

# FLOODS AND FLASH FLOODS

Floods are the most common and widespread of all natural disasters. Floods are caused by heavy or continuous rainfall that exceeds the absorptive capacity of the soil and flow capacity of rivers, streams and surrounding lakes. These conditions cause the waters to overflow their banks. Heavy rains can result in flash floods, dumping several inches of rain in such a short period of time that areas not usually subject to high waters are devastated. Riverine and tidal flooding can potentially inundate a city when protection fails. The lands most subject to flooding are known as floodplains. Every major drainage basin has a floodplain surrounding it. Flood prone areas are found around every ocean, lake, river, stream and county drain. The type of development that exists within the floodplain will determine whether or not flooding will cause damage. Property and structures situated in a floodplain are exposed to the risk of flooding. Strong currents associated with flash floods can wash away anything in their path and pose a threat to life. Riverine and tidal flooding can inundate large populated areas, causing more costly damage than all other hazards to properties and structures.

The frequency of floods is referred to by the time interval in which a certain-size flood is likely to occur. A “100-year flood” means that a flood of a certain depth has a 1% chance of occurring each year. “Fifty-year” floods have a 2% chance of occurring in any one year; “ten-year” floods have a 10% chance. These intervals of probability are classified into hazard zones. Floods are measured according to the heights the waters reach. Their magnitude is based on the chances that water flow will equal or exceed a certain level on a recurring basis. The larger the flood, the longer the period in which one is likely to recur. Small, localized floods are more common. Most floods develop slowly over a period of days. Flash floods, however, are like walls of water that develop in a matter of minutes. Flash floods can be caused by intense storms or dam failure.

## PLANNING CONSIDERATIONS

Consider the following when preparing for floods:

- Determine if the facility is located in a floodplain
- Learn the history of flooding in the area. Learn the facility’s elevation in relation to tidal basins, rivers, streams, etc.
- Review the community’s emergency plan. Learn the community’s evacuation routes. Know where to find higher ground.
- Establish warning and evacuation procedures for the facility. Make plans for assisting employees who may need transportation
- Inspect areas within the facility subject to flooding. Identify records and equipment that can be moved to a higher area. Make plans to move records and equipment if needed.
- Purchase a NOAA Weather Radio with a warning alarm tone and battery backup. Listen for flood watches and warnings to be issued.
- Ask the insurance carrier about flood insurance. Regular property and casualty insurance does not cover flooding.

## **FLOOD WATCH VS FLOOD WARNING**

### **FLOOD WATCH**

The National Weather Service (NWS) issues watches when the risk of a flood event has increased significantly, but its occurrence, location, and/or timing remains uncertain. Watches are issued to provide enough lead-time for those who must set their plans in motion to do so. Watches contain the following information:

- Affected area
- Potential hazards and their severity
- Safety rules, call to action statements
- Speed and direction of the hazard

***When a flood watch is issued, you should monitor the situation very closely for the period of the watch, and execute the following steps:***

- Monitor forecast updates and “upstream” locations
- Move to a higher state of readiness
- Determine if the location of the long term care facility is in an area likely to be affected.

***Contact the local Emergency Management Agency if unsure:***

- Determine the timeframes for action
- Identify clinically complex residents
- Activate staff notification procedures, if necessary
- If applicable, check to see that the emergency generator is protected from floodwaters and is in running order.

### **FLOOD WARNING**

Warnings are issued when a hazardous flood event is occurring, is imminent, or has a very high probability of occurring. The National Weather Service issues warnings in situations where hazardous weather conditions pose a real threat to life and or property. When conditions warrant, warnings may be issued without previous notification. Warnings contain the following information:

- Affected area
- Potential hazards and their severity
- Timing of the event
- Safety rules, call to action statements
- Speed and direction of the hazard

***When a warning is issued for the area where the long term care facility is located, the following steps must be executed:***

- All of the activities listed for watches
- Emergency notification of staff, possible alternate facilities, and emergency resource contacts
- Take mitigation steps as necessary (and safe) to lessen the effects of the flooding

- Assess the status of residents, and be prepared to share this information with the Incident Commander, should an evacuation advisory be issued
- Begin preparing for a possible evacuation to higher ground, allowing sufficient time for moving non-ambulatory residents - Use information contained on the current HCFA Form 672 and/or HCFA 802 to help estimate transportation requirements
- Activate evacuation measures, if necessary
- Listen to local TV and radio stations for vital information.

***If it is certain that the facility will flood:***

- Maintain contact with the County Emergency Manager, request assistance in evacuating the facility and transportation of residents, if necessary
- Recall staff as needed
- Notify other facilities with which you have agreements to prepare for receiving residents
- Move resident records to safe area
- Move equipment, supplies, food, furniture, etc. to highest ground level in the facility
- Notify next-of-kin/responsible parties about the status of their resident(s)
- Be prepared for media inquiries
- Shut off all utilities
- Leave sign of evacuation site and contact information
- Activate vendor agreements for pump rental. Otherwise, contact County Emergency Manager or fire department to request assistance locating pumps

**FLASH FLOOD WATCH VS FLASH FLOOD WARNING**

**FLASH FLOOD WATCH**

A flash flood WATCH means flash flooding is possible in your area. If a flash flood WATCH is issued for your area, be prepared!

- Stay tuned to radio and TV stations for vital local information
- Keep alert for signs of flash flooding, such as intense rainfall or rising waters
- Keep on hand or have access to materials like sandbags plywood, plastic sheeting and lumber.
- Check with your local Emergency Management Coordinator for location of sandbags. Sandbags are very difficult to find once the flooding starts.

**FLASH FLOOD WARNING**

A flash flood WARNING means you may have very little time before floodwaters reach your area. A flash flood can happen so rapidly that you may not get a warning. If a flash flood WARNING is issued for your area, or if you suspect a flash flood is happening, move everyone to safety immediately!

- Evacuate residents from the affected portion of the facility to the highest elevation in the building. If time permits, evacuate the residents from the

facility. Use information contained on the current HCFA Form 672 and/or HCFA 802 to help estimate transportation requirement

- Make arrangements for medical assistance as needed
- Inform the County Emergency Manager of action taken and help needed
- Inform the local law enforcement agency of your problem and situation
- Recall staff as needed
- If the facility is to be evacuated, notify other facilities with which you have agreements
- Activate emergency transportation procedures to evacuate residents as needed
- If numerous residents require hospital treatment, alert area hospitals of what to expect
- Move resident records to safe area
- Inform the local Emergency Manager of action taken and help needed

### **PREVENTING FLOOD HAZARDS**

Preventative measures are the best means of protection from floods. Floodwaters and fallen trees often damage utilities in the affected areas. Always consider:

- Know the facility's flood risk and elevation above flood stages. Do local streams or rivers flood easily? If so, be prepared! Flash flooding and external flooding can be forecasted and emergency actions initiated.
- Local public broadcast stations will disseminate flood advisory information. NOAA Weather Alert Radios carry up to date information on the weather conditions in your area. The County Emergency Manager can also provide information and warnings about flood conditions.
- Compliance with floodplain zoning laws, designed to limit or prevent construction in the flood prone areas, are the best means of limiting economic loss and property damage.
- Back-up communications should be part of the Disaster Response and Recovery Planning effort.
- If you have an emergency generator, protect it from the floodwaters. Conduct periodic safety checks before utilizing a generator to supply power to the facility
- Measures can be taken to flood proof structures, including:
  - 1) Installing check valves in facility sewer traps, to prevent floodwater from backing up in sewer drains
  - 2) Sealing cracks in walls and floors with hydraulic cement
  - 3) Installing a sump pump with a dependable power source or allow the basement to fill with water, which enters on the floor above. Most basements and floors are not able to withstand the additional pressure of water-soaked soils, so the facility will sustain less damage if water is allowed to enter the basement. The water pressure on the inside will equalize that on the outside and prevent caving-in of the basement walls or popping up of the basement floor
  - 4) Constructing floodwalls or levees outside the facility to keep flood water away.

5) For new facilities, elevating the facility on walls, columns or compacted fill to be above the floodplain.

## **FLOOD RECOVERY**

Adapted from: "A Prevention Guide to Promote Personal Health and Safety", 1996 Centers for Disease Control and Prevention (CDC) US Department of Health and Human Services

### **INTRODUCTION**

After a flood, the physical devastation to a community is obvious. But during the flood and its aftermath, there are some basic facts to remember that will help protect health and safety. This guide provides information that will help flood victims prevent disease and injury, and maintain good health in the days and weeks that follow.

### **WATER QUALITY**

- Listen for public announcements on the safety of the municipal water supply
- Check back up water supply
- Questions about testing should be directed to the local health dept

### **WATER FOR DRINKING AND COOKING**

Safe drinking water includes bottled, boiled or treated water. The local health department can make specific recommendations for boiling or treating drinking water in the area. Here are some general rules concerning water for drinking and cooking:

- Do not use contaminated water to wash dishes, wash and prepare food, or make ice. The precaution holds true for personal hygiene as well (brushing teeth, hand washing, etc.)
- If bottled water is used, know where it was bottled. Otherwise, water should be boiled or treated before use. Drink only bottled, boiled or treated water until the supply is tested and found safe.
- Boiling water kills harmful bacteria and parasites. Bringing water to a roiling boil for one minute kills most organisms
- Water may be treated with chlorine or iodine tablets, or by mixing six drops (1/8 teaspoon) of unscented, ordinary household chlorine bleach (5.25 percent sodium hypochlorite) per gallon of water. Mix the solution thoroughly, and let stand about 30 minutes. This treatment will not kill parasitic organisms.
- Containers for water should be rinsed with a chlorine bleach solution before reusing them. Use water storage tanks and other types of containers with caution. For example, fire truck storage tanks, as well as previously used bottles or cans, may be contaminated with microbes or chemicals. Do not rely on untested devices for decontaminating water.

### **FOOD SAFETY**

Do not use food supplies that may have come into contact with floodwater.

- Discard any food without a waterproof container if there is any chance that it has come into contact with floodwater.
- Undamaged, commercially canned foods can be saved if the can labels are removed. Thoroughly wash the cans and then disinfect them with a solution consisting of one cup of bleach in 5 gallons of water. Re-label your cans, including expiration date, with a marker.
- Food containers with screw caps, snap lids, crimped caps (soda pop bottles), twist caps, flip tops, and home canned foods should be discarded if they have come into contact with flood waters because they cannot be disinfected. For infants, use only pre-prepared canned baby formula that requires no added water, rather than powdered formulas prepared with treated water.

### **FROZEN AND REFRIGERATED FOODS**

If the refrigerator or freezer will be without power for a long period:

- Seek freezer space in a store, church, school, or commercial freezer that has electrical service and post location of alternate food storage.
- Use dry ice -- 25 pounds of dry ice will keep a 10-cubic-foot freezer below freezing for 3-4 days. (Exercise care when handling dry ice, because it freezes everything it touches. Wear dry, heavy gloves to avoid injury.)
- Thawed food can usually be eaten or refrozen if it is still "refrigerator cold," or if it still contains ice crystals. To be safe, remember, "When in doubt, throw it out." Discard any food that has been at room temperature for two hours or more, and any food that has an unusual odor, color, or texture.
- A refrigerator will keep foods cool for about 4 hours without power, if it is unopened.
- Add block or dry ice to your refrigerator, if the electricity will be off longer than 4 hours.

### **SANITATION AND HYGIENE**

It is critical that everyone in a long term care facility practice basic hygiene during the emergency period. Hands must be washed with soap and water that has been boiled or disinfected:

- Before preparing or eating food
- After toilet use
- After participating in flood cleanup activities
- After handling articles contaminated with floodwater or sewage
- Also waterless hand sanitizer can be utilized

Floodwaters may contain fecal material from overflowing sewage systems, and agricultural and industrial byproducts. Although skin contact with floodwater does not, by itself, pose a serious health risk, there is some risk of disease from eating or drinking anything contaminated with floodwater. Anyone with open cuts or sores should limit exposure to flood water, keeping as clean as possible by washing well with soap to control infection. If a wound develops redness, swelling, or drainage, seek immediate medical attention.

## **PRECAUTIONS WHEN RETURNING TO THE FACILITY**

- Electrical power and natural gas or propane tanks should be shut off to avoid fire, electrocution, or explosions.
- Try to return to the facility during the daytime so that you do not have to use any lights. Use battery-powered flashlights and lanterns, rather than candles, gas lanterns, or torches.
- If you smell gas or suspect a leak, turn off the main gas valve, open all windows, and leave the facility immediately.
- Notify the gas company and the police or fire department. Do not turn on the lights or do anything that could cause a spark. Do not return until advised by authorities it is safe to do so.
- The facility's electrical system may also be damaged. If anyone sees frayed wiring or sparks, or if there is an odor of something burning but no visible fire, immediately shut off the electrical system at the circuit breaker.
- Avoid any downed power lines, particularly those in water. Avoid wading in standing water, which also may contain glass or metal fragments.
- Consult the utility company about using electrical equipment, including generators. Be aware that it is against the law and a violation of electrical codes to connect generators to the facility's electrical circuits without the approved automatic-interrupt devices.
- If a generator is on line when power is restored, it can become a major fire hazard. In addition, the improper connection of a generator to the facility's electrical circuits may endanger line workers restoring power to the area.
- All electrical equipment, appliances and devices must be completely dry before returning to service. It is advisable to have a certified electrician check these items if there is any question.
- Do not operate gas-powered equipment indoors.
- Determine safety of building by on site visit and input of community agencies before returning staff and/or residents

## **CLEANUP**

- Walls, hard-surfaced floors, and many other household surfaces should be cleaned with soap and water and disinfected with a solution of 1 cup of bleach to five gallons of water.
- Be particularly careful to thoroughly disinfect surfaces that may come in contact with food, such as counter tops, pantry shelves, refrigerators, etc.
- All linens and clothing should be washed in hot water or dry-cleaned.
- For items that cannot be washed or dry-cleaned, such as mattresses and upholstered furniture, air dry them in the sun and then spray them thoroughly with a disinfectant.
- Steam-clean all carpeting.
- If there has been a backflow of sewage into the long term care facility, wear rubber boots and waterproof gloves during cleanup.
- Remove and discard contaminated household materials that cannot be disinfected, such as wall coverings, cloth, rugs, and drywall.

## **IMMUNIZATIONS**

Outbreaks of communicable diseases after floods are unusual. However, the rates of disease present before a flood may increase because of decreased sanitation or overcrowding among displaced persons. Increases in infectious diseases that were not present in the community before the flood are not usually a problem.

- Upon receiving a puncture wound or a wound contaminated with feces, soil, or saliva, have a doctor or health department determine whether a tetanus booster is necessary based on individual records.
- Specific recommendations for vaccinations should be made on a case-by-case basis, or as determined by local and state health departments.

## **MOSQUITOES**

The large amount of pooled water remaining after the flood will lead to an increase in mosquito populations. Mosquitoes are most active at sunrise and sunset. The majority of these 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.

- To protect from mosquitoes, use window screens on the facility. Advise staff and residents to wear long-sleeved and long-legged clothing.
- Insect repellents containing DEET are very effective. Be sure to read all instructions before using DEET. Extreme care must be taken when using DEET on elderly—consult physician before applying. Products containing DEET are available from retail outlets and through local and state health departments.
- To control mosquito populations, drain all standing water left in containers around the long term care facility.

## **SWIFTLY FLOWING WATER**

If you enter swiftly flowing water, you risk drowning! Regardless of your ability to swim, swiftly moving shallow water can be deadly! Even shallow standing water can be dangerous for small children. Cars or other vehicles do not provide adequate protection from floodwaters. Cars can be swept away or may break down in moving water.

## **ANIMALS**

Flooding forces wild animals from their natural habitats and many domestic animals are also without homes after the flood. Take care to avoid these animals because some may carry rabies. Remember, most animals are disoriented and displaced, too. Take the following precautions:

- Do not corner an animal.
- If an animal must be removed, contact local animal control authorities. The local and state health department can provide information about the types of wild animals that carry rabies in the area.
- Rats may be a problem during and after a flood.

- Take care to secure all food supplies and remove any animal carcasses in the vicinity by contacting local animal control authorities.
- If bitten by any animal, seek immediate medical attention.
- If bitten by a snake, first try to accurately identify the type of snake so that, if poisonous, the correct anti-venom may be administered.

### **CHEMICAL HAZARDS**

Use extreme caution when returning to the area after a flood. Be aware of potential chemical hazards that may be encountered during flood recovery. Floodwaters 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. These represent a very real danger of fire or explosion.
- Call the local police or fire departments immediately.
- Car batteries, even those in floodwater, 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.

### **SANITIZING FLOODED LAUNDRY EQUIPMENT**

When appliances have been immersed in floodwater, a qualified repairman should recondition them. After they have been reconditioned, sanitize them as follows:

#### **WASHER:**

1. Unplug the washer and wipe off the outside of the washer and inside drum with a cloth dipped in a disinfectant solution of 1/2 cup chlorine bleach per gallon of water.
2. Remove washing machine filter and clean with the chlorine solution.
3. Rinse with a cloth dipped in clean water.
4. Pour a disinfectant such as chlorine, pine oil or phenolic, into the empty washing machine. Check the product label for the appropriate amount. Then complete a 15-minute wash cycle at the hot water setting.

#### **DRYER:**

1. Unplug the dryer and wipe the drum with a cloth dipped in a disinfectant solution of 1/2 cup chlorine bleach per gallon of water. Be sure to wipe all areas of the drum, filter, dryer door and outside of dryer
2. Rinse with a cloth dipped in clean water
3. Leave the dryer door open until all parts are thoroughly dry--preferably overnight
4. When the drum is dry, plug in the dryer and resume normal

In addition to disinfecting the washer and dryer, be sure to disinfect clothes baskets, work surfaces, and containers where clean, sanitary clothes will be placed. Keep clean,

disinfected clothes and other textile items separate from those not yet clean, and away from surfaces likely to be contaminated.

## **SUMMARY**

The physical devastation that accompanies a flood is enormous. But as the floodwaters recede, there may be more threats to personal health and safety. By taking some basic precautions, injuries as well as some diseases can be prevented.

In the midst of all this water, remember that heat or cold can play a major role in health.

- Residents and staff must drink plenty of fluids, avoid caffeine, and do not wait to get thirsty.
- When possible, take a break. Take measures to prevent or reduce exhaustion in the staff. Do not add weather-related health problems, like heat stress or hypothermia, to the other problems.
- The weeks after a flood are going to be rough. In addition to physical health, everyone needs to take some time to consider mental health as well.
- Remember that some sleeplessness, anxiety, anger, hyperactivity, mild depression, or lethargy are normal and may go away with time. If staff or residents feel any of these symptoms acutely, seek some counseling. Local health departments will help find local resources, including hospitals or health care providers that may be needed.

In addition to the information provided in this guide, local and state health departments or emergency management agencies may issue health advisories particular to the location. For more information, contact the local health department.