

# INJURY PREVENTION IN COLD CONDITIONS

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Which of these is not true?

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Which superpower would you most like to have?

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What is your level of understanding of this topic?

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# Statistics

- CDC found that too much cold has a worse effect on life than the heat has had
  - In 2015 800+ people died because of hypothermia. Less than 400 people died from hyperthermia
- Cold and winter weather-related accidents are common
- According to the U.S. Bureau of Labor Statistics (BLS), in 2017, there were over 20,000 occupational injuries related to ice, sleet and snow.



**20%** of reported on-the-job injuries are due to **slips, trips and falls.**



# Statistics



- Slips, trips and falls
  - 15% of accidental deaths
    - Second only to motor vehicle accidents
  - Leading cause of death in the construction industry
  - Increased likelihood in cold weather condition
  - Can also include bone fractures, contusions and bruises, severe abrasions and laceration
- According to a worker comp company, 25% of ice- and snow-related falls occur in parking lots
  - 20% of these result in lost time from work

# Factors

- Certain existing medical conditions
  - Raynaud's Disease
  - Anemia
  - Diabetes
  - Sickle cell disease
  - Hypotension
  - Atherosclerosis
- Medications
  - Benzodiazepines
  - Tricyclic antidepressants
  - Barbiturates
  - General anesthetics





# Factors

- Alcohol and nicotine
  - Creates a sense of warmth
  - May impairs sense of judgement
- Over- and under-activity
  - Vigorous exercise/activity induces sweating
  - Under-activity results in low heat production
- Dehydration
  - Inadequate fluid intake affects the body's ability to sustain physical activity
  - In cold environments sensitivity to thirst declines



A person wearing a bright red jacket and dark pants is running away from the camera on a snowy, muddy path. The path is marked with footprints and appears to be a mix of snow and ice. In the background, there is a wooden fence and a forested hillside under a cloudy sky. The overall scene is a winter outdoor setting.

**Vigorous exercise and  
activity induces sweating**

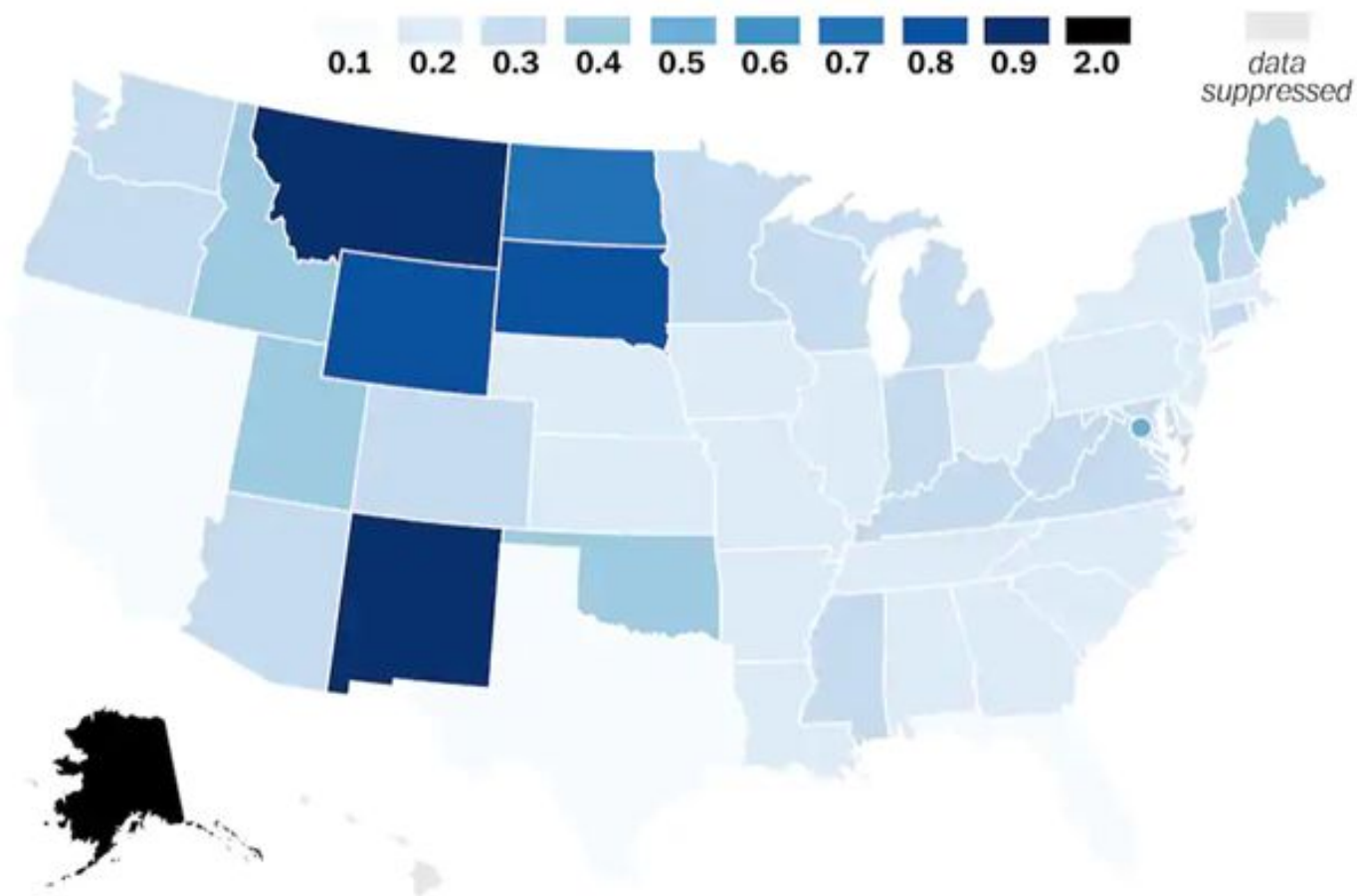
# Factors

- Inadequate nutrition
  - Underfeeding can cause low blood sugar
- Older people are much more likely to be affected heat or cold than younger individuals
- Many deaths attributable to cold happened on moderately cold days as opposed to extremely cold ones
- Weather related deaths are 2 to 7 times as high in low-income counties as in high-income counties



# Cold-related deaths, 1999 -- 2015

Age-adjusted cold-related death rate (per 100,000)



# What are Cold Weather Injuries?


- Cold weather injuries (CWIs) occur when there is an imbalance of body temperature regulation, or where heat loss is greater than heat production in an area of the body (or the body core)
- Having a CWI makes a person more susceptible to a future cold injury





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At what temperature can a cold weather condition occur?

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# Hypothermia

- A condition of abnormally low core body temperature (below 95°F)
- Occurs when cold conditions are severe, windy, clothing is wet or during periods of inactivity



# Hypothermia

- Severe stages
  - Stops shivering, desire to lie down/sleep, faint heartbeat and breathing, unconsciousness
- Treatment
  - Prevent further cold exposure, drink warm, sweet liquids if conscious, rewarm with body-to-body contact or in warmed sleeping bag





# Frostbite

- Freezing or crystallization of tissues
- Symptoms
  - Skin feels cold, stiff, or woody
  - Numbness, tingling or stinging sensation
- Treatment
  - Remove from cold and prevent further heat loss
  - Do not massage affected area or rub with snow



# Chilblains

- A condition that occurs in cold, wet conditions due to prolonged exposure of bare skin
- Symptoms:
  - Skin is initially pale & colorless
  - Becomes red, swollen, hot, itchy, & tender upon rewarming
  - Blistering occurs in severe cases
- Treatment
  - Wash, dry area gently
  - Rewarm with body heat



# Trench/Immersion Foot

- Results from prolonged exposure to water at temperatures below 50°F
- Symptoms
  - Skin initially appears wet, white and shriveled
  - Sensations of pins & needles, tingling, numbness, then pain



# Trench/Immersion Foot

- Treatment and Prevention
  - Clean and dry feet
  - Put on clean, dry socks daily
  - Treat the affected part by applying warm packs or soaking in warm water (102° to 110° F) for approximately 5 minutes



# Injuries Related to Cold Exposure

- Dehydration
- Sunburn
- Carbon monoxide poisoning
- Snow blindness
- Slips, trips and falls
- Repetitive stress injuries



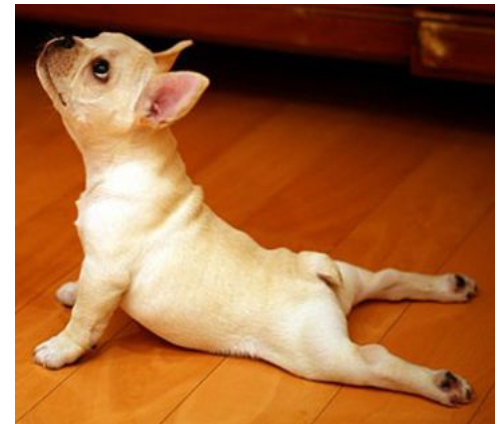
# How Does Cold Affect Our Body?

- Causes muscles to lose more heat and contract
- Joints get tighter, muscles can lose their range of motion and nerves can more easily be pinched
- Blood vessels and arteries to narrow
- Stretching a cold muscle can result in pulling or straining your muscles because they're tight



# Stretching Benefits


1. Reduces fatigue and increases blood supply and nutrients to joints and soft tissue
2. Increases muscle fiber elasticity
3. Increases joints synovial fluid allowing improved mobility and can increase a joint's range of motion
4. Decreases tightness on muscles and tendons
5. Improves muscular balance and posture
6. Reduction pain and disability
7. Improves self-worth





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Which one more rapidly decreases your body temperature?

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- Does not have specific standards for working in cold environments
- Under OSHA, employers have a duty to protect workers from hazards.
- Employers should take the lead on safety initiatives by establishing
  - Safety standards
  - Promoting a company culture of workplace safety
  - Provide training to prevent, identify and treat cold-related illnesses and injuries.

# Prevention

## Water Consumption

- 5-6 quarts per day
- Hot juice or soup
- Use an insulated water bottle or container to prevent liquids from freezing



# Prevention

## Food Consumption

- Caloric intake increases by 25-50%
- Calories needed
  - Moderate exertion: 4,500 calories per day
  - Extreme exertion: 8,000 calories per day
- Frequently snack throughout the day



# Prevention

## Slips, trips and falls

- Clear snow and ice from walking surfaces
- Put down ice melt as quickly as possible
- Monitor indoor floors for slippery surfaces
- For wet areas that can not be immediately addressed, post signage



# Snow Removal


- Use snow removal processes
- Have a competent individual inspect elevated surfaces
- Use the right equipment and PPE
- Provide proper training
- Supply fall protection if needed





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When walking on snow and ice, which animal/bird should you walk like?

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# Cold Weather Gear

- Wear footwear with traction and insulation
  - Take short, flat and wider steps (walk like a penguin)
- Hats, gloves and boots



# Cold Weather Gear

- Heating devices
  - Milwaukee
    - Heated jackets and gloves
  - Scheels
    - Heated stocking hat - ActionHeat
  - Disposable hand and foot warmers





# Clothing Specifics

- First one to two layers
  - Moisture wicking with thermal properties and insulation
- Middle layer
  - Designed to insulate
  - Flexible and loose enough to trap body heat
- Outer layer
  - Protection from the elements
  - Breathable and tough



# Brands

- Woolmark
- Patagonia
- Lululemon
- Duluth Trading Company



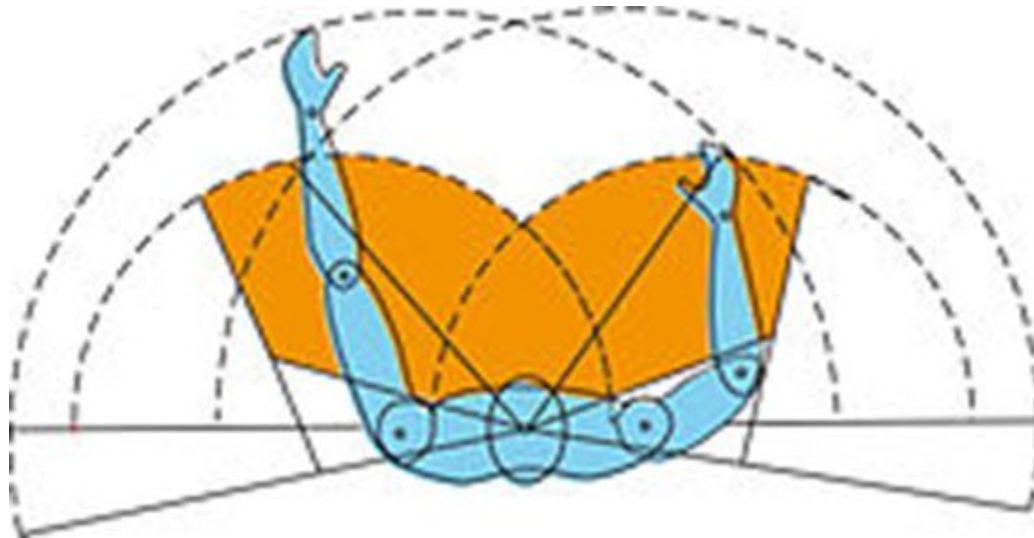
# What is Ergonomics?

- Ergonomics considers the match between the person, the equipment they use, the work processes and the work environment
- The goal is to improve the fit between the worker and the workplace in order to prevent musculoskeletal disorders
  - Chronic injuries to your muscular and skeletal system due to unsafe body mechanics and positioning or repetitive motions
- Healthier, happier and more productive

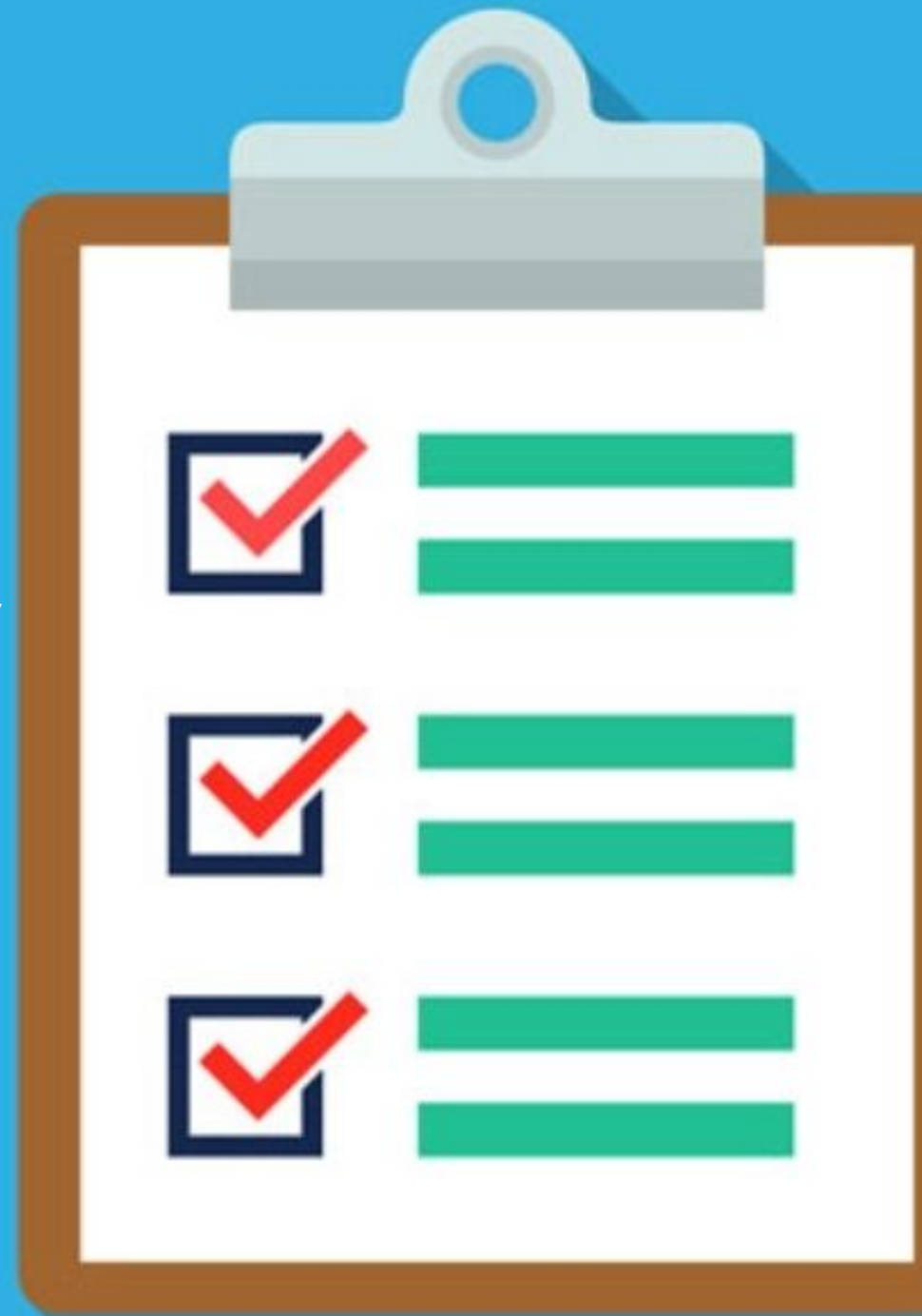


# Power Zone

- The area which your upper extremities should be placed a majority of the time while completing various tasks
- Bend your elbow at a 90 degree angle (an L shaped position of the arm) and you are in your primary power zone
- The more time you can work in your power zone the less stress and fatigue on your body is created
- Avoiding an extended reach (more than 12" from your body) is ideal




- Dress properly
- Drink plenty of fluids
- Eat right
- Stay in shape
- Get plenty of rest
- Minimize periods of inactivity
- Maintain a positive attitude
- Practice being in the Power Zone





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What is your key takeaway from today's session?

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Thank you



# References

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