HEAT STRESS
PREVENTATIVE MEASURES

Facilitator’s Guide
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Facilitator’s Guide

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Overview

While everyone loves to relax and enjoy vacations in warm climates, someone who has to perform vigorous tasks in a hot environment is at risk. Heat stress can overcome anyone who does not properly acclimate themselves to heat, or watch for the signs and symptoms that may alert them to possible heat stress disorders. Informing employees of all risk factors and heat stress disorders that they may encounter, and how to avoid serious complications can greatly reduce the risk of serious injury or death.
Getting Started

Training Materials

Collect all of the necessary materials and supplies before training begins. Here are some suggested materials and supplies:

- A training location that is free of distractions, has good lighting, and a comfortable temperature.
- Desks and chairs arranged so that everyone will be able to see the viewing screen, the facilitator, and each other.
- The video, a VCR, and a TV with a remote. Make sure the video is rewound.
- An employee handbook and pen/pencil for each trainee. Each handbook includes a quiz at the back, which can be used to test comprehension and document training.
- Other supplies and equipment you may need - blackboard chalk, paper, handouts, transparencies, overhead projector, markers, notepads, etc.
- Additional information, such as a copy of the regulation or other reference tools.
Preparation

A successful presentation requires preparation and planning. Give yourself several days before the training session to get organized.

• Locate and schedule the training site as soon as possible.
• Notify trainees of the training date and time, the training schedule, and proper dress.
• Obtain all necessary equipment and supplies.
• Make sure you know how to operate the TV, VCR, and other equipment. Check to ensure that it is working properly. Replace or repair any damaged equipment.
• Review all training materials, including the Facilitator’s Guide, handouts, and any other reference materials.
• Prepare your presentation, including a lesson plan or outline of the training. Include the training goals and objectives. Some presentation guidelines are included on the next page. A sample lesson plan has been included on page “f” of this Facilitator’s Guide.
• A day or so before conducting the training session, you may want to have participants take the quiz as a pre-test. The results of this test can help you to determine weak areas to focus on during the training session.
• Preview the videotape. Note any key points you want to expand upon in your training.
Presentation Guidelines

How you present the training course can have a great impact on learning. By following these simple presentation guidelines and keeping your objectives in mind, you can effectively and efficiently get the most out of your training session.

Organize Training Time Efficiently
In today’s busy work climate it can be difficult to find the time needed for training, so it is important to be organized and well-prepared when you do schedule training sessions. Whether you use Summit’s suggested lesson plan or not, it is important to have a lesson plan prepared that you can implement comfortably. This ensures that time spent in training is productive and beneficial for everyone.

Stress the Purpose and Goals of Training
Training needs to be goal-oriented. State the purpose of training in a clear, specific manner - whether it’s to reduce injuries, increase production, improve quality, improve working conditions, etc. Review the goals and objectives of the training so trainees know what is expected of them.

Capture Their Attention
Training needs to be interesting and compelling to hold trainees’ attention. To help motivate learners, give them specific evidence that their effort makes a difference and provide feedback on their progress. Also, remember that the first experience with a new subject usually forms a lasting impression on the learner. By making that experience a positive one, you can help ensure your audience retains the information learned.
Make New Learning Experiences Pleasant
For some adults, past experiences with education were unpleasant and not helpful. Adults learn best when they feel comfortable. By making the learning environment open and friendly, you can help adults to feel secure in their new learning experience. Offer support and feedback as often as possible, and be ready to provide extra attention to those who may require it.

Ask If There are any Questions
When most adults learn new information that conflicts with what they already know, they are less likely to integrate those new ideas. It is very important to make sure participants fully understand the training and do not have any unresolved questions. Provide for a question and answer period so participants can resolve those questions and/or answer questions throughout the training session.
Lesson Plan

As a qualified trainer, your job is to effectively communicate a great deal of information in a well-organized manner. By preparing a lesson plan, you can ensure that each minute of the training session is productive. Summit has provided a suggested lesson plan for your use.

1. Program Objective
This guide reviews *Heat Stress: Preventative Measures*. In it, we will cover:
  - What is Heat Stress?
  - Control Measures
  - Heat Stress Disorders
  - Safe Work Practices

2. Show the Video: “*Heat stress: Preventative Measures*”

3. Discussion and Demonstration
To help relate the training to your site, you may wish to incorporate your own discussion topics and exercises. Key issues you might consider include:

- What work practices must be followed when heavy PPE is needed for job tasks in a hot environment?
- What procedure should be followed in the event of a heat stress incident?
- What types of clothing are best for the work tasks performed at this facility?
4. Use Handbooks to Reinforce Training
The handbooks increase comprehension and reinforce the information learned in the video program by explaining the main points and expanding on the original material. For increased employee information retention, go over one section at a time and stop to answer questions. The quiz at the back of the Facilitator’s Guide is provided to document employee training. Answers to the quiz are provided on a separate page.

5. Questions and Answers
Provide for a Q&A session to answer any questions. It may be necessary to review some of the material when providing answers. The employee handbook, equipment manuals, and other reference tools may be helpful.

Other relevent Summit titles that might be of interest:
Personal Protective Equipment
Off-The-Job safety
First Aid
Construction Safety Orientation
What should be done if I suspect a coworker is experiencing symptoms of heat stroke?
If you believe a coworker is suffering from heat stroke contact emergency medical services immediately and move them to a cool area. Try to lower their body temperature by any means necessary as soon as possible. If the worker is vomiting, turn them on their side to prevent choking. Immediate treatment is needed to avoid serious complications.

If I am not feeling well before reporting to work in a hot environment, what precautions should be taken to avoid a heat stress disorder?
If you are taking any medications, make sure to check the labels for any warnings about heat exposure. If you are unsure, consult your doctor with any concerns you may have. Always be sure to keep yourself properly hydrated and take frequent breaks during your work tasks. It is also important to eat a proper diet and get plenty of rest. Watch for any symptoms of heat stress you may be experiencing and ask coworkers to also keep a close eye on you.
Introduction

Be careful what you wish for. If your job takes you near a hot environment, heat exposure can quickly lead to stress disorders, ranging from minor discomfort to serious injuries and even death. It’s not just workers performing jobs outdoors who are at risk, but those working indoors as well. Heat kills an average of 500 people in the United States each year and is often overlooked as a root cause of injuries and death in the workplace. So it is very important that you recognize the potential dangers of heat in your work area. Through a combination of proper training, control measures, safe work practices, and common sense, you can acquire the tools necessary to prevent heat stress.

In this handbook we will focus on:
- What is heat stress?
- Control measures
- Heat stress disorders
- Safe work practices
What is Heat Stress?

Heat stress occurs when a combination of factors no longer allow the body’s thermoregulatory system to maintain a normal core temperature of 98.6 degrees Fahrenheit, 37 degrees Celsius. The thermoregulatory system is very touchy, an increase of 2 degrees in the core can affect mental ability and an increase of 5 degrees can lead to serious injury or death. As you work, the core builds up heat generated by muscle movement and the heat from surrounding environments. As the core temperature rises, the brain signals the thermoregulatory system to return to its normal temperature by expelling heat through the processes of radiation, convection and evaporation. Upon receiving
the brain’s signals, the heart rate increases and blood, the body’s means of heat transport, circulates closer to the skin. Heat is then transferred to nearby objects that have a cooler temperature by radiation and to cooler surrounding air through convection. As increased blood flows to the skin, sweat glands release sweat, a solution of water and salt, onto the skin. When humidity levels are low enough, sweat will evaporate, releasing heat from the body. Through this process, it is possible to perspire 2 to 3 gallons of sweat each day, so it is vitally important to drink plenty of fluids regardless of thirst.
As core temperature rises and more blood flows to the skin, less is available for the active muscles and brain. This leads to decreased work performance abilities and workers are more likely to suffer injuries due to the loss of dexterity, coordination and judgment. Incidents of workplace violence have been reported to increase with heat. Anger often causes workers to overlook safety procedures and become easily distracted.

Heat stress can happen to anyone and everyone reacts to it differently. It is caused by a combination of environmental and personal risk factors. The two most noted environmental risk factors are high temperature and humidity level, often referred to as the heat index. The heat index is a measurement of how hot it really feels. Other environmental risk factors are direct sun exposure,
amount of air movement, physical exertion required, and the amount and type of clothing and PPE worn. Personal risk factors affect an individual’s sensitivity to heat exposure, and include age, weight, metabolism, degree of fitness, level of acclimation, and the use of alcohol, drugs, and certain medications.
Control Measures

The best way to avoid heat stress is prevention, by taking control measures.

Before you begin working in a hot environment, undergo a medical screening to ensure that you are healthy enough for the job.

As a new employee your body will not be able to handle the same amount of heat as experienced workers. You must first train, or acclimate your body to work in a hot environment. Acclimation allows the thermoregulatory system to maintain a normal core temperature easier by allowing increased sweat production, better blood distribution, and decreased heart rate. During your first day on the job, you should only be exposed to the heat for 20 percent of the time. Then increase your time by
20 percent each following day. It usually takes 5 to 6 days to become fully acclimated. However, it can only take a few days away from heat to lose acclimation, and be aware of changing conditions that make reacclimating necessary.

You won’t become properly acclimated if you are not replacing fluids as they are lost. Some workers think they can be more productive by drinking fewer fluids and sweating less. These are very dangerous, untrue thoughts. Drinking and sweating less lowers production capabilities and leads to dehydration, an insufficiency of water in the body.
Drink one cup of cool fluids, either water or a sports drink containing carbohydrates and electrolytes, every 20 minutes before, during, and after work regardless of thirst or activity level. It is not a good idea to drink a lot at one time, as painful stomach cramps can occur. When properly hydrated, you should have to urinate every 2 to 4 hours. Avoid beverages with caffeine, alcohol or large amounts of sugar. They increase urine production and speed up the rate of dehydration. If your doctor limits fluid intake, ask for their opinion before starting the job. Make sure the
body’s salt and minerals are replaced through a proper diet and a moderate use of salt at meals. Do not use salt tablets.

Where possible, engineering controls have been put in place by your employer to reduce heat and make the job easier to physically perform. Engineering controls may include ventilation, air conditioning, fans, insulation, shields, canopies, and power assists. Using power tools also makes work easier to perform.
Heat Stress Disorders

Let’s take a look at six heat stress disorders, ranging from minor to very serious.

Remember to always inform your supervisor if you or a coworker develops any symptoms.

Heat Fatigue
Heat fatigue occurs when workers are not properly acclimated to a hot environment. Heat fatigue causes discomfort, irritability, and other minor symptoms that lower job performance abilities. If you notice any symptoms, take a break in a cool area and drink fluids before more serious conditions develop.
Heat Rash
Heat rash, commonly known as prickly heat, is an uncomfortable skin condition. It forms when sweat does not properly evaporate and sweat glands become plugged, trapping sweat beneath the skin. A rash of bumps or blisters then appears on the skin. As the bumps break and sweat is released, you will feel an itching or prickling sensation. Heat rash usually does not require medical attention, but if not treated can become infected. Avoid heat rash by wearing clothes made of materials that allow sweat to evaporate easily, such as cotton. Also make sure to shower regularly and fully dry your skin before changing into dry clothes.
Heat Stress Disorders continued

Heat Collapse
Heat collapse, like heat fatigue, is caused by a lack of acclimation, as well as standing still for long periods of time. When blood flow increases to the skin, less is sent to the active muscles and the brain. This can restrain oxygen from reaching the brain and cause the worker to faint. If you have to stand, flex your muscles frequently to increase circulation. Heat collapse can happen quickly, so always be on the lookout for your coworkers. If a coworker does collapse, move them to a cool area to rest. Give them fluids and look for signs of more serious heat disorders.

Heat Cramps
Heat cramps are painful spasms that occur in the muscles that perform physical work, usually the arms, legs, and abdomen, when salt lost in sweat is not replaced. They can occur while working or afterwards. If you feel the onset of a cramp, relax in a cool area and do not return to physical activity right away. Apply pressure and massage the cramping muscles. Do not ignore cramps; they can be a symptom of more serious heat disorders. Seek medical attention if they last longer than one hour.
Heat Exhaustion
Heat exhaustion occurs when the body struggles to maintain its normal core temperature after large amounts of fluid and salt have been lost during heavy sweat. It is often mistaken for the flu, and symptoms include, but are not limited to weakness, giddiness, nausea, headaches, clammy skin, pale or flushed complexion, extreme thirst, vomiting and fainting. If you or a coworker are suffering from these symptoms, move them to a cool area and have them lie down with their feet raised 8 to 12 inches. Cool them by loosening their clothes, applying a wet cloth and fanning them. As long as they are not vomiting, give them fluids. If they are, turn them on their side. Have them checked by medical personnel and allow time to rest. If not treated quickly, heat exhaustion can quickly lead to heat stroke.
Heat Stroke
Heat stroke is the most serious heat stress disorder. It occurs when your body can no longer get rid of heat and shuts down. It is a life threatening condition, often mistaken for a heart attack and requires immediate medical attention. Symptoms include hot dry skin, which can be red, spotted or bluish in color, complete lack of sweating, confusion, collapse, muscle cramping, convulsions, as well as those associated with heat exhaustion. Sometimes symptoms do not appear and there can be very little warning, as core temperature can rise above 105 degrees Fahrenheit, 40.6 degrees Celsius within 10 to 15 minutes. If you suspect that you or a coworker is suffering from heat stroke, immediately contact emergency medical services. Move them to a cool area and quickly lower their
body’s temperature by any means necessary. If vomiting occurs, turn them on their side. Unless the victim receives proper treatment and recovers quickly, death can occur. In some cases, suffering from heat stroke increases heat sensitivity, and causes long term damage to the brain and vital organs.
Safe Work Practices

While control measures have been taken, safe work practices and a little common sense must also be followed to protect yourself from heat.

Check the heat index to alert yourself and coworkers of each day’s risk. Be especially careful when the index reaches 80 degrees or more. Check the labels on all medications for warnings about heat exposure. If you have any concerns, consult your doctor. Remember to stay hydrated and replace salt and minerals with a proper diet. Avoid hot, heavy meals as well as excess exercise on work days. If you can, avoid working vigorously during the hottest times.

Apparent Temperature is what the temperature feels like when you combine heat and humidity.

<table>
<thead>
<tr>
<th>HEAT INDEX CHART</th>
<th>Air Temperature (Degrees F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Humidity</td>
<td>Caution</td>
</tr>
<tr>
<td>0%</td>
<td>64</td>
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<td>100%</td>
<td>72</td>
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</table>

Caution 80-89 degrees F

Extreme Caution 90-104 degrees F

Danger 105-129 degrees F

Extreme Danger 130 + degrees F
of the day, and schedule the heaviest jobs for early morning or late at night. Take frequent short breaks to rest in a designated shaded, cool area and make sure you get plenty of sleep at night. Pace yourself, work in shifts and use the buddy system to look for signs and symptoms of heat stress in your coworkers, and have them do the same for you.

If you work in direct sunlight, wear the proper head coverings. Keeping the head cool is important in maintaining a normal core temperature. Apply at least SPF-15 sunscreen a half hour before going out in direct sunlight to protect the skin from sunburn. Sunburn is a painful condition that makes it harder for the body to stay cool. Continue reapplying sunscreen as directed.
Safe Work Practices continued

Wear light colored, light weight, loose fitting clothing and avoid extra layers whenever possible. Breathable materials, such as cotton, work best to allow sweat to evaporate off the skin. Consider the moisture vapor transport rating when selecting personal protective equipment. PPE should not interfere with the job or create new hazards. PPE made of reflective material protects the body from radiant heat, but can limit sweat evaporation. Take breaks more frequently when wearing heavy PPE. Auxiliary cooling devices can assist in maintaining a normal core temperature. If humidity is low, dampening your clothes slightly with a sponge can also help.
In this handbook we have learned that heat stress can happen to anyone, so be on the lookout for signs and symptoms in yourself and your coworkers. Know the potential dangers of heat. Become properly acclimated to hot environments, replace fluids regardless of thirst, use all available engineering controls, and follow safe work practices. Heat stress disorders can range from minor discomfort to life threatening conditions. If someone is suffering from heat stroke, contact emergency medical services immediately. If you have any questions, ask your supervisor.

While sometimes you may wish to be in a warmer location, be careful what you wish for. In the workplace heat exposure can quickly lead to dangerous stress disorders. But through proper training, control measures, safe work practices, and common sense you can take the preventative measures to maintain your health and safety on the job.
Quiz

To review your knowledge of *Heat Stress: Preventative Measures*, answer the questions below.

Your name    Date

1. A two degree increase in your normal core body temperature can affect your mental ability.
   a. True   b. False

2. What are some common risk factors that can affect a person’s sensitivity to heat exposure? Select all that apply.
   a. Direct sun exposure
   b. Physical exertion required
   c. A person’s age and weight
   d. A person’s metabolism

3. Before you take on a job working in a hot environment, you should undergo a medical screening.
   a. True   b. False

4. A new employee on the first day of a new job can handle the same amount of heat as an experienced worker in a hot environment.
   a. True   b. False

5. What type of beverages will help to keep a person hydrated?
   a. Cool fluids with carbohydrates and electrolytes
   b. Water
   c. Alcohol
   d. Caffeinated beverages
   e. Drinks with large amounts of sugar
6. What are some possible engineering controls used to reduce the amount of heat exposure? Select all that apply.
   a. Ventilation
   b. Air conditioning
   c. Shields
   d. Canopies
   e. Power assists

7. Which type of heat stress disorder is considered to be the most serious which can result in death?
   a. Heat rash
   b. Heat exhaustion
   c. Heat stroke
   d. Heat collapse

8. You should perform your heaviest jobs early in the morning or late at night.
   a. True   b. False

9. Sunscreen of at least SPF-15 should be applied a half hour before going out in direct sunlight.
   a. True   b. False

10. Dark colored, heavy clothing should be worn when working in hot environments to allow sweat to evaporate.
    a. True   b. False
1. a True

2. a Direct sun exposure  
   b Physical exertion required  
   c A person’s age and weight  
   d A person’s metabolism

3. a True

4. b False

5. a Cool fluids with carbohydrates and electrolytes  
   b Water

6. a Ventilation  
   b Air conditioning  
   c Shields  
   d Canopies  
   e Power assists

7. c Heat stroke

8. a True

9. a True

10. b False
As an added bonus, this wallet-sized perforated card will be included in every Heat Stress: Preventative Measures Employee Handbook.

Front of Card

<table>
<thead>
<tr>
<th>Signs and Symptoms of Heat Stress</th>
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<tbody>
<tr>
<td><strong>Heat Fatigue</strong> – Discomfort, irritability, and other minor symptoms that lowers job performance.</td>
</tr>
<tr>
<td><strong>Heat Rash</strong> (prickly heat) – Rash of bumps or blisters on the skin. As the bumps break, you feel an itching or prickling sensation.</td>
</tr>
<tr>
<td><strong>Heat Collapse</strong> – Like heat fatigue, it is caused by lack of acclimation, as well as standing still for long periods of time. Can quickly cause a worker to faint or collapse.</td>
</tr>
<tr>
<td><strong>Heat Cramps</strong> – Painful cramps or spasms that occur in the muscles, usually occurring in the arms, legs, and abdomen.</td>
</tr>
<tr>
<td><strong>Heat Exhustion</strong> – Heavy sweating with symptoms often mistaken for the flu, like weakness, giddiness, nausea, headaches, clammy skin, pale or flushed complexion, extreme thirst, vomiting, and fainting.</td>
</tr>
<tr>
<td><strong>Heat Stroke</strong> – Resembles heart attack, hot dry skin, red, spotted or bluish in color, lack of sweating, confusion, collapse, muscle cramping, convulsions, as well as symptoms of heat exhaustion. Sometimes symptoms may not appear and there can be very little warning.</td>
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Back of Card

<table>
<thead>
<tr>
<th>Emergency Care for Treating Heat Stress</th>
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<tbody>
<tr>
<td><strong>Heat Fatigue</strong> – Take a break in a cool area and drink fluids.</td>
</tr>
<tr>
<td><strong>Heat Rash</strong> – Usually no medical attention is required, but if not treated, it can become infected. Avoid heat rash by wearing cotton clothing, shower regularly, and fully dry skin before putting on dry clothes.</td>
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<tr>
<td><strong>Heat Collapse</strong> – Move person to cool area to rest, give them fluids and look for signs of more serious heat disorders.</td>
</tr>
<tr>
<td><strong>Heat Cramps</strong> – Relax in cool area. Apply pressure and massage cramping muscles.</td>
</tr>
<tr>
<td><strong>Heat Exhustion</strong> – Move person to cool area to lay down, elevate feet 8-12 inches, cool by loosening clothes, apply wet cloth, fanning. Give fluids unless vomiting. If vomiting turn on side. Seek medical treatment and get rest.</td>
</tr>
<tr>
<td><strong>Heat Stroke</strong> – Most serious. Contact emergency medical services immediately. Move person to cool area and quickly lower their body temperature by any means necessary. If vomiting, turn them on their side. <strong>If not treated quickly death can occur.</strong></td>
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</tbody>
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