

OCCUPATIONAL PHYSICAL HAZARDS

Heat & Cold

By: Gh. Pouryaghoub. MD

Center for Research on Occupational Diseases (CROD)

Tehran University of Medical Sciences (TUMS)

OCCUPATIONAL HAZARDS

- CHEMICAL
- PHYSICAL
- PSYCHOLOGICAL
- BIOLOGICAL
- ERGONOMIC

OCCUPATIONAL PHYSICAL HAZARDS

- NOISE
- HEAT
- COLD
- IONIZING RADIATION
- NONIONIZING RADIATION
- VIBRATION
- LOW & HIGH PRESSURE

Occupational exposure to heat

Outdoor

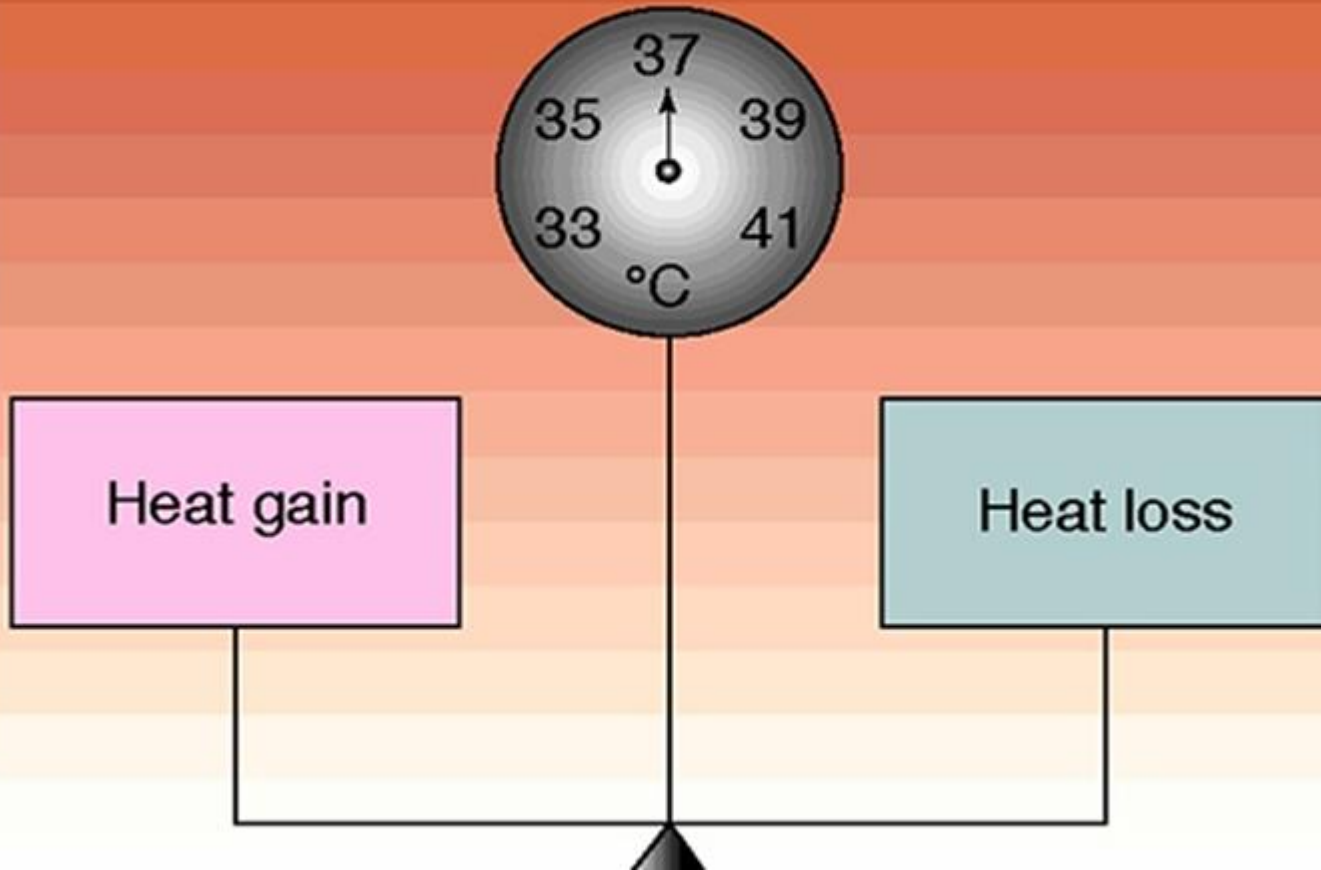
- Farmers
- Military personnel
- Fishers
- Construction workers
- Open surface mining

Indoor

- Foundry workers
- Steel workers
- Oven/Furnace workers
- Glassblowers
- Bakeries

Heat Balance

Balance in heat gain and heat loss



Heat Gain

- Metabolism
- External heat load
- Physical activity

Heat Loss

- Convection
- Conduction
- Radiation
- Evaporation

Heat Balance Equation

$$H \pm K \pm C \pm R - E = 0$$

H = metabolism

K = conduction

C = convection

R = radiation

E = evaporation



Acclimatization

- Altered sweat:
 - Early Beginning
 - Increasing quantity
 - Reducing salt content
- Enhanced CV fitness:
 - Increasing maximal oxygen uptake in muscles
 - Increasing plasma volume
 - Increasing cardiac output
 - Decreasing HR
- Enhance renal function:
 - GFR increase up to 20% over baseline

Heat Related Disorders

- Heat stroke
- Heat exhaustion
- Heat cramp
- Heat syncope
- Heat edema
- Heat tetany
- Reproductive effects
- Skin disorders



COLD STRESS

- Temperature
- Humidity
- Wind velocity
- Duration
- Protection

HYPOTHERMIA

- **Systemic**

 - Mild (35-33)

 - Moderate (33-30)

 - Sever (<30)

- **Localized**

 - Chilblain (pernio)

 - Immersion foot

 - Frostbite

Initial therapy

Systemic Hypothermia

- Remove wet garment
- Protect against heat loss (use blanket & insulating equipment)
- Horizontal position
- Avoid rough movement & excess activity
- Monitor core temperature
- Monitor cardiac rhythm

Initial therapy

Localized Hypothermia

- Remove wet gloves, socks & shoes
- Dry extremities & cover with dry clothing
- Elevate extremities & place them next to a warmer part of body
- Gradually rewarm by exposure to air at room temperature
- Protect pressure sites from trauma
- Avoid massage & physical activity

Caution

Rewarming should not be attempted if refreezing is likely prior to definitive therapy

