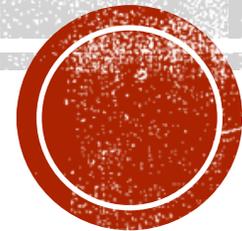


# HEAT STRESS

Presented by:  
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Med-I-Well Services

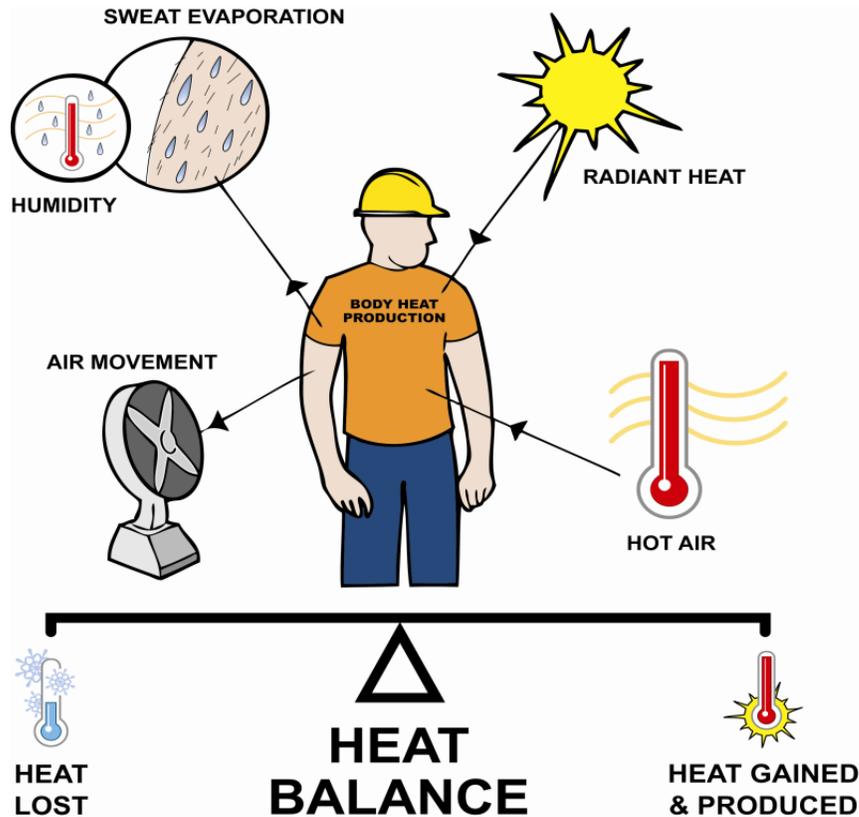


# OVERVIEW

- ✓ Thermoregulation
- ✓ Types of Heat Stress
  - ✓ Signs and Symptoms to be aware of
- ✓ Risks of Heat Stress in the Workplace
- ✓ Treatment
- ✓ Prevention
  - ✓ What is within your control
  - ✓ Who is at greatest risk?
- ✓ Take Away Messages
- ✓ Questions



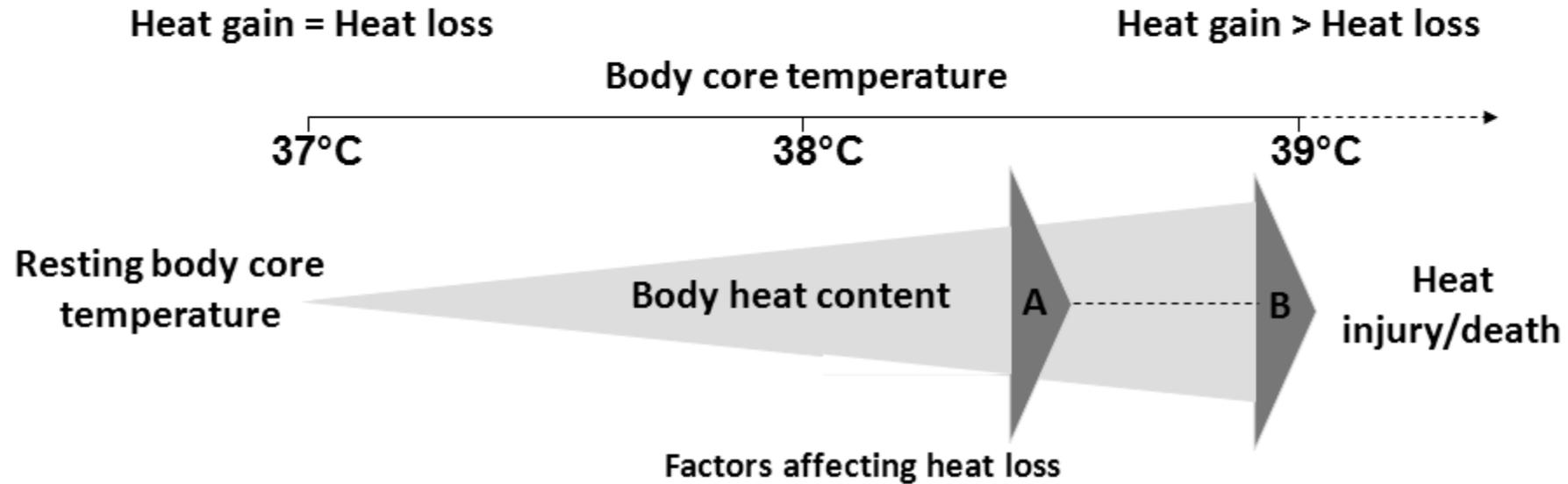
# THERMOREGULATION



- Body's response to rising core temperatures
  - Vasodilation
  - Increased Heart Rate
  - Sweating (most effective method)



Heat gain: metabolic heat production, ambient temperature



**Intrinsic factors**

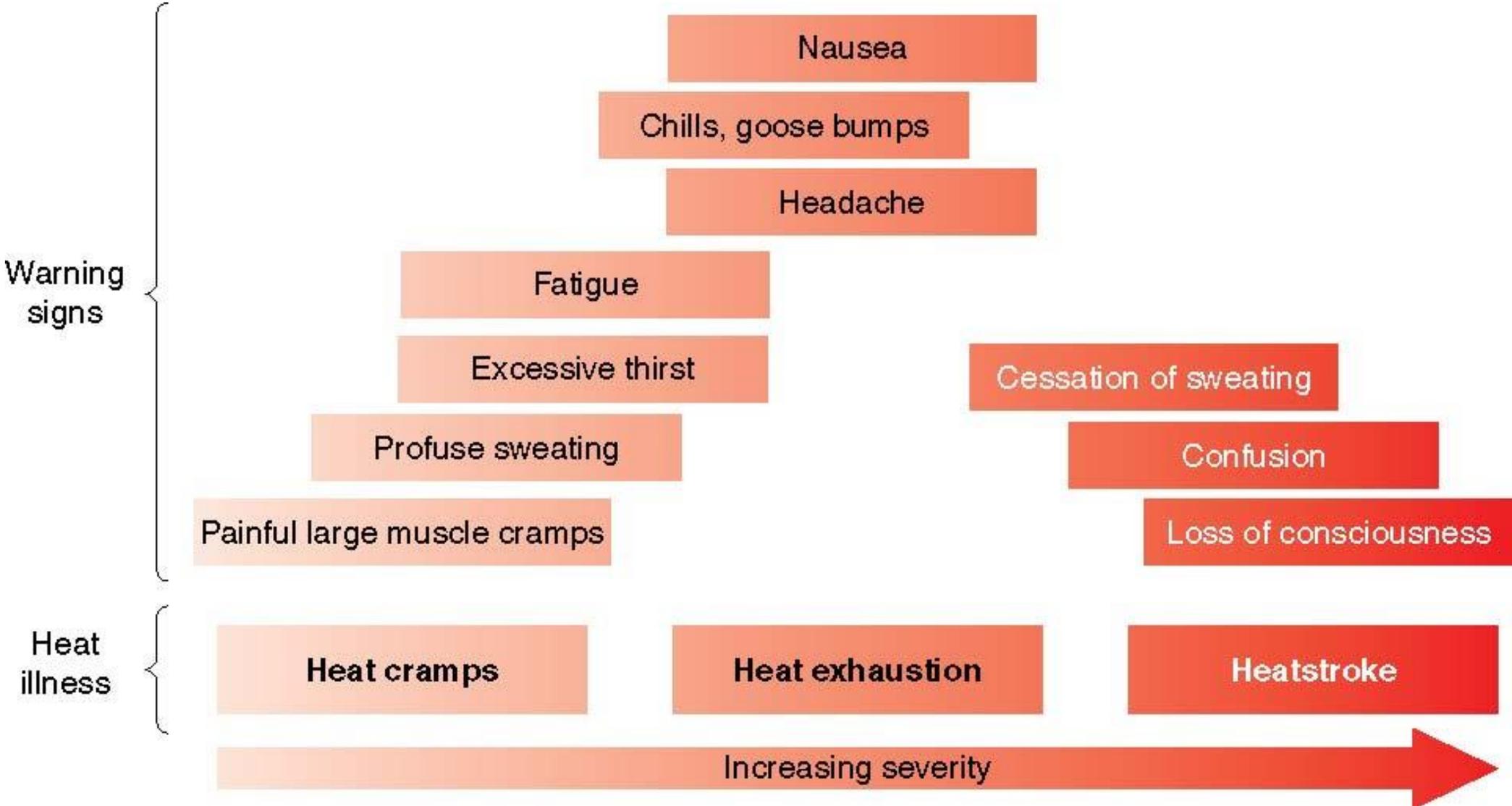
- Age
- Acclimation
- Hydration
- Fitness
- Gender
- Medication use (\*)
- Chronic disease (\*)  
(e.g. type 2 diabetes, cardiovascular disease, obesity and others)

**Extrinsic factors**

- Humidity (water vapor pressure)
- Wind – air velocity
- Clothing



# Warning Signs and Symptoms of Heat Cramps, Heat Exhaustion, and Heatstroke



**Chain of Perils**



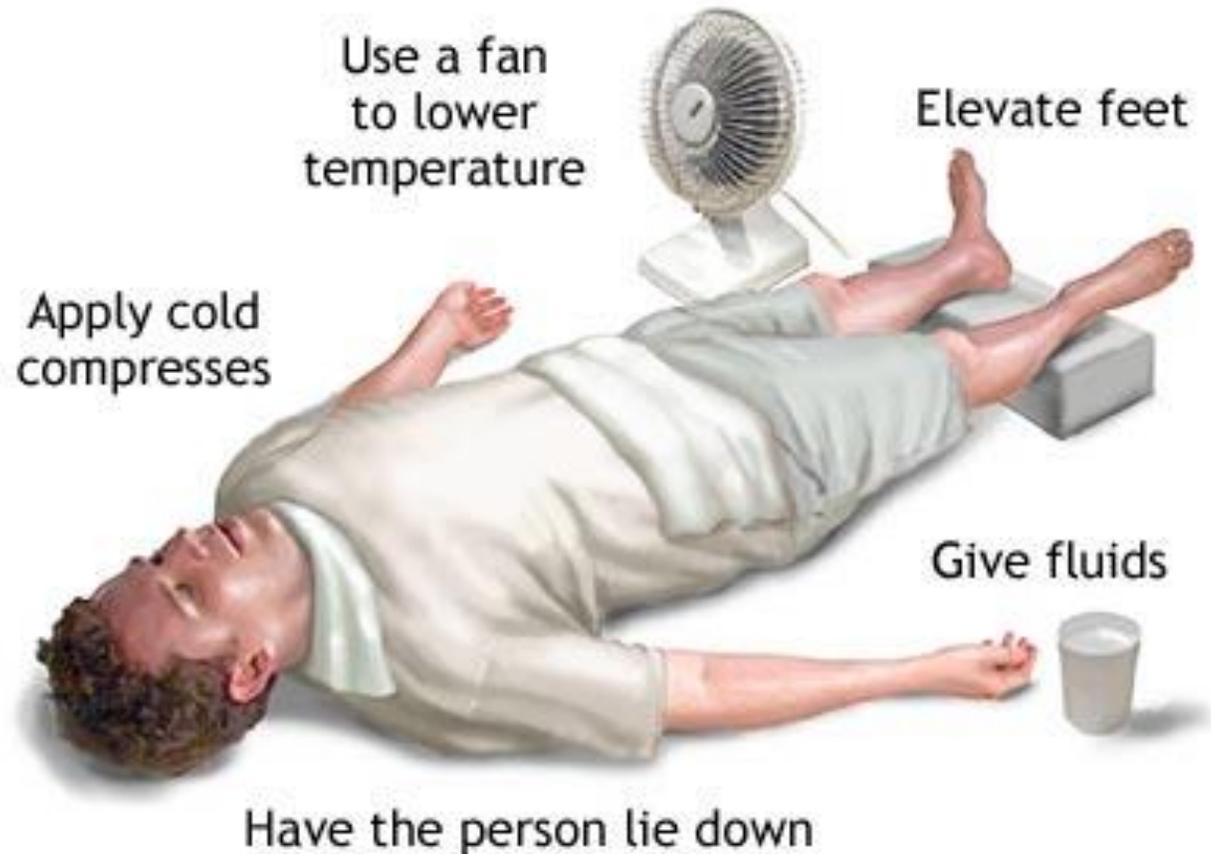
# WHAT ARE THE RISKS?

- **Health Threats:**
  - Physical fatigue/exhaustion
  - Heat stress (exhaustion, heat stroke)
    - Promote accidents due to dizziness
    - Reduces mental alertness and manual dexterity
    - Increased physical discomfort leading to irritability, anger and other emotional states
      - Could cause workers to overlook safety procedures or to divert attention from hazardous tasks.



# HEAT EXHAUSTION- TREATMENT

- Place individual in shaded or lightly air-conditioned area.
- Place the patient supine with their feet elevated.
- Remove excess clothing and equipment.
- Rehydrate the individual if they are not nauseated, vomiting or manifesting depressed mental status.
- Monitor heart rate, blood pressure and mental status.
- **Transport to an emergency department if rapid improvement does not occur despite appropriate treatment.**



# HEAT STROKE- TREATMENT

- **Call EMS immediately**
- **COOL FIRST and transport second whenever possible.**
- Evaluating and securing the ABCs in accordance with standard life support protocols.
- Remove all equipment and excess clothing.
- Rapid cooling is the most effective strategy for minimizing morbidity and mortality and should be initiated as soon as possible
  - If ice water immersion is to be performed, immerse the patient in a tub of cold water; maintain an appropriately cool water temperature; stir the water vigorously during cooling.
  - If ice water immersion is not possible, rapidly initiate an alternative method of cooling.
- Monitor vital signs (rectal temperature, heart rate, respiratory rate, blood pressure) and mental status continually.



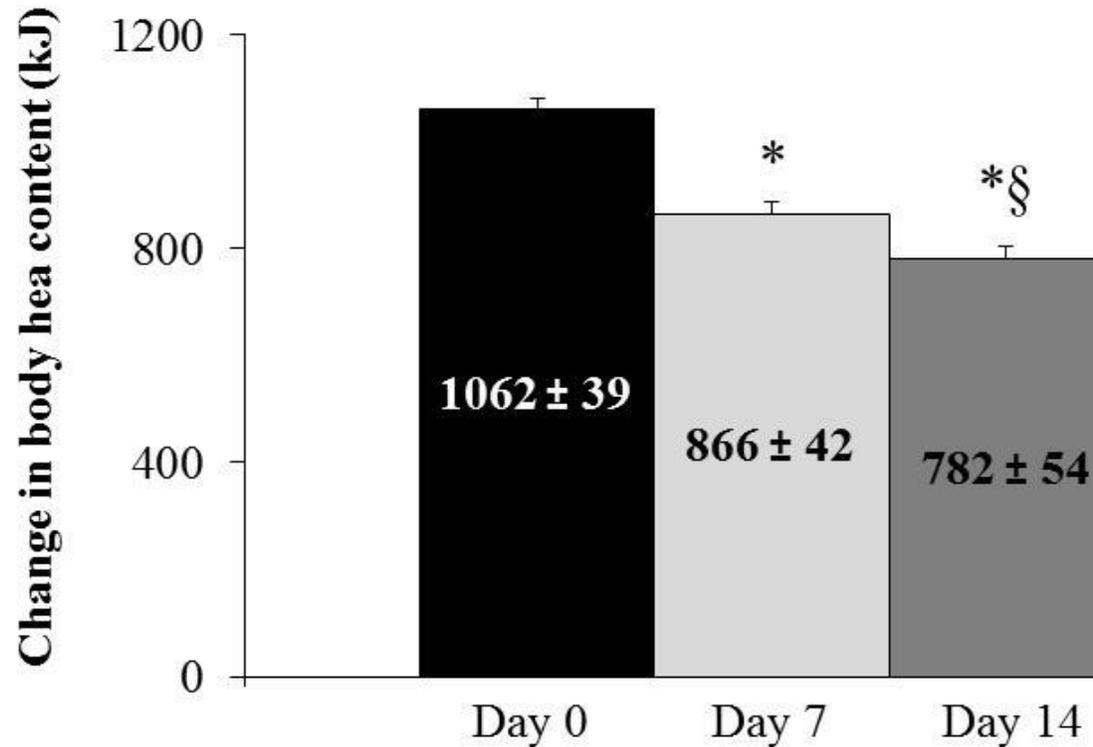
# PREVENTION

## INTRINSIC FACTORS WITHIN OUR CONTROL

- Acclimatization
- Clothing
- Fitness Levels
- Body Mass
- Hydration
- Nutrition
- Sleep
- Stress
- Certain supplements and drugs



# ACCLIMATIZATION



## Factors that Affect Rate of Acclimatization

- Fitness
- Age
- Body Mass
- Gender

**Figure 2.** The cumulative change in body heat content measured across the three exercise periods. (\*) Significantly different than day 0; (§) Significantly different than day 7. All  $p \leq 0.05$ . Values are mean  $\pm$  standard error

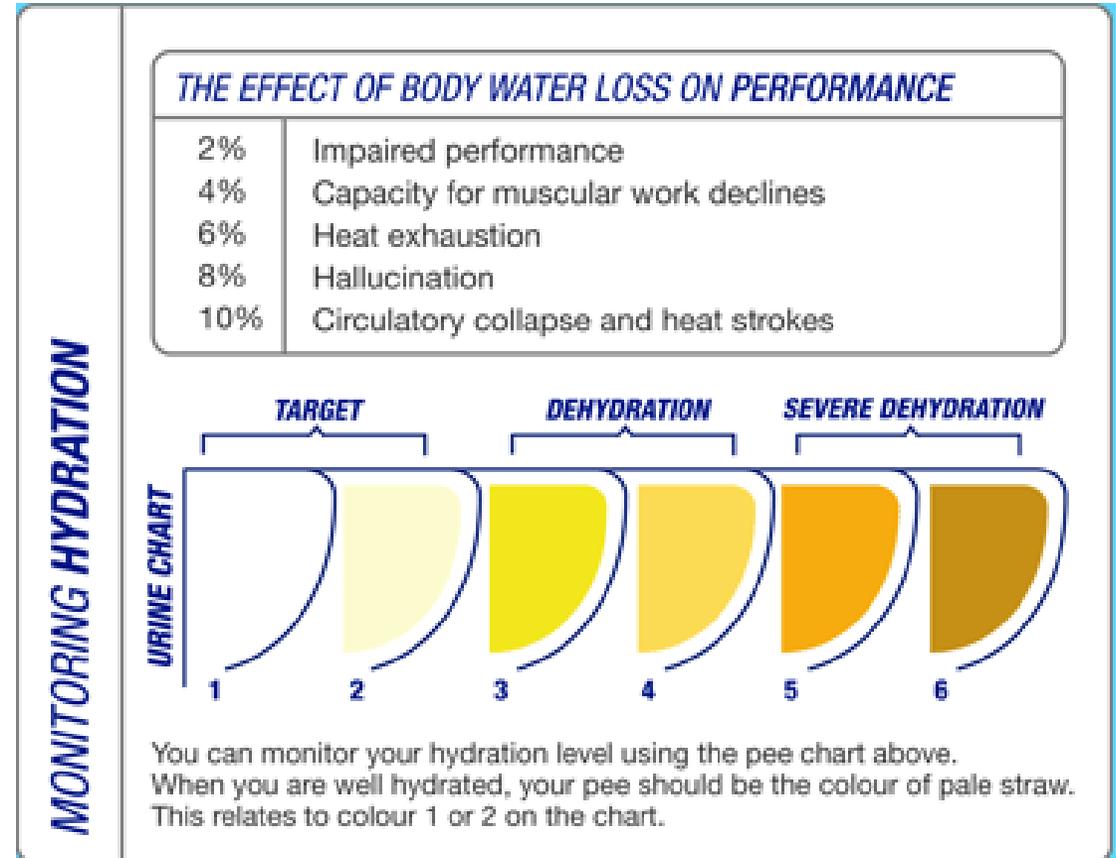




# HYDRATION THIRST



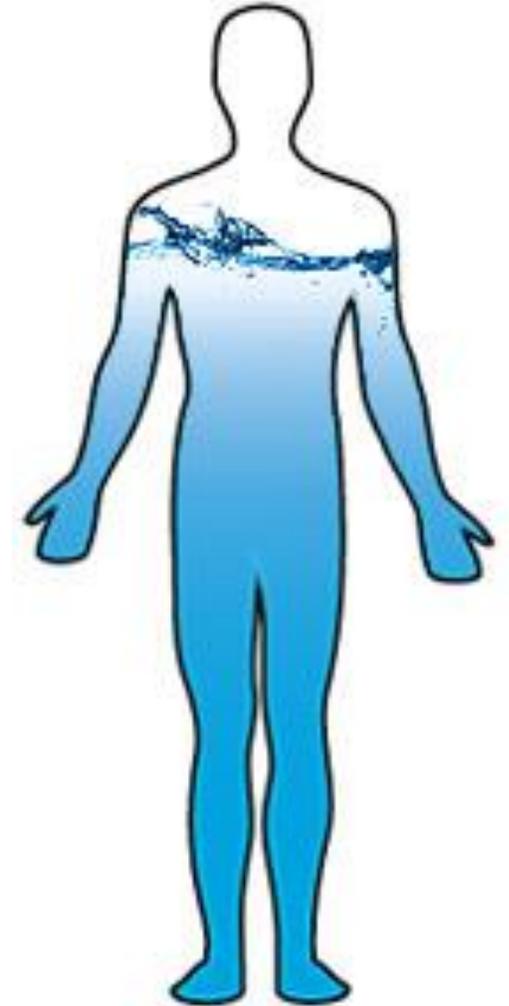
- Do not wait until you feel thirsty= too late
  - Already lost 2% of body's water
    - = reduced concentration and alertness, slowed reaction times and physical work capacity decrease.
- If worker is not regularly urinating or has dark urine, they are dehydrated and **AT INCREASED RISK!**



# HYDRATION

## IMPORTANCE OF WATER

- Composes 60-70% of your body
- One of the most essential elements necessary for your body to function properly.
- Regulates body temperature
- Hydrate at all times
  - 2-7 cups of water consumed in 3 hours before shift
  - 1 cup of water every 15 to 20 minutes.
  - Fluid loss continues several hours after exertion
- Start your day with a glass of water!

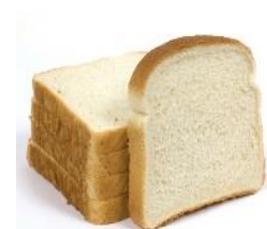


# NUTRITION

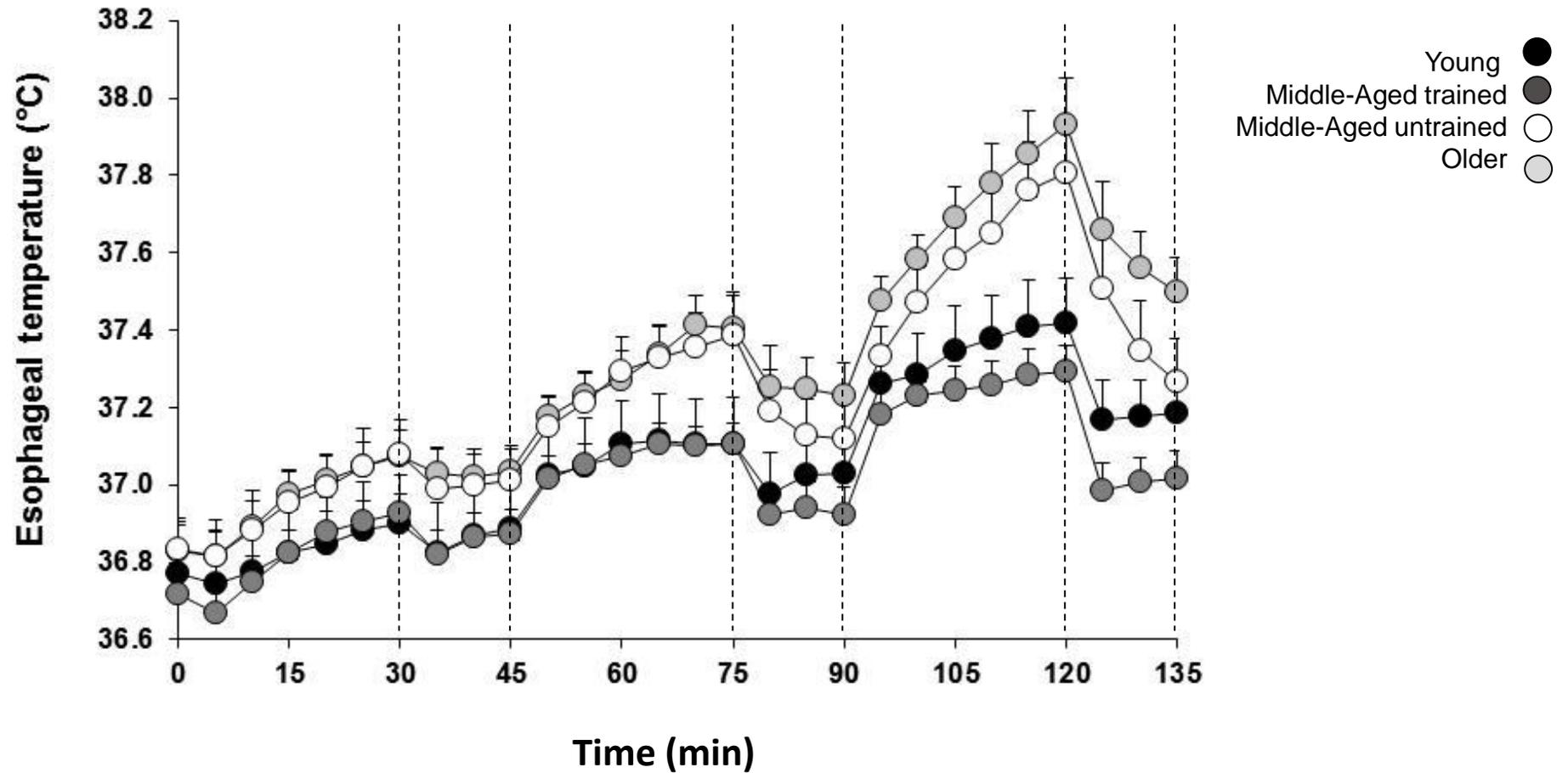
Just like gas fuels your car-  
FOOD FUELS YOUR BODY!



Supreme Fuel	Low Grade Fuel
Whole Grains	Added Sugars
Lean Protein	Refined Grains
Unsaturated Fats	Processed Foods



# FITNESS LEVELS



# DRUGS, DIETARY SUPPLEMENTS AND ALCOHOL

Drugs used for:

- Epilepsy
- Allergies/Congestion
- Depression
- High Blood Pressure (water pills)
- Stimulant (energy drinks)
- Alcohol
- Review your medication and supplement use with your doctor or pharmacist to find out if they could effect your ability to deal with heat stress.



# LISTEN TO YOUR BODY



- Self-pacing should be encouraged as a protective behaviour without productivity compromise
- Be aware of signs and symptoms of heat stress continuum
- Listen to your bodies. Always be aware of:
  - Hydration status
  - Heart rate
  - Mental Status
    - Are you experiencing dizziness, difficulty focusing, mood changes?



# WHO IS AT GREATER RISK?

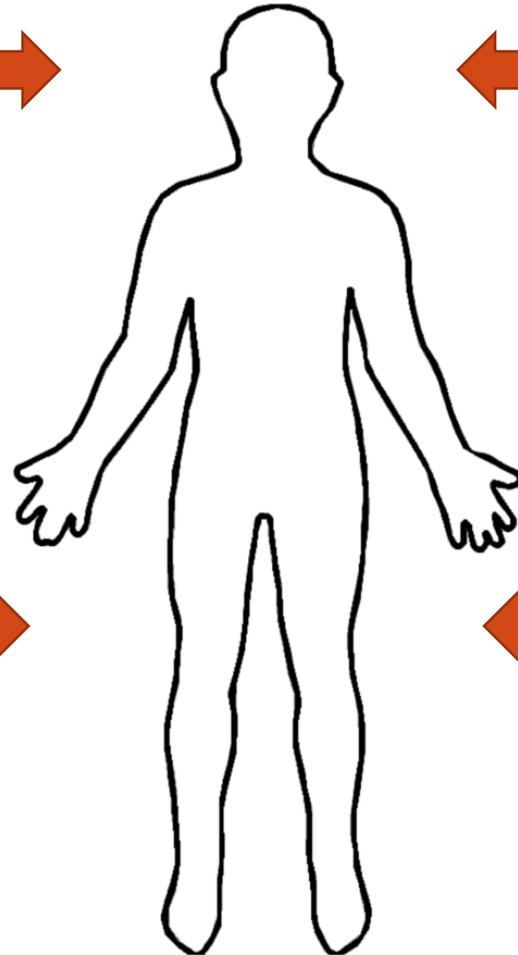
Age	Gender	Weight	Medical Conditions		Shift
40+	Females	Overweight/ Obese	Diabetes	Cardiovascular Disease	Day Time
<ul style="list-style-type: none"> <li>Reduced rate of heat dissipation</li> </ul>	<ul style="list-style-type: none"> <li>Lower sweat rates</li> </ul>	<ul style="list-style-type: none"> <li>Greater heat generation</li> <li>Reduced ability to cool down</li> </ul>	<ul style="list-style-type: none"> <li>Decrease heat tolerance or</li> <li>Increase the risk of dehydration and subsequent heat related illness.</li> </ul>	<ul style="list-style-type: none"> <li>Higher air temperature during day</li> <li>Diurnal variation</li> </ul>	



# HEAT STRESS- MANY FACTORS IN PLAY

## Thermoregulation

- Sweating
- Vasodilation
- Heart Rate



## Extrinsic Factors

- Humidity (water vapor pressure)
- Ambient Temperature
- Wind-Air Velocity
- Clothing
- Shift



## Intrinsic Factors

### Within Individual's Control

- Acclimatization
- Fitness Levels
- Body Mass
- Hydration
- Nutrition
- Sleep
- Stress
- Certain Supplements & Drugs

### Other Intrinsic Factors

- Age
- Gender
- Pre-Existing Medical Conditions



# TAKE AWAY MESSAGES

- Listen to your Body
  - Heart rate, sweat rate, fatigue, decreased mental alertness
- Use the Buddy System
  - Be aware of individuals who are at greater risk
  - Learn to recognize signs and symptoms in others
- Take Control of Your Health and Safety
  - Eat properly
  - Hydrate adequately (drink that glass of water upon waking up!)
  - Attain quality sleep
  - Achieve good fitness levels



# QUESTIONS?

MED·I·WELL

Med-I-Well Services

284 Larch Street

Sudbury, Ontario

(705) 671-7356

[info@mediwell.ca](mailto:info@mediwell.ca)

*Educate • Motivate • Inspire • Enhance*



# CLOTHING

Clothing insulates the body from its surroundings.

It can protect against extreme heat from external radiant sources but in parallel it compromises the ability of the body to lose heat and therefore work performance.

Clothing acts as a resistance to heat and moisture transfer between the skin surface and the ambient environment.



# HEAT EXHAUSTION

- Heavy Sweating
- Cool moist skin
- Weak pulse
- Normal or low blood pressure
- Person is tired or weak
- Headaches
- Coordination problems
- Nausea and/or vomiting
- Thirsty
- Breathing rapidly
- Vision may be blurred
- “Prickly heat” sensations
- \* No significant dysfunction of the central nervous system



# HYDRATION

## ELECTROLYTE REPLACEMENT

- Salt tablets should never be used unless instructed to do so by their doctor.
- Most people are able to restore electrolytes through normal meals and snacks.
- Workers should drink plenty of water with their meals and snacks, not only to stay hydrated but also to aid digestion.
- Ingestion of too much salt may cause nausea and vomiting which can worsen the level dehydration already present.



# MEASURING TEMPERATURE

- **Measuring temperature** — Do **NOT** use alternative methods to determine body temperature (eg, oral, tympanic, axillary, temporal, forehead sticker) even if a rectal thermometer is not available.
- Alternative methods do **not** provide accurate measurements of core temperature.
- If a rectal temperature is not available when treating EHS, we suggest one of two options:
  - Cool until the patient begins to shiver OR
  - Treat with cold water immersion for 15 to 20 minutes. This would cool most patients 3 to 4°C, which would make removal from an ice tub prudent in most cases.

