



“Beat the Heat”

Challenges of Controlling Heat Stress Injuries

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Beating the Heat?



Here's one way...

Objectives

Today, we'll look at:

- ▶ How the Body Deals with Heat
- ▶ Heat Stress Illnesses
- ▶ Costs of Heat Stress Incidents
- ▶ Prevention and Mitigation



Heat Stress is Real

Negative Impacts on Worker Performance

Negative Impacts on Worker Efficiency/Accuracy

4% body fluid loss can lead to a 23% decrease in reaction time!

Errors increase - NASA Precision study of Telegraph Operators

At 80 degrees – 5 errors/hour

At 90 degrees – 9 errors/hour

At 95 degrees – 60/hour

- ▶ Heat stress can trigger cardiac events

Prevention Costs



- ▶ Heat Stress Injuries cost on average: **\$48,000** (National Safety Council “Accident Facts” 2010)

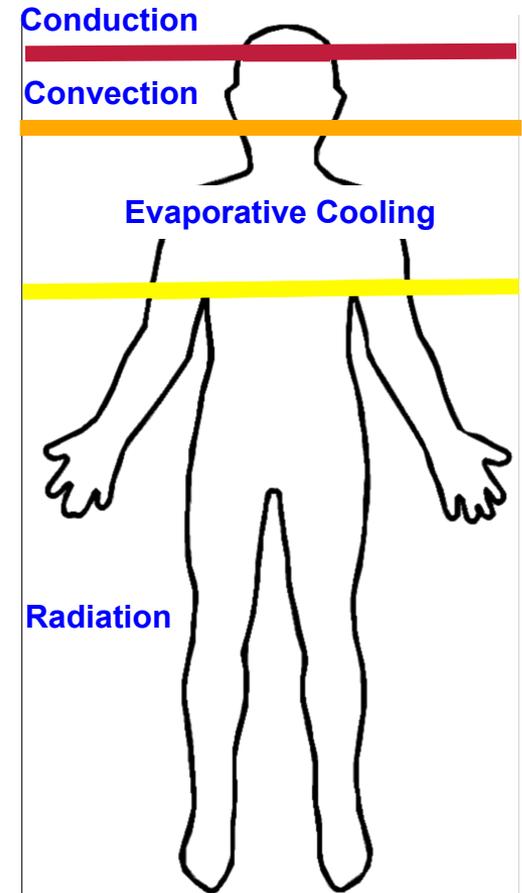
This represents an increase of more than \$20,000 over the last decade

- ▶ What does this mean?

Prevention is Cheaper than the Injury

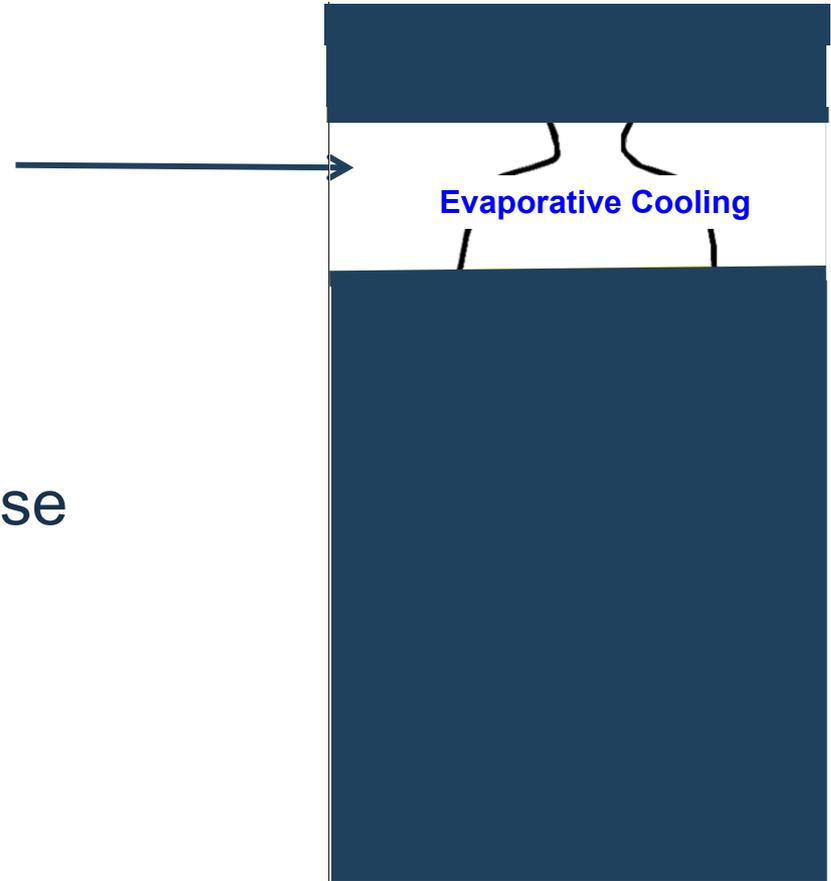
How does the body cope with heat exposures?

- ▶ The body has to shed heat constantly. Under normal conditions, the body releases:
 - 65% of its heat through radiation
 - 10% through convection
 - 23% evaporative cooling
 - 2% conduction



How does the body cope with heat exposures?

- ▶ As ambient temperatures rise, the efficiency of heat transfer falls until only evaporative cooling remains.
- ▶ Evaporation cools surfaces as moisture enters the vapor phase



Complications

- ▶ Limited Air Movement
- ▶ High Humidity
- ▶ Personal Protective Equipment
 - Gloves
 - Respirators
 - Coveralls
 - Boots

Remember - Barriers work both ways



Contributing Factors to Heat Stress Illnesses

- ▶ Use of Personal Protective Equipment
- ▶ Pre-existing medical conditions
- ▶ Prescription/OTC medications
- ▶ Diet
- ▶ Fitness Level
- ▶ Age
- ▶ Previous Heat Stress Illnesses
- ▶ Use of Caffeine



Recognize the symptoms

► Heat Stroke

Symptoms

- Hallucinations
- Chills
- Throbbing headache
- High body temperature
- Confusion/dizziness
- Slurred speech

First Aid

- Call 911
- Notify supervisor
- Arrange transportation Move worker to shade
- Cool worker – *soak clothes with cold water, spray or sponge worker with cold water, fan their body*

► Heat Exhaustion

Symptoms

- Heavy sweating
- Extreme weakness or fatigue
- Dizziness, confusion
- Nausea
- Clammy, moist skin
- Pale or flushed complexion
- Muscle cramps
- Slightly elevated body temperature
- Fast and shallow breathing

First Aid

- Have them rest in a cool, shaded or air conditioned area.
- Have them drink plenty of water or other cool, nonalcoholic beverages.
- Have them take a cool shower, bath or sponge bath.

Heat Related Disorders (cont)

► Heat Syncope

Symptoms

- Light –headedness
- Dizziness
- Fainting

First Aid

- Sit or lie down in a cool place
- Slowly drink water, clear juice or sports beverage
- If they have or are fainting, call 911, then notify their supervisor and make arrangements for transport to medical facility

► Heat Cramps

Symptoms

- Muscle pain or spasms usually in the abdomen, arms or legs

First Aid

- Stop activity
- Have them rest in a cool place
- Have them drink clear juice or sports beverage.
- Do not return to strenuous work for a few hours after the cramps subside – further exertion may cause heat exhaustion or heat stroke
- Seek medical attention if any of the following apply
 - – worker has heart problems or on a low-sodium diet.
 - - cramps do not subside within an hour

► Heat Rash

Symptoms

- Looks like a red cluster of pimples or small blisters
- More like to occur on neck, upper chest, groin, under the breasts and in elbow creases.

First Aid

- Try to work in a cooler, less humid environment when possible.
- Keep the affected area dry
- Dusting powder may be used to increase comfort

Coping with the Heat

- ▶ Watch your employees
- ▶ Establish a work-rest cycle
- ▶ Allow workers to acclimate
- ▶ Hydration
 - Sports Drinks?
 - Water?
 - Ratio – 3 or 4 Water to 1 Sports Drink
- ▶ Provide shaded areas with air movement to promote cooling
- ▶ Promote fitness in the workforce
- ▶ Provide medical monitoring



Coping with the Heat

- ▶ If PPE is required, select with heat transfer in mind
- ▶ Provide sunscreen (SPF 50) for workers in the field
- ▶ Utilize cooling fabrics, broad-brimmed hats, etc. for occupations with direct sun exposures



Cooling Strategies



Heat Stress?



Questions and Further Information

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