Overview

Accidental hypothermia consists of an uncontrolled lowering of the body temperature below 95°F (35°C) by cold exposure.

Hypothermia can result in severe injury and even death. Populations exposed to frigid T° (especially when they are wet) and fire fighters performing rescues during the winter months are at high risk.

It is important to recognize that cold exposure is magnified by wind and skin moisture.

The effects of cold on the body are the same for exposure to zero degrees F with a two-mile per hour wind as they are with exposure to 20° F with a 40-mile per hour wind. Moisture or any wetness of the body/skin will increase the rate of heat loss by 100 times faster.

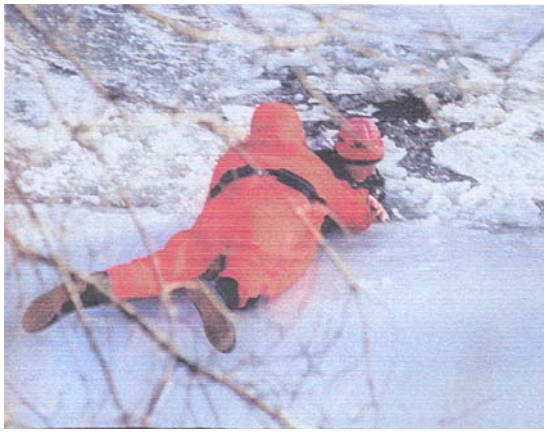
Hypothermia can occur in cold water in seconds compared to minutes or hours with cold air.

When the body core temperature drops below 89° F (32° C) pulse and respiration will be difficult to detect. Consequently, a patient may appear dead and not be dead.

Urban Hypothermia

Elderly are particularly prone to hypothermia in cold air

Immersion Hypothermia



Hypothermia in cold water can occur in seconds

Environmental Classifications:	Risk Factors for Hypothermia:
Immersion Hypothermia results from immersion in cold water. A similar hypothermia can be due to exposure to cold rain. **Field Hypothermia** occurs in previously healthy individuals such as drivers, skiers, and hikers and may accompany injuries occurring outdoors in cold weather. **Urban Hypothermia** occurs in individuals with a physical predisposition, disability or illness, also infants and the elderly with thin skin	• Thin skin (due to youth or advanced age) • Exposure to a cold environment for a prolonged period of time • Wet skin in modest cold • Cool water exposure (heat loss is 100 times faster if skin is wet) • Alcohol or drug use (rate of heat loss increases and protective shivering decreasing • An expected, prolonged exposure to cold (relative to protective clothing used)

High risk situation for Field Hypothermia

Management of Field Hypothermia

Clinical Classification

Mild Hypothermia is defined as a body temperature between 90-95°F or 32-35°C.

Characteristics

- Shivering
- Anxiety
- Blood pressure normal to high
- Respiratory rate is increased
- Skin cool
- Appearance overall may be normal

Moderate Hypothermia is defined as a body temperature between 86-90°F or 30-32°C

Characteristics

- Shivering (but may be depressed)
- Somnolent, disoriented
- Blood pressure may be normal
- Breathing rate is slower than normal
- Appearance is pale to gray

Severe Hypothermia is a body temperature below 86°F or 30°C

Characteristics

- Unconsciousness
- Slow pulse, often less than 10 bpm or non-palpable
- Low or often no obtainable blood pressure
- Breathing may appear absent
- Appearance is gray to cyanotic
- Skin is very cold, mottled

Note: A normal thermometer does not read temperatures 90°F or 32°C

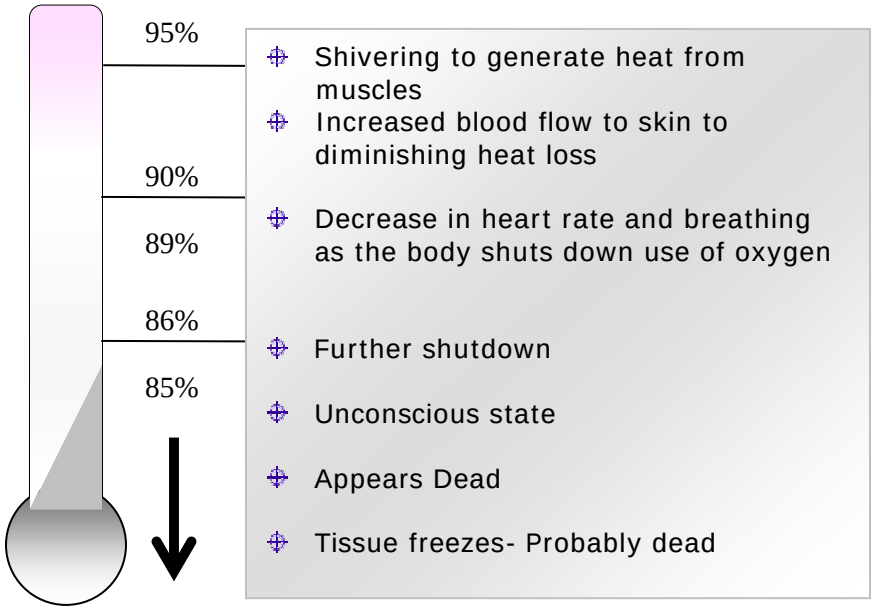
Fatal Hypothermia

Characteristics

- *With severe hypothermia, it is difficult to determine death*
- Patients should not be pronounced dead until they are re-warmed. The exception would be a pre-existing fatal event.

Alcohol, sedatives, pain medicine, illegal drugs; all accelerate the degree of heat loss, and an earlier death

Response to Hypothermia	Sources of Heat Loss
The initial body response to dropping temperature is to produce more heat by shivering. If that fails to raise body temperature, the body responds by slowing the heart rate, decreasing respiration and diminishing brain function. The decrease in oxygen levels eventually leads to an unconscious state. As body temperature continues to fall, tissue damage from freezing occurs and the heart eventually stops and death results.	◆ Conduction (heat loss is directly proportional to difference T° between body and outside environment) ◆ Convection: (heat loss is affected by strength of wind removing heat) ◆ Contact: (rate of heat loss is magnified by T° of contact surface eg. water, ice) ◆ Respiration: (heat loss is directly proportional to difference between inside body T° and outside air T°



Initial Injury Management

The most critical phase of treatment is the first 30 minutes following rescue. It is imperative that measures are initiated to avoid post-rescue collapse.

- Initiate necessary life support measures
- Remove wet garments
- Use blankets and insulating equipment to protect against heat loss and wind chill
- Position patient horizontally to protect against shock
- Avoid any rough handling or excess movement of the patient
  - *the cold heart is very irritable and any jolting could initiate a cardiac arrest*
- Minimize patient muscle activity to prevent a further drop in body T° due to cold blood circulation
- Monitor core temperature using Low-range thermometer
- Monitor cardiac rhythm

Passive Re-warming

Passive re-warming is initiated in all patients to avoid any further heat loss. This process is initiated in the field and is effective for temperature above 92°F or 34°C.

- Remove patient from the cold environment
- Keep the patient dry
- Replace wet clothing
- Apply external heat to both sides of the patient using whatever heat is available, (this can include the body heat of the rescuers)
- Keep patient in a warm environment
- Monitor core temperature, respiration and pulse rates
- Transport the patient
- Provide warm humidified air

Active Re-warming

Active re-warming needs to be initiated for along with passive re-warming procedures in patients with body temperatures at or below 92°F or 32°C

- Begin patient on warmed IV fluids
- Provide heated (102°F -105°F) inhaled air
- Immerse in warm water
- In extreme cases, initiate heart/ lung bypass re-warming

Prognosis

- Survival can be expected in 50% of patients whose core T° drops below 90° F, when optimal treatment is provided
- Co-existing disease (especially in the elderly) increases death rate
- Survival is not closely connected with the lowest absolute T°

Prevention Measures

- Heat loss though conduction and convection can be minimized through the use of insulation and windproof materials
- Clothing should be worn in layers to trap several layers of still-air that has been warmed by body heat
- The fabrics that provide the best protection from cold exposure are wool with polyester followed by acrylic and synthetic fabrics. These fabrics are worn typically as the inner-most two or three layers
- Outer layers should be of “lofting” materials, such as polyester and nylon pile and fleece
- The outermost layer should be windproof and water-resistance fabric
- Avoid prolonged contact with cold surfaces such as ice, snow cold metal surfaces etc.
- Removed wet clothing immediately

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Acknowledgement to: Katherine Latson, for artwork and design