FIRST AID RESPONSE / Cold Weather Survival

- The Arctic - challenges
- 7 steps for First Aid Response
- Cold Related Injuries
- Cold Weather Survival
- Emergency Equipment
- Outdoor Accidents and Injuries
«The Arctic problem»

- Distance
- Weather
- Communication
- Infrastructure
Before going into the field

- The Buddy System
- Self rescue
- Rescue others
Seven steps for first aid response

1. Take charge of the situation
2. Approach the patient safely
3. Preform emergency rescue and urgent first aid
4. Protect the patient
5. Check for other injuries
6. Plan what to do
7. Carry out the plan

This steps guides you in dealing with all injuries or accidents, but use common sense.
Step 1 - Take charge of the situation

Objective:
control – response - time

• You need a leader
• Initial assessment
• Organize required activities
• Be a good follower
Step 1 - Take charge of the situation

- Avoid panic!
- Proper emergency response:

**STOP**

S   – Stop  
T   – Think 
O   – Observe 
P   – Plan
Step 2 - Approach the patient safely

Objective:
Avoid further injury – keep party members safe

- Approach – rapid and safe
- Other risk – threatening the rescuers or patient?
- Do not be a victim yourself!
Step 2

• “Stay and play”

or

• “Load and go”
Step 3 - Perform emergency rescue and urgent first aid

Objective:
#1 treat conditions that can cause loss of life within a few minutes

- Area of high risk? – move to safe location
- Check; airway, breathing, or serious bleeding – focus on these immediate threats of life
Step 3

The rule of 3’s

Humans can survive:

• 3 minutes without air
• 3 hours without heat
• 3 days without water
• 3 weeks without food
Step 3 – questions to ask

You need information from the scene / patient
Ask this questions:
1. Does the patient require emergency rescue?
2. Is the patient responsive?
3. Does the patient consent to your help?
4. Is the patient having life-threatening difficulty with breathing?
5. Does the patient have serious bleeding?
Step 4 - Protect the patient

Objective:
Reduce physical and emotional demands

• The patient will need protection from the elements
• Reduce exposure to cold
  - If you have a tent: use it!
Step 4 - Protect the patient

- Prevent further injury
  - DO NOT MOVE the patient
  - avoid stepping on the patient
  - keep equipment away from the patient
  - walk around, NOT OVER, the patient

- Reduce unnecessary fear and worry
  - Remain calm
  - one person communicate with the patient
  - show concern for the individual
Step 5 - Check for other injuries

Objective: Identify all injuries – major and minor

• First: Life-threatening emergencies. Identify and control

• Then examine carefully the patient in more detail
Step 6 - Plan what to do

Objective:
The situation need cool analysis and development of a plan of action.

After maximum treatment is provided:

• Evaluate:
  - Patient’s injuries
  - Party size and physical conditions
  - Terrain and weather
  - Location – outside assistance
Step 7 - Carry out the plan

Objective:
Follow up treatment of patient and ensure the safety and well-being of the party members

• Your plan:
  - self-evacuation
  - outside assistance
  - change in patient’s condition?
  - change in terrain and weather?
  -> altering plan of action
Summary: First Aid response

Your success depend on:

• You have a plan, you know how to act on the scene
• Speed in combination with safety
• Leadership
• Communication
• Disposal of resources
• Qualified rescuers
• Necessary equipment
• First Aid
• Continuous monitoring and assessment of the situation / scene
• COLD WEATHER INJURIES
• COLD WEATHER SURVIVAL
• EXAMPLES FROM ACCIDENTS
«The Arctic problem»

- Cold environment: *Dressed for one kind of activity- injuries means being pacified, producing less energy/heat, being hypothermic.*
- Long transportation time.
- Limited communication.
COLD ENVIRONMENT

• Avoid further heat loss – protect against the elements (if necessary use your own clothing)

• Place insulation over and under the patient (WRAP)
Cold weather injuries

- Factors
- Local frostbite
- Hypothermia
- Treatment in the field
Cold weather injuries

Cold tolerance will be influenced by:

- Individual factors
- External factors
- Disease and injuries

Exposed area in general:

- White spots, normally not dangerous.
- Cheek and chin
- Nose
- Ears
- Fingers
- Toes and feet
# Wind Chill Chart

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**Legend:**
- Blue: +10°F (about -23°C)
- Green: +20°F (about -29°C)
- Yellow: +30°F (about -35°C)
- Orange: +40°F (about -38°C)
- Red: +50°F (about -40°C)

**Celsius to Fahrenheit Conversion:***
- °C * 9/5 + 32 = °F
Frostbite

• Superficial
  - pin-feeling, pain
  - pale, wax-like skin
  - movable skin

• Deep
  - numb, feeling-less skin
  - white, cold, hard skin
  - sometimes blisters
3 Stages of Frostbite

- **Stage 1 – Frostnip**
  - pins-and-needles sensation
  - skin turns very white and soft
- **Stage 2 - Superficial frostbite**
  - May show blistering
  - Skin is numb, waxy, and frozen
  - Ice crystal form in the skin
- **Stage 3 – Deep Frostbite**
  - Freezing of blood vessels, muscles, tendons, nerves, and bone.
  - Can lead to permanent damage, blood clots, gangrene
  - No feeling in the affected area
  - Usually no blistering
  - Serious infection and loss of limb is frequent
  - Medical attention is needed as soon as possible
Frostbite – after 2 days
Frostbite – after 14 days
Cold weather injuries

- Clothing must be adapted to the activity
- Use the Buddy system
- In windy conditions, cover bare skin and avoid working with bare hands.
- Everything takes more time in cold climate, be sure that it has been given enough time for the operations to succeed

INJURIES RELATED TO COLD ENVIRONMENTS IS DUE TO A LEADERSHIP PROBLEM, NOT A MEDICAL PROBLEM.
Local treatment

• Differ between non-freezing / superficial and deep frostbite
• Keep the patient warm
• Protect against the elements
• Avoid further heat loss by covering and clothing
• Heating the surface slowly – ex. Fingers in the armpit
Treatment frostbite
Djup kylskada omedelbart efter upptining

Djup kylskada dagen efter upptining

Djup kylskada efter ca 2 veckor

Läkt djup kylskada
BODY HEAT LOSS – “HYPOOTHERMIA”

WIND AND WETNESS
TAKE AWAY BODY HEAT FASTER
THAN IT CAN BE PRODUCED.
Body heat loss

• **Evaporation** – fluid changes into a gas (e.g. sweating, during breathing)
• **Conduction** – transfer of heat by direct contact (e.g. sitting on the snow, handling equipment)
• **Radiation** – heat loss from uncovered surfaces on the body (e.g. head, neck area)
• **Convection** – cooling by air or water in contact with the skin (e.g. wind chill effect)
Hypothermia

MILD HYPOTHERMIA (35-32 °C)
• pale, cold skin
• shivering
• ”clumsy”
• awake, but sometimes tired
• quick pulse and breathing
Hypothermia

MODERATE HYPOTHERMIA (32-30 °C)
• reduced consciousness
• no shivering
• paradox heat-feeling, may undress!
• muscle-stiffness
• decreasing pulse and breathing rate
Hypothermia

SERIOUS HYPOTHERMIA (<30 °C)
• unconscious
• very low pulse and breathing rate
• may appear dead
• muscle stiffness down to 27 °C, below 27 more relaxed
Prevention of hypothermia

• Appropriate clothing for the arctic environment
• Avoid dehydration and exhaustion
• Act the safest possible way
• Take care of yourself and the others “The Buddy system”
Treatment Hypothermia

In the field focus on this:

• Awake – shivering
• Reduced consciousness – no shivering
Treatment Hypothermia

- Protect against wind and humidity
- Remove wet clothes
- Avoid further heat loss - WRAP
- Treat very carefully! (”rotten egg”)
Treatment Hypothermia conscious patient

- Warm, sweet drink
- Sleeping bag with other person - WRAP
- Warm bottles/heat packs in arm pits, groins, stomach and neck
- Observe closely, especially heart rhythm
TREATMENT HYPOTHERMIA
unconscious patients

- Treat other injuries
- Observe
- CPR (long time!!) if necessary
- Defibrillation when >28 °C

- NB! Dead means warm and dead (>32 °C)
WRAP – Hibler’s method

vapor barrier – insulation – windproof barrier
Cold Weather Survival

- Priorities in a survival situation? Video
- You need equipment and supplies that can help you await rescue:
  - Fire
  - Shelter
  - Signals
  - Water
  - Food
Cold Weather Survival

• Basic gear in your pockets, bulky gear in backpack, snowmobile, sledge
• The items should be small, reliable, easily accessible, simple to use and idiot proof
Cold Weather Survival

• 1st line, 2nd line, 3rd line

• Distribution of equipment in the group?

16.4.2014:
En belgisk turguide falt onsdag ned i en bresprekk ved Conwayjøkulen ved Sentralisen, nord for Billefjorden. Hovedredningssentralen fikk melding om ulykken ved at en nødpeilesender ble utløst like før klokken 14.
Cold Weather Survival

• Common mistakes:
  • leaving it behind (camp, rest spot..)
  • fall into water, down slopes, blowing away
  • stored on snowmobile lost in an accident
Emergency Equipment
First Aid kit

UNIS - basic first aid kit:

- Elastic bandage; 2
- Conforming gauze roll; 2
- Pressure dressing; 1
- Gauze dressing, sterile; 2 10x10 & 2 5x5
- Band-Aid
- Bacimycin
- Gloves; 3 pair, Nitrile
- Tape; 1
- Pain killers; Ibuprofen and paracetamol
- Safety pins; 5
- EMT Shears; 1
- Tweezers; 1
- Sam-splint; 1
- Triangle fold; 2
- CPR Face Shield; 1
- Sponges
- NaCl; 4 ampules
- WaterJel; burn dressing
- Glad pack (plastic film); 1

For longer trips add more!
Emergency shelter

- Mandatory safety equipment: summer and winter

- Your personal tent, poncho, sleeping bag, ......many ways of use!

Photo: www.jerven.no
Where to find information

UNIS

Weather stations

Facebook

Visit Norway

Norwegian Meteorological Institute
Outdoor Accidents and Injuries
- Worst case examples
Snowmobile – Accidents and injuries
Injuries - snowmobile

• Fractures, back and neck
• Trauma, head
• Wounds / bleeding
• Hypothermia

• First Aid response – how?
Glaciers – Accidents and injuries
Glaciers – Accidents and injuries

- 7. January 2015, Hansbreen - Hornsund
- Drop 25 m
- Body core temp. 34.9 °C (2.5 hrs)
Glaciers – Accidents and injuries

- 4. April 2014
- Group of 9 UNIS students on a private trip to Nordenskiold fjellet
- Video; rescue
- Map
Glaciers – Accidents and injuries

Glacier risk areas by Longyearbyen

- Crevasse area
- Melt water hole
- Melt water channel
Injuries – Glacier /crevasses

• Fractures
• Trauma, head
• Wounds / bleeding
• Hypothermia

• First Aid response – how?
Avalanches – Accidents and injuries
• 2007 to 2010
• 191 avalanches

Map: M. Eckerstorfer/H. Christiansen, UNIS
Avalanches – Accidents and injuries

• Map

Possible release area for avalanches
Injuries - avalanche

- DEATH
  - Suffocation
  - Trauma
- Trauma / wounds
- Hypothermia

First Aid response – how?

If recovered within 15 minutes, chances of survival are almost 92%.

At 35 minutes, survival rate drops to 37%.

After that, the success rate is extremely low.
Sea ice – Accidents and injuries
Sea ice

“One minute – Ten minute – One hour”

• One minute to get breathing control
• Ten minute of meaningful movement
• (Less than) One hour before becoming unconscious due to hypothermia
Injuries – Sea ice

• DEATH
  - drowning
  - hypothermia

• Wounds / bleeding

• Hypothermia

• First Aid response – how?
Polar bear
– Accidents and injuries
Det av fangsthytta i Hytten vi med den døde bjørnen. Tatt idet Sysselmannens helikopter går inn for landing. Ekteparet Sjø Frantzen står og ventar på ankomsten. FOTO: Arild Lynsørd/Sysselmannen
Sysselmannen har kartlagt isbjørnens vandring gjennom Longyearbyen. FOTO: Sysselmannen (kart)
Injuries – polar bear

• Trauma to head, neck
• Wounds / bleeding
• Fractures
• Hypothermia

• First Aid response – how?
Firearms
– Accidents and injuries
Injuries – Firearms

• Wounds / bleeding
• Eye injury, objects in the eye
• Hypothermia

• First Aid response – how?
Camp – Accidents and injuries
Injuries – camp

• Burns
• Wounds / bleeding
• Carbon monoxide poisoning
• Hypothermia

• First Aid response – how?
Reference:

- *Mountaineering First Aid*, Jan D. Carline, Martha J. Lentz, Steven C. Macdonald
- *Førstehjelp på tur*, Lena Fauske, Øyvind S. Bruland
End of lecture