Winter Preparedness

For Blind and Low Vision Individuals Of course this can apply to those with sight as well.

National Federation of the Blind Chicago Chapter

Version 1.2

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Written and edited By

Gregory D. Rosenberg (AB9MZ)

gregg@ricis.com

7849 Bristol Park Dr.
Tinley Park, IL 60477-4594

708-444-2690 Home Office

708-267-6664 Mobile
(You will go to voicemail if you are not in my contacts.)

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Document Change History

This table shows the change history for this document.

Date	Version	By	Description
2020-10-06	1.0	GDR	Original document
2020-10-06	1.1	GDR	1st draft
2020-10-10	1.2	GDR	Final draft

Table 1 Document change history

Section I - Introduction

What are your greatest challenges in the wintertime? Certainly, transportation, safety, finding landmarks, and staying warm are amongst my biggest concerns. Winter weather can challenge us in many obvious ways and some not so obvious. Slush, snow, ice, black ice, ice storms, blizzards, freezing or sub-zero temperatures, wind chill, and, even freak winter tornadoes. Downed power lines, fallen tree limbs, hidden surface, inability to find landmarks, and powdered snow on ice are just of few of the less obvious challenges for newcomers to vision loss.

Treacherous winter weather comes with many hazards, including the possibility of falling on slick, icy surfaces. It's even more challenging as we get older and are less agile. Each year, 2.5 million older Americans are treated in emergency departments for injuries from falls both indoors and outside. Falls are the leading cause of injury among those over 65. Traveling with a white cane, walking stick, or walker only amplifies the challenges of traveling in harsh winter conditions.

> Emergency preparedness is based on the rule of threes. You can survive three seconds without hope, three minutes without air, three hours in harsh weather, three days without water, and three weeks without food. Of course, there are many other factors that enter into this equation such as your health and comorbidities. For the purposes of this article we will focus on harsh weather conditions.

Section II - Be proactive

The Lighthouse Guild offers the following general guidance for traveling in the wintertime and the colder months of the year:

1) Draw up a plan: Get to know as much as you can about the location you're traveling to. Check the weather, plan your route and give yourself extra time to get there.

2) Remove snow and ice: To avoid falls, ask a family member, friend or neighbor to shovel your porch, steps and pathways. Have them remove ice by using salt, cat litter or sand.

3) Keep track while traveling: Use an accessible compass or a cell phone navigation app to keep track of your directions and location.

4) Be visible when walking: Wear brightly colored, reflective safety clothing so that drivers can see you in the dark. Put reflective tape on your cane and travel with a flashlight. The flashlight helps other see you and helps those with low vision.

5) Wear ice and snow grips on your shoes: There are a number of products available that cover the outside of the soles of your shoes and have metal grips on the bottom for added traction when walking on snow and ice.

6) Find new landmarks and walk slowly: Snow covers landmarks such as the changes from pavement to grass. Prevent falls by relying on taller landmarks to navigate, such as bushes, fences and signposts.

7) Use your cane to probe: To uncover snow or break up ice, tap your cane harder on the ground or "touch and slide". Use a long white cane to probe for changes like sudden inclines. On black ice, which isn't detectable with a cane, take smaller steps than usual.

8) Guide Dogs: Limit your reliance on your guide dog in bad weather. Your dog can lose its scent in heavy snow. According to the Guide Dog Foundation, more dogs get lost during winter than at any other time of year. Dry your dog after being out in the snow. To avoid cuts and cracked pads, clean and dry your dog's paws and rub on a little petroleum jelly.

9) Dress in layers: Loose-fitting wool, silk or polypropylene inner layers of clothing protect you from wind and frostbite. Layer your clothing—including coat or jacket, sweater and scarf—to retain body temperature when outside and allow you to remove layers as needed indoors.

10) Cover your skin in frigid temperatures: If you travel with a guide cane but find it difficult to use while wearing gloves, it might help to cut off the tip of the index finger (or more fingers) so you can feel the cane. For a mitten, you can make a hole at the tip and insert the cane so you can hold it inside the mitten. You can also purchase "mobility mittens" that cover your cane and hand with cuffed openings. And to make sure you hear important sounds while traveling, avoid hats with ear flaps or earmuffs.

11) Wear waterproof winter boots that have good traction: Although traction will help prevent falls, the soles of your boots should be thin enough so you can feel the surface as you walk. Another option are footwear traction devices attached to the bottom of your boots.

12) Stay connected: Travel with a cell phone and charger. Take with you a device you use for reading such as a handheld magnifier, portable video magnifier, tablet or e-reader that provide magnification.

13) Tell family or friends where you're going: Identify your planned route, and what time you expect to arrive and return. Ask them to inform authorities if you're very late.

14) For peace of mind, stay at home in very bad weather: If you must travel, if possible, consider riding with a friend, or taking a cab or public transport instead of walking. Should you encounter a problem, don't hesitate to ask for help.

You don't have to give up traveling independently because of vision loss. You can live the life you want!

Section III - Causes of Heat Loss

During the colder months of the year our bodies loose heat by evaporative cooling, respiration, conduction, convection, and radiation. Let's examine the impact of each method of heat loss.

Evaporation (evaporative cooling) is caused by evaporation of water from your skin if it is wet (sweating). This situation becomes more serious If your clothing is also wet. This can become life threatening when our body temperatures become higher than 99°F (37°C). During intense exercise (i.e. walking fast, carrying heavy items, …), the body can lose up to 85% of its heat through evaporative cooling.

Respiration (breathing) causes some heat loss. You breathe out warm air and breathe in colder air. Your body is forced to expend energy (celeries) to warm the cold air you breathe in.

Radiation (similar to heat leaving a woodstove). This normal process of heat moving away from the body usually occurs in air temperatures lower than 68°F (20°C). The body loses up to 65% of its heat through radiation.

Conduction (such as heat loss from sleeping on the cold ground). Heat is lost in air temperatures lower than 68°F (20°C) . The body loses about 2% of its heat through air conduction. However, water causes more heat loss from the body than air does, so heat can be lost from the body very quickly when it is placed in cold water.

Convection (similar to sitting in front of a fan or having the wind blow on you). The body loses between 10% to 15% of its heat through convection.

Heat loss through evaporation and respiration increases in dry, windy weather conditions.

Wet clothing greatly increases heat loss through conduction and evaporative cooling.

Heat loss in cold, wet weather increases the risk for hypothermia and cold injury. Heat loss can occur in warm temperatures through conduction. Swimming or sitting in cool or cold water can cause the body to lose heat very quickly and increase the risk for hypothermia.

Hypothermia can occur quickly (within a few hours) or gradually over days and weeks depending on a person's age, overall health, and environmental conditions.

It is vital we protect our skin, core body temperature, head, and feet by wearing layers of clothing to protect our skin against below freezing temperatures, sub-zero wind chill factors, and particles of ice pelting our faces. Winter weather conditions

can easily challenge us going to or from a vehicle, waiting for a bus, train, or other forms special transportation.

I remember back in ’79 we had fairly nice weather, so I wore my suit and overcoat. While waiting downtown on Michigan Avenue for the Vand¥aray bus to drive us back to Matteson. Then without any warning a massive blizzard arose. We were all huddled together in the parking structure where the bus normally picked us up. It took nearly seven hours for the bus to get us back home. We arrived just after midnight. So, what would you do if you got caught by a severe winter storm? It is all about having a plan.

Do you know the signs of hypothermia and can you render first aid should you or someone you are with fall prey to hypothermia?

Wait, I’ll walk faster and get out of the bad weather. This is a good concept, but there is a hidden danger. If you work up a sweat in the wintertime you are subject to what we refer to as evaporative cooling. You will start to develop chills; your core will start pooling your blood to your body’s core in order to protect your organs from shutting down or becoming damaged. This can lead to frostbite. When the chills stop is when you will face a life-threatening emergency.

Section IV - Multiple concurrent emergencies

Most of us can generally manage a single emergency fairly well; however, what happens when we have to deal with two or more concurrent emergencies. Let's consider the following dual emergency.

The temperatures have dropped to -20°F (-28.9°C) and because of excessive icing on powerlines shutting off your electricity and / or the power that manages the gas distribution system in your community. This may be a lower likelihood in the Chicago and suburban areas; however, I have seen these situations twice in my lifetime.

What could you do to stay warm?

1) Make sure that all windows and doors fit well and don't have any leaks.

2) Cover windows with 3M or similar plastic insulation kits.

4) If you have a basement then go there as the temperatures below ground are generally warmer and more consistent.

5) If you don't have a basement setup a tent or make a shelter with heave blankets.

6) If you have a room in the center of your house that you can setup to insulate you from the cold. Hang cardboard or blankets to add insulation to the walls. Place a towel at the bottom of the door to block any drafts.

7) If you have a way to generate electricity by means of a generator that is outside of your house or have a heater that is safe to use indoors by all means take advantage of that. Never use open fires or heat generating devices that are not specifically rated for indoor use. Doing so will likely result in carbon monoxide poising shortly followed by death.

7) If you have a deep metal bowl you can place low profile candles in the bottom of it. Or an emergency candle in it with multiple wicks. WARNING this is very dangerous and should only be used as a last resort. You should practice this with a sighted person to make sure you can do it safely. Three candles will generate the equivalent heat of one person. Of course you will also want to huddle together to stay warmer.

Section V - Preventative Measures

Remember the old adage “An ounce of prevention is better than a pound of cure.” Your winter preparedness should focus on prevention. During winter structure fires greatly increase the risk to life and property. Not only to you, your pets and service animals, and your family, but also the first responders. With that in mind consider the following preventative steps to protect your living space from fire:

1) Smoke, Heat, and Carbon Monoxide Detectors

Hopefully your living, work, school, or public spaces you frequent have smoke and heat detectors, as well as carbon monoxide detectors. Since heat and smoke rise you should ensure that smoke and / or heat detectors are placed on a wall near the ceiling of on the ceiling itself. Carbon Monoxide is heavier than air, so it is best to place these between waste and chest height of an average adult.

These are key elements of your early warning system. Make sure you change the batteries in your smoke, heat, and carbon monoxide detectors. Especially if you live in a multi-tenant dwelling. Your neighbors might not be as careful or smart about fire prevention as you are.

Remember Carbon Monoxide is a colorless and odorless gas. Fires will generally produce heat before they produce smoke. Once the temperature of the fire is around 1,800 degrees it will rabidly jump from wall to wall.

Kiddie, First Alert, and others make smoke and heat detectors that can be placed on a window and many of these devices are equipped with a red flashing light to alert fire rescue peroneal to know what rooms we, our service animals, and pets can likely be found in.

2) Kitchen Dangers

Use caution in the kitchen. According to the National Fire Protection Association, cooking fires are the No. 1 cause of home fires, burns, and smoke inhalation. The leading cause of fires in the kitchen is unattended cooking. That's why the NFPA recommends the following:

A) Don't use a stove or stovetop if you're sleepy or have consumed alcohol.

NOTE: *You should avoid alcohol, smoking products, and recreational drugs if you plan on venturing outside in winter. These indirectly contribute to heat loss, they can impair your breathing, and challenge your mobility.*

B) Never leave the kitchen while you have food boiling, broiling frying, or grilling.

C) Always cook with a lid beside your pan. If you do have a fire, put the lid on the pan and turn off the burner.

D) If you're simmering, baking or roasting food, check it regularly to ensure it's not smoking or on fire.

E) Use a timer so you don't forget you have something cooking that needs attention.

F) Keep your stovetop clutter-free, as oven mitts, wood utensils, packaging, towels and other items can easily catch fire. Avoid wearing loose clothing or having dangling sleeves near an open flame.

G) Make sure to keep your stove top, oven, broiler clean of grease.

H) Strongly consider having a box of baking soda or a carbon dioxide fire extinguisher to extinguish small stove top or oven fires.

3) Electricity and heat producing devices

Be smart when it comes to electrical wiring. A little common sense can go a long way when it comes to preventing electrical fires. The U.S. Fire Administration boiling, or broiling recommends the following:

A) Don't overload extension cords or wall outlets, and only use extension cords temporarily. Adding two or more extension cords together will cut the collective cords current carrying ability in half every time you add an additional cord. Never ever daisy chain extension cords, even for temporary use.

Let's say to have a 1,200-Watt electrical space heater that is rated for indoor use. You plug in two six food extension cords that are rated for 15 Amps. By doing so your combined extension cords can only carry 7.5 Amps. The space heater requires 10 Amps. Which now exceeds the 7.5 Amp carrying capacity of your daisy changed extension cords. Guess what will happen? The extension cord will overheat and start on fire.

I had a client in Joliet that was a law firm. Their building wasn't completely finished so they took several 10 gauge 100-foot extension cords to run power from the first floor to the second and third floors. The owner got a call from the fire department that very night. The building was fulling engulfed.

B) Never use an extension cord with a heat-producing appliance such as a space heater, hair dryer, coffee maker, air fryer, toaster, electric stove, electric walk, microwave, clothes dryer, as well as electric (water bath or pressure canner). You should only plug one heat-producing appliance directly into a wall outlet at a time and never exceed 80% of the current load capacity of your circuit breaker capacity.

Large appliances should be on their own dedicated circuit breakers. You may have to reach out to your network of sighted friends or consult an electrician if you are unsure.

Let's say we have a walk that takes 10 Amps and toaster that consumes 5 Amps of electricity, but you only have a 15 Amp braker in your electrical panel for your countertop electric outlets. You should not operate these devices together as they will exceed more than 80% of your 15 Amp electrical circuit. Most modern buildings built since the mid '80s will generally have 20 Amp circuits. In which case this would be a safe electrical load.

C) Replace any cracked or damaged electrical cords. Don't try to repair them.

4) Fireplaces, Wood Stoves, and Chimneys

According to the Chimney Safety Institute of America, chimneys (or stove pipes), fireplaces, and vents should be inspected at least once a year to ensure they don't require cleaning or repairs. This maintenance is mandatory. Overtime they will develop a buildup of creosol, oils, and other combustible materials that **WILL** cause fires. There are devices that look like an automotive flair that you can ignite to extinguish such fires before they get out of control.

5) Dryers and Dryer Vents

Clean dryer vents every two to three years. Failure to clean the dryer is the leading cause of home clothes dryer fires, according to the USFA. That's why you should clean lint filters every time you use your dryer and have your dryer vent ductwork cleaned annually.

6) Fire Escape Plan

Have a fire escape plan for your home. Make sure you practice it a few times a year. This develops muscle memory so you can instinctively no your route to safety. Find out the fire escape plan where you work, shop, go to school, or attend events in public venues. You need to get out and call for help. Never go back into to a building on fire.

Section VI - Your First Line Shelter

Your first line shelter against in climate weather are the layers of clothing, headwear, gloves, and footwear items you are wearing on your body.

1) Clothing and Outerwear

You need to have a few layers of clothing you can put on or take off as weather conditions change, as you increase or decrease your activity level, as well as the weight of what you carry with you. You should have a wool, synthetic blend or silk layer against your skin. Your second layer might be a wool blend. When wool gets wet it will still help you retain body heat. Your outer layer should be a water resistant or waterproof layer that is also wind resistant.

Avoid wearing cotton in the wintertime or colder months of the year. **Cotton kills!** Why you ask? Because it will absorb moisture or water and once it does so it will chill you to the bone. It is best to stay with wool (Marino Wool is the best) or synthetic blends, you can often find great deals on various clothing layers at thrift shops.

2) Headwear

A) A silk balaclava or buff. Silk is the best know insulator and can add 10 to 20 degrees of warmth. You might consider wearing a silk layer under your clothing on very cold in climate days.

B) A warm hat that can cover your head and ears. You can wear your balaclava or buff under this. Make sure the hat, earmuffs, balaclava, or buff you choose doesn't muffle your hearing, as our hearing is critical for our safety.

C) A very long scarf you can wrap around your neck in layers.

D) Some hand and foot warmers that are activated by air once you take them out of their package.

E) Chapstick or Vaseline to prevent cracked lips.

3) Handwear

An extra pair of waterproof gloves that can protect your hands from below freezing and sub-zero temperatures. Newer glove designs have emerged in the past five to seven years that allow you to operate your phone with your gloves on. You may have to double up gloves in extreme situations. Which as Chicagoans we see occurring all too often.

4) Footwear

A) Protect your feet from heat loss by wearing an inner synthetic sock with an outer wool sock.

B) Choose footwear that provides good traction.

C) Consider adding rubber cleats or metal spikes if you have to walk on icy surfaces or powdered snow on ice.

5) Protecting what you carry

Consider lining your pack and / or purse with a plastic garbage bag and put things that can be damaged by melting snow or slush in double zipper freezer bags. You can wash out ones you used for food storage and repurpose them.

Section VII – Communications and Critical Documents

1) Your Family Communications Plan

Everyone should have a list of emergency contacts in their phone and a paper backup in print or braille to carry in your purse or wallet. This should include name and phone numbers for your emergency contacts. Names, addresses, phone numbers of your family, friends, hospitals, health care provider offices, veterinarian, public and private transportation companies, emergency shelter locations, utilities, as well as any relevant local, county, and state government agencies.

2) Your Mobile Communications and Navigation Devices

Our mobile communications and navigation devices provide a critical lifeline for those of us that are visually challenged. Protect your phone by carrying it in an inside pocket of your winter coat to keep the touch screen and metal case warmer. If your fingers, gloves, and touch screen get to cold you may otherwise have to warm them up to use them in a winter emergency situation.

About a decade ago we had an ice storm in Tinley Park. I was leaving our EOC at around 22:00 and walked about 10 feet to find the entire ground was covered in a thick sheet of ice. I huddled closed to the building but found I couldn't operate my touch screen because my hands were too cold. It was well below freezing. I was lucky that I had my keycard and could go back in the building to warm my hands and phone to check the train schedule.

A battery bank in case your phone or tablet die, and you lose your only form of communications. Usually a 5,000 or 10,000 MAh battery bank will be sufficient.

When Alkaline or Nichol Metal Hydride batteries freeze, they will rapidly lose their power and can even crack. You want to choose batteries with the lowest

amount of water in them as possible. Lithium Polymer Ion, Lithium Ferro Phosphate, and the newer Lithium Sulfur batteries (coming out in the next few years) all address this issue by design.

3) Your Critical Documents

Have copies of your vital documents stored on your mobile device(s), a waterproof USB device, and in a waterproof (if not also fireproof) pouch. Locate the pouch in a place you can easily grab when you flee out a bedroom window or use another escape route. This will include birth certificate, State ID, Real ID, or a driver's license (if you are sighted). Insurance cards, a list of medical conditions, a list of prescription, over-the-counter medications, and nutraceuticals that you regularly take. You should also have the logins for your banking and financial and electronical medical records sites. These can all be stored in a password manager and synched across all of your devices. LastPass and Dashlane are two popular choices, but there are many more.

Section VIII- Hydration

Carry your water bottle inside your clothing or deep in your pack or purse during the winter to keep your drinking water or beverage of choice from getting cold or freezing. You only want to drink things that are warm or hot in the wintertime. If you drink something that is cold it will steal heat from your body to warm it up.

I used to carry my water bottle on my belt. After walking two miles it started to freeze. The temperature was -60. I was plenty warm and protected against the weather, but the water in my water bottle certainly wasn't. When I was in Antarctica, we had real temperatures that were -85. You don't even want to know what the wind chill was with 40 mile an hour winds guesting to 50.

Appendix A - Resources and Further Reading

CSIA.org Chimney Safety FAQs
https://www.csia.org/faq.htm

NFPA.org Cooking Fire Prevention
https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Top-fire-causes/Cooking

Ready.gov: Home Fires
https://www.ready.gov/home-fires

USFA: Clothes Dryer Fire Safety
https://www.redcross.org/get-help/how-to-prepare-for-emergencies/types-of-emergencies/fire.html¥¥

USFA Electrical and Appliance Fire Safety
USFA: Electrical And Appliance Fire Safety

How to stay safe outdoors this winter if you are visually impaired.
https://www.lighthouseguild.org/vision-health/how-to-stay-safe-outdoors-this-winter-if-youre-visually-impaired/

Appendix B – Wind Chill Temperature Index and Calculator

You can find wind chill conversion charts and calculators at:
https://www.weather.gov/safety/cold-wind-chill-chart

Wind Chill Chart
Temperatures in Degrees Fahrenheit

Wind Speed (Miles Per Hour)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
	5	36	31	25	19	37	7	-1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
	10	34	27	21	15	13	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
	15	32	25	19	13	9	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
	20	30	24	17	11	5	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
	25	29	23	16	9	4	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
	30	28	22	15	8	3	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
	35	28	21	14	7	1	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
	40	27	20	13	6	0	-8	-15	-22	-29	-36	-42	-50	-57	-64	-71	-78	-84	-91
	45	26	19	12	5	-1	-9	-16	-23	-30	-37	-43	-51	-58	-65	-79	-79	-86	-93
	50	26	19	12	4	-2	-10	-17	-24	-31	-38	-45	-52	-60	-67	-81	-81	-88	-95
	55	25	18	11	4	-3	-11	-18	-25	-33	-39	-46	-54	-61	-68	-82	-82	-89	-97
	60	25	17	10	3	-4	-11	-19	-26	-34	-40	-48	-55	-62	-69	-84	-84	-91	-98
	Wind Chill Times				**30 Minutes**				**10 Minutes**			**5 Minutes**							

Table 2 Wind Chill Chart

Equation 1 Calculate Wind Chill Temperature

$$\text{Wind Chill in F} = 35.74 + 0.6215T - 33.75\,(V^{0.16}) + 0.4275T\,(V^{0.16})$$

Where: *T = Air Temperature in °F*
V is Wind Speed in MPH

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