



## Winter Storms

### **Why talk about winter storms?**

Each year, exposure to cold, vehicle accidents caused by wintry roads, and fires caused by the improper use of heaters injure and kill hundreds of people in the United States. Add these to other winter weather hazards and you have a significant threat to human health and safety.

A major winter storm can last for several days and can include high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. People can become marooned at home without utilities or other services. Heavy snowfall and blizzards can trap motorists in their vehicles and make walking to find help a deadly effort. Storm effects, such as severely cold temperatures, heavy snow, and coastal flooding, can cause hazardous conditions and hidden problems. The aftermath of a winter storm can impact a community or region for days, weeks, or even months.

### **What are winter storms?**

Winter storms can range from a moderate snow over a few hours to a blizzard with blinding, wind-driven snow that lasts for several days. Some winter storms are large enough to affect several states, while others affect only a single community. Many winter storms are accompanied by dangerously low temperatures and sometimes by strong winds, icing, sleet, and freezing rain.

Winter storms are defined differently in various areas of the country, and each area is equipped differently to deal with the challenges and hazards of severe winter weather. A snowstorm that would be unremarkable in Buffalo, N.Y., could bring a city in the southern states to a standstill. Local emergency management offices, National Weather Service (NWS) offices, and American Red Cross chapters can provide definitions specific to each area.

### **What damages can snow cause, and what are the different kinds of snow?**

Heavy snow can immobilize a region and paralyze a city, stranding commuters, closing airports, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can cause roofs to collapse and knock down trees and power lines. Homes and farms may be isolated for days. In rural areas, unprotected livestock can be lost. In urban areas, the cost of snow removal, damage repair, and lost business can have severe economic impacts. In the mountains, heavy snow can lead to an avalanche—a mass of tumbling snow. More than 80 percent of midwinter avalanches are triggered by a rapid accumulation of snow, and 90 percent of those occur within 24 hours of snowfall. An avalanche can reach a mass of a million tons and travel at speeds up to 200 miles (322 kilome-

*(Continued on page 2)*



## Winter Storms

*(Continued from page 1)*

ters) per hour.

Various intensities of snow are defined differently:

- Blizzard describes winds of 35 miles (56 kilometers) per hour or more with snow and blowing snow that reduce visibility to less than one-quarter mile (0.4 kilometer) for at least three hours.
- Blowing snow describes wind-driven snow that reduces visibility. Blowing snow may be falling snow and/or snow on the ground that is picked up by the wind.
- Snow squall describes a brief, intense snow shower accompanied by strong, gusty winds. Accumulation from snow squalls can be significant.
- Snow shower describes snow that falls at varying intensities for short durations with little or no accumulation.

### **What damages can ice cause, and what are the different kinds of ice?**

Heavy accumulations of ice can bring down trees and topple utility poles and communication towers. Ice can disrupt communications and power for days while utility companies repair extensive damage. Even small accumulations of ice can be severely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.

Ice forms in different ways:

- Sleet is rain that freezes into ice pellets before it reaches the ground. Sleet usually bounces when hitting a surface and does not stick to objects; however, it can accumulate like snow and cause roads and walkways to become hazardous.
- Freezing rain (also known as an ice storm) is rain that falls onto a surface that has a temperature below freezing. The cold surface causes the rain to freeze so the surfaces—trees, utility wires, vehicles, and roads—become glazed with ice. Even small accumulations of ice can cause significant hazards to people—especially pedestrians and motorists—and property.

### **What damages can severe cold cause?**

What constitutes severe cold varies in different parts of the country. In some northern regions, cold temperatures are not considered severe until they are well below 0° F (-18° C). In most southern regions, near-freezing temperatures (around 32° F, or 0° C) are considered severe cold. Severe cold can cause much harm; for example, it can damage crops and other vegetation and freeze pipes causing them to burst. Unusually cold temperatures are especially dangerous in areas not accustomed to them because residents are generally unprepared and may not realize the dangers severe cold present.

*(Continued on page 3)*



## Winter Storms

*(Continued from page 2)*

Exposure to cold can cause frostbite and life-threatening hypothermia. Frostbite is the freezing of body tissue, and it most frequently affects fingers, toes, earlobes, and the tip of the nose. Frostbite damage ranges from superficial and reversible to deep and permanent. Frostbite can result in tissue loss and even loss of digits and limbs.

Hypothermia begins to occur when a person's body temperature drops to 3° below its normal temperature. On average, a person would begin to suffer hypothermia if his or her temperature dropped to 96° F (35.6° C). Cold temperatures can cause hypothermia in anyone who is not adequately clothed or sheltered in a place with adequate heat. Hypothermia can kill people, and those who survive hypothermia are likely to suffer lasting ill effects. Infants and elderly people are the most susceptible. Elderly people account for the largest percentage of hypothermia victims, many of whom freeze to death in their own homes. Most of these victims are alone and their heating systems are working improperly or not at all. People who are taking certain medications, who have certain medical conditions, or who have been drinking alcohol also are at increased risk for hypothermia.

### **What is winter flooding?**

Winter flooding can result from winter storms or long periods of cold temperatures, and it can cause significant damage and loss of life. The winds of intense winter storms can cause widespread tidal flooding and severe beach erosion along coastal areas. Long cold spells can cause rivers and lakes to freeze so that when a rise in the water level or a thaw breaks the ice into large chunks, the chunks become jammed at man-made and natural obstructions. These ice jams can act as dams, resulting in severe flooding. In addition, the sudden thawing of a heavy snow pack can often lead to flooding.

### **How can I protect myself in winter storms?**

Winter storms are considered deceptive killers because most winter storm deaths are related only indirectly to the storms. Overall, most winter storm deaths result from vehicle or other transportation accidents caused by ice and snow. You should avoid driving when conditions include sleet, freezing rain or drizzle, snow, or dense fog. These are serious conditions that are often underestimated, and they make driving—and even walking outside—very hazardous.

Exhaustion and heart attacks brought on by overexertion are two other common causes of deaths related to winter storms. Cold temperatures compound the strain of physical labor on a person's body. Tasks such as shoveling snow, pushing a vehicle, or even walking in heavy snow can cause a heart attack, particularly in people who are older or not used to

*(Continued on page 4)*



## Winter Storms

*(Continued from page 3)*

high levels of physical activity. Before tackling strenuous tasks in cold temperatures, you should carefully consider your physical condition, the weather factors, and the nature of the task. If you are not sure how much you can safely do, you should avoid all heavy work in cold temperatures.

You should also dress to protect yourself from frostbite and hypothermia. When outside in cold temperatures, wear warm, loose-fitting, lightweight clothing in several layers. If you get too warm, you can remove one or more layers and if you get too cold you can add layers, so you can avoid the sweat-chills cycle. Your outer garments should be tightly woven, water repellent, and have a hood. Wear a hat. Half of your body heat can be lost from your head. Mittens, snug at the wrist, are better than gloves. Try to stay dry. If it is extremely cold, cover your mouth to protect your lungs.

If, during severe cold, your home loses power or heat, go to a designated public shelter. For information on designated shelters, contact your local emergency management office or American Red Cross chapter.

Home fires occur more frequently in the winter because people do not take the proper safety precautions when using alternative heating sources. Be sure all heating sources are installed according to local codes and permit requirements. To protect yourself, be sure that you never leave a fire unattended, that you dispose of ashes properly and only after they are completely cold, and that you operate and position space heaters only according to the manufacturer's instructions. Use only space heaters approved by an independent testing laboratory. Fire during winter storms is exceptionally dangerous because conditions may make it difficult for firefighters to get to the fire, and the water needed to fight the fire may be frozen.

In addition, every winter people are killed by carbon monoxide (CO) emitted by fuels they are using to heat their homes. Never operate unvented fuel-burning appliances in any closed room or where people are sleeping. CO poisoning from fuel-burning appliances kills people each year in the United States. Never use gas appliances such as ranges, ovens, or clothes dryers to heat your home. Do not use charcoal grills indoors or in attached garages.

Never use a portable generator in an enclosed or partially enclosed space, including in your home, or in a garage, basement, crawl space, or other partially enclosed area, even with ventilation. Opening doors and windows or using fans will not prevent CO buildup. Locate a portable generator outdoors and away from doors, windows, and vents that could allow CO to come indoors. Portable generators can produce high levels of deadly CO very quickly. In addition to producing toxic engine exhaust, portable generators can cause electric shock or electrocution and fire.

*(Continued on page 5)*



## Winter Storms

*(Continued from page 4)*

### **What is the best source of information about winter weather?**

Local radio or television stations or NOAA Weather Radio are the best sources of information about winter weather conditions. NOAA Weather Radio is the prime alerting and critical information delivery system of the National Weather Service (NWS). NOAA Weather Radio broadcasts warnings, watches, forecasts, and other hazard information 24 hours a day over more than 650 stations in the 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific territories.

The NWS encourages people to buy a weather radio equipped with the Specific Area Message Encoder (SAME) feature. This feature automatically alerts you when important information about winter weather and other hazards is issued for your area. Information on NOAA Weather Radio is available from your local NWS office or at <http://www.nws.noaa.gov/nwr>.

### **Wind Chill Temperature**

The wind chill temperature is how cold people and animals feel when they are outside. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As wind increases, heat is carried away from the body at a faster rate. This drives down the body temperature. Therefore, the wind makes it feel much colder. The wind chill temperature is not the actual temperature but rather how wind and cold feel on exposed skin.

### **Outlook, Watch, Warning, Advisory**

A Winter Storm **OUTLOOK** means winter storm conditions are possible in the next two to five days. Stay tuned to local media for updates.

A Winter Storm **WATCH** means winter storm conditions are possible within the next 36 to 48 hours. People in a watch area should review their winter storm plans (Family Disaster Plan, Disaster Supplies Kit) and keep informed about weather conditions.

A Winter Storm **WARNING** means life-threatening, severe winter conditions have begun or will begin within 24 hours. People in a warning area should take precautions immediately.

A Blizzard **WARNING** means sustained winds or frequent gusts of 35 miles (56 kilometers) per hour or greater and considerable falling or blowing snow that reduces visibility to less than a quarter mile (0.4 kilometer) are expected to prevail for a period of three hours or longer. People in a warning area should take precautions immediately.

*(Continued on page 6)*



## Winter Storms

*(Continued from page 5)*

A Winter Weather ADVISORY means winter weather conditions are expected to cause significant inconveniences and may be hazardous. If you are cautious, these situations should not be life threatening.

Outlooks, watches, warnings, and advisories are issued by the National Weather Service (NWS) and broadcast on NOAA Weather Radio and on local radio and television stations.

### **Carbon Monoxide Alarm**

Every home should have properly installed and maintained carbon monoxide (CO) alarms that meet current safety standards. CO alarms can help detect CO, a colorless, odorless gas produced by burning any fuel. Exposure to high levels of CO can cause death. The initial symptoms of CO poisoning are similar to the flu and include dizziness, fatigue, headache, nausea, and irregular breathing.

### **Be Prepared for a Winter Storm**

For general preparedness, every household should create and practice a Family Disaster Plan and assemble and maintain a Disaster Supplies Kit. In addition, every household should take specific precautions and make specific plans for cold weather.

### **Protect Yourself**

If you live in an area where severe winter weather is possible, you should:

- Talk with members of your household about what to do if a winter storm watch or warning is issued. Discussing winter storms ahead of time helps reduce fear and helps everyone know how to respond during a winter storm.
- Install smoke alarms. For new homes, interconnected smoke alarms are required on every level of the home, outside each sleeping area and inside each bedroom. Although this approach is ideal for all homes, as a minimum, existing homes should have smoke alarms on every level and outside each sleeping area. Test and maintain them according to the manufacturer's instructions.
- Install carbon monoxide (CO) alarms following the manufacturer's instructions. It is especially important to have one near sleeping areas. Test and maintain them according to the manufacturer's instructions.
- Get training. Take an American Red Cross first aid course to learn how to treat exposure to the cold, frostbite, and hypothermia.
- Service snow removal equipment before the winter storm season and maintain it in good working order.

*(Continued on page 7)*



## Winter Storms

*(Continued from page 6)*

- Keep your vehicle's gas tank full so you can leave right away in an emergency and to keep the fuel line from freezing.
- Keep a supply of non-clumping kitty litter to make walkways and steps less slippery. Kitty litter temporarily improves traction on an icy surface. Rock salt melts ice on walkways, but it can damage vegetation and concrete. You may find other, less damaging, ice-melting products at building supplies stores.
- Keep handy a warm coat, gloves or mittens, hat, water-resistant boots, and extra blankets and warm clothing for each member of the household.
- Make sure your home heating sources are installed according to local codes and permit requirements and are clean and in working order. Many home fires are started by poorly maintained furnaces or stoves, cracked or rusted furnace parts, or chimneys with creosote buildup.
- Be sure all portable and fixed electric space heaters have been certified by an independent testing laboratory. Keep blankets, clothing, curtains, furniture, and anything that could get hot and catch fire at least three feet away from all heat sources. Plug heaters directly into the wall socket rather than using an extension cord and unplug them when they are not in use.
- Use kerosene heaters only if permitted by law in your area. Refuel kerosene heaters outdoors only after they have cooled. Kerosene has a low flash point. If mistakenly dripped on hot surfaces, it can cause fires. Do not substitute gasoline for kerosene in the heater. Make sure the area is ventilated properly. Follow all of the manufacturer's instructions.
- Have chimneys and wood stoves inspected annually and cleaned if necessary. Chimneys and wood stoves build up creosote, which is the residue left behind by burning wood. Creosote is flammable and needs to be professionally removed periodically. Store ashes in a metal container with a tight-fitting lid.
- Bring your companion animals inside during winter weather.

### **Protect Your Property**

If you live in an area where severe winter weather is possible, you should:

- Make sure your home is properly insulated. If necessary, insulate the walls and attic to reduce your home's power demands for heat. Caulk and weather-strip doors and windowsills to keep cold air out.
- Install storm windows or cover windows with plastic from the inside to provide an extra layer of insulation to keep cold air out.
- Protect pipes from freezing by:
  - Wrapping pipes in insulation or layers of newspaper and then covering them with plastic to keep out moisture.

*(Continued on page 8)*



## Winter Storms

*(Continued from page 7)*

- Letting faucets drip a little.
- Know how to shut off the main water valve and how to shut off and drain outside faucets. Outside faucets are often controlled by a valve inside the home. Keep a wrench near the valves.
- Install heat tape on water pipes. Put the tape on all exterior water pipes and interior pipes located on outside walls or anywhere else that temperatures could go below freezing. Follow carefully the manufacturer's instructions for installation.
- If the pipes freeze, remove any insulation or newspaper and wrap the pipes in rags. Completely open all faucets and pour hot water over the pipes, starting where they were most exposed to the cold or where the cold most likely penetrated. A hand-held hair dryer, used with caution to prevent overheating, also works well.
- Consider buying emergency heating equipment, such as a wood- or coal-burning stove or an electric or kerosene heater. If you have a stove, be sure it is properly vented and in good working order and that you dispose of ashes safely. Keep a supply of wood or coal on hand. If you have an electric space heater, either portable or fixed, be sure it is certified by an independent testing laboratory. Plug a heater directly into the wall socket rather than using an extension cord and unplug it when it is not in use. Use a kerosene heater only if permitted by law in your area; check with your local fire department. If you have a kerosene heater, use only the correct fuel for your unit. Properly ventilate the area of use. Refuel the unit outdoors only, and only when the unit is cool. Follow all of the manufacturer's instructions. Keep all heaters at least three feet away from furniture and other flammable objects.
- When using fireplaces, stoves, and space heaters, ventilate properly and guard against fire. Using alternative sources of heat such as these greatly increases your risk for fire and carbon monoxide (CO) poisoning.
- Consider storing sufficient heating fuel. Regular fuel sources may be cut off. Be cautious of fire hazards when storing any type of fuel.
- If you have a fireplace, consider keeping a supply of firewood or coal. Be sure the fireplace is properly vented and in good working order and that you dispose of ashes safely.
- Install snow fences in rural areas to reduce drifting snow on roads and paths, which could block access to homes, barns, and animals' feed and water.
- Create a place where your animals can be comfortable in severe winter weather. Bring your companion animals indoors. Horses and livestock should have a shelter where they can be protected from wind, snow, ice, and rain. Grazing animals should have access to a protected supply of food and non-frozen water.
- Be aware of the potential for flooding when snow and ice melt and be sure that your animals have access to high ground that is not impeded by fencing or other barriers. You may not be able to get to them in time to relocate them in the event of flooding.
- Ensure that any outbuildings that house or shelter animals can withstand wind and

*(Continued on page 9)*



## Winter Storms

*(Continued from page 8)*

heavy snow and ice.

- Consider purchasing flood insurance, if you live in a flood-prone area, to cover possible flood damage that may occur during the spring thaw. Homeowners' policies do not cover damage from floods. Ask your insurance agent about the National Flood Insurance Program (NFIP) if you are at risk.

### What to Do Before a Winter Storm

You should:

- Keep handy a battery-powered radio or television or NOAA Weather Radio with the Specific Area Message Encoder (SAME) feature.
- Contact your local emergency management office or American Red Cross chapter for information on designated public shelters in case you lose power or heat.
- Check your Disaster Supplies Kit, and keep it handy.
- Be sure you have ample heating fuel.
- If you have alternative heating sources, such as fireplaces, wood- or coal-burning stoves, or space heaters, be sure they are installed according to local codes and permit requirements and are clean and in working order.
- Check that your fire extinguisher(s) is in good working order, and replace it if necessary.
- Bring your companion animals inside and ensure that your horses and livestock have blankets if appropriate and unimpeded access to shelter, food, and nonfrozen water.

### What to Do During a Winter Storm Watch

- Listen to NOAA Weather Radio or a local radio or television station for updated information.
- Watch for changing weather conditions. Severe weather can happen quickly. Temperatures may drop rapidly, winds may increase, or snow may begin to fall at heavier rates. Even local media may not know moment by moment what is happening in your particular area.
- Move animals to sheltered areas with a supply of non-frozen water. Most animal deaths in winter storms are caused by dehydration.
- Ensure that you have supplies for clean-up for your companion animals, particularly if they are used to eliminating outdoors (large plastic bags, paper towels, and extra cat litter).
- Avoid unnecessary travel. The safest place during a winter storm is indoors. About 70 percent of deaths related to ice and snow occur in automobiles.

*(Continued on page 10)*



## Winter Storms

*(Continued from page 9)*

### **What to Do During a Winter Storm Warning or a Blizzard Warning**

- Stay indoors and wear warm clothes. Layers of loose-fitting, lightweight, warm clothing will keep you warmer than a bulky sweater. If you feel too warm, remove layers to avoid sweating; if you feel chilled, add layers.
- Listen to a local station on battery-powered radio or television or to NOAA Weather Radio for updated emergency information.
- Bring your companion animals inside before the storm begins.
- Eat regularly. Food provides the body with energy for producing its own heat.
- Keep the body replenished with fluids to prevent dehydration. Drink liquids such as warm broth or juice. Avoid caffeine and alcohol. Caffeine, a stimulant, accelerates the symptoms of hypothermia. Alcohol, such as brandy, is a depressant and hastens the effects of cold on the body. Alcohol also slows circulation and can make you less aware of the effects of cold. Both caffeine and alcohol can cause dehydration.
- Conserve fuel. Winter storms can last for several days. Great demand may be placed on electric, gas, and other fuel distribution systems (fuel oil, propane, etc.). Suppliers of propane and fuel oil may not be able to replenish depleted supplies during severe weather. Electric and gas services may be temporarily disrupted when many people demand large amounts at the same time. Lower the thermostat to 65° F (18° C) during the day and to 55° F (13° C) at night. Close off unused rooms, and stuff towels or rags in cracks under the doors. Cover the windows at night.
- If you must go outside, protect yourself from winter storm hazards:
  - Wear layered clothing, mittens or gloves, and a hat. Layered clothing will keep you warmer than a single, heavy coat. Outer garments should be tightly woven and water repellent. Mittens or gloves and a hat will prevent the loss of body heat. Mittens are warmer than gloves because your fingers maintain more warmth when they touch each other. Half of your body-heat loss is from your head.
  - Cover your mouth to protect your lungs from severely cold air. Avoid taking deep breaths; minimize talking.
  - Watch for signs of hypothermia and frostbite.
  - Keep dry. Change wet clothing frequently to prevent a loss of body heat. Wet clothing loses much of its insulating value and transmits heat rapidly away from the body.
  - Stretch before you go out. If you go out to shovel snow, do a few stretching exercises to warm up your body. This will reduce your chances of muscle injury.
  - Avoid overexertion, such as shoveling heavy snow, pushing a vehicle, or walking in deep snow. The strain from the cold and the hard labor may cause a heart attack.

*(Continued on page 11)*



## Winter Storms

*(Continued from page 10)*

- Sweating could lead to a chill and hypothermia.
- Walk carefully on snowy, icy sidewalks. Slips and falls occur frequently in winter weather, resulting in painful and sometimes disabling injuries.
- If you must go out during a winter storm, use public transportation if possible. About 70 percent of winter deaths related to ice and snow occur in automobiles.
- Check on relatives, neighbors, and friends, particularly if they are elderly or if they live alone.

### Driving in Winter Conditions

You should:

- Have your vehicle winterized before the winter storm season. Keeping your vehicle in good condition will decrease your chance of being stranded in cold weather. Have a mechanic check your battery, antifreeze, wipers and windshield washer fluid, ignition system, thermostat, lights, flashing hazard lights, exhaust system, heater, brakes, defroster, and oil level. If necessary, replace existing oil with winter-grade oil. Install good winter tires. Make sure the tires have adequate tread. All-weather radials are usually adequate for most winter conditions. However, some jurisdictions require that vehicles on their roads be equipped with chains or snow tires with studs.
- Check your vehicle emergency supplies kit and replenish it if necessary.
- If you will be driving in wintry conditions, in addition to the usual emergency supplies you keep in your vehicle, be sure to keep enough of the following for each person:
  - Blankets or sleeping bags.
  - Rain gear, extra sets of dry clothing, mittens, socks, and wool hats.
  - Newspapers for insulation.
  - Plastic bags for sanitation.
  - Canned fruit, nuts, and high energy "munchies." (Include a non-electric can opener if necessary.)
  - Keep in your vehicle:
    - A windshield scraper and small broom for ice and snow removal.
    - A small sack of sand for generating traction under wheels and a set of tire chains or traction mats.
    - Matches in a waterproof container.
    - Cards, games, and puzzles.
    - A brightly colored (preferably red) cloth to tie to the antenna.
- Keep a cell phone or two-way radio with you when traveling in winter. Make sure the battery is charged.
- If you must be on the road during a winter storm, bring warm broth in a thermos and several bottles of water for each person.
- Keep your vehicle's gas tank full so you will be ready in case of emergency and to pre-

*(Continued on page 12)*



## Winter Storms

*(Continued from page 11)*

vent the fuel line from freezing.

- Plan to travel during daylight and, if possible, take at least one other person with you.
- Let someone know your destination, your route, and when you expect to arrive. If your vehicle gets stuck along the way, help can be sent along your predetermined route.
- Before leaving, listen to weather reports for your area and the areas you will be passing through, or call the state highway patrol for the latest road conditions.
- Be on the lookout for sleet, freezing rain, freezing drizzle, and dense fog, which can make driving very hazardous.
- Avoid traveling during a winter storm.
- If you must travel and do become stranded, it is better to stay in the vehicle and wait for help. Do not leave the vehicle to search for assistance unless help is visible within 100 yards (91 meters). You can quickly become disoriented and confused in blowing snow.
- If you are stuck in a vehicle:
  - Display a trouble sign to indicate you need help. Hang a brightly colored cloth (preferably red) on the radio antenna and raise the hood after snow stops falling.
  - Run the engine occasionally to keep warm. Carbon monoxide can build up inside a standing vehicle while the engine is running, even if the exhaust pipe is clear. Running the heater for 10 minutes every hour generally is enough to keep the occupants warm. Running the engine for only short periods reduces the risk of carbon monoxide poisoning and conserves fuel. Turn on the engine for about 10 minutes each hour (or five minutes every half hour). Use the heater while the engine is running.
  - Keep the exhaust pipe clear of snow, and slightly open a downwind window for ventilation.
  - Leave the overhead light on when the engine is running so that you can be seen.
  - Do light exercises to keep up circulation. Clap your hands and move your arms and legs occasionally. Try not to stay in one position for too long.
  - If more than one person is in the vehicle, take turns sleeping. One of the first signs of hypothermia is sleepiness. If you are not awakened periodically to increase body temperature and circulation, you can freeze to death.
  - Huddle together for warmth. Use newspapers, maps, and even the removable floor mats for added insulation. Layering items will help trap more body heat.
  - Watch for signs of frostbite and hypothermia. Severe cold can cause numbness, making you unaware of possible danger. Keep fingers and toes moving for circulation, and drink warm broth to reduce the risk of further injury.
  - Drink fluids to avoid dehydration. Bulky winter clothing can cause you to sweat, but cold dry air will help the sweat evaporate, making you unaware of possible dehydration. When people are dehydrated, they are more susceptible to the ill effects of cold and to heart attacks.

*(Continued on page 13)*



## Winter Storms

*(Continued from page 12)*

- Avoid overexertion. Cold weather puts an added strain on the heart. Unaccustomed exercise, such as shoveling snow or pushing a vehicle, can bring on a heart attack or make other medical conditions worse.

### What to Do After a Winter Storm

You should:

- Keep listening to a local radio or television station or NOAA Weather Radio for updated information and instructions. Access to some parts of the community may be limited or roads may be blocked.
- Help people who require special assistance—infants, elderly people, those without transportation, large families who may need additional help in an emergency situation, people with disabilities, and the people who care for them.
- Avoid driving and other travel until conditions have improved. Roads may be blocked by snow or emergency vehicles.
- Avoid overexertion. Heart attacks from shoveling heavy snow are a leading cause of death during the winter.
- Keep up with local weather forecasts and be prepared when you go outside. Major winter storms are often followed by even colder conditions.
- Check on your animals and ensure that their access to food and water is unimpeded by drifted snow, ice, or other obstacles.

### Frostbite and Hypothermia

Frostbite is a severe reaction to exposure to cold that can cause permanent harm to people. Symptoms of frostbite are a loss of feeling and a white or pale appearance in fingers, toes, nose, or earlobes.

Hypothermia is a condition brought on when a person's body temperature drops to 3° below its normal temperature. On average, a person would begin to suffer hypothermia if his or her temperature dropped to 96° F (35.6° C). Symptoms of hypothermia include uncontrollable shivering, slow speech, memory lapses, frequent stumbling, drowsiness, and exhaustion. Hypothermia is not always fatal, but those who survive it are likely to suffer lasting kidney, liver, and pancreas problems.

If frostbite or hypothermia is suspected, begin warming the person slowly and get immediate medical assistance. Warm the person's trunk first. You can hug the person to use your own body heat to help warm him or her. Arms and legs should be warmed last because stimulation of the limbs can drive cold blood toward the heart and lead to cardiac arrest. Put the person in dry clothing and wrap his or her entire body in a blanket. Never give any-

*(Continued on page 14)*



## Winter Storms

*(Continued from page 13)*

thing with alcohol or caffeine in it to a person who is suffering from frostbite or hypothermia. Caffeine, a stimulant, can cause the heart to beat faster and hasten the effect the cold has on the body. Alcohol, a depressant, can slow the heart and also hasten the ill effects of the cold.

### Facts and Fiction

**Fiction:** If you are stuck in a car in a snowstorm, the best thing to do is to get out and look for help.

**Facts:** You should stay in your vehicle and wait for rescuers. If you leave your vehicle in wind-driven snow, you could quickly become disoriented. Make the vehicle visible to rescuers (tie a colored cloth to the antenna or door, turn on the dome light when running the engine for heat, raise the hood when the snow stops falling). If you have a cell phone, call a towing company or 9-1-1 or the local emergency number.

**Fiction:** In severe cold, it is best to stay warm by wearing a very heavy coat.

**Facts:** You should wear loose, lightweight, warm clothes in layers. Trapped air insulates. Remove layers to avoid perspiration and subsequent chill. Outer garments should be tightly woven, water repellent, and hooded. Wear a hat. Half your body-heat loss can be from the head. Cover your mouth to protect your lungs from extreme cold. Mittens, snug at the wrist, are better than gloves. Try to stay dry.

