

# **Winter Weather and Social Science**

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# Presentation Overview

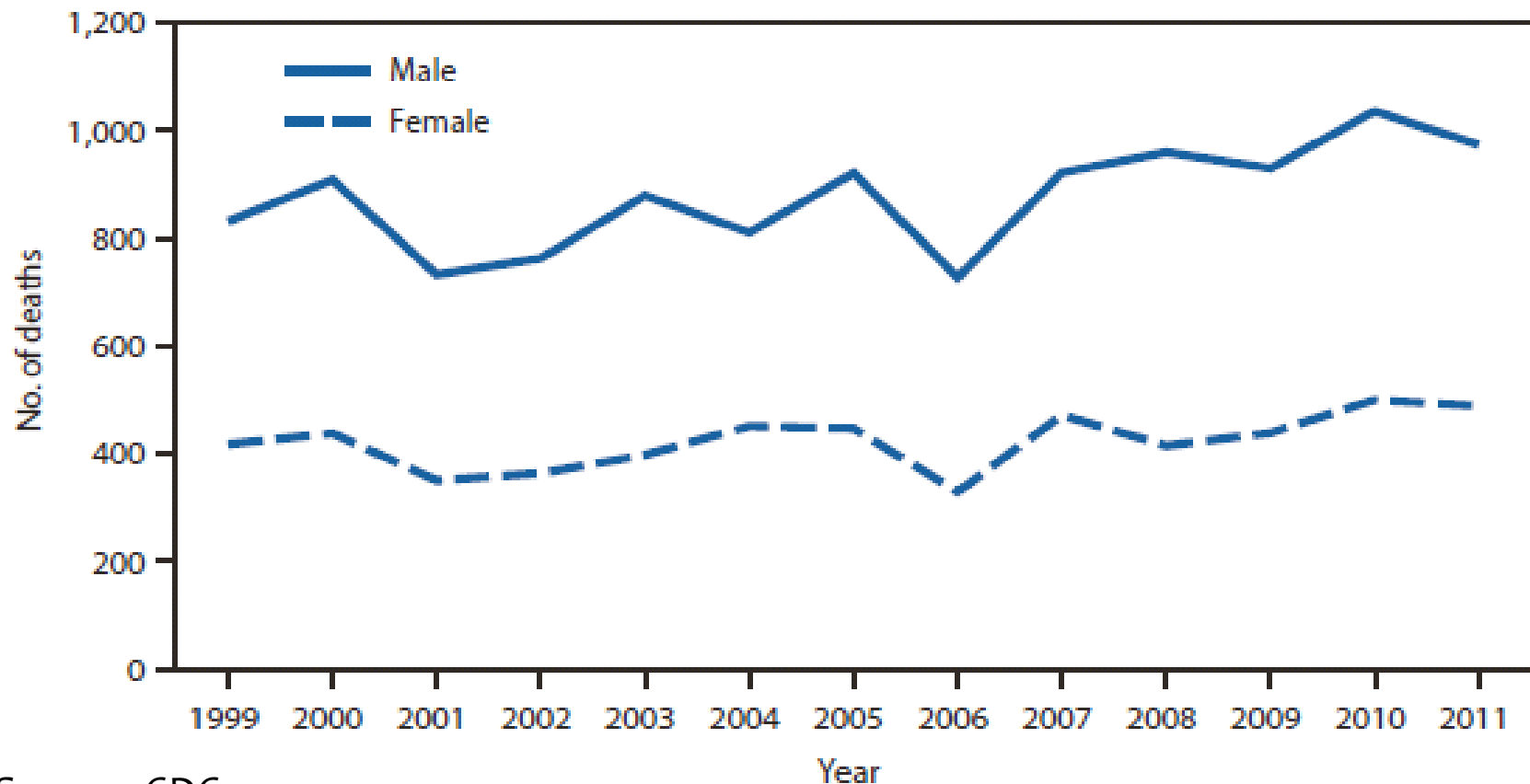
- \* Winter Weather and Social Impacts
  - \* Public health risks - frostbite, and hypothermia
  - \* Risk factors
  - \* Region dependence
- \* Winter Weather Communication
  - \* Risk communication
  - \* Watch's and warnings
  - \* False Alarms

# Winter Weather Public Health Impacts

- \* Hypothermia-related injuries and death
- \* Carbon monoxide poisoning
- \* Injuries and deaths from
  - \* Household fires
  - \* Motor vehicle crashes
- \* Injuries and deaths from slips, trips, and falls

# Number of Hypothermia-Related Deaths by Sex — US 1999–2011

average of 1,301 per year



# Cold Exposure - Health Consequences

## \* Hypothermia

- \* Body loses heat more than it can generate
- \* Extended exposure to cold temperatures – can occur at cool temperatures (above 40°F)
- \* Signs are disorientation, uncontrollable shivering, slurred speech, drowsiness, and exhaustion

## \* Frostbite

- \* Damage to the skin and underlying tissues
- \* Exposure to extreme cold in the presence of hypothermia but tissues can freeze at about 28 F (-2 C)
- \* Susceptible body parts - fingers, toes, ear lobes, and tip of the nose with loss of feeling and white or pale appearance

**Sources:** <http://emergency.cdc.gov/disasters/winter/staysafe/hypothermia.asp>; [www.nws.noaa.gov](http://www.nws.noaa.gov);  
<http://emergency.cdc.gov/disasters/winter/staysafe/frostbite.asp>; <http://www.mayoclinic.com/health/frostbite/DS01164/DSECTION=causes>  
<http://www.nlm.nih.gov/medlineplus/ency/article/000057.htm>

# Risk Factors during Winter Weather

## Exposure to Cold

- \* Older adults > 65 years of age
- \* Babies sleeping in cold bedrooms
- \* People who remain outdoors for long periods—the homeless, hikers, hunters, ice fishing etc.
- \* People who drink alcohol or use illicit drugs

## Use of Alternative Heat Sources

- \* Carbon monoxide (CO) poisoning and house fires peak in winter
  - \* Indoor charcoal grills are a major source of CO exposure during winter storms
  - \* Half of all home heating fires occur in Dec-Feb. most caused by unattended fires, improper use of space heaters, and candles etc.

# Communication

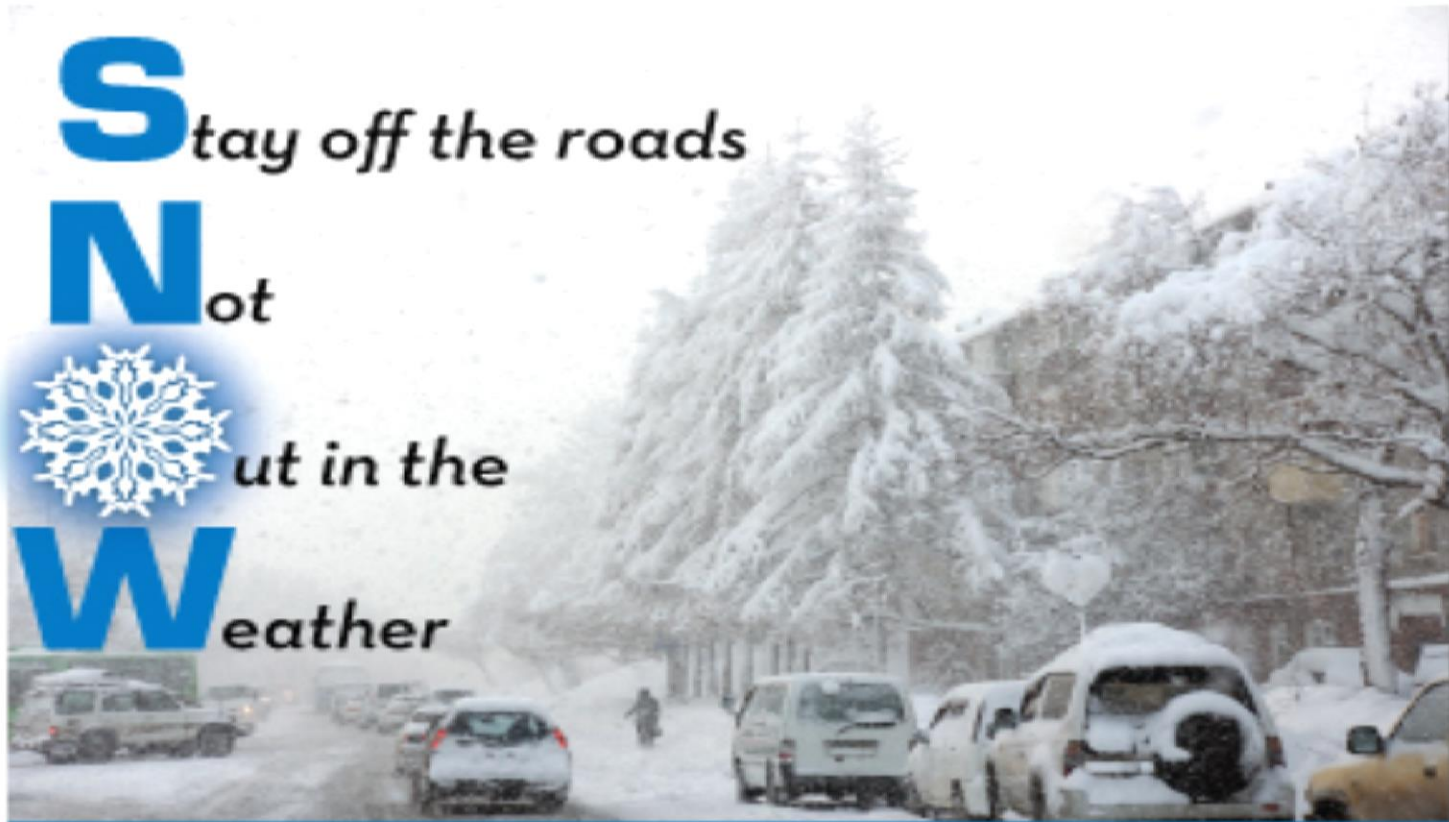
**S**tay off the roads

**N**ot



ut in the

**W**eather



*Get Where You Need to Be Before the Weather Gets Bad!*





# Winter Weather Preparedness Tips



## Dress for the Weather

- Wear several layers of loose fitting, lightweight, warm clothing rather than one layer of heavy clothing. The outer garments should be tightly woven and water repellent.
- **Wear mittens**, which are warmer than gloves.
- **Wear a hat.**
- **Cover your mouth** with a scarf to protect your lungs.



## Prepare your home and family

- Winterize your home by insulating walls and attics.
- **Caulk and weather strip** doors and windows.
- Install storm windows or cover windows with plastic.
- **Install and check** smoke detectors.
- **Learn how to shut off** water valves (in case a pipe bursts.)



## Prepare your car

- Check or have a mechanic check the following items on your car:
  - Antifreeze levels**—ensure they are sufficient and avoid freezing.
  - Battery and ignition system**—should be in top condition and battery terminal should be clean.
  - Brakes**—check for wear and fluid levels.
  - Exhaust system**—check for leaks and crimped pipes and repair or replace as necessary.
  - Fuel and air filters**—replace and keep water out of the system by using additives and maintaining a full tank of gas.
  - Heater and defroster**—ensure they work properly.
  - Lights and flashing hazard lights**—check for serviceability.
  - Oil**—check for level and weight. Heavier oils congeal more at low temperatures and do not lubricate as well.
  - Thermostat**—ensure it works properly.
  - Windshield wiper equipment**—repair any problems and maintain proper washer fluid level.
- **Place a winter emergency kit in each car** that includes:

a shovel	windshield scraper	flashlight
battery powered radio	extra batteries	water
snack food	matches	extra hats, socks & mittens
first aid kit with pocket knife	necessary medications	blanket(s)
tow chain or rope	road salt and sand	booster cables
emergency flares	fluorescent distress flag	

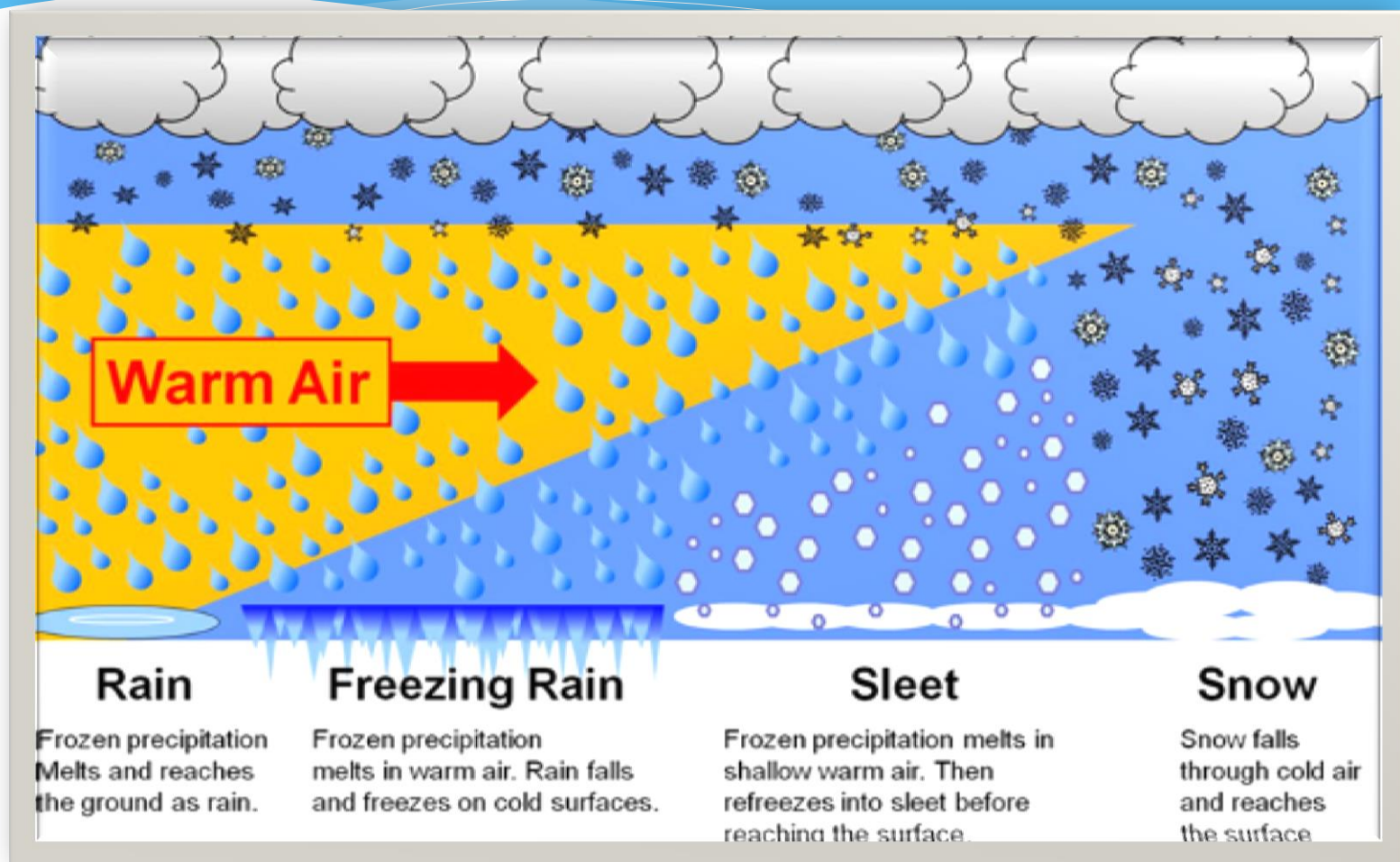


Brought to you by your Local Emergency Management Office

Office (505) 663-3511 Fax (505) 663-3512  
[www.losalamosnm.us/EmergencyMgt](http://www.losalamosnm.us/EmergencyMgt)



# Communication

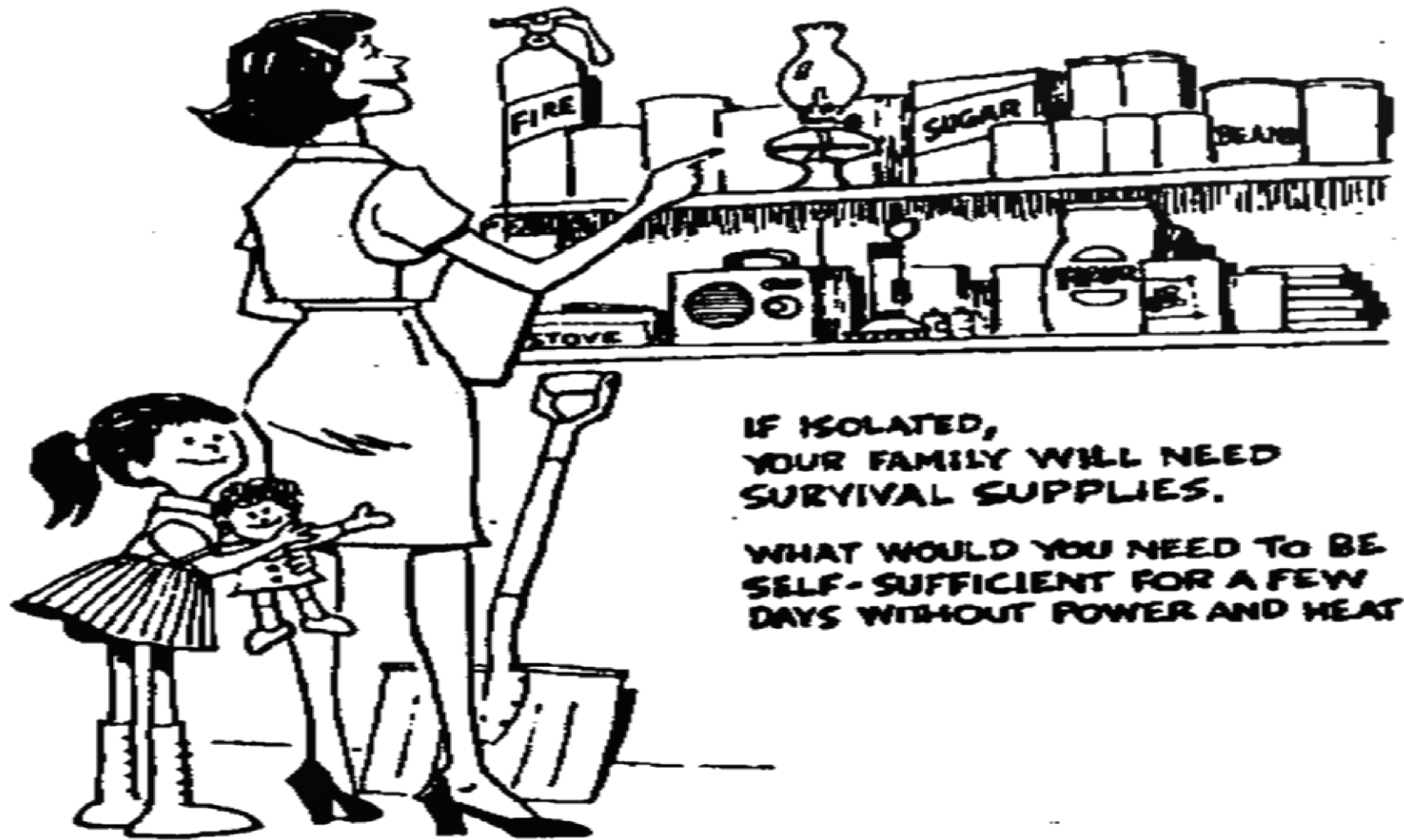


# Communication



Source: <http://blog.firstaidstore.com/winter-weather-preparedness/>

# DID YOU KNOW ?



**IF ISOLATED,  
YOUR FAMILY WILL NEED  
SURVIVAL SUPPLIES.**

**WHAT WOULD YOU NEED TO BE  
SELF-SUFFICIENT FOR A FEW  
DAYS WITHOUT POWER AND HEAT?**

# Target Specific Groups–Door Hangers

## Carbon Monoxide Hazard - Translated

### English



The English door hanger features a red background with a white circle at the top. On the left is the logo for the U.S. Environmental Protection Agency (EPA) and on the right is the CDC logo. Below the circle, the word "DANGER!" is written in large, bold, white letters on a red oval background. Underneath, the text "POISON GAS - POISON GAS - POISON GAS" and "CARBON MONOXIDE HAZARD" is printed in red and black. The main warning text reads: "Using a generator indoors WILL KILL YOU IN MINUTES. Exhaust contains carbon monoxide, a poison gas you can not see or smell." Below this, there are two circular icons with red slashes over them, showing a house with a generator inside. The text "NEVER use a generator indoors, in garages, or carports." is printed below the icons. At the bottom, there is an icon of a generator with a double-headed arrow pointing to a house. The text "ONLY use outdoors and far from open windows, doors, and vents." is printed below the icon.

**DANGER!**

POISON GAS - POISON GAS - POISON GAS  
CARBON MONOXIDE HAZARD

Using a generator indoors  
WILL KILL YOU IN MINUTES.  
Exhaust contains carbon monoxide,  
a poison gas you can not see or smell.

**NEVER** use a generator indoors,  
in garages, or carports.

ONLY use outdoors and far from  
open windows, doors, and vents.

### Spanish



The Spanish door hanger features a red background with a white circle at the top. On the left is the logo for the U.S. Environmental Protection Agency (EPA) and on the right is the CDC logo. Below the circle, the word "¡PELIGRO!" is written in large, bold, white letters on a red oval background. Underneath, the text "GAS VENENOSO - GAS VENENOSO - GAS VENENOSO" and "PELIGRO DE INTOXICACIÓN POR MONÓXIDO DE CARBONO" is printed in red and black. The main warning text reads: "Usar un generador en un espacio encerrado LO MATARÁ EN MINUTOS. El humo del sistema de escape contiene un gas venenoso que usted no puede ver ni oler." Below this, there are two circular icons with red slashes over them, showing a house with a generator inside. The text "Nunca use un generador en cuartos encerrados, garajes ni cocheras." is printed below the icons. At the bottom, there is an icon of a generator with a double-headed arrow pointing to a house. The text "SÍ LO use el generador al aire libre, y lejos de ventanas o puertas abiertas, o entradas de aire." is printed below the icon.

**¡PELIGRO!**

GAS VENENOSO - GAS VENENOSO - GAS VENENOSO  
PELIGRO DE INTOXICACIÓN POR MONÓXIDO DE CARBONO

Usar un generador en un espacio  
encerrado LO MATARÁ EN MINUTOS.  
El humo del sistema de escape contiene un  
gas venenoso que usted no puede ver ni oler.

Nunca use un generador en cuartos  
encerrados, garajes ni cocheras.

SÍ LO use el generador al aire libre, y lejos de  
ventanas o puertas abiertas, o entradas de aire.

### Vietnamese



The Vietnamese door hanger features a red background with a white circle at the top. Below the circle, the word "NGUY HIỂM" is written in large, bold, white letters on a red oval background. Underneath, the text "KHÍ ĐỘC - KHÍ ĐỘC - KHÍ ĐỘC" and "HIỂM HỌA CỦA KHÍ CARBON MONOXIDE" is printed in red and black. The main warning text reads: "Dùng một máy phát điện trong nhà SẼ GIẾT QUÝ VỊ TRONG VÀI PHÚT. Hơi thoát ra có khí độc carbon monoxide, quý vị không thể nhìn hoặc ngửi thấy." Below this, there are two circular icons with red slashes over them, showing a house with a generator inside. The text "KHÔNG BAO GIỜ dùng máy phát điện trong nhà, trong ga-ra hoặc nhà để xe." is printed below the icons. At the bottom, there is an icon of a generator with a double-headed arrow pointing to a house. The text "CHỈ dùng ngoài trời và tránh xa các cửa sổ, cửa lớn, và ống thông hơi." is printed below the icon.

**NGUY HIỂM**

KHÍ ĐỘC - KHÍ ĐỘC - KHÍ ĐỘC  
HIỂM HỌA CỦA KHÍ CARBON MONOXIDE

Dùng một máy phát điện trong nhà  
SẼ GIẾT QUÝ VỊ TRONG VÀI PHÚT.  
Hơi thoát ra có khí độc carbon monoxide,  
quý vị không thể nhìn hoặc ngửi thấy.

KHÔNG BAO GIỜ dùng máy phát điện  
trong nhà, trong ga-ra hoặc nhà để xe.

CHỈ dùng ngoài trời và tránh xa  
các cửa sổ, cửa lớn, và ống thông hơi.



# What does that weather warning mean?



Source: <http://www.thorntonweather.com/blog/colorado-weather/what-does-that-weather-warning-mean/>

# Communicating Winter Weather Information to the Public

- \* Risk communication
- \* Crisis communication
- \* Impact-based messaging
  - \* What can happen under specific conditions
  - \* Comparison to previous events
- \* Target specific populations!!!
  - \* Transient populations
  - \* Language issues
- \* Use channels people are familiar with

# Making Communication Effective

- \* Communicate winter weather health related information before, during and after the event
- \* Some regions more prepared than others
- \* Impacts less in areas more experienced with winter weather
- \* Know major weather information sources to use
- \* Who are your vulnerable populations?
- \* All about preparedness



# Preparedness

- \* When and where are people vulnerable?
- \* Who is vulnerable?
- \* Winter survival kits
- \* Preparing the home, the car
- \* Indoor safety/outdoor safety
- \* Knowing the impacts of cold weather on the body

# Watches and Warnings

- \* Is there a point where the public stops listening when overloaded with watches and warnings?
- \* Wind chill warning: Wind chill temps are life threatening
- \* Wind chill advisory: Wind chill temps are potentially hazardous

# False Alarms

- \* About one third of the population indicates they will not be as likely to take action with repeated false alarms
- \* False alarms not so clear with chill factors
- \* Some may perceive a false alarm depending on their exposure and/or location
- \* Health risks outweigh false alarms

# Conveying Uncertainty

- \* How should uncertainty in the forecast be conveyed to partners and the public?
  - \* Accuracy of forecasts
  - \* Understanding how winter weather is forecast and how it affects probabilities
- \* Convey this to partners and the public in different ways with tools such as <http://www.weather.com/encyclopedia/winter/forecast.html>

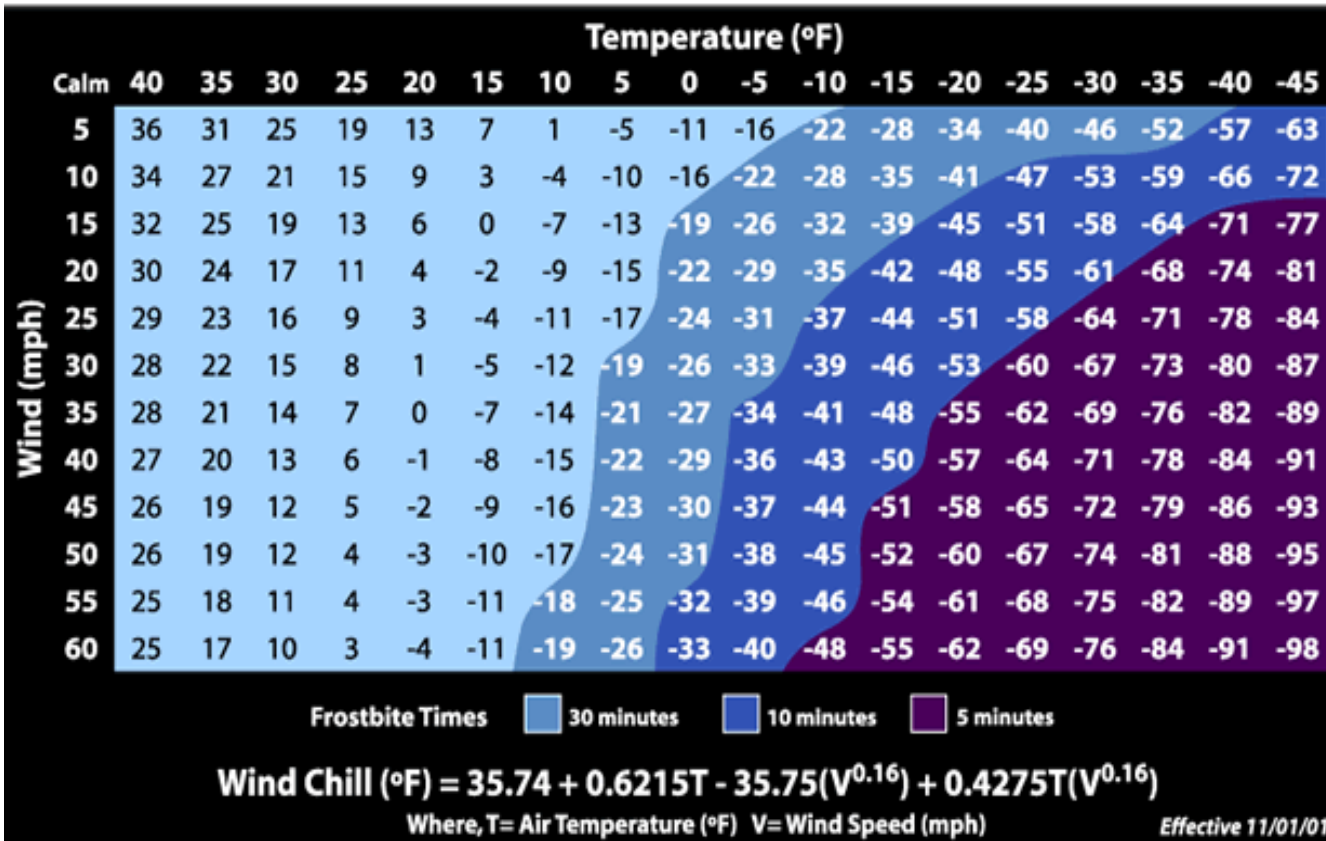
# Thresholds

- \* What are the wind chill value thresholds for impacts to the public?
- \* When is it unsafe for folks to be outside or children to be outside during recess?

# Wind Chill/Frostbite Chart



## NWS Windchill Chart



# Communicating Wind Chill Impacts

## WIND - CHILL CHART

		ACTUAL THERMOMETER READING F										
		50	40	30	20	10	0	-10	-20	-30	-40	-50
ESTIMATED WIND SPEED MPH	EQUIVALENT TEMPERATURE F											
	CALM	50	40	30	20	10	0	-10	-20	-30	-40	-50
	5	48	37	27	16	6	-5	-15	-26	-36	-47	-57
	10	40	28	16	4	-9	-21	-33	-46	-58	-70	-83
	15	36	22	9	-5	-18	-36	-45	-58	-72	-85	-99
	20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110
	25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118
	30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125
	35	27	11	-4	-20	-35	-49	-67	-83	-98	-113	-129
	40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132
		LITTLE DANGER FOR PROPERLY CLOTHED PERSON					INCREASING DANGER			GREAT DANGER		

Wind speeds greater  
then 40 MPH have  
little additional effect

DANGER FROM FREEZING  
OF EXPOSED FLESH



# Thresholds for Impacts to the Public

- \* Characteristics of your population
  - \* age extremes
  - \* at-risk activities
  - \* protective strategies in place – hats/mittens
- \* Remember some regions more prepared than others may experience less impacts
- \* Threshold for impacts might “depend”

# Conclusion

- \* Lots of resources available for conveying winter weather impacts – see next slide
- \* Important to determine your populations characteristics and their perceptions about winter weather
- \* Develop beforehand risk and crisis communication messages
- \* Important to use multiple means to getting the public's attention – TV, radio, apps, flyers, and community groups.
- \* Persistent challenge to have vulnerable people to understand their susceptibility

# Resources

- \* FEMA: Winter Storms and Extreme Cold  
<http://www.ready.gov/winter-weather>
- \* Extreme Cold: A Prevention Guide to Promote Your Personal Health and Safety  
<http://emergency.cdc.gov/disasters/winter/pdf/extreme-cold-guide.pdf>
- \* CDC Emergency Preparedness and Response  
<http://emergency.cdc.gov/disasters/winter/index.asp>

# Resources

- \* Winter Weather Preparedness  
<http://www.fairfaxcounty.gov/emergency/prepare/winter/>
- \* Winter Weather Preparedness Tips, Los Alamos County, New Mexico  
<http://www.losalamosnm.us/emo/Pages/WinterPreparednessTips.aspx>
- \* Winter Weather Preparedness, National Weather Service Weather Forecast Office, Jackson, MS  
[http://www.srh.noaa.gov/jan/?n=winter\\_wx\\_preparedness](http://www.srh.noaa.gov/jan/?n=winter_wx_preparedness)

# Resources

- \* Winter Weather Awareness Day, Nov. 10, 2013, National Weather Service Weather Forecast Office, St. Louis, MO <http://www.crh.noaa.gov/lxx/?n=winterday>
- \* What does that weather warning mean?, Thornton Weather <http://www.thorntonweather.com/blog/colorado-weather/what-does-that-weather-warning-mean/>