

# Cold Weather Emergencies

# Working Outside in Cold Weather

Hypothermia  
Frostnip/Frostbite  
Windburn  
Cardiac events



# Hypothermia

- Body temperature falls below 95 degrees
  - Normal temperature is 98.6 degrees
- Exposure to extreme cold
  - Body loses heat faster than it generates it

# Three Stages of Hypothermia

First: Shivering: reduced circulation

Second: Slow weak pulse, slower breathing, lack of coordination, confusion, irritability, sleepiness

Third: Very weak or absent pulse and breathing

# Frostnip/Frostbite

- Exposed Skin
- Symptoms
  - Stinging sensation, then no feeling
  - Reddening of the skin
    - Later, waxiness
    - Lastly, blackening and hardening of the skin
  - Swelling of extremities



Frostbitten hand

# Windburn

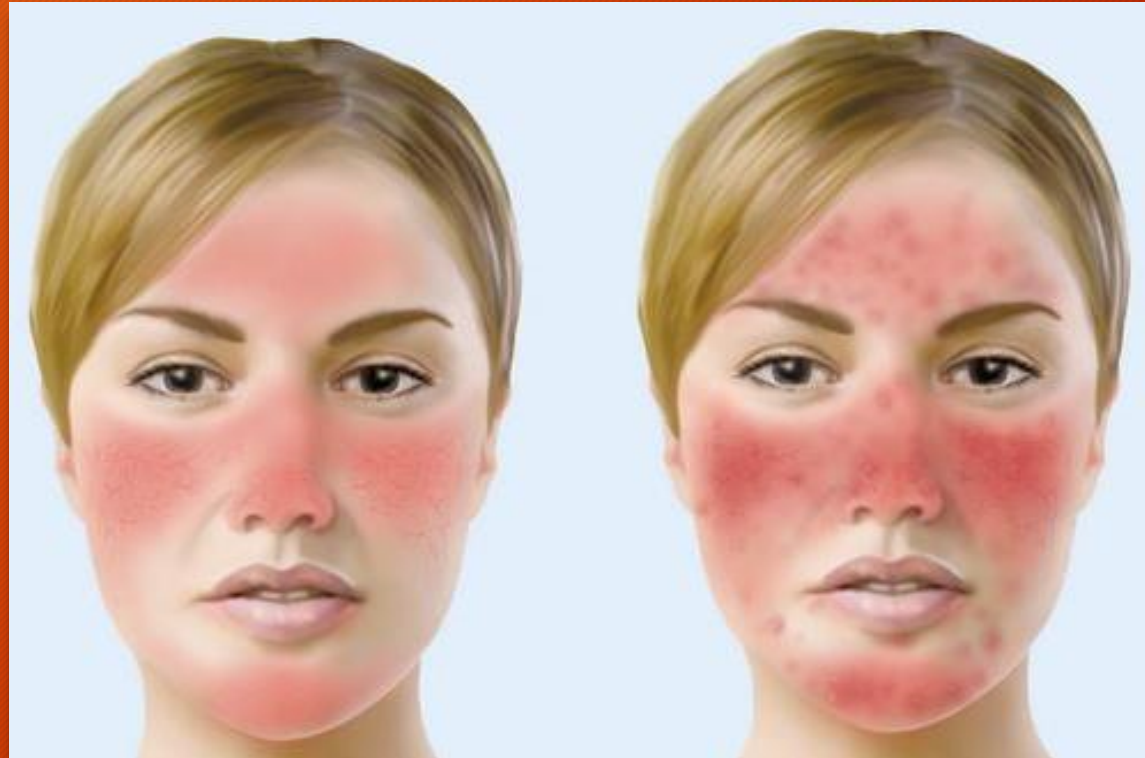
Skin is dry, red and painful

Resembles sunburn

Keep well hydrated

**Moisturizers**

Vaseline, Hyaluronic Acid, Shea Butter,  
Aloe, Coconut Oil



# Cardiac Events

- Cold causes blood vessels to contract
- Increased risk of Heart Attack and Stroke
- Increased Blood Pressure
- Hard (unaccustomed) work



# Snow Removal



# Symptoms of Cardiac Problems

- Chest Pain
  - Often radiating into the left arm
- Shortness of Breath
- Nausea and/or vomiting
- Sweating
- Fatigue

# Temperature, Time and Wind Levels

- 0 degrees F for 30 minutes
- -15 degrees F for 10 minutes
- Increased windspeed can significantly increase the time
  - 10 degrees F at 10 mph equals -4 degrees F
  - 20 degrees F at 30 mph equals 1 degree F

# Windchill Chart



## Wind Chill Chart



Temperature (°F)

Wind (mph)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
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

10 minutes

5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

# Preventative Measures

Keep moving

Limit time in cold weather

- Provide shelter for outside workers

Avoid alcohol



# Warm Clothing

## Coat

- Layers
- Thermal underwear

## Hat

## Gloves/Mittens



# Treatment

Get into warm environment

-At least out of the wind



# Treatment

- Remove wet/frozen clothing
  - Dry skin
  - Cautious Immersion
- Stimulants
  - Soup
  - Tea or Coffee
    - Preferably weak



# Effect of Cold on Work Operations

Plumbing freezing  
-Burst pipes



# Effect of Cold on Work Operations

- Taxing building systems
  - Heating system not keeping up with cold
    - Raising the thermostat temperature
    - Using Alternative/Supplemental heaters
  - Electrical wires brought down by ice

# Drafts into buildings

## Open Doors

- Front doors for customers
- Loading Docks in shop

## Leaking building/windows

- Seal up openings



# Alternative/Supplemental Heating Devices

## Space Heaters

-Used in offices and other workspaces



# Space Heaters

- Older models lack safety features
  - Tip over shutoffs
  - Ceramic/protected vents
- Make sure there is open space around the heater
  - Keep away from combustibles, drapes, hanging clothes
- Don't overload electrical systems
  - Plug directly into wall outlet
  - Do not use extension cords/power strips

# Torpedo Heaters

Be very careful using any  
open flame heater

-Do not use inside



# Fire Department Operations

- Number of fires increase in cold weather
  - Usually due to increased heating demands
  - Poor alternatives to provide more heat
    - Old space heaters
    - Open fires/candles
    - Cooking Stoves
- Become more difficult to respond and deal with
  - Snow/Ice covered streets
    - Difficult to drive or walk on

# Alternative Heating methods



Fireplaces



Candles



Old Space Heaters



# Effects of Cold on Fire Division

## Personnel

- Protective clothing becomes wet, then frozen



# Effects of Cold on Fire Division

## Frozen Hydrants

- Leaking hydrants can freeze
- Control stem can break



# Effect of Cold on Fire Division

Freezing pumps  
on fire apparatus  
-Hoselines



# Winter storms affecting response

Snow and Ice create slower responses and work at emergency scenes



# Conclusion

- Dress for weather
- Limit exposure time in cold weather
- If having difficulties, seek help quickly
- Check building systems prior to winter
- Seal up leaks around windows and doors
- Be careful with alternative/supplemental heating devices