Presenter’s Name

Presenter’s Command

Local Contact Information
Introduction

Prevention of cold injuries is a Command and Individual Responsibility

ALL COLD WEATHER INJURIES ARE PREVENTABLE!!!
Outline

• Susceptibility Factors
• Cold Weather Injuries
  – description
  – treatment
  – Prevention
• Cold Casualty Risk Management
• Conclusion
Susceptibility Factors

- Previous cold weather injury
- Inadequate nutrition
- Alcohol, nicotine use
- Dehydration
- Overactivity (sweating)
- Underactivity
- Long exposure to the cold

- Sick or injured
- Acclimatization
- Ethnic/geographic origin
- Wind, cold, rain
- Age
- Discipline and morale
- Physical stamina
- Inadequate training
- Poor clothing and equip
Typical Victim of a Cold Weather Injury

- Male
- E-4 or below
- Approximately 20 years old
- From a warm climate
- Less than 18 months time in service
- Uses tobacco, alcohol or medications
- Neglects proper foot care
Types of Cold Injuries

- Hypothermia
- Frostbite
- Chilblains
- Immersion/Trench Foot

- Dehydration
- Carbon Monoxide Poisoning
- Snow Blindness
- Sunburn
Hypothermia

• MEDICAL EMERGENCY; life threatening condition
• Severe body heat loss-body temp falls below 95°F
• Occurs when:
  – conditions are windy, clothing is wet, and/or the individual is inactive
  – extended water exposure or immersion
    • 1 hour or less when water temp is below 45°F
    • prolonged exposure in slightly cool water (e.g. 60°F)
    • thunderstorms, hail, rain and accompanying winds
Hypothermia

• Initial Symptoms
  – shivering
  – dizzy, drowsy
  – withdrawn behavior
  – irritability
  – confusion
  – slowed, slurred speech
  – altered vision
  – stumbling

• Severe Stages
  – stops shivering
  – desire to lie down and sleep
  – heartbeat and breathing is faint or undetectable
  – unconsciousness followed by DEATH

The “umbles”-stumbles, mumbles, fumbles, and grumbles
Hypothermia

• Treatment
  – prevent further cold exposure
  – evacuate immediately if severe hypothermia
  – remove wet clothing
  – rewarm in a warmed sleeping bag
  – warm, sweet liquids if conscious
  – minimize handling of the unconscious victim so as to not induce a heart attack.
Hypothermia

• Prevention
  – eat properly and often
  – warm liquids and water
  – wear uniform properly (layers worn loosely)
  – keep active
  – stay dry
  – warming tents
  – get plenty of rest
  – buddy watch/observation/NCO checks
### Cold Weather Injury Prevention

#### Signs and Symptoms of decreased body temperatures (Hypothermia)

<table>
<thead>
<tr>
<th>BODY TEMP</th>
<th>SYMPTOMS</th>
<th>OBSERVABLE IN OTHERS</th>
<th>FELT BY YOURSELF</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Early Stage)</td>
<td></td>
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</tr>
<tr>
<td>98.6 ⇒ 95.0</td>
<td>Intense and uncontrollable shivering; ability to perform complex tasks impaired</td>
<td>Slowing of pace. Intense shivering. Poor coordination.</td>
<td>Fatigue. Uncontrollable fits of shivering. Immobile, fumbling hands.</td>
</tr>
<tr>
<td>(Moderate Stage)</td>
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<tr>
<td>(Severe Stages)</td>
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<tr>
<td>91.4 ⇒ 87.8</td>
<td>Shivering decreases; replaced by muscular rigidity and erratic, jerky movements; thinking not clear but maintains posture.</td>
<td>Irrationality, incoherence. Memory lapses, amnesia. Hallucinations. Loss of contact with environment.</td>
<td>Disorientation. Decrease in shivering. Stiffening of muscles. Exhaustion, inability to get up after a rest.</td>
</tr>
<tr>
<td>87.8 ⇒ 85.2</td>
<td>Victim becomes irrational, loses contact with environment, drifts into stupor; muscular rigidity continues; pulse and respiration slowed.</td>
<td>Blueness of skin. Decreased heart and respiratory rate. Dilation of pupils. Weak or irregular pulse. Stupor.</td>
<td>Blueness of skin. Slow, irregular, or weak pulse. Drowsiness.</td>
</tr>
<tr>
<td>85.2 ⇒ 78.8</td>
<td>Unconsciousness; does not respond to spoken work; most reflexes cease to function; heartbeat becomes erratic.</td>
<td>Unconsciousness.</td>
<td></td>
</tr>
<tr>
<td>78.8 ↓</td>
<td>Failure of cardiac and respiratory control centers in brain; cardiac fibrillation; probable edema and hemorrhage in lungs; apparent death.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Frostbite

- Air temps below 32°F
  - skin freezes at 28°F
- Superficial frostbite (mild)
  - freezing of skin surface
- Deep frostbite (severe)
  - freezing of skin and flesh, may include bone
- Hands, fingers, feet, toes, ears, chin, nose, groin area
Frostbite

• Symptoms
  – initially redness in light skin or grayish in dark skin
  – tingling, stinging sensation
  – turns numb, yellowish, waxy or gray color
  – feels cold, stiff, woody
  – blisters may develop
Frostbite

1st Degree (Frost Nip)
- Partial freezing
- Stinging

2nd Degree
- Clear Blisters
- Numbness and Burning pain

3rd Degree
- Blue-gray discoloration
- Bleeding blisters

4th Degree
- Blue
- Deeply aching
Deep Frostbite
Frostbite

• Treatment
  – remove from cold and prevent further heat loss
  – remove constricting clothing and jewelry
  – rewarm affected area evenly with body heat until pain returns
    • when skin thaws it hurts!!
    • do not rewarm a frostbite injury if it could refreeze during evacuation or if victim must walk for medical treatment
  – do not massage affected parts or rub with snow
  – evacuate for medical treatment
Frostbite

• Prevention
  – wear uniform properly (layers and loosely)
  – keep socks and clothing dry (use poly pro/thermax liner socks and foot powder/ change insoles also)
  – protect yourself from wind
  – keep face and ears covered and dry
  – drink hot fluids and eat often
  – keep active
  – insulate yourself from the ground (sleeping pad/tree branches etc…)
  – “Buddy System”
  – caution skin contact with super-cooled metals or fuel
  – Use approved gloves to handle POL
  – seek medical aid for all suspected cases
Chilblains

• Nonfreezing cold injury
• Cold, wet conditions (between 32-60°F, high humidity)
• Repeated, prolonged exposure of bare skin
• Can develop in only a few hours
• Ears, nose, cheeks, hands and feet
Chilblains

• Symptoms:
  – initially pale and colorless
  – worsens to achy, prickly sensation then numbness
  – red, swollen, hot, itchy, tender skin upon rewarming
  – blistering in severe cases
Chilblains

• Treatment
  – prevent further exposure
  – wash, dry gently
  – rewarm (apply body heat)
  – don’t massage or rub
  – dry sterile dressing
  – seek medical aid
Chilblains

• Prevention
  – keep dry and warm
  – cover exposed skin
  – wear uniform properly
  – use the “Buddy System”
Trench/Immersion Foot

- Potentially crippling, nonfreezing injury (temps from 50°F-32°F)
- Prolonged exposure of skin to moisture (12 or more hours)
- High risk during wet weather, in wet areas, or sweat accumulated in boots or gloves
Trench/Immersion Foot

• Symptoms
  – initially appears wet, soggy, white, shriveled
  – sensations of pins and needles, tingling, numbness, and then pain
  – skin discoloration - red, bluish, or black
  – becomes cold, swollen, and waxy appearance
  – may develop blisters, open weeping or bleeding
  – in extreme cases, flesh dies
Trench/Immersion Foot
Trench/Immersion Foot

• Treatment
  – prevent further exposure
  – dry carefully
  – DO NOT break blisters, apply lotions, massage, expose to heat, or allow to walk on injury
  – rewarm by exposing to warm air
  – clean and wrap loosely
  – elevate feet to reduce swelling
  – evacuate for medical treatment
Trench/Immersion Foot

• Prevention
  – keep feet clean and dry
  – change socks at least every 8 hours or whenever wet and apply foot powder
  – bring extra boots to field - alternate boots from day to day to allow boots to dry.
  – no blousing bands
  – report all suspected cases to leadership
Dehydration

• A loss of body fluids to the point of slowing or preventing normal body functions
• Increases chance of becoming a cold weather casualty (especially hypothermia)
Dehydration

- Symptoms
  - dark urine
  - headache
  - dizziness, nausea
  - weakness
  - dry mouth, tongue, throat, lips
  - lack of appetite
  - stomach cramps or vomiting

- irritability
- decreased amount of urine being produced
- mental sluggishness
- increased or rapid heartbeat
- lethargic
- unconsciousness
Dehydration

• Treatment
  – drink WATER or other warm liquids
  – water should be sipped, not gulped
  – do not eat snow
  – Rest
  – get medical treatment
Dehydration

• Prevention
  – drink minimum of 3 canteens of water daily for inactivity and 5-6 quarts for activity
  – monitor urine color
  – do not wait until you are thirsty
  – drink hot liquids for warmth
Carbon Monoxide Poisoning

• When oxygen in the body is replaced by carbon monoxide
  – colorless, odorless, tasteless gas resulting from incomplete combustion

• Inadequate ventilation from engines, stoves, heaters
Carbon Monoxide Poisoning

- Symptoms
  - headache
  - dizziness
  - weakness
  - excessive yawning
  - ringing in ears
  - confusion
  - nausea
  - bright red lips, eyelids
  - grayish tint in dark-skinned people
  - drowsiness
  - unconsciousness
  - possibly death
Carbon Monoxide Poisoning

• Treatment
  – move to fresh air immediately
  – seek medical aid promptly
  – provide mouth-to-mouth resuscitation if victim is not breathing
Carbon Monoxide Poisoning

• Prevention
  – ensure proper ventilation
  – don’t use unvented heaters or engines
  – ensure heaters are regularly serviced
  – turn heaters off when not needed (during sleep)
  – if heater kept on during sleep, post a fire guard
  – never sleep in vehicle with engine running
  – never wrap poncho around vehicle exhaust to collect heat
Snow Blindness

- Inflammation and sensitivity of the eyes caused by ultraviolet rays of the sun reflected by the snow or ice
- Symptoms
  - gritty feeling in eyes
  - redness and tearing
  - eye movement will cause pain
  - headache
Snow Blindness

• Treatment
  – remove from sunlight
  – blindfold both eyes or cover with cool, wet bandages
  – seek medical attention
  – recovery may take 2-3 days

• Prevention
  – eye protection
    • dark, UV protective glasses
    • field expedient-cut narrow slits in MRE cardboard and tie around head
  – do not wait for discomfort to begin
Winter Sunburn

- Burning of the skin due to overexposure to the sun and UV light
- Contributing factors – fair skin, light hair – exposed skin – reflective qualities of the snow – high altitudes

- Symptoms
  - redness of skin, slight swelling (1st deg)
  - prolonged exposure (2nd deg)
    - pain and blistering
    - chills, fever, headache
Winter Sunburn

• Treatment
  – soothing skin creams in mild cases
  – in severe cases, seek medical attention
  – ibuprofen for pain

• Prevention
  – cover exposed skin with clothing
  – sunscreen, lip balm
  – limit exposure of skin to the environment
PREVENTING COLD CASUALTIES

- Prior planning and adequate training

- Cold injuries include:
  - Nonfreezing injuries (trench/immersion foot)
  - Freezing injuries (frostbite)
  - Hypothermia

- Cluster of cold casualties increases risk for more

- 5 steps of cold casualty risk management:
  - Identify Hazards
  - Assess Hazards
  - Develop Controls
  - Implement Controls
  - Supervise and Evaluate

Immersion Foot (mild)
STEP 1: IDENTIFY HAZARDS

➢ To keep warm, remember the acronym C-O-L-D

  C - Cleanliness and Care
  O - Overheating
  L - Layers and Looseness
  D - Dry

➢ The following are cold injury hazards:

  • Cold (temperature 40°F or below)
  • Wet (rain, snow, ice, humidity or wet clothes)
  • Wind (5 mph or greater)
  • Lack of adequate shelter/clothes
  • Lack of water or provisions
STEP 1: IDENTIFY HAZARDS con’t

The following factors combine to place Soldiers at higher risk for cold injury:

- Previous day cold casualties
- Hunger
- Low activity
- Fatigue/sleep deprivation
- Lack of cold weather experience
- Dehydration or Poor hydration
- Illness or injury/wounds
- Medications
- Prior history of cold injury
- Overly motivated Soldiers
- Tobacco/alcohol within last 24 hrs.
**STEP 1: IDENTIFY HAZARDS con’t**

**Prototype Risk Management Worksheet**

<table>
<thead>
<tr>
<th>A. Mission or Task:</th>
<th>B. Date/Time Group:</th>
<th>C. Date Prepared:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Train the Army’s soldiers</strong></td>
<td><strong>1 Oct 03 - 31 Mar 04</strong></td>
<td><strong>9-Dec-03</strong></td>
</tr>
<tr>
<td>D. Prepared By:</td>
<td><strong>Command Surgeon’s Office, USATRADOC</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E. Task</th>
<th>F. Identify Hazards</th>
<th>G. Assess Hazards</th>
<th>H. Develop Controls</th>
<th>I. Determine Residual Risk</th>
<th>J. Implement Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent cold injuries, hypothermia, and carbon monoxide poisoning</td>
<td>Cold (40° F or less)</td>
<td>(M)</td>
<td>Ensure that soldiers have serviceable, properly-fitted clothing, especially footgear, headwear, and handwear; ensure clothing is kept Clean; that soldiers avoid Overheating; that clothing is worn Loosely and in layers; and that clothing is kept Dry. Ensure soldiers use lip balm and sunscreen</td>
<td>(L)</td>
<td>Review local standing operating procedures (SOP) regularly Review local risk management worksheets regularly and accept risk at the appropriate level Maintain the buddy system Post stove watch in tents; ensure sleeping areas are well-ventilated Do not permit sleeping in or near running vehicles</td>
</tr>
<tr>
<td>Wet environment or wet clothes</td>
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<td>Provide sheltered transporation and warming areas</td>
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<tr>
<td>Wind (5 mph or more)</td>
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<td>Enforce regular meal consumption, water and fluid intake, rest periods, physical activity, and change of clothes</td>
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<tr>
<td>Lack of adequate shelter/clothing</td>
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<td>Watch soldiers with minor illnesses and/or taking medications; utilize the buddy system</td>
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<tr>
<td>Lack of provisions/water</td>
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<tr>
<td>Host factors (prior cold injury; skipping meals; low activity; fatigue; sleep loss; lack of experience; dehydration; minor illness; medications; mission-focused)</td>
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</tbody>
</table>

K. Determine overall mission/task risk level after controls are implemented (circle one)

- **LOW (L)**
- MODERATE (M)
- HIGH (H)
- EXTREMELY HIGH (E)
STEP 2: ASSESS HAZARDS

- Recognize conditions that influence risk of cold injury:
  - Temperature
  - Wind
  - Humidity
  - Ground conditions

- Wind Chill Chart

- Movement or lack of it

**New Wind Chill Chart**

<table>
<thead>
<tr>
<th>Temperature (°F)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
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<tr>
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<td>34</td>
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</tr>
</tbody>
</table>

Frostbite occurs in 15 minutes or less

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

Where, T = Air Temperature (°F)
V = Wind Speed (mph)
# Cold Weather Injury Prevention

## STEP 2: ASSESS HAZARDS

### Recommended Uniform and Work Modifications

<table>
<thead>
<tr>
<th>Work Intensity</th>
<th>Little Danger (+40)</th>
<th>Increased Danger (-20)</th>
<th>Great Danger (-65)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High</strong></td>
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</tr>
<tr>
<td>Digging foxhole, running, marching with rucksack, making or breaking bivouac</td>
<td></td>
<td></td>
<td>Postpone non-essential training; essential tasks only with less than 15 min exposure; work groups of no less than 2; cover all exposed skin</td>
</tr>
<tr>
<td><strong>Low</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Walking, marching without rucksack, drill and ceremony</td>
<td></td>
<td></td>
<td>Cancel outdoor training</td>
</tr>
<tr>
<td><strong>Sedentary</strong></td>
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<tr>
<td>Sentry duty, eating, resting, sleeping, clerical work</td>
<td></td>
<td></td>
<td>Cancel outdoor training</td>
</tr>
</tbody>
</table>

**Increased surveillance by unit leaders**

- Cover exposed skin
- Vapor barrier boots
- Facial camouflage
- Polypropylene underwear (worn next to skin), field jacket liner, and field jacket for temperatures +40 to -20

**Mandatory**

- Extended cold weather clothing system or equivalent; cover exposed skin
- Restricted non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks
- Postpone non-essential training; 15-20 minute work cycles for essential tasks; work groups of no less than 2 personnel; no exposed skin

**Optional**

- Provide warming facilities

**Recommended Uniform and Work Modifications**

- Extended cold weather clothing system or equivalent; cover exposed skin
- Restrict non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks
- Postpone non-essential training; 15-20 minute work cycles for essential tasks; work groups of no less than 2 personnel; no exposed skin

- Provide warming facilities

**Training Today’s Leaders for Tomorrow’s Army**
STEP 3: DEVELOP CONTROLS

- Train all leaders and all Soldiers every year
- Properly fitting cold weather clothing and footgear
- Insulation (layering); adjustments for activity and environment
- Don’t allow wear of Gortex during physical activity
- Every Soldier wears gloves
- Lip balm/ChapStick
- Gloves approved for handling POL, when applicable
- Integrate controls into SOP
STEP 4: IMPLEMENT CONTROLS

- Battle buddies are the first-line of defense

- Leadership controls:
  - Uniform checks
  - Limit activities in extreme cold
  - Covered troop transport
  - Warming tents
  - Hot food & drink

- Facility controls:
  - Army approved heaters
  - Properly train fire guards
  - Heating equipment is properly maintained
  - Inspect shelters for maximum cold protection and structural safety

Battle of the Bulge, Jan 1945
## STEP 4: IMPLEMENT CONTROLS

Cold Weather Clothing -- Physical Fitness Uniform

<table>
<thead>
<tr>
<th>Wind chill</th>
<th>T-shirt and trunks</th>
<th>Add jacket</th>
<th>Add pants, cap, and gloves</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 60° F:</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between 50°-60°F:</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Less than 50°F:</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
Leaders should repeatedly ask the following questions concerning the risk for Cold Injury when planning and executing training in cold weather:

- Do Soldiers have adequate shelter/clothing?
- Have Soldiers eaten warm meals?
- Are Soldiers in contact with bare metal or POL?
- Are Soldiers in contact with wet ground?
- Are Soldiers in wet clothes?
- Can Soldiers move about to keep warm?
- Do Soldiers have dry and warm feet?
- Are battle buddy teams being maintained?

Valley Forge, DEC 1777
STEP 5: SUPERVISE AND EVALUATE

- Leaders take personal responsibility
- Set and enforce the standard
- Monitor implementation of controls
- **SPOT CHECK, SPOT CHECK, SPOT CHECK!** (ears, nose, hands, feet)

- Record, report, and monitor risk:
  - Increase of cold injury casualties
  - Increased complaints/comments about cold
  - Shivering, stomping, jumping-jacks
  - Signs or symptoms of frostbite
Conclusion

• Dress properly
• Drink plenty of fluids
• Eat right
• Keep in shape
• Get plenty of rest
• Minimize periods of inactivity
• Maintain a positive attitude
• Implement Cold Casualty Risk Management
QUESTIONS, COMMENTS, or CONCERNS?