Heat Illness Prevention



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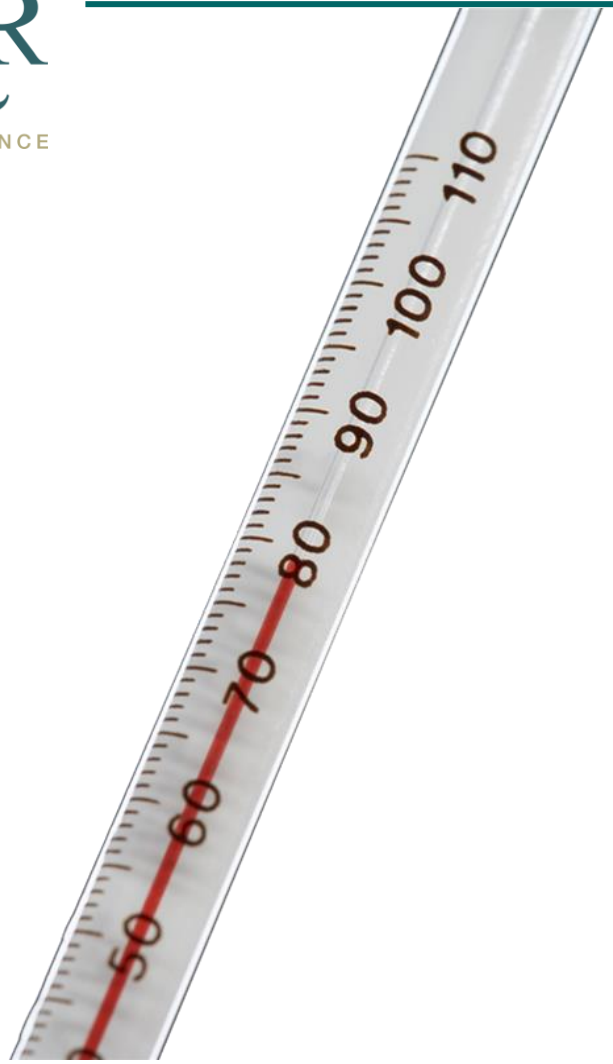
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Learning Objectives

- What causes and contributes to heat illnesses
- How to recognize heat illnesses
- How to treat and prevent heat illnesses
- Heat illness prevention program requirements



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Course Outline

1. Introduction to Heat Illnesses
2. Risk Factors
3. Heat Illness Prevention Program
4. Training Requirements
5. Heat Illness Signs & Symptoms
6. Heat Illness Controls
7. Temperature Guidelines
8. Summary

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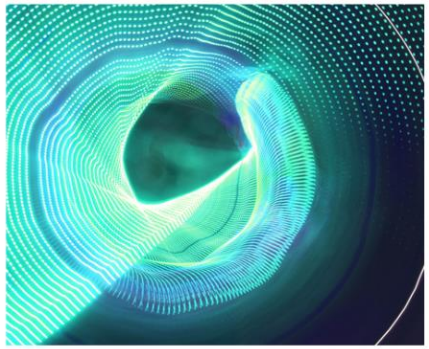
Introduction to Heat Illness

- When employees are required to work in hot environments for extended periods of time, every precaution must be taken to minimize heat illnesses, which may result in death if left untreated.
- This onsite course provides information on how to avoid heat illnesses.
  - Your state or local agencies may have more stringent regulations that should be followed for heat illness prevention measures.



Understanding Body Temperature

Body's Coping Strategies in High Heat



- The body gains or loses heat through:
  - Radiation
  - Convection
  - Conduction
  - Evaporation



- Normal body temperature is 98.6°F.



- Heat illnesses occur when the body's natural defense mechanisms against heat fail.

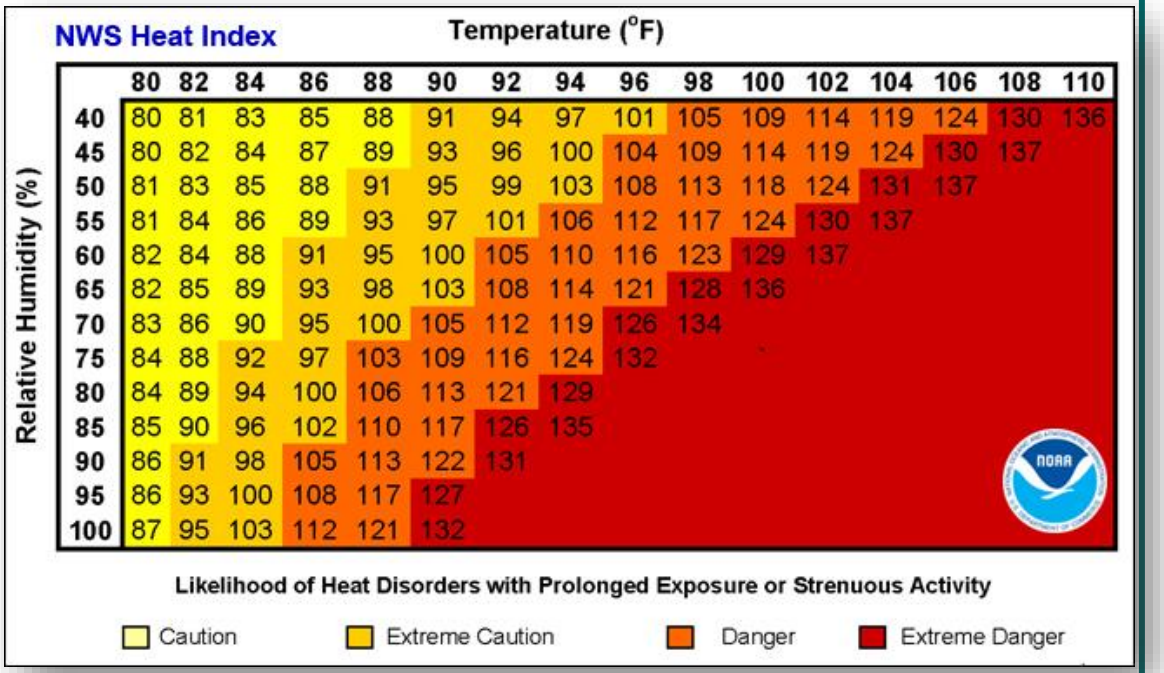


- Temperature regulation is called *thermoregulation* or *homeostasis*.

Introduction to Heat Illnesses

Understanding the Heat Index

- Heat Index = Measures "real feel" of outdoors, combines temperature and humidity.
- The heat index is for shaded areas.
  - Direct sunlight exposure can add up to a 15° difference in what the temperature feels like.
- Depending on heat index value, heat illness risk ranges from low to extreme.



Source: National Oceanic and Atmospheric Administration

Risk Factors

Environmental Factors

- The temperature of the air
- Humidity
- Radiant heat exchange with surrounding surfaces:
  - The sun
  - Bright lights
  - Boiler
  - Furnace
- Air movement:
  - No breeze
  - Lack of ventilation



Risk Factors

Task-Related Factors

Certain work tasks may increase heat illness risk:

- Heavier clothing and personal protective equipment (PPE)
  - This may make it difficult to drink water frequently
- Higher levels of physical exertion
- Working near radiant heat sources (ovens, boilers, combustion equipment)



Risk Factors

Personal Factors

Everyone has different risks for heat illness based on personal factors:

- A poor level of physical fitness
- Obesity
- Chronic or acute illnesses and conditions
- Medications
- Alcohol or drugs
- Lack of acclimatization
- Age
- Pregnancy
- Previous heat illnesses

Heat Illness Prevention Program

Written Program Requirements

- Create, implement, and maintain an effective plan for minimizing and treating heat illness.
- Make the plan available to all employees, company representatives, and any requesting authorities.
- Provide copies of the plan in English and or the language understood by the majority of employees.



SAFETY ASSURANCE TIP

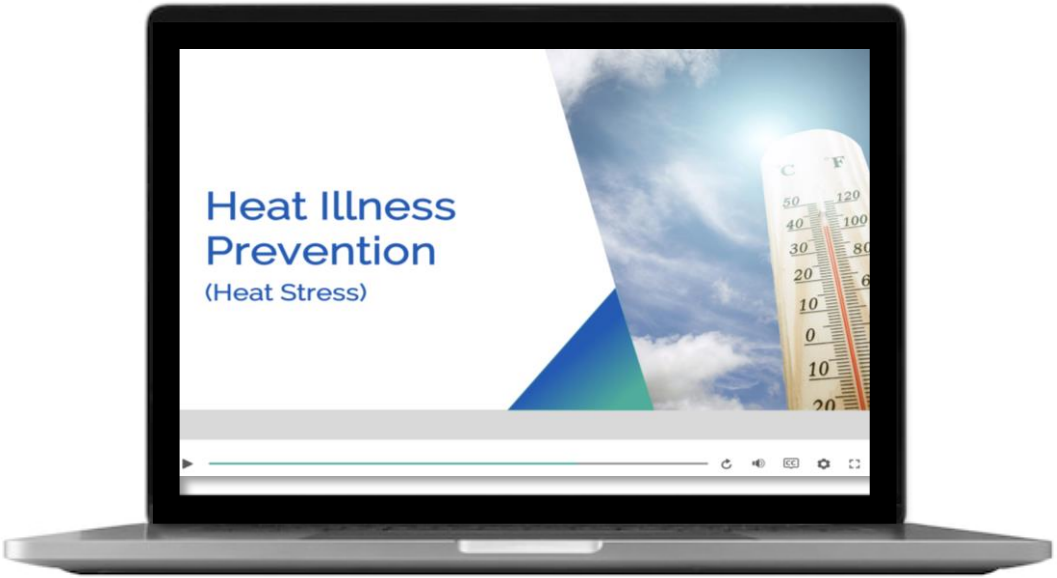
The Heat Illness Prevention Plan must address all requirements covered in this course, including potable water provisions, shade, preventative cool-down rest periods, high heat procedures, acclimation, and training policies and procedures.

Heat Illness Employee Training Requirements

Online Training is Available in the Risk Management Center

Employees Training:

- Details of company heat illness prevention plan and workplace-specific procedures
- Right to report heat illness concerns without fear of retaliation
- Environmental and personal risk factors
- Types of heat illnesses and their symptoms
- Acclimation methods
- Emergency response
  - First Aid
  - How to contact emergency services
    - How non-English speaking employees can direct emergency services
- Prevention methods (i.e., water consumption, shade, etc.).



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Heat Illness Supervisor Training Requirements

Supervisors should be trained on all employee training requirements PLUS:

- Required procedures, frequency, and timing for heat illness prevention compliance, including, but not limited to, employer's responsibility to provide water, heat conditions information (including employees' risks of experiencing a heat illness), shade, preventative rest breaks, and access to first aid
- Monitoring weather reports
- Calculating heat index values
- When to implement high heat procedures and what they consist of
- Supervisor responsibilities during emergency heat illness situations

Heat Illnesses



Emergency Reporting and Response

- Ensure work area is staffed with someone who can administer first aid and that emergency personnel are readily available.
  - Employees must know how to provide treatment until emergency personnel arrive.
- Employees must know who to contact to report signs of heat illness.
- They need a means to contact help and know how to provide directions.
- Supervisors and employees must establish and maintain effective communication through voice, visual gesture, or electronics.

SAFETY ASSURANCE TIP

Review your emergency preparedness plan for who will contact emergency services.

Heat Illnesses

Results of Heat Stress

- Other workplace injuries due to sweaty palms, fogged-up glasses, confusion, and dizziness.
- If heat stress worsens, it leads to heat illnesses.

Examples

- Rashes
- Muscle cramps
- Heat exhaustion
- Heat syncope
- Heat stroke

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Heat Illnesses

Monitoring for Heat Rash

Heat rash is a visible skin irritation, usually clusters of small red pimples or blisters.

Usually occurs in areas where sweat collects and can easily clog pores, like the backs of knees and elbows, neck, and groin.

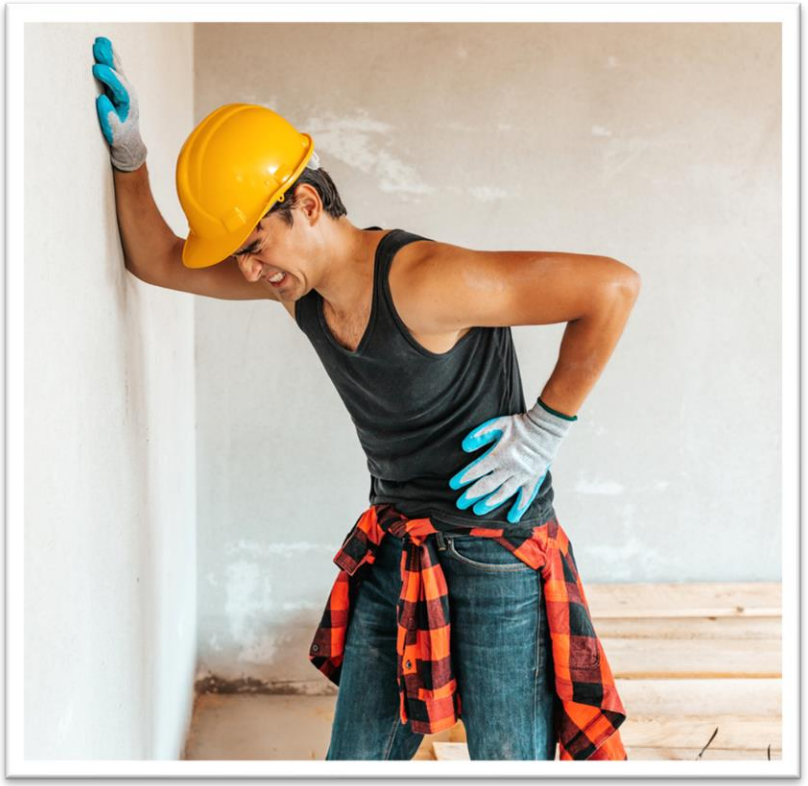
If heat rash occurs, the employee must:

- Stop all activity and rest in a cool place.
- Clean and dry the affected area.
- If the rash continues to worsen, seek medical treatment.

Heat Illnesses

Monitoring for Heat Cramps

- Heat cramps are **muscle pains or spasms** due to salt imbalance in the body.
- Usually occur in heavily-used muscle groups.
- If heat cramps occur, the employee must:
  - Stop all activity and rest in a cool place.
  - Drink clear juice or a sports beverage.
  - Seek medical attention if cramps don't subside in 1 hour.
  - Rest for several hours after the cramps subside.



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Heat Illnesses

Monitoring for Heat Syncope

- Heat syncope, or **fainting**, occurs when enough blood flow doesn't reach the brain.
- It may also present itself as general dizziness, which could lead to fainting.
- If heat syncope occurs:
  - If safe, move the person to a shaded, cool area.
    - If the person is unconscious or has a head or neck injury, it may not be safe to move them – bring shade and cooling to them.
  - Elevate legs and feet slightly
  - Remove excess clothing
  - Provide water or electrolytes
  - Seek follow-up treatment

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Heat Illnesses

Understanding Heat Exhaustion

- Heat exhaustion is caused by dehydration and can develop after several days of exposure to high temperatures.
- It may lead to heat stroke.

Symptoms

- Extreme weakness or fatigue
- Nausea or vomiting
- Headache
- Irritability
- Clammy, moist skin with profuse sweating
- Rapid, weak heartbeat
- Slightly elevated body temperature
- Dizziness, lightheadedness, or fainting
- Heat cramps

Heat Illnesses

Treating Heat Exhaustion

- If you detect signs of heat exhaustion, notify a supervisor or appropriate individual with first aid training.
- The individual giving care must:
  - Move victim to shade or air-conditioned environment.
  - Cool the person by fanning, sponging with cool water, or applying ice packs.
  - If conscious, give the victim cool, nonalcoholic beverages.



Heat Illnesses

Heat Stroke

- Heat stroke is immediately life-threatening.
- Heat stroke occurs when the body's cooling mechanisms have been exhausted.
- Symptoms include the following:
  - Body temperature of 104°F or higher
  - Red, hot, dry skin with a lack of perspiration
  - Nausea
  - Dizziness
  - Confusion or irrational behavior
  - Strong and rapid pulse
  - Seizures or convulsions
  - Loss of consciousness or coma



Heat Illnesses

Heat Stroke – CALL 911!

Treatment:

- Notify a supervisor and follow the emergency action procedure.
- Move the victim to a shaded or air-conditioned environment.
- Cool by fanning, sponging, and applying ice packs.
- Give water only if conscious.
- Remove boots, socks, and other excess clothing.



Heat Illness Controls

Shaded Areas

In temperatures exceeding 80°F:

- Provide shaded areas large enough to accommodate all employees during meal, rest, or recovery periods. This can be achieved through rotating employee breaks.
- Locate shaded areas as close as feasible to areas where employees are working.
- Provide seating.



Heat Illness Controls

Controlling Radiant Heat

- Some work areas may have radiant heat hazards related to the type of equipment, processes, or work they perform onsite.
- When radiant heat is a factor, the heat index will not give an accurate measurement of the "real-feel" temperature.
- Assess the worker's risk as part of their Job Hazard Analysis and adjust work-rest ratios as needed.
- Use controls such as reflective screens or shields to help block radiant heat sources.



Heat Illness Controls

Ventilation

- Air conditioning removes the heat from the air.
- If the air temperature is less than 95°F, fans can help employees stay cooler.
  - Fans increase convection and evaporation.
  - They provide movement, which must directly impact the employee.



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Heat Illness Controls

Establish A Water Station

- Locate water stations as close as possible to areas where employees are working.
- Assure that the water is pure, fresh, cool, and free for employees.
- Employees should drink up to 4 cups per hour, especially during hot weather periods.
- Monitor the water supply throughout the day to ensure adequate supply.
- Employees should be encouraged to stay hydrated before, during, and after their shifts.



SAFETY ASSURANCE TIP

Establish a pre-shift inspection policy to ensure shade and water are near where employees work.

Heat Illness Controls

Choosing the Best Drink

In elevated temperatures, increase fluid intake.

- Water is preferable, but fluids with high electrolyte concentrations are OK in small quantities.
- Avoid alcohol, caffeine, carbonation, and sugar.

Employees must:

- Drink water before, during, and after working in heat, even if not thirsty.
- Drink small amounts frequently:
  - 6 ounces/15 minutes
  - 4 cups of water/hour if excessive sweating
- Not:
  - Drink extremely cold fluids.
  - Drink extreme amounts.

Heat Illness Controls

Proper Diet

- Diet affects ability to regulate heat.
- Employees should eat light, cool meals during their shifts.
- Don’t skip meals in hot weather.
- Heavy meals and hot foods can impact the body’s ability to regulate heat.



Heat Illness Controls

Clothing Options

- Clothing should be:
  - Reflective
  - Light-colored
  - Lightweight
  - Loose-fitting and breathable
- Clothing should cover exposed parts of the body.
- Hat with wide brim or bill.
- Consider providing:
  - Ice vests
  - Water-cooled garments
  - Phase change liquid cooling vests
  - Cooling cloths made from special fabrics



Heat Illness Controls

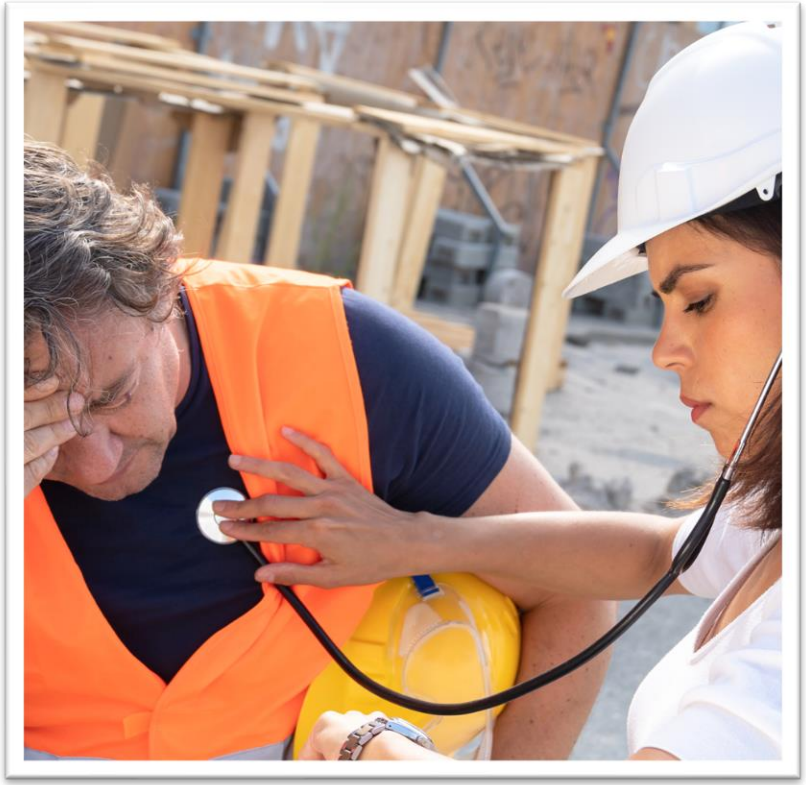
Acclimatization

- Acclimatization is the physical process of adapting to a different thermal environment.
- It occurs during one to two weeks of exposure, depending on:
  - Temperature
  - Humidity
  - Health and conditioning
- Gradually increase the length of time of work.
- Observe new employees during their first 14 days of working in high heat areas.
- Re-acclimatization is necessary if:
  - Employees are away for a week or more.
  - The temperate increases significantly.

Heat Illness Controls

Employee Monitoring

- Monitor for symptoms of heat illness.
- Watch those with risk factors more closely:
  - Heavy protective clothing
  - Working in direct sun
- Consider monitoring employees' heart rate and body temperature.
- Shorten work cycles and increase rest periods if employees':
  - Body temperatures are over 98.6°F.
  - Heart rates are over 110 beats per minute.



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Heat Illness Controls

Managing the Schedule

- Incorporate rest breaks.
  - Allow and encourage rest periods in shaded areas for at least 5 minutes for employees feeling that they need protection from overheating.
  - Never order employees back to work if they exhibit heat illness symptoms.
- Reduce workloads and/or rotate strenuous tasks.
- If heat index is at or above 115°F, suspend:
  - Strenuous work.
  - Work requiring non-breathable clothing.
- Reschedule strenuous jobs for the cooler part of the day.



SAFETY ASSURANCE TIP

Use the OSHA/NIOSH Heat Safety Tool App to monitor the Heat Index throughout the day.

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Temperature Controls

Heat Wave

- Assign supervisors to observe and monitor employees during a heat wave.
- A heat wave is defined as:
  - Consistent temperatures over 80°F.
  - Anytime the temperature is 10° higher than the average high daily temperature in the preceding 5 days.
- Review or create plans to monitor employees in high-heat conditions.



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Temperature Controls

Extreme Heat

When worksite temperatures equal or exceed **95°F**, the following procedures for extreme heat are necessary:

- Establish and maintain communications between employees and supervisors.
- Institute mandatory 10-minute break periods after every 2 hours worked.
- Supervise new employees for acclimatization.
- Monitor all employees for heat illness.
- Supervisors must remind employees to rest and drink water.
- Control convective heat by:
  - Decreasing air velocity.
  - Wearing clothing to cover exposed skin.

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Tips to Comply with Best Practices

Review your Heat Illness Prevention Plan and Employee Handbook. Ensure the following items are clear:

1. All requirements about potable water provisions, shade, preventative cool-down rest periods, high-heat procedures, acclimation, and training policies and procedures.
2. Emergency response including effective communication with employees by voice, observation, or electronic means, first aid response measures, and procedures for contacting emergency responders.
3. All additional state or local authorities' requirements should be addressed and communicated to employees.

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Summary

- Employees working in hot environments are at risk for heat illnesses.
- Risk is increased for those not acclimated to the heat, are obese, have specific medical conditions, or take certain medications.
- Heat illnesses include heat exhaustion, heat cramps, and heat stroke.
- Treatment includes cooling the victim and replacing fluids if the victim is conscious.
- Employees must drink plenty of water throughout the day, take breaks in the shade, and wear appropriate clothing and PPE.
- Immediately report signs of heat illness.