



**South Dakota
Department of Health**

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Table of Contents

A. General Precautions.....	1
B. Personal Precautions	2
1. Hygiene	2
2. Protective Clothing.....	2
3. Diarrheal Diseases.....	3
4. Wound Management.....	3
5. Immunizations.....	4
6. Insects/Animals.....	4
C. Water for Drinking and Cooking	5
1. How To Disinfect A Well	5
2. How To Disinfect A Cistern.....	6
3. How To Disinfect Small Quantities Of Water	7
4. Biological Water Sampling.....	8
D. Food Safety	8
1. Canned Goods.....	8
2. What To Do When Your Freezer Fails.....	9
3. What To Do When Your Refrigerator Fails.....	10
E. Cleanup Hazards/Recommendations.....	10
1. Sewage Backflow.....	11
2. Gas Lines	12
3. Electricity.....	12
4. Chemical Hazards.....	13
5. Carbon Monoxide.....	13
6. Musculoskeletal Hazards.....	13
7. Stress & Fatigue	14
F. Contact Information	15

After a flood, the physical devastation to personal property and the community is obvious. These tragic consequences can be compounded by injuries or illness, though, if certain precautions are not taken to protect your personal health and safety. In addition to your physical health, you need to take time to consider your mental health as well. Remember, some sleeplessness, anxiety, anger, hyperactivity, mild depression or lethargy are normal. If these symptoms are acute or if they persist consult professionals at community health and mental health centers.

PERSONAL HEALTH AND SAFETY INFORMATION

GENERAL PRECAUTIONS:

- Provision of safe drinking water should be of top priority (boil if in doubt). For infants use ready to feed formula or bottled water for mixing formula. Water of drinking quality should be used for food preparation. Clean water should be available for frequent hand washing or bathing.
- Cook foods thoroughly. Keep hot foods hot and cold foods cold to prevent foodborne illness during cleanup activities. Frozen foods which have thawed should be discarded.
- Wear rubber boots and waterproof gloves, especially if in direct contact with untreated sewage. Wash hands thoroughly with soap and clean water afterward.
- To avoid severe sunburn, use sunscreen for prolonged sun exposure during cleanup activities.
- Seek immediate medical guidance in the event of contact with chemical or corrosive substances.
- Keep litter, garbage, and refuse contained to discourage insects and wild animals.
- If you are evacuated take your essential medications with you.
- Avoid driving through flood waters.
- To prevent the growth of black mold (*Stachbotrys*), clean and disinfect your home thoroughly after the flood waters recede – including the removal of any insulating material that's been saturated with flood waters.

PERSONAL PRECAUTIONS

Hygiene

Following a flood, it can be difficult to maintain good hygiene and cleanliness. Doing so is imperative, however, if the risk of disease is to be minimized.

One of the most important things you can do to prevent the spread of waterborne disease is to always wash your hands with plenty of soap and clean, warm, running water. This is particularly important in these situations:

- before preparing or eating food, handling a baby, smoking, or any other activity that involves touching something that may enter a person's mouth (Adults should make sure children do the same.);
- after toilet use;
- after handling articles contaminated with floodwater or sewage.

When no regular safe water supply is available, use bottled, boiled or chemically disinfected water for washing hands (and brushing teeth).

Keep wash cloths and dish towels clean. Bacteria can remain on towels and cloths, so wash linen often with clean water and soap.

Parents need to take special care that their children follow these precautions. Do not allow children to play in floodwater or in areas that have been flooded. Wash their hands frequently, especially before meals. Contaminated toys should be disinfected in a solution of 1 ounce of bleach (1/8 cup) in 2 gallons of water.

Protective Clothing

When entering an area that is or has been flooded, it is important to wear protective clothing, such as boots, rubber gloves and long-sleeved shirts, to help reduce contact with contaminated items. Take care not to step on nails or other protruding items.

Floodwater may contain fecal material from overflowing sewage systems, and agricultural and industrial byproducts. While skin contact with floodwater does not, by itself, pose a serious health risk, ingesting anything contaminated with floodwater may cause disease.

Diarrheal Diseases:

- Diarrheal diseases may be common during flooding due to disruption in human sewage and overflow of animal manure piles. General symptoms of diarrheal diseases include: fever, headache, body aches, malaise, nausea, vomiting, abdominal cramping, and diarrhea. Consult your doctor if diarrhea, vomiting or fever develops.
- If a disease-causing organism is not present in an area (such as typhoid or cholera) and is not introduced after a disaster, the disease poses no threat to the public's health.
- Diarrheal diseases are usually foodborne or waterborne diseases. The Department of Health is actively monitoring flood areas for the occurrence of disease outbreaks.

Wound Management:

- Minor wounds should be cleansed thoroughly with soap and clean water, covered, and kept dry while working on cleanup activities. Immunization with tetanus is recommended if it has been more than 10 years since completion of series or a previous booster. Serious injuries such as deep lacerations, uncontrolled bleeding, broken bones, etc., require immediate medical attention. For wounds with environmental contamination, immunization with tetanus is recommended if it has been more than 5 years since completion of series or a previous booster.
- If redness, swelling, or drainage occurs at wound site, seek medical attention.

Immunizations:

- People do not face any unusual risk of developing vaccine preventable diseases during a flood. There are no recommendations to receive hepatitis A or hepatitis B vaccine as a result of contact with flood water or working in the flood affected areas.
- Immunization with tetanus (Td) is recommended as appropriate in wound management.

Insect Pests And Animals:

- An increase in mosquitoes or other insects can be expected after flooding. They will be more a nuisance than a public health threat in the weeks immediately following the flooding. To reduce exposure to insects, wear protective clothing such as long sleeves and pants with legs tucked into boots. Protect exposed skin and clothing with insect repellent and follow the manufacturer's instructions on the label.
- The Department of Health is monitoring flood areas for mosquito-borne or other vector-borne diseases.
- Many wild animals have been forced from their natural habitats by flooding, and many pets and livestock are also displaced after the flood. Take care to avoid these animals, because some may carry rabies, if bitten seek immediate medical attention.
- Rats may be a problem during and after a flood. Take care to secure all food supplies and remove any animal carcasses.
- If you are bitten by any animal seek immediate medical attention.
- Responsibility for proper disposal of animal carcasses rests with the owner or caretaker under South Dakota State law. These requirements include burning, burial, rendering, or as otherwise prescribed by the State Veterinarian. For further information regarding proper disposal, contact the State Veterinarian at the South Dakota Animal Industry Board at (605)773-3321.

WATER FOR DRINKING AND COOKING

Public and private water supplies may be contaminated in a flood. After a flood, consider all water unsafe. Listen for public announcements on the safety of your area's water supply and follow the instructions of local authorities.

Private water wells should be pumped out, allowed to recharge naturally, disinfected and the water tested before drinking or being used for cooking.

The safest approach is to drink and cook with bottled water or water previously stored in the refrigerator. If you have to use tap water, follow the recommendations for disinfection of small quantities of drinking water in the following sections.

Do not use contaminated water to make ice, brush your teeth or wash dishes. If there is a shortage of safe drinking water, use clean disposable eating utensils, plates and napkins.

How To Disinfect A Well

Adequate disinfection requires a certain chlorine dosage for a minimum contact time. We recommend 50 parts per million for eight hours or overnight. The tables that follow are based on the overnight contact time. We also recommend using household bleach for the disinfectant. Household bleach is a 5.25% hypochlorite solution commonly sold under brand names such as "Hilex", "Clorox" or "Purex." These products are available at all grocery stores and most discount marts.

To disinfect your well, please follow the recommended procedure:

- Determine the chlorine dosage for your well from the following table. Again, this is the amount of chlorine to add for an eight-hour (overnight) contact time.

Inside diameter of well (inches)	Quantity of chlorine (bleach) for each 10 foot of water in well
2	1/4 ounce
4	3/4 ounce
6	2 ounce
8	3 1/2 ounce
10	5 ounce
12	1 cup
18	2 1/4 cup
24	3 3/4 cup
36	8 3/4 cup

- Lift the well pump and pour the required amount of chlorine into the well.
- Lower the pump and open every faucet in your system and let the water run until you can smell the chlorine. Close all the faucets and let the chlorine stand in the well overnight. Do not use the water during this period.
- The next morning, again turn on all the faucets and pump water until all the chlorine odor disappears.
- Forty-eight hours after chlorination collect a water sample for bacteriological testing.

How To Disinfect A Cistern, Reservoir Or Spring Box

Adequate disinfection requires a certain chlorine dosage for a minimum contact time. We recommend 50 parts per million for eight hours or overnight. The tables that follow are based on the overnight contact time. We also recommend using household bleach for the disinfectant. Household bleach is a 5.25% hypochlorite solution commonly sold under brand names such as "Hilex", "Clorox" or "Purex." These products are available at all grocery stores and most discount marts.

To disinfect your storage unit follow the recommended procedure:

- Determine the chlorine dosage for your unit from the following table. This is the amount of chlorine to add for an eight-hour (overnight) contact time.

Volume of box, basin, reservoir or cistern (gallons)	Quantity of bleach reservoir or cistern (gallons)
50	3/4 cup
200	3 cups
500	7 1/2 cups
1,000	1 gallon
2,000	2 gallon
5,000	5 gallon

- Make sure that your storage unit is completely full. Mix the required amount of chlorine throughout the unit.
- Let the chlorine stand in the unit overnight. Do not use the heavily chlorinated water.
- In the morning, remove the water from the unit. Do not allow the water to enter a river, lake or stream.
- Fill the unit with fresh water.
- Forty-eight hours after chlorination collect a water sample for bacteriological testing.

Recommended Procedure For Disinfection Of Small Quantities Of Drinking Water - Chlorination Or Boiling

Adequate disinfection requires a certain chlorine dosage for a minimum contact time. We recommend 50 parts per million for eight hours or overnight. The tables that follow are based on the overnight contact time. We also recommend using household bleach for the disinfectant. Household bleach is a 5.25% hypochlorite solution commonly sold under brand names such as "Hilex", "Clorox" or "Purex." These products are available at all grocery stores and most discount marts.

There are many occasions where you may want to disinfect a small quantity of water. This discussion is for those times you wish to disinfect less than 5 gallons. The water must not be cloudy or dirty, the chlorine must be mixed thoroughly with the water, at least 30 minutes of contact time must be provided and the treated water must be protected from further contamination.

To decontaminate the drinking water, place it in a clean container. Add 3 drops of chlorine (bleach) for each gallon. If you have one gallon of water to be disinfected, you would add 3 drops. If you have four gallons of water, add 12 drops. After the chlorine is added, mix thoroughly. Cover or cap the container and allow to sit undisturbed for 30 minutes. A slight odor and taste will be apparent but are entirely harmless to humans and will disappear with time.

* This water should not be used by pregnant women and mothers that are either nursing or mixing formula, unless the nitrate level has been determined.

Boiling is an excellent option to chemical disinfection, but again, it should not be used unless the nitrate concentration is known. If you know that the nitrate level is low, less than 5 mg/l for example, you may disinfect by allowing the water to boil for three minutes after it has reached a rolling boil. Allow the water to cool and store in a well covered container.

Biological Water Sampling

A water sample should be collected about two days after the disinfection of your water supply is completed. Sample containers are available from your public health nurse, county extension agent, or the State Department of Health. **PLEASE USE ONLY THE CONTAINERS PROVIDED AND FOLLOW DIRECTIONS CAREFULLY.**

FOOD SAFETY

Generally, do not eat any food that has come in contact with floodwater. If the safety of any food or beverage is questionable, follow this simple rule: ***When in doubt, throw it out.***

Canned Goods

Carefully examine all canned and bottled goods that have been submerged or come in contact with floodwater. Some cans or bottles may be safe to use after a good cleaning. Follow these guidelines:

- After being under water, containers with cork-lined lids or caps, screw tops or pop tops are nearly impossible to clean thoroughly around the opening. Any major temperature changes can

actually cause contaminants to be sucked into such containers. They should be discarded.

- If they appear undamaged, tin cans are usually safe. Wash in bleach water (1/4-cup bleach in 1 gallon of water) for one minute, then dry to prevent rusting.
- If cans have pitted rust spots that cannot be buffed off with a soft cloth, contamination may have entered through corroded holes in the walls of the can. Discard these cans.
- Cans with ends that bulge or spring in and out when pressed should be discarded immediately. This usually means bacteria are growing inside and producing gas that expands the can. **Do not taste the contents of such cans.**
- If a can is crushed, dented or creased, closely examine it to see if it is safe to use. A dent may weaken the seam and allow contamination. If a dent or crease is very sharp, the contents may be contaminated. Discard these cans. **Do not taste.**

What To Do When Your Freezer Fails

When the electricity is off, a fully stocked freezer will keep food frozen two days if the door remains closed. A half-full freezer can keep foods frozen about one day. What can you do if electric service will not be reconnected within one or two days?

- Keep the freezer door closed.
- If your friends have electricity, divide your frozen foods among their freezers.
- Seek freezer space in a store, church, school, or commercial meat locker or freezer that has electrical service.
- Know where you can buy dry and block ice. Dry ice freezes everything it touches; 25 pounds of it will keep a 10-cubic-foot freezer below freezing for three to four days. When using dry ice, though, be sure to take several precautions. **Never touch dry ice with bare hands!** Also, do not stick your head into a freezer that contains dry ice. It gives off carbon dioxide, which replaces oxygen, so leave the door open a short time before examining your food.

- If food is still “cold-to-the-touch” or below 45°F., it may be cooked and eaten immediately, or refrozen.

What To Do When Your Refrigerator Fails

When power goes off in the refrigerator, you can normally expect food inside to stay safely cold for four to six hours, depending on how warm your kitchen is.

- Add block ice to the refrigerator if the electricity is off longer than four to six hours.
- High-protein foods (dairy products, meat, fish, and poultry) should be consumed as soon as possible if power is not restored immediately. They cannot be stored safely at room temperature.
- Fruits and vegetables can be kept safely at room temperature until there are obvious signs of spoilage (mold, slime, and wilt). In fact, with good ventilation, vegetables will last longer at room temperature. Remove them from the refrigerator if electrical service may not resume soon.

CLEANUP HAZARDS AND RECOMMENDATIONS

Flooded indoor areas must be scrubbed with warm soapy water. Pay particular attention to food-contact surfaces (counter tops, pantry shelves, refrigerators, stoves, cutting boards, etc.) and areas where small children play. Then, rinse with a solution made by adding ½ cup (4 ounces) of laundry bleach to each gallon of water.

Wash all linens and clothing in hot water or have them dry-cleaned. Items that cannot be washed or dry cleaned, such as mattresses and upholstered furniture, should be air dried in the sun and then vacuumed and sprayed thoroughly with a disinfectant. Steam clean all carpeting.

If there has been a backflow of sewage into the house, remove and discard any absorbent household materials, such as wall coverings, cloth, rugs and sheetrock. Be sure to wear rubber boots and waterproof gloves during the cleanup.

Suggested Guidelines For Clean Up From Sewage Backflow Into Buildings

Raw untreated sewage poses a threat to human health. Clean up should commence as soon as possible and proceed as follows:

- Remove all water, sewage, and contaminated materials
- Thoroughly clean and mop the area
- Treat the flooded area with an appropriate disinfectant
- Dehumidify
- Replace all absorbent materials

Remember: During clean up protect yourself from contamination by wearing rubber boots, waterproof gloves and protective garments. Wash your hands thoroughly when the job is done. Those persons whose resistance to infection is compromised are considered to be at greater risks, and should not attempt this type of clean up.

Chemical Disinfection

The process of disinfection is important to insure the elimination of the pathogens (disease causing bacteria, viruses and fungi) that are present in raw sewage. Thorough cleaning must take place before disinfection to insure the effectiveness.

<u>TYPE OF DISINFECTANT</u>	<u>SUGGESTED STRENGTH</u>
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Household Bleach	1:10 - 1:100 (usually 1 oz to 1 gal water)
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Phenolic (Lysol and other brand name disinfectant products)	0.5 - 5%
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* REMEMBER TO FOLLOW MANUFACTURER'S LABEL INSTRUCTION AND USE IN AREAS WITH ADEQUATE VENTILATION.

Recommendation

All absorbent materials which have been exposed to sewage contamination, such as rugs and carpets, wall coverings, cloth and sheetrock, should be removed and cleaned off site, or replaced as part of the cleaning process. Water damaged and contaminated mattresses and other stuffed items (toys, pillows) which are not recoverable should be discarded.

Gas Lines

When returning to your home, check immediately for leaking gas pipes. Do this by smell only. If you must have light, use battery-powered flashlights or lanterns. **DO NOT** turn lights on or off and do not use candles, oil or gas lanterns, or torches because, if gas lines are broken, an explosion could occur.

If you smell gas or suspect a leak, turn off the main gas valve at the meter, open all windows and leave the house. Notify the gas company or the police or fire department. Do not re-enter the house until you are told it is safe to do so.

Electricity

If water has been present anywhere near electrical circuits and electrical equipment, turn off the power at the main breaker or fuse on the service panel. Do not turn the power back on until electrical equipment has been inspected by a qualified electrician. Never enter flooded areas or touch electrical equipment if the ground is wet, unless you are certain that the power is off. **NEVER** handle a downed power line.

When using gasoline and diesel generators to supply power to a building, switch the main breaker or fuse on the service panel to the "off" position prior to starting the generator. This will prevent inadvertent energization of power lines from backfeed electrical energy from the generators, and help to protect utility line workers from possible electrocution.

If clearing or other work must be performed near a downed power line, contact the utility company to discuss de-energizing and grounding or shielding of power lines. Extreme caution is necessary when moving ladders and other equipment near overhead power lines to avoid inadvertent contact.

Chemical Hazards

Use extreme caution when returning to your area after a flood. Be aware of potential chemical hazards you may encounter during flood recovery. Flood waters may have buried or moved hazardous chemical containers from their normal storage place, including solvents, aerosol cans and industrial chemicals.

If any propane tanks (whether 20-lb. tanks for a gas grill or household propane tanks) or drums are discovered, do not attempt to move them yourself. These represent a very real threat, and police or fire departments or your State Fire Marshal's office should be contacted immediately.

Also car batteries, while flooded, may still contain an electrical charge, and should be removed with extreme caution, using insulated gloves.

For more information on pesticide and chemical storage, removal, or disposal you can contact the Department of Agriculture at 1-800-228-5254 or the Department of Environment and Natural Resources at 1-800-438-3367.



Carbon Monoxide

Flood cleanup activities may involve the use of gasoline-or diesel-powered pumps, generators, and pressure washers. Because these devices release carbon monoxide, a deadly, colorless, odorless gas, operate all gasoline powered devices outdoors and **never** bring them indoors. It is virtually impossible to assess adequate ventilation. NIOSH has investigated several carbon monoxide poisoning deaths in the past caused by the use of gasoline-powered engines indoors or in confined spaces.



Musculoskeletal Hazards

Cleanup workers are at risk for developing serious musculoskeletal injuries to the hands, back, knees, and shoulders. Special attention is needed to avoid back injuries associated with manual lifting and handling of debris and building materials. To help prevent injury,

use teams of two or more to move bulky objects, avoid lifting any material that weights more than 50 pounds (per person), and use proper automated-assist lifting devices.

Stress, Long Hours, And Fatigue May Increase The Risks For Injury And Illness

Continued long hours of work, combined with emotional and physical exhaustion and losses from damaged homes and temporary job layoffs can create a highly stressful situation for flood cleanup workers. Workers exposed to these stressful conditions have an increased risk of injury and emotional crisis, and are more vulnerable to stress-induced illnesses and disease.

Emotional support from family members, neighbors, and local mental health professionals can help to prevent more serious stress-related problems in the difficult months ahead.

People working in all phases of flood cleanup can reduce their risks of injury and illness in several ways:

- Set priorities for cleanup tasks and pace the work over several days (or weeks).
- Avoid physical exhaustion.
- Resume a normal sleep schedule as quickly as possible. Get plenty of rest and take frequent rest breaks **BEFORE** exhaustion builds up.
- Take advantage of disaster relief programs and services in your community.
- Be alert to emotional exhaustion or strain. When family members and neighbors are unavailable for emotional support, consult professionals at community health and mental health centers.

Contact Information

For further information, or additional copies of this handbook contact the South Dakota Department of Health at:

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