- Listen to people who wish to share their stories and emotions and remember there is no wrong or right way to feel.
- Be friendly and compassionate even if people are being difficult.
- Offer accurate information about the disaster or trauma, and the relief efforts underway to help victims understand the situation.

Promote Connectedness

- Help people contact friends or loved ones.
- Keep families together. Keep children with parents or other close relatives whenever possible.

Promote Self-Efficacy

- Give practical suggestions that steer people towards helping themselves.
- Engage people in meeting their own needs.

Promote Hope

- Find out the types and locations of government and non-government services and direct people to those services that are available.
- Remind people (if you know) that more help and services are on the way when they express fear or worry.

DON'T:

- Force people to share their stories with you, especially very personal details (this may decrease calmness in people who are not ready to share their experiences).
- Give simple reassurances like "everything will be OK" or "at least you survived" (statements like these tend to diminish calmness).
- Tell people what you think they should be feeling, thinking or doing now or how they should have acted earlier (this decreases self-efficacy).
- Tell people why you think they have suffered by alluding to personal behaviors or beliefs of victims (this also decreases self-efficacy).

Continued on reverse side

Don't, continued

- Make promises that may not be kept (un-kept promises decrease hope).
- Criticize existing services or relief activities in front of people in need of these services (this undermines an environment of hope and calm).

Photographs of the impacts of Hurricane Katrina on the Gulf states. Top photo: destroyed bridge. Bottom photo: flooded residential neighborhood. Photos by Paul Morse, White House photographer. (These photos were taken from Air Force 1 when President George W. Bush flew over hurricane devestated areas on August 31, 2005, as he flew from Crawford TX to Washington, DC).

For more information on the Center for the Study of Traumatic Stress and its resources (disaster fact sheets, articles and books) go to: ***www.usuhs.mil/csts***

PLACE LOCAL CONTACT INFORMATION HERE

Center for the Study of Traumatic Stress
Uniformed Services University of the Health Sciences
4301 Jones Bridge Road
Bethesda, MD 20814-4799
T: 301-295-2470
F: 301-319-6965
www.usuhs.mil/csts | www.centerforthestudyoftraumaticstress.org

Center for the Study of Traumatic Stress

Understanding the Effects of Trauma and Traumatic Events to Help Prevent, Mitigate and Foster Recovery for Individuals, Organizations and Communities
A Program of Uniformed Services University, Our Nation's Federal Medical School, Bethesda, Maryland • www. usuhs.mil/csts/

Psychological First Aid: How You Can Support Well-Being in Disaster Victims

People often experience strong and unpleasant emotional and physical responses to disasters. Reactions may include combinations of confusion, fear, hopelessness, helplessness, sleeplessness, physical pain, anxiety, anger, grief, shock, aggressiveness, mistrustfulness, guilt, shame, shaken religious faith, and loss of confidence in self or others. There is consensus among international disaster experts and researchers that psychological first aid can help alleviate painful emotions and reduce further harm from initial reactions to disasters.

Your actions and interactions with others can help provide psychosocial first aid to people in distress. Psychological first aid creates and sustains an environment of (1) safety, (2) calming, (3) connectedness to others, (4) self efficacy—or empowerment, and (5) hopefulness.

PSYCHOLOGICAL FIRST AID

DO:

- Do help people meet basic needs for food & shelter, and obtain emergency medical attention. Provide repeated, simple and accurate information on how to obtain these. (safety)
- Do listen to people who wish to share their stories and emotions and remember there is no wrong or right way to feel (calming).
- Do be friendly and compassionate even if people are being difficult (calming).
- Do provide accurate information about the disaster or trauma and the relief efforts. This will help people to understand the situation (calming).
- Do help people contact friends or loved ones (connectedness).
- Do keep families together. Keep children with parents or other close relatives whenever possible. (connectedness)
- Do give practical suggestions that steer people towards helping themselves (self-efficacy).
- Do engage people in meeting their own needs (self-efficacy).
- Do find out the types and locations of government and non-government services and direct people to services that are available (hopefulness).
- If you know that more help and services are on the way do remind people of this when they express fear or worry (hopefulness)

DON'T:

- Don't force people to share their stories with you, especially very personal details (this may decrease calmness in people who are not ready to share their experiences).
- Don't give simple reassurances like "everything will be ok" or "at least you survived" (statements like these tend to diminish calmness).
- Don't tell people what you think they should be feeling, thinking or doing now or how they should have acted earlier (this decreases self-efficacy).
- Don't tell people why you think they have suffered by giving reasons about their personal behaviors or beliefs (this also decreases self-efficacy).
- Don't make promises that may not be kept (un-kept promises decrease hope).
- Don't criticise existing services or relief activities in front of people in need of these services (this may decrease hopefulness or decrease calming).

Center for the Study of Traumatic Stress

erstanding the Effects of Trauma and Traumatic Events to Help Prevent, Mitigate and Foster Recovery for Individuals, Organizations and Communit
A Program of Uniformed Services University, Our Nation's Federal Medical School, Bethesda, Maryland • www. usuhs.mil/csts/

Psychosocial Concerns after Hurricane Katrina
Tips for Medical Care Providers

Health care providers assume many roles in the midst of natural disasters: caregiver, leader, comforter, and information source. Hurricane Katrina has displaced thousands, destroyed countless homes and property, and claimed numerous lives. Although the hurricane's strength has dissipated, its aftermath will be felt for considerable time to come. As health care providers mobilize to help, they should be mindful of the losses experienced by the population they will assist. Interviewing with sensitivity is essential, and is the first step in assessing specific needs. This issue of Courage to Care provides information for health care providers after hurricanes and pays special attention to some of the issues for individuals providing support in the aftermath of Katrina.

Services and basic needs, such as water, food, power, and sanitation, have been disrupted. Depending on the extent of damage and access to damaged areas, it may be some time before these are restored. The potential for spread of disease and infections underscores need for surveillance and the institution of public health measures. Providers play an integral role in advocating for the restoration of these services as public health necessities.

Those who have otherwise well-controlled medical conditions may not have access to their regular medications. Evacuation and relocation may disrupt medication availability and may contribute to the exacerbations of ongoing mental health and other medical conditions. In addition, persons who routinely use alcohol, tobacco, or illicit drugs may experience additional difficulties when these are not readily available.

Psychological first aid, an evidenced-informed approach for helping populations cope in the aftermath of a disaster, aims to reduce the emotional and physical responses in the immediate aftermath of a disaster.

Principles include:

- Promotion of safety (help people meet the basic needs for shelter and food, provide a 'recovery environment' to include limited exposure to news and other media related to the disaster, encourage those who are relocated to return only when their areas are deemed safe)
- Promote calm (offer accurate information about the disaster and the efforts underway to help the situation)
- Promote connectedness (help to reunite families and friends, establish a sense of normalcy for children by reinforcing parent-child bond, reuniting children with playmates, and re-establishing, if possible, school and other safe environments)
- Promote self-efficacy (give practical suggestions and referrals that move people to help themselves)
- Promote hope (direct people to services that are available, remind people (if you know) that more assistance will be arriving).

Many of those who have experienced Hurricane Katrina first-hand have lost loved ones, pets, jobs, and property. After such losses, it is not uncommon to experience distress in the form of difficulty sleeping, disbelief, nightmares, feeling sad, and anxiety. In most individuals, these symptoms remit over time and require no formal treatment. A small subset will continue to have difficulties and may present with depression, anxiety, increased arguments with significant others, unexplained medical symptoms, and increased use of cigarettes and alcohol. Should health care providers identify such problems, this may indicate a need for more formalized assessment and intervention.

Providers must be aware of the impact of the disaster on themselves and their professional colleagues. Times of high demand and the desire to "do more" put providers at risk for burn out, fatigue, and reduced effectiveness. Providers are not immune, and should attend to their own needs as well as those around them.

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Hurricane Katrina: Sustaining Effectiveness in First Responders

The first-responder community is a diverse group that includes:

- Police
- Firefighters
- Search and Rescue teams
- Emergency medical personnel
- Public safety and construction workers
- Sanitation & communication experts and engineers
- Other disaster workers

First responders from these organizations must work together to help individuals in the aftermath of a disaster. This cooperation is often a community's first step towards repair. By providing direction, protection, treatment, and security first responders help the affected population "rebuild community."

Katrina has destroyed cities, towns, and neighborhoods. Thousands of people are displaced, and must now live in crowded conditions. The recovery effort will require communities to work with local first responders, with first responders who arrive from afar, and with other agencies and communities at distant locations. All first responders bring to the relief efforts their unique training and skills. The ideas listed below will help first responders of all job-types work most effectively with each other and the communities they assist.

- Safety and maintaining health are critical. Attention to health basics such as using only potable water, providing sanitation, adequate food and proper shelter will reduce the risk of disease and limit the spread of infection.
- Those in need may not respond positively to offers of assistance. They may actually be wary of or fear those who are attempting to offer help. Calm and compassionate reassurance will generally be effective even if a victim's initial behavior is irrational, difficult, or seems like an "attack."
- Populations at particular risk for problems include the mentally ill, the medically ill, the elderly, and children. Also, as immigrants may avoid or flee help for fear of deportation special effort must be made to convey the message that an approach is an offer of assistance.
- Staying aware of each others' stress level is critical to maintaining the effectiveness of recovery and assistance efforts. Simple interventions, such as providing a rest area with cots and washing stations, fluids and food, that is protected from news media and onlookers, encouraging resting off of one's feet during breaks, watching out for over-dedication to task, and engaging persons in conversation/topics of their choosing, and praising others efforts and assistance go a long way to maintaining effectiveness.
- In speaking with the public, reliable, repeated, accurate, and up-to-date information about safety concerns, response plans, and available resources is calming
- First responder work involves exposure to the losses and injury of others. The responder community must monitor each other's stress level and help one another manage as they help the larger community.
- Proper sleep, nutrition, and exercise are critical to sustaining the rebuilding effort in first responders and community members. First responders should also be aware of their own limitations and potential for injury.
- Recreation, regular exercise, and other healthy outlets help maintain energy and alleviate stress. Excessive alcohol use detracts from efficiency on the job and may be dangerous
- Regularly planned and scheduled communication with family members back home is important not only for the family—but for responders themselves.

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Tips for shift workers: How to eat, sleep and stay fit when you work unusual hours

Your manager just posted the new schedule at work, and next month you're on the evening shift. You quickly weigh the pros and cons — you'll be able to pick up the kids from school each day. But you'll miss your kids' bath time and bedtime stories.

There's no doubt about it — shift work can be difficult. The demands of juggling alternate work hours and staying connected to family and friends can have a big impact on your health — both mentally and physically. But you can still get enough sleep, eat the right foods, be physically active and maintain social ties — even when you work the graveyard shift.

Sleep tips

Changing your normal rhythm of waking and sleeping as a result of switching shifts requires a period of adjustment. If you've ever flown across multiple time zones, you know what can happen when your body's internal clock is disrupted. Insomnia, mental and physical fatigue, indigestion, and an overall feeling of ill health are common.

If your job requires you to constantly change shifts, your body will have more difficulty adjusting and readjusting as you get older. Here are some strategies to help you sleep well:

- Develop a pre-bedtime ritual. Read the paper, listen to soft music or take a warm bath before going to bed. Allow yourself to unwind from your shift.
- Set your environment for sleeping. Sleep in a dark room. Use room-darkening shades or wear a sleep mask. Wear earplugs or run a fan to block out daytime noises and make sleep easier.
- Maintain your sleep schedule. If at all possible, keep a consistent sleep schedule. Stick to the same sleep hours every day — even on your days off.
- Choose less frequent rotations. Work a shift for three weeks rather than rotating to a different schedule every week.
- Change the sequence. A more normal sleep pattern results when your shift sequence is day-evening-night rather than day-night-evening.
- Take naps. A short nap — maybe 30 minutes — before your evening shift can help you feel refreshed and more alert at work. Rouse yourself well before your shift starts, though, in case you feel groggy when you first wake up.
- Sleeping pills. If you experience severe insomnia, ask your doctor about a short-acting sleeping pill.

Nutrition tips

Shift workers may find it difficult to make healthy food choices because what's most readily available in the middle of the night comes from vending machines and 24-hour fast-food restaurants. Unhealthy eating isn't necessarily a given, though. Here are some tips to help you eat well:

- Brown bag it. Bringing food from home will make you less tempted to raid the vending machines. Pack a healthy lunch that includes plenty of fruits and vegetables.
- Eat smaller portions. Aim for smaller portions, such as a couple of quick, healthy snacks, during your shift rather than eating a big meal. Shift work can interfere with your body's regular digestive routine. Eating light can reduce the chance of an upset stomach — especially if you're working through the night — because heavier meals are more difficult to digest and can give you heartburn.
- Avoid late-night caffeine. Have caffeinated drinks before your shift or early during your shift. Avoid too much caffeine or caffeine late in your shift — it can make it hard for you to fall asleep after you get home.

Exercise tips

Shift work doesn't mean you can't exercise. Scheduling regular exercise is important — it may help improve your sleep, your energy level and your mood. Don't know if you can fit it into your day — or night? Here are some tips to get the job done:

- Work out before work. Twenty minutes of aerobic activity, such as brisk walking, jogging or swimming, on most days can help you stay alert on the job. It also keeps your heart in tip-top shape.
- On the job. During work, use your breaks to exercise. Take a lap around your building. Shoot hoops outdoors. Keep a resistance band or hand weights at work for strength training.
- Don't take the shortcut. Work exercise into your normal routine. Walk or bike to work instead of driving. Climb the stairs instead of riding the elevator.
- Find a buddy. Find a co-worker and exercise together. It'll make exercising more fun and will also help keep you motivated.

Social tips

Shift work makes it tough to maintain social ties — after all, you'll be working when most people are socializing. Here are some tips to help you maintain social ties:

- Phone home. Make time to call home and talk with your kids and spouse, whether it's just before bedtime or just after the sun rises.
- Publicize your hours. Let your family and friends know your work schedule. Make time for get-togethers on your days off to keep in touch.
- Get creative. Make a breakfast date — it'll be a nice end-of-the-day treat for you and a nice start-of-the-day treat for someone else.

The ability to adjust to shift work is different for every person. You may be happy working alternate hours or you may find it extremely frustrating. If you feel that your work hours are impacting your health and well-being, it may be time to consider changing your job.

By Mayo Clinic staff HQ01388 June 18, 2004

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