

# The Cold Challenge

## Life Outside These Days . . .

### **Brrrrr!**

Exposure to cold temperatures or cold challenge, whether indoors or outside, can cause serious or life-threatening health problems.

Planning, preparation and education (PPE) are the keys to preventing cold weather injury.

As the temperatures revert to below seasonal and winds are on increase, it is imperative to review with staff your safe work practices and policies for cold weather safety.

To keep yourself and your staff safe from the cold challenge, you should know how to prevent cold-related health problems and what to do if a cold-weather health emergency arises.

The information and emergency procedures outlined here are not a substitute for training in first aid or for proper medical evaluation. They are meant to supplement your current policies and practices. More importantly they should serve as a reminder to the seriousness of cold related hazards in the workplace.

## What is the Cold Challenge?

What constitutes extreme cold and its effects can vary across different areas of the country and the workforce. In regions or populations relatively unaccustomed to cold weather, near freezing temperatures can be considered “extreme cold.”

Whenever temperatures drop below normal and wind speed increases, heat can leave your body more rapidly. These weather related conditions may lead to serious health problems.

### **Points to review with staff:**

- A different kind of PPE for cold weather
- Dressing for the challenge
- Activity level and overheating
- Drinks, snacks and meals
- Hypothermia signs, symptoms and treatment
- Frostbite—signs, symptoms, and treatment

When your body temperature decreases, it must compensate, by shunting blood from extremities and limiting non-life supporting functions. The colder you get the more extreme the body’s compensation efforts are. Shivering is an early sign of a drop in body temperature, followed by confusion, the “fumbles,” exhaustion, slurred speech, and finally unconsciousness.

Extreme cold is a dangerous situation that can bring on health emergencies in

**What is the Cold Challenge continued...** susceptible people, such as those unprepared for it or those who are required to work outside for extended periods.

Prepare for extremely cold weather every winter— it's always a possibility. There are steps you can take.

## Dress for Success

Proper gear for working out of doors in the winter should include but is not limited to:

- a hat
- a scarf, mask or neck warmer
- several layers of loose-fitting clothing
- sleeves that are snug at the wrist
- mittens (with a wool or polypro liner)
- wind/water-resistant outer layer
- 2 pair of socks (a thin layer of non-cotton wicking material next to the skin and an insulating layer such a wool or a wool blend as the outer layer)
- Water resistant, insulated boots

## What Your Mom Always Told You

Mom will always tell you to “wear your hat” or “zip up your jacket” or you’ll catch your death of cold. Where those comments may not have been founded in scientific fact, they still ring true to fending off the cold challenge.

A **hat** is key, as we can lose up to 40% of our body temperature through our head. In cold weather a hat can be used to help

regulate body temperature. Start with it on, as the activity level increases and you feel warmer, take it off for a minute to “vent for heat.”

**Layer for warmth.** Be sure the outer layer of your clothing is tightly woven, preferably wind/water resistant, to reduce body heat loss caused by wind. Wool, silk, or polypropylene inner layers of clothing will hold more body heat than cotton.

**Stay dry.** Wet clothing chills the body rapidly. Excess perspiration will increase heat loss, so remove extra layers of clothing whenever you feel too warm. Bring a change of socks and gloves as these are the first to get saturated while working and will increase the cold challenge to you core. Do not ignore shivering. It's an important first sign that the body is losing heat.

## What can increase the Cold Challenge?

### Wind Chill

The Wind Chill index is the temperature your body feels when the air temperature is combined with the wind speed.

It is based on the rate of heat loss from exposed skin caused by the effects of wind and cold. As the speed of the wind increases, rapid cooling from convection will decrease the skin temperature, increasing the potential for hypothermia and frost nip/bite.

The Wind Chill chart shows the difference between actual air temperature and

**Wind Chill continued...**

		Temperature (°F)																		
		Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph)	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63	
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72	
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77	
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81	
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84	
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87	
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89	
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91	
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93	
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95	
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97	
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98		

Frostbite Times: 30 minutes (light blue), 10 minutes (medium blue), 5 minutes (dark blue)

perceived temperature and amount of time until frostbite occurs.

**What We Eat**

Food and fluid consumption can have a dramatic effect on core temperature and influence of the cold challenge on the body.

Eating well-balanced meals will help you stay warmer. Candy, soft drinks, sports drinks, and processed foods such as chips, white bread, prepared frozen dinners are difficult for your body to process and do not provide a balanced combination of nutrients we need for good health.

Fruits and veggies as well as whole grains and protein are more easily digested and provide the more consistent source of energy. This is necessary to maintain energy levels and temperature over the course of the workday.

Do not drink alcoholic or caffeinated beverages— they cause your body to lose heat more rapidly. Instead, drink warm,

sweet beverages or broth to help maintain your body temperature. If you have any dietary restrictions, ask your doctor.

Prescription medication or over the counter drugs, all can have a negative effect on your body’s ability to regulate temperature and hold off the cold challenge. Even medications or diet pills that temporarily increase the body’s metabolism will cause core temperature decrease with prolonged exposure to the cold challenge.

**What We Do**

Activity levels can both increase and decrease the cold challenge.

Short periods of heavy exertion working up a sweat, followed by longer periods of rest or limited exertion, such as in snowmaking or snow shoveling, can put a person at risk for cold related injuries. As the sweat evaporates it cools the skin, thereby lowering the core temperature. Sweat can also saturate the protective layers of clothing keeping a damp or wet layer close to the skin, further lowering skin temperature through evaporation and conduction.

Long periods of limited or no activity, such as a lift attendant or an operator at a detachable lift can also increase the cold challenge. In cold temperatures the body needs to remain moderately active to maintain body temperature. A by-product of muscle activity is heat. Shivering is an automatic compensatory response for a lack of activity and a falling core temperature.

### **What We Do continued...**

Workers should modify their activity levels and add or remove clothing layers to remain warm, but not so warm that they become wet from sweat. Job modification or work rotation can be effective in limiting the cold challenge, enabling conditions that are conducive to higher quality work, better decisions, and greater endurance.

## **Cold Related Injuries**

### **Hypothermia**

When exposed to cold temperatures, your body begins to lose heat faster than it can be produced. Prolonged exposure to cold will eventually use up your body's stored energy. The result is hypothermia, or low body temperature.

Body temperature that is too low affects the brain, making the victim unable to think clearly or move well. This makes hypothermia particularly dangerous because a person may not know it is happening and won't be able to do anything about it.

Hypothermia is most likely at very cold temperatures, but it can occur even at cool temperatures (above 40°F) if a person becomes chilled from rain, sweat, or submersion in cold water.

### **Warnings signs of hypothermia:**

- shivering, exhaustion
- confusion, fumbling hands
- memory loss, slurred speech
- drowsiness

### **What to Do**

If you notice any of these signs, if possible remove the person to a warm environment and get medical attention immediately.

### **Frost Bite**

Frostbite is an injury to the body that is caused by the freezing of the water inside of the tissue cells.

Frostbite causes a loss of feeling and color in affected areas. It most often affects the nose, ears, cheeks, chin, fingers, or toes. Frostbite can permanently damage the body, and severe cases can lead to amputation.

The risk of frostbite is increased in people with reduced blood circulation and among people who are not dressed properly for cold temperatures.

### **Recognizing Frostbite**

At the first signs of redness or pain in any skin area, get out of the cold or protect any exposed skin—frostbite may be beginning. Any of the following signs may indicate frostbite:

- a white or grayish-yellow skin area
- skin that feels unusually firm or waxy
- numbness

A worker is often unaware of frostbite until someone else points it out because the frozen tissues are numb.

### **What to Do**

If you detect symptoms of frostbite, seek medical care. Because frostbite and

### **What to Do continued...**

hypothermia both result from exposure, first remove the worker to a warm area away from the wind, wet and cold, and seek medical attention right away.

If the exposed skin is soft to the touch, begin to re-warm by placing a warm hand over the area or, if it is the hands, placing them under the armpits.

If the area is unusually firm or hard to the touch, do not re-warm in the field, but seek medical attention immediately.

## **The Bottom Line on the Cold Challenge**

Planning, preparation, and education will go far in reducing the cold challenge for the out of doors workforce.

Review the jobs, tasks, and people under our supervision to identify the existing and future hazards and the weakness of your current policies and practices.

Prevention is the best medicine so remember to eat well and drink plenty of non-caffeinated/alcoholic fluids and when dressing, dress for the **C.O.L.D.**

**C** – keep your clothes **CLEAN**

**O** –avoid **OVERHEATING**

**L** – wear **LAYERS**

**D** – keep it **DRY**

### Sources:

Army Unit Leader's and Instructor's Risk Management Steps for Preventing Cold Casualties, November 2006, [http://chppm-www.apgea.army.mil/coldinjury/ColdWeather\\_Temp\\_Home\\_20061121.pdf](http://chppm-www.apgea.army.mil/coldinjury/ColdWeather_Temp_Home_20061121.pdf)

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