Facilities Management’s

Environmental Health & Safety Division

Presents...

Heat-Related Illness:
Working in Hot Environments
METABOLIC HEAT:
BODY HEAT IS PRODUCED THROUGH WORK, EXERCISE, AND DIGESTION OF FOOD

ENVIRONMENTAL HEAT:
HEAT ABSORBED BY THE BODY FROM THE ENVIRONMENT
# Hot Environment Dangers

## Heat Index (Apparent Temperature)

<table>
<thead>
<tr>
<th>Air Temperature</th>
<th>Relative Humidity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>110°C 136°F</td>
<td>40%</td>
</tr>
<tr>
<td>108°C 130°F</td>
<td>45%</td>
</tr>
<tr>
<td>106°C 123°F</td>
<td>50%</td>
</tr>
<tr>
<td>104°C 119°F</td>
<td>55%</td>
</tr>
<tr>
<td>102°C 114°F</td>
<td>60%</td>
</tr>
<tr>
<td>100°C 109°F</td>
<td>65%</td>
</tr>
<tr>
<td>98°C 105°F</td>
<td>70%</td>
</tr>
<tr>
<td>96°C 101°F</td>
<td>75%</td>
</tr>
<tr>
<td>94°C 97°F</td>
<td>80%</td>
</tr>
<tr>
<td>92°C 94°F</td>
<td>85%</td>
</tr>
<tr>
<td>90°C 91°F</td>
<td>90%</td>
</tr>
<tr>
<td>88°C 88°F</td>
<td>95%</td>
</tr>
<tr>
<td>86°C 85°F</td>
<td>100%</td>
</tr>
<tr>
<td>84°C 84°F</td>
<td>105%</td>
</tr>
<tr>
<td>82°C 82°F</td>
<td>110%</td>
</tr>
<tr>
<td>80°C 80°F</td>
<td>115%</td>
</tr>
</tbody>
</table>

### With Prolonged Exposure and/or Physical Activity

- **Extreme Danger**
  - Heat stroke or sunstroke highly likely
- **Danger**
  - Sunstroke, muscle cramps, and/or heat exhaustion likely
- **Extreme Caution**
  - Sunstroke, muscle cramps, and/or heat exhaustion possible
- **Caution**
  - Fatigue possible
CONVECTION:
TRANSFER OF HEAT THROUGH AIR MOVEMENT - WIND

EVAPORATION:
LIQUID CHANGES TO A VAPOR – BODY SWEATING

RADIATION:
HEAT COMING FROM A SURFACE – BODY HEAT
ACCLIMATION:
A PERSON WILL ADAPT TO THE ENVIRONMENT IN WHICH THEY ARE EXPOSED TO

AIR MOVEMENT:
AIR MOVEMENT INCREASES EVAPORATION RATES

AIR TEMPERATURE:
HEAT FLOWS FROM HOT TO COLD

HUMIDITY:
AMOUNT OF WATER VAPOR IN THE AIR

CLOTHING:
TYPE OF CLOTHING AFFECTS THE AMOUNT OF HEAT THE BODY WILL ABSORB & RETAIN
Heat is a serious physical hazard that can cause serious illness when working in a hot environment.

Heat-Related Illnesses Include:

- Sun Burn
- Heat Rash
- Heat Syncope
- Heat Cramps
- Heat Exhaustion
- Heat Stress
- Heat Stroke
A redness and pain of the skin caused by an over-exposure to sunlight...

Severe cases of sunburn will have a swelling of the skin with blisters, fever, and headache.
FIRST SIGN OF HEAT STRESS: hot, humid conditions cause clothing to remain damp with sweat.

Heat Rash may affect a small area of skin of the entire body. If the entire body is affected, sweat production is also affected and the body will not be able to cool itself.
Dizziness or fainting while standing still in the heat for long periods of time...

Heat Syncope is caused by blood pooling in the skin and lower part of the body – which causes a lack of blood flow to the brain.
Heat Cramps are characterized by:

- Heavy sweating
- Painful muscle spasms in the legs, arms, or stomach
- Spasms may occur during or after physical activity

Heat Cramps are caused by an imbalance of fluid and salt during physical activity in a hot environment.
A person with heat exhaustion will still sweat, but they will experience extreme weakness.

Heat Exhaustion is caused by the loss of fluid during excessive sweating.

SYMPTOMS INCLUDE:
- Nausea & Headache
- Clammy, Moist Skin
- Pale Complexion
- Body Temperature – Normal or Slightly Above Normal
Heat Stress is the illness that occurs when your body is subjected to more heat than it can cope with.

High temperatures, humidity, sunlight, and heavy work increase the chance of heat stress.
During work, too much heat can cause a loss of concentrations or increase fatigue and irritability which may increase the chances of an accident or injury.

Heat Stress is NOT caused by exposure to pesticides or chemicals.

During the summer, personal protective equipment (PPE) worn during pest control operations may increase the risk of heat stress.
It is not easy to tell the difference between heat stress and illness caused by pesticide poisoning.

The signs and symptoms are similar.

Do not waste time trying to determine what is causing the illness.

Get Medical Help Immediately!
Signs & Symptoms of Heat Stress are:

- Dizziness & Fainting
- Severe Thirst & Dry Mouth
- Headache, Nausea & Chills
- Clammy or Hot, Dry Skin
- Fatigue, Exhaustion & Muscle Weakness
- Heavy Sweating or Complete Lack of Sweating
- Altered Behavior, such as Confusion, Slurred Speech, Quarrelsome or Irrational Behavior
- Get the victim into a shaded or cool area.

- Cool the victim as rapidly as possible by sponging or splashing the skin, especially the face, neck, hands and forearms, with cool water or immersing the victim in cool water.

- Remove any PPE or clothing that may be making the victim warm.

- If the victim is conscious, encourage them to drink as much cool water as possible.

- Keep the victim quiet until help arrives.
Heat Stroke is the most serious of any health problems associated with working in a hot environment.

- Heat Stroke is a life-threatening condition and must be treated as an emergency.
- Heat Stroke occurs when the body’s temperature regulatory system fails.
Signs & Symptoms of Heat Stroke:

- Hot, Dry Skin
- Red or Spotted Skin
- Body Temperature of 105 Degrees or Higher
- Pupils of Eyes Small
- Extreme Weakness or Loss of Consciousness
- Confusion, Delirium or Convulsions
If not treated, the victim may suffer convulsions, brain damage or, in severe cases, death may occur.

A person with signs and symptoms of heat stroke requires immediate medical help!
- Move the victim to a cool area.
- Cool the victim with cool packs or a fan.
- If possible, soak the victim in a cool bath.
- Keep the victim calm and laying down with their feet elevated.
- Take action, call for help, administer First Aid, and get the victim to a medical facility.
Prevention of Heat-Related Health Problems

ACCLIMATION:
Become accustomed to the weather before long periods of physical activity.


WEAR A WIDE BRIM HAT
Prevention of Heat-Related Health Problems Continued

- MAINTAIN BODY FLUIDS.

- DRINK FLUIDS PERIODICALLY DURING PHYSICAL ACTIVITIES – DO NOT RELY ON THIRST AS A SIGN OF BODY DEHYDRATION.

- DO NOT DRINK ALCOHOL – IT INCREASES DEHYDRATION AND CAN INTERFERE WITH HEAT LOSS.
Prevention of Heat-Related Health Problems Continued

- **PROPER DIET:** Eat light foods, avoiding heavy meals.

- **REST PERIODS:** Take frequent rest periods in a cool shady area and drink fluids.

- **WORK PACE:** Work at a slower pace.
WORK PROCEDURES:

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Danger Category</th>
<th>Heat Syndrome</th>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 130</td>
<td>Extreme Danger</td>
<td>Heat Stroke Imminent</td>
<td>When the heat index is in this zone employees in the affected area should be dismissed</td>
</tr>
<tr>
<td>105 - 129</td>
<td>Danger</td>
<td>Heat Cramps or heat exhaustion likely. Heat Stroke possible with prolonged exposure and activity</td>
<td>When the heat index is in this zone. Non critical work activities should be suspended. Critical work activities shall be evaluated and schedule changes of affected employees should be made. Management must specifically approve employees working in heat index danger areas</td>
</tr>
<tr>
<td>91 - 104</td>
<td>Extreme Caution</td>
<td>Heat cramps or heat exhaustion possible with prolonged exposure and activity</td>
<td>When the heat index is in this zone management shall discuss the situation with supervisors and make schedule/work adjustments to accommodate for the heat. Specific approval must be granted for working under extreme heat conditions</td>
</tr>
<tr>
<td>77 - 90</td>
<td>Caution</td>
<td>Fatigue Possible</td>
<td>Normal work day, no alerts posted</td>
</tr>
</tbody>
</table>

Locate the temperature in the left column, and then locate the humidity on the top row. Follow the temperature across and the humidity down until they meet. This measurement is the Heat Index.
HEAT-RELATED ILLNESSES:

- Sun Burn
- Heat Rash
- Heat Syncope
- Heat Cramps
- Heat Exhaustion
- Heat Stress
- Heat Stroke
Heat Stress and Heat Stroke are SERIOUS health problems!

Sign and symptoms are similar to pesticide poisoning and require immediate First Aid.

DO NOT BECOME A VICTIM – TAKE PRECAUTIONS AGAINST THE HEAT
ACCLIMATE YOURSELF TO THE HEAT.

WEAR A WIDE BRIM HAT.

WEAR LIGHT WEIGHT AND LIGHT COLORED WORK CLOTHES.

MAINTAIN BODY FLUIDS BY DRINKING PERIODICALLY DURING WORK.

WORK AT A SLOWER PACE.

EAT LIGHT MEALS.

DO NOT DRINK ALCOHOL

TAKE FREQUENT BREAKS DURING WORK.
Take Precautions When Working or Playing in the Heat...

- Use sun screen.
- Drink plenty of fluids.

Tired Of The Heat Burning You Out? Chill Out Before You Burn Up!

- Drink plenty of water to keep yourself hydrated.
- Have a little salt with your meals to give you energy.
- Take frequent breaks

- Follow first-aid procedures if your co-worker suffers symptoms of heat stress.
  - Cool the co-worker's body down with ice water and wet rags.
  - Move the co-worker to a shaded area
  - Call for medical help and wait for it.

Think Safety, To Stop Heat Stress Before It Starts!
Heat-Related Health Problems are **NOT** a Joke...

"Heh - some 'Death Ray' ... more like a 'Mild Heat Rash Ray', I'd say."
For Information Regarding Heat-Related Health Problems...

Ask your...

- Health-Care Provider
- Supervisor
- County Extension Office
- Or Call EH&S at 479-575-5448

INFORMATION IS ALSO AVAILABLE ON LINE
WWW: USING A SEARCH ENGINE
Office of Environmental Health & Safety

Campus Location: Facilities Management
521 S. Razorback Road

Telephone: 479-575-5448

Web Site: http://uafphpl.uark.edu