



Heat Illness Prevention Program

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1. Program Description

The purpose of this program is to ensure that all UC Riverside employees, working in outdoor places of employment or in other areas when environmental risk factors for heat illness are present, are protected from heat illness and are knowledgeable of heat illness symptoms, methods to prevent illness, and procedures to follow if symptoms occur.

2. Scope

The Heat Illness Prevention Program applies to all University employees that may be at risk of heat illness and applies to all indoor and outdoor places of employment where environmental risk factors for heat illness are present.

3. Definitions

Acclimatization: means the temporary adaptation of the body to work in the heat that occurs gradually when a person is exposed to it. Acclimatization peaks in most people within four to fourteen days of regular work for at least two hours per day in the heat.

Heat Illness: means a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat rash, heat cramps, heat exhaustion, heat syncope, and heat stroke.

Environmental Risk Factors for Heat Illness: means working conditions that create the possibility that heat illness could occur, including air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity, and duration, protective clothing and personal protective equipment worn by employees.

Landscaping: means providing landscape care and maintenance services and/or installing trees, shrubs, plants, lawns, or gardens, or providing these services in conjunction with the design of landscape plans and/or the construction (i.e., installation) of walkways, retaining walls, decks, fences, ponds, and similar structures, except for employment by an employer who operates a fixed establishment where the work is to be performed and where drinking water is plumbed.

Personal Risk Factors for Heat Illness: Factors such as an individual's age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body's water retention or other physiological responses to heat.

Potable: A liquid that is suitable and safe to drink.

Preventative Recovery Period: A period, at least five minutes, used to recover from the heat in order to prevent further heat illness.

Shade: Blockage of direct sunlight. Canopies, umbrellas, and other temporary structures or devices may be used to provide shade. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when the heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to a person inside it, unless the car is running with air conditioning.

Temperature: means the dry bulb temperature in degrees Fahrenheit obtainable by using a thermometer to measure the outdoor temperature in an area where there is no shade. While the temperature measurement must be taken in an area with full sunlight, the bulb or sensor of the thermometer should be shielded while taking the measurement, e.g., with the hand or some other object, from direct contact with sunlight.

Wet Bulb Globe Temperature (WBGT): means a type of apparent temperature used to estimate the effect of temperature, humidity, wind speed (wind chill), and visible and infrared radiation (usually sunlight) on humans. It is used by industrial hygienists, sporting events and the military to determine appropriate exposure levels to high temperatures. Measurements are taken with a WBGT meter, and the actual WBGT is derived using a formula.



4. Responsibilities

Employees

- Awareness and compliance with all appropriate heat illness prevention procedures while performing assigned duties
- Take extra precautions while wearing PPE and face coverings by reducing the interval times between breaks and visits to shade.
- Employees are ultimately responsible for drinking adequate amounts of hydrating fluids when the environmental risk factors for heat illness are present (See [appendix A](#)). Ensure you are hydrated when you arrive to work
- Alert your supervisor if you have heat intolerance due to medical conditions and/or medications you are taking
- Ensure access to a shaded area is available to recover from heat related symptoms prior to beginning work tasks
- Request supervisors schedule hot area or outdoor tasks early in the day or at night when temperatures are lower
- Inform supervisors if shade and/or water is inadequate
- Report any symptoms of heat related illness promptly to supervisors
- Call 911 to request emergency medical services in the event medical assistance is required for anyone

Supervisors

- Identify and maintain records of all tasks/employees that are required to work indoors or outdoors where potential heat illness could occur
- Monitor weather conditions and alert employees of heat illness prevention measures when the temperature exceeds 80 degrees
- Complete Worksite Specific Heat Illness Work Plan for all work areas off the main campus and/or that do not fall under the general campus plan. Examples include Agricultural Operations, Botanic Gardens, CE-CERT, Reserves, Palm Desert, etc.
- Require all affected employees to receive proper training on heat illness prevention and comply with all appropriate procedures
- Attend supervisor training for heat illness prevention
- Provide worksite-specific training that identifies specifically where and how water, rest, and shade are handled
- Schedule outdoor or hot area tasks early in the day or at night when temperatures are lower
- Take extra precautions for teams wearing PPE and face coverings by reducing the interval times between breaks and increasing visits to shade.
- Ensure that adequate water and shade are available at the job site when the environmental risk factors for heat illness are present
- Always provide shade when the temperature reaches 80 degrees and by request if lower than 80 degrees
- Identify indoor air-conditioned cooling locations where possible and inform employees of them
- Initiate high-heat procedures when temperatures reach 95 degrees including:
 - Ensure there is effective communication by voice, observation, or electronic means is maintained so that employees can contact a supervisor when necessary. Cell phone may be used for this purpose only if there is reliable signal.
 - Observing employees for alertness or signs and symptoms heat illness by implementing one or more of the following methods:
 - A supervisor or designee to observe per 20 or fewer employees

- Mandatory buddy system
- Regular communication check-ins with a designee dedicated to this task
- Other effective means of observation
 - Have a designated employee at each worksite authorized to call for emergency medical services and allow other employees to call when that person is unavailable. They must know how to direct emergency medical services to the location.
 - Remind employees throughout the day to drink adequate amounts of water.
 - Conduct a start-of-shift meeting before work begins to review the high heat procedures and discuss shade options, cooling options, water availability, recommended water amounts, and remind them of their right to take breaks as needed.
 - Require cool-down breaks for 10 minutes every 2 hours. These can be provided concurrently with regular rest breaks and meal breaks.
- Provide shade directly over the work location whenever possible with tents or umbrellas
- Provide fans, misters, misting fans, or other supplemental cooling to work and shade areas
- Encourage and allow employees to take cool-down breaks as needed when they feel they need to do so in order to protect themselves from overheating
- Supervisors must monitor employees or designate someone to monitor employees during work and breaks to watch for signs of heat illness
- Encourage employees to drink water frequently
- Provide coolers of chilled water or ice
- If employees show any signs of heat illness initiate first aid procedures
- Call 911 to request emergency medical services in the event medical assistance is required

Environmental Health and Safety (EH&S)

- Establish and update the written Heat Illness Prevention Program
- Provide consultation/training to departments who fall within the scope of the program

- Conduct heat exposure assessments when requested
- Assist departments in determining when, where, and how water and shade is provided

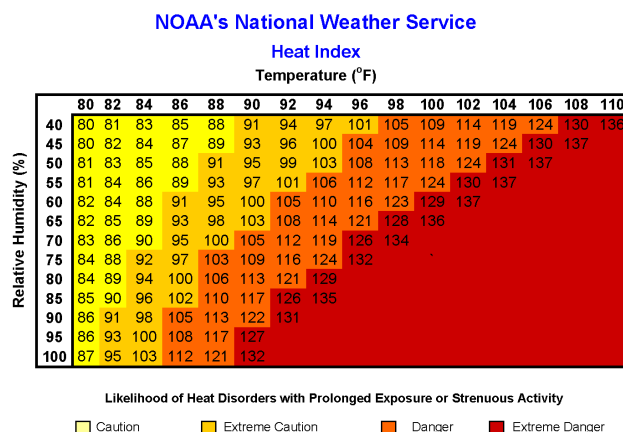
5. Program Components

The following elements of the University's program for [heat illness](#) prevention provide specific information for departments and supervisors complying with the program:

Determining Weather conditions

Supervisors should monitor weather conditions year-round. Here in Southern California 80-degree days can happen in month and trigger heat illness prevention actions. For UCR purposes, the heat index will provide the adjusted temperature we should base our level of action upon. You can determine the heat index by finding the temperature and humidity from the [National Weather Service](#) for forecasts and current conditions. You will need to use the heat index chart below to determine the heat index. An acceptable alternative to this is to download and use the [NIOSH Heat Safety Tool](#) app on a cell phone or other supported device. The app is a more user-friendly tool which gives you the heat index (feels like temperature) and also provides symptom lists, first aid procedures, a hydration and rest timer, and other useful information.

If the heat index or "feels like" temperature is in the danger or extreme danger zone, the work should be rescheduled for overnight, earlier in the day or when the weather improves. Activities outside during a danger or extreme danger period should be for emergency and critical repairs only. All other regular non-critical work must be rescheduled unless engineering and administrative controls can effectively reduce the hazard as determined by EH&S.



Heat Illness Symptoms

Heat-related illnesses occur when the body's temperature regulation mechanisms are overwhelmed by excessive heat exposure. These conditions can range from mild to severe and require immediate attention to prevent further complications. Here is a synopsis of common heat illnesses and their respective symptoms:

1. Heat Rash (Prickly Heat) Symptoms:

- Red, itchy rash with small blisters, usually occurring in areas covered by clothing.

2. Heat Cramps Symptoms:

- Painful muscle cramps, particularly in the legs, arms, or abdomen
- Profuse sweating.

3. Heat Syncope (Fainting) Symptoms:

- Dizziness
- Lightheadedness
- Fainting
- Temporary loss of consciousness due to reduced blood flow to the brain.

4. Heat Exhaustion Symptoms:

- Heavy sweating
- Weakness
- Fatigue
- Dizziness
- Headache
- Nausea
- Vomiting
- Cool and clammy skin
- Fast and shallow breathing
- Elevated heart rate
- Low blood pressure

5. Heat Stroke (Hyperthermia) Symptoms:

- High body temperature (usually above 103°F or 39.4°C)

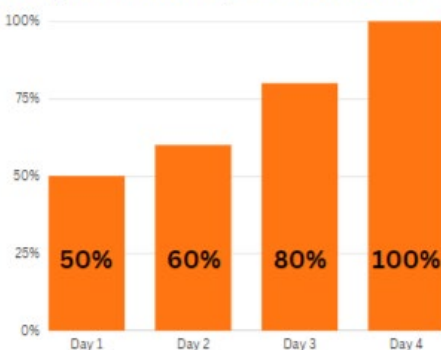
- Hot and dry skin (lack of sweating), strong and rapid pulse
- Throbbing headache
- Confusion
- Dizziness
- Seizures
- Disorientation
- Loss of consciousness
- Other potentially life-threatening complications
- Requires medical attention

It is essential to recognize the signs and symptoms of heat-related illnesses promptly. If you or someone else experiences severe symptoms indicating heat stroke, seek immediate medical attention. In the case of mild to moderate symptoms, it is crucial to move to a cooler environment, rest, drink plenty of fluids, and apply cool compresses to aid in cooling the body. Prevention is key to avoiding heat-related illnesses.

Acclimatization

Supervisors are required to acclimatize employees and allow time to adapt when temperatures rise suddenly and employee's risk for heat illness increase. [Acclimatization](#) may also be required for new employees, employees working at temperatures to which they have not been exposed for several weeks or longer, or employees assigned to new jobs in hot environments. There is no set time for acclimatization because everyone is different. Generally, about four to fourteen days of daily heat exposure is needed for acclimatization. See the graphics below for a suggested acclimatization schedule. Heat acclimatization requires a minimum daily heat exposure of about two hours of work. Gradually increase the length of work each day until an appropriate schedule adapted to the required activity level for the work environment is achieved. This will allow the employee to acclimate to conditions of heat while reducing the risk of heat illness.

Sample Plan for Experienced Workers



Sample Plan for New Workers



It should be noted that new employees are among those most at risk of suffering the consequences of inadequate acclimatization. Supervisors with new employees (newly hired, transferred, or assigned) should be extra-vigilant during the acclimatization period, and respond immediately to signs and symptoms of possible heat illness.

Provision of Water

Whenever [environmental risk factors for heat illness](#) exist, supervisors are responsible to ensure that clean, fresh, and cool [potable](#) water is readily available to employees. See [Appendix A](#) for a map of refill stations on campus.

Where unlimited drinking water is not immediately available from a plumbed system, supervisors must provide enough water for every employee to be able to drink one quart of water per hour for the entire shift (at least 2 gallons per employee for an 8-hour shift). Smaller quantities of water may be provided at the beginning of the shift if there are effective procedures for replenishing the water supply during the shift as needed.

The Cal/OSHA standard requires not only that water be provided, but that supervisors encourage employees to drink frequently. Employees must understand that thirst is not an effective indicator of a person's need for water and it is recommended that individuals drink one quart of water, or four 8-ounce cups, per hour when working in hot environments. The amount can vary according to workload and some people may need more water.

Fluid Replacement Guide

| Heat Category | WBGT Index, (°F) | Easy Work Walking on hard surface, 2.5 mph, <30 lb. load; weapon maintenance, marksmanship training. | Moderate Work Patrolling, walking in sand, 2.5 mph, no load; callisthenics. | Hard Work Walking in sand, 2.5 mph, with load; field assaults. |
|---------------|------------------|---|--|---|
| | | Fluid Intake (quarts/hour) | Fluid Intake (quarts/hour) | Fluid Intake (quarts/hour) |
| 1 | 78° - 81.9° | ½ | ¾ | ¾ (1)* |
| 2 | 82° - 84.9° | ½ | ¾ (1)* | 1 (1¼)* |
| 3 | 85° - 87.9° | ¾ | ¾ (1)* | 1 (1¼)* |
| 4 | 88° - 89.9° | ¾ | ¾ (1¼)* | 1 (1¼)* |
| 5 | > 90° | 1 | 1 (1¼)* | 1 (1¼)* |

*Use the amounts in parentheses for continuous work when rest breaks are not possible. Leaders should ensure several hours of rest and rehydration time after continuous work. This guidance will sustain performance and hydration for at least 4 hours of work in the specified heat category. Fluid needs can vary based on individual differences (± ¼ q/hr) and exposure to full sun or full shade (± ¼ q/hr). Rest means minimal physical activity (sitting or standing) in the shade if possible. Body armor - add 5°F to WBGT Index in humid climates. NBC (MOPP 4) - Add 10°F (Easy Work) or 20°F (Moderate or Hard Work) to WBGT Index. **CAUTION:** Hourly fluid intake should not exceed 1½ qts. Daily fluid intake should not exceed 12 qts.



USAPHC 1-800-222-9695 <http://phc.amedd.army.mil>

TA-091-0615 (Also available as a poster.)
Approved for public release, distribution unlimited.

Departments shall take one or more of the following steps to ensure employees have access to drinking water:

1. Provide access to drinking fountains
2. Supply water cooler/dispenser and single service cups
3. Supply sealed one time use water containers

Drinking water and water dispensers shall meet the following requirements:

- All sources of drinking water shall be maintained in a clean and sanitary condition
- Drinking water must always be kept cool. When temperatures exceed 90°F it is recommended that ice be provided to keep the water cool. (Ice is available at EH&S)
- Potable drinking water dispensers used to provide water to more than one person shall be equipped with a spigot or faucet.
- Any container used to store or dispense drinking water shall be clearly marked as to the nature of its contents and shall not be used for any other purpose.
- Dipping or pouring drinking water from containers, such as barrels, pails or tanks, is prohibited regardless of whether or not the containers are fitted with covers.
- The use of shared cups, glasses or other vessels for drinking purposes is prohibited.
- Non-potable water shall not be used for drinking.
- Outlets for non-potable water shall be posted in a manner understandable to all employees that the water is unsafe for drinking.

Access to Shade

Supervisors are responsible to ensure that employees have access to a [shaded](#) area. Shaded areas should be large enough to accommodate 25 percent of the employees on a shift and allow employees to sit in the shade without touching each other.

The nearest shaded area must be as close as practicable. Usually this will mean that shade must be reachable within a 2 1/2-minute walk, but in no case more than 1/4-mile or a five-minute walk away, whichever is shorter.

Canopies, umbrellas or other temporary structures may be used to provide shade, provided they block direct sunlight. Trees and dense vines can provide shade if the canopy of the trees is sufficiently dense to provide substantially

complete blockage of direct sunlight. Areas shaded by artificial or mechanical means, such as by a pop-up canopy as opposed to a tree, must provide means for employees to avoid contact with bare soil.



The interior of a building or vehicle may be used to provide shade if the vehicle is air-conditioned and the air conditioner is operating.

Misting and evaporative cooling fans may be used in lieu of shade if it can be demonstrated they are at least as effective in allowing employees to cool.

If the National Weather Service, as of 5 p.m. the previous day, forecasts the temperature to be over 80°F, shade structures must be available at the beginning of the shift and present throughout the day. Regardless of predicted temperatures, supervisors must always have the capability to provide shade promptly if employees request it. If the temperature is predicted to exceed 90°F, shade must actually be present regardless of the previous day's predicted temperature high.

While employees are taking cool-down breaks in the shade, supervisors, or their trained designees must monitor employees for symptoms of heat illness. If any employee shows signs of heat illness appropriate first aid or emergency response should be initiated.

Preventive Recovery Periods

A recovery period is essential for the prevention of heat illness. The supervisor is required to provide access to shade for employees who believe they need a [preventive recovery period](#) from the effects of heat and for any who exhibit indications of heat illness.

Access to shade must be allowed at all times, and employees must be allowed to remain in the shade for at least five minutes. If employees are wearing PPE including but not limited to respirators, face coverings, disposable coveralls, backpack vacuums, arc flash suits, and welding gear they need to be allowed more frequent breaks to prevent overheating. These breaks may need to be

longer in order to allow the employees to remove PPE to cool more completely. In addition, activities in hot locations like in the tunnels, some welding or pipe soldering operations will require more frequent breaks where the employees need to leave the area to a cooler area often.

The purpose of the preventive recovery period is to reduce heat stress on the employee. The preventive recovery period is not a substitute for medical treatment.

See Appendix C for additional work rest guidance

High Heat Procedures

When the temperature hits 95 degrees or higher, high-heat procedures must be implemented by supervisors. These procedures are as follows:

1. Supervisors must ensure effective communication by voice, observation, or electronic means is maintained so that employees at the worksite can contact a supervisor when necessary. Cell phone calling or texting, and radio communication are acceptable but must be tested to ensure it works and also continues to work throughout the shift.
2. Employees must be observed for alertness and signs or symptoms of heat illness. The supervisor is responsible to ensure effective observation/monitoring by implementing one or more of the following:
 - a. Supervisor or designee observing 20 or fewer employees per person
 - b. Mandatory buddy system
 - c. Regular communication with each employee by radio, cell phone
 - d. Another effective method as approved by EH&S
3. Designate one or more employees on each worksite as authorized to call for emergency medical services, and allow other employees to call for emergency services when no designated person is available.
4. Reminding employees to drink water throughout the shift
5. Supervisors must hold pre-shift meetings before the start of work to review the high heat procedures, where to access shade and cooling areas, supervisors must remind employees to take water with them and encourage them to drink, and remind employees of their right to take a cool-down rest when necessary.
6. For employees in agricultural work:
 - When temperatures reach 95 degrees or above, the employer shall ensure that the employees take a minimum ten-minute net preventative cool-

down rest period every two hours. The preventative cool-down rest period required by this paragraph may be provided concurrently with any other meal or rest period required by Industrial Welfare Commission Order No. 14 (8 CCR 11140) if the timing of the preventative cool-down rest period coincides with a required meal or rest period thus resulting in no additional preventative cool-down rest period required in an eight-hour workday. If the workday will extend beyond eight hours, then an additional preventative cool-down rest period will be required at the conclusion of the eighth hour of work; and if the workday extends beyond ten hours, then another preventative cool-down rest period will be required at the conclusion of the tenth hour and so on. For purposes of this section, the preventative cool-down rest period has the same meaning as the “recovery period” in Labor Code Section 226.7(a).

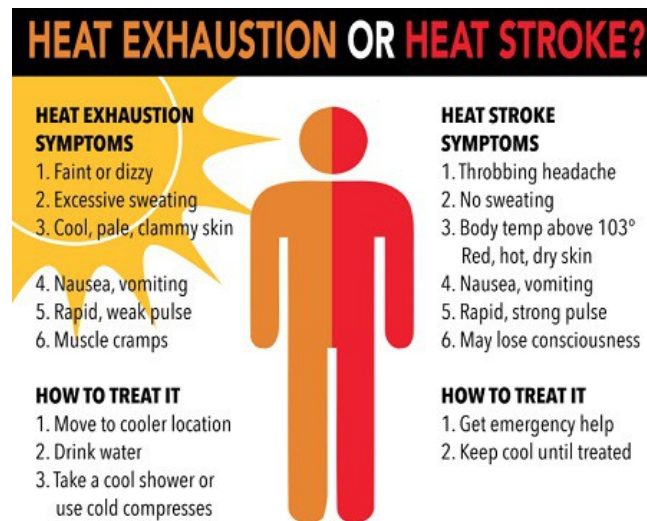
Emergency Procedures

If an employee has any symptoms of heat illness, first-aid procedures should be initiated without delay. Common early signs and symptoms of heat illness include headache, muscle cramps, and unusual fatigue. However, progression to more serious illness can be rapid, and can include loss of consciousness, seizures, mental confusion, unusual behavior, nausea or vomiting, hot dry skin, or unusually profuse sweating.

Any employee exhibiting any of the above-mentioned symptoms requires immediate attention. Even the initial symptoms may indicate serious heat exposure. If medical personnel are not immediately available onsite and serious heat illness is suspected, emergency medical personnel should be immediately contacted and on-site first aid undertaken. No employee with symptoms of possible serious heat illness should be left unattended or sent home without medical assessment and authorization.

All Supervisors and employees must be trained to recognize and respond to symptoms of possible heat illness.

If any employee exhibits signs or symptoms of heat stroke emergency medical services must be contacted. Supervisors must be able to provide clear and precise directions to the worksite and should carry cell phones or other means of communication to ensure that emergency services can be called.



6. Reporting Requirements

Constant awareness of and respect for heat illness prevention procedures and compliance with all applicable UC Riverside safety rules is mandatory.

Employees may report any safety concerns to their supervisor or EH&S (827-5528.)

Supervisors may issue warnings to employees and implement disciplinary actions up to and including termination for failure to follow the guidelines of this program.

Representatives of EH&S are authorized to issue safety warnings to departments, supervisors, and employees and stop unsafe work from continuing.

7. Training Requirements and Competency Assessment

Training shall be provided by EH&S for all potentially impacted employees, and their supervisors, working where environmental risk factors for heat illness are present. Training information shall include, but not be limited to:

- Environmental and [personal risk factors](#) for heat illness
- Procedures for identifying, evaluating, and controlling exposure to environmental risk factors for heat illness
- The importance of frequent consumption of hydrating fluids, up to 1 quart (4 cups of water) per hour, when environmental risk factors for heat illness are present. Particularly when employee is excessively sweating during the exposure

- The importance of acclimatization
- Different types of heat illness and the common signs and symptoms of heat illness
- The importance of immediately reporting symptoms or signs of heat illness, in themselves or in co-workers, to their supervisor
- Understanding the procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by emergency medical service
- Procedures for ensuring that, in the event of an emergency, clear and precise direction to the work site can and will be provided to emergency responders

Supervisors shall receive training on the following topics in addition to the above list prior to being assigned to supervise outdoor employees.

- The training information required of the employees, detailed above
- Procedures supervisors are to follow to implement the provisions of this program
- Procedures the supervisor shall follow when an employee exhibits symptom consistent with possible heat illness, including emergency response procedures

Retraining will be required under any of the following conditions:

Annual retraining is encouraged but not required unless one of the conditions listed below is met.

- Periodically, EH&S may assign training to teams as an update or to refresh the information as part of safety initiative.
- Changes in the workplace render previous training obsolete or inadequate
- Inadequacies in an employee's knowledge of heat illness prevention indicate that the employee has not retained the required information and heat stress management strategies
- If the training is assigned by the supervisor or EH&S it is required.

UCR online heat illness training is always available in the UC Learning Center here: [Heat Illness](#)

Training records shall be maintained by EH&S for a minimum of 3 years beyond employment.

8. Information and External References

Worksite Specific Heat Illness Prevention Plan Template

<https://live-ucr-ehs.pantheonsite.io/document/worksite-specific-heat-illness-work-plan>

Worksite Heat Illness Prevention Compliance Checklist

<https://live-ucr-ehs.pantheonsite.io/document/ucr-heat-illness-prevention-compliance-checklist>

Cal/OSHA Heat Illness Prevention

<https://www.dir.ca.gov/dosh/heatillnessinfo.html>

Title 8 California Code of Regulations, General Industry Safety Orders - §3395

<https://www.dir.ca.gov/title8/3395.html>

Heat Illness Prevention: What you need to know

<http://www.99calor.org/downloads/factsheet.english.pdf>
<http://www.99calor.org/downloads/factsheet.spanish.pdf>

Heat Illness Prevention Enforcement Q&A

<http://www.dir.ca.gov/dosh/heatillnessQA.html>

Protect Yourself from Heat Illness Cards

http://www.dir.ca.gov/dosh/dosh_publications/HeatIllnessEmployeeEngSpan.pdf

OSHA-NIOSH Heat Safety Tool App

<https://www.cdc.gov/niosh/topics/heatstress/heatapp.html>

CDC Poster

https://www.cdc.gov/niosh/docs/2016-151/pdfs/fy16_heat-related-illness-poster_2016-151.pdf

CDC Infographic

<https://www.cdc.gov/niosh/topics/heatstress/infographic.html>

CDC Protect Yourself from Heat Stress Podcast

<https://tools.cdc.gov/medialibrary/index.aspx#/media/id/303858>

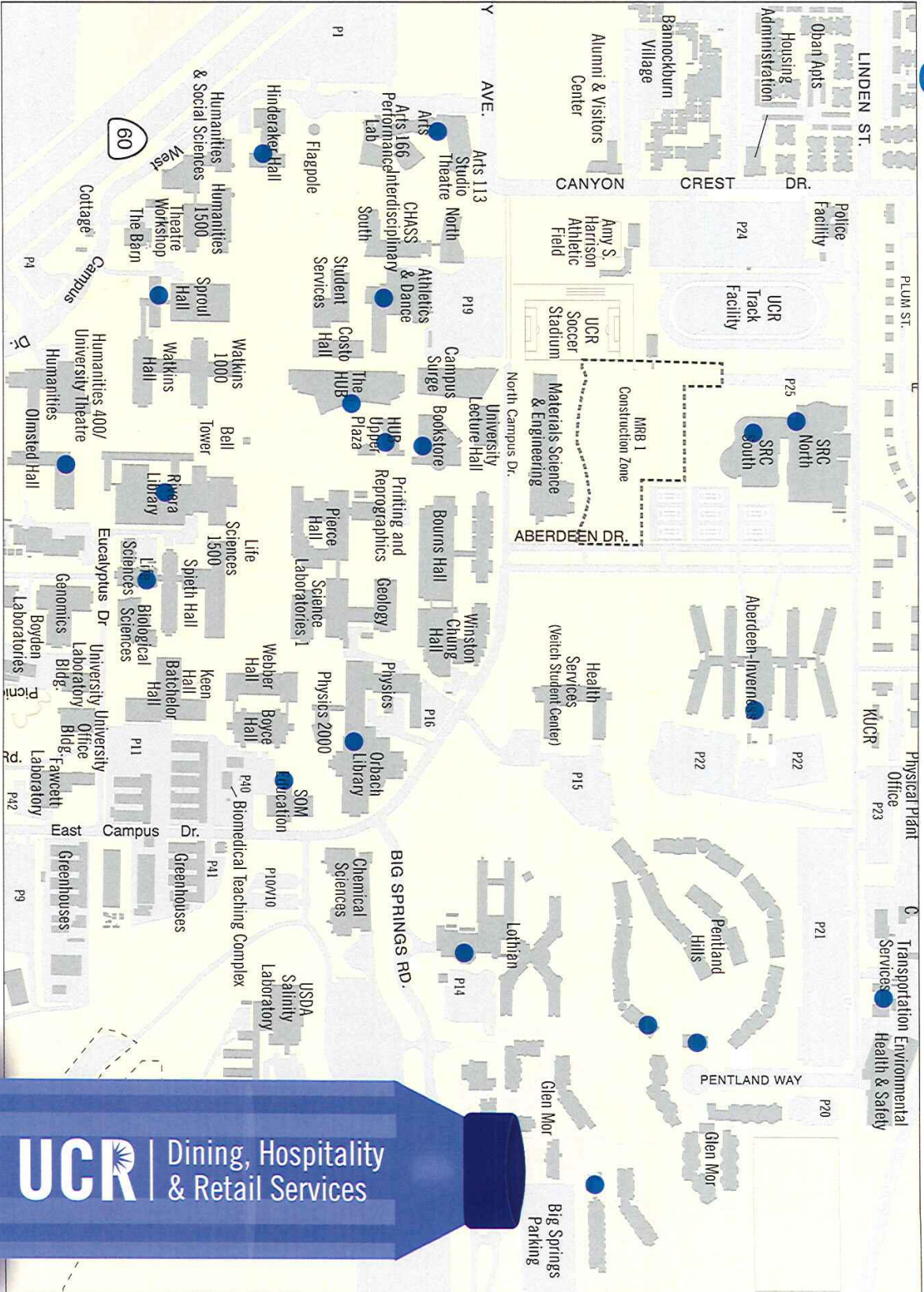
National Ag Safety Database: Keep Cool

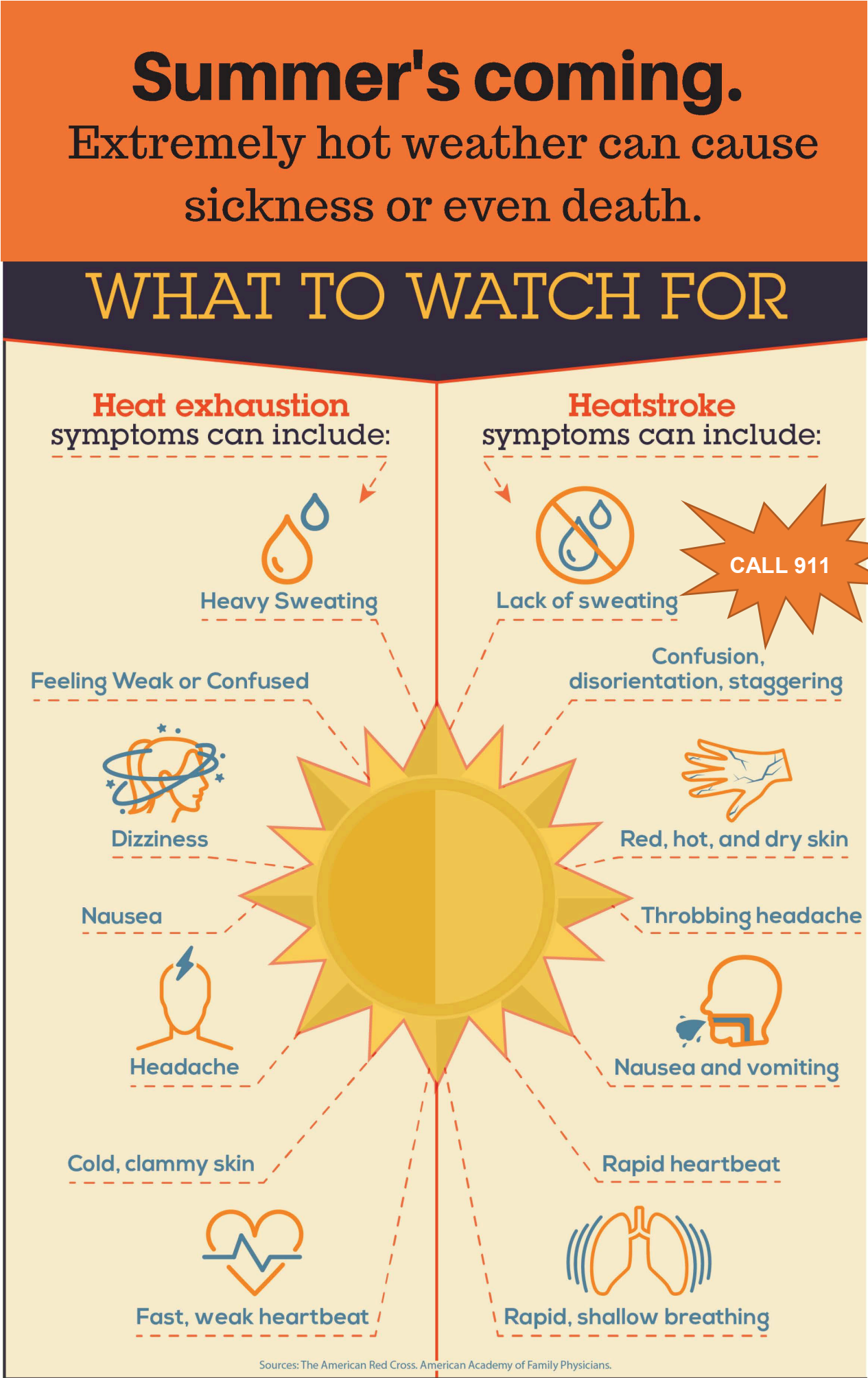
<https://nasdonline.org/182/d000004/keep-cool.html>

A guide to refillable water stations at UCR

Appendix A

- Water Refill Station Know where other refillable water stations are located? Please email mkaplan@ucr.edu.





Drink plenty of water and stay cool!



Appendix C



Sample Work/Rest Schedule for Workers Wearing Normal Clothing*

The NIOSH work/rest schedule is based on air temperature, with adjustments for direct sunlight and humidity. It may not be applicable to all worksites. Other work/rest schedules are available, some of which are based on Wet Bulb Globe Temperature. See reverse for temperature adjustments for the NIOSH work/rest schedule and examples of light, moderate, and heavy work.

| Temperature (°F) | Light Work Minutes Work/Rest | Moderate Work Minutes Work/Rest | Heavy Work Minutes Work/Rest |
|------------------|---------------------------------|------------------------------------|---------------------------------|
| 90 | Normal | Normal | Normal |
| 91 | Normal | Normal | Normal |
| 92 | Normal | Normal | Normal |
| 93 | Normal | Normal | Normal |
| 94 | Normal | Normal | Normal |
| 95 | Normal | Normal | 45/15 |
| 96 | Normal | Normal | 45/15 |
| 97 | Normal | Normal | 40/20 |
| 98 | Normal | Normal | 35/25 |
| 99 | Normal | Normal | 35/25 |
| 100 | Normal | 45/15 | 30/30 |
| 101 | Normal | 40/20 | 30/30 |
| 102 | Normal | 35/25 | 25/35 |
| 103 | Normal | 30/30 | 20/40 |
| 104 | Normal | 30/30 | 20/40 |
| 105 | Normal | 25/35 | 15/45 |
| 106 | 45/15 | 20/40 | Caution |
| 107 | 40/20 | 15/45 | Caution |
| 108 | 35/25 | Caution | Caution |
| 109 | 30/30 | Caution | Caution |
| 110 | 15/45 | Caution | Caution |
| 111 | Caution | Caution | Caution |
| 112 | Caution | Caution | Caution |

Things you need to know:

- Continuous work in the heat is not advisable—you must take rest breaks periodically to allow your body to cool down.
- A variety of work/rest schedules are available that can be adapted to your worksite. Relying on self-pacing alone may not be sufficient.

Example

A worker performing heavy work in 104 °F temperatures should work for 20 minutes and rest for 40 minutes.

Example

A worker performing moderate work at 108 °F should use extreme caution! The risk for heat injury is high in this situation.

* From NIOSH Criteria for a Recommended Standard, Occupational Exposure to Heat and Hot Environments, <https://www.cdc.gov/niosh/docs/2016-106/pdfs/2016-106.pdf>. **Assumptions:** workers are physically fit, well-rested, fully hydrated, under age 40, and environment has 30% humidity and perceptible air movement.

HEAT STRESS

Work/Rest Schedules

Temperature Adjustments for this Work/Rest Schedule

Adjust the temperature in the table based on:

| Environmental conditions | AND | Humidity |
|---|-----|--|
| <ul style="list-style-type: none">• Full sun (no clouds): Add 13 °F• Partly cloudy/overcast: Add 7 °F• No shadows visible, in the shade, or at night: No adjustment | | <ul style="list-style-type: none">• 40% humidity: Add 3 °F• 50% humidity: Add 6 °F• 60% humidity or more: Add 9 °F |
| <div><div>Example Adjustment</div><div>Conditions at a mine are 90 °F, with partly cloudy skies and 50% humidity. Adjust the table as follows: Add 7 °F for partly cloudy skies and 6 °F for 50% humidity, to arrive at 103 °F.</div></div> | | |




Photo by ©Thinkstock

Examples of Work at Different Intensity Levels

Light work

- Operating equipment
- Inspection work
- Walking on flat, level ground
- Using light hand tools (wrench, pliers, etc.). However, this may be moderate work depending on the task
- Travel by conveyance

Moderate work

- Jack-leg drilling
- Installing ground support
- Loading explosives
- Carrying equipment/supplies weighing 20–40 pounds
- Using hand tools (shovel, fin-hoe, scaling bar) for short periods

Heavy work

- Climbing
- Carrying equipment/supplies weighing 40 pounds or more
- Installing utilities
- Using hand tools (shovel, fin-hoe, scaling bar) for extended periods

Case Study: Use of Work/Rest Schedule

A crew was shoveling ore out from under the primary conveyor at a surface mine in Arizona in August. The high temperature that day was 113 °F. The crew was rotating in 10-minute shifts and hydrating between shifts. Coworkers noticed signs of heat illness in two employees, and they were transferred to the medical station for evaluation. From there they were sent to the hospital, where they were given IV saline and released home. Both employees recovered after rehydration at the hospital.

Lessons Learned

In extreme heat, even a work/rest schedule may not eliminate the risk of heat illness. In this case, use of work/rest schedules, frequent hydration, and team monitoring helped keep this situation from becoming even more serious. Without those safety precautions the workers could have potentially suffered more severe heat illness, possibly including heat stroke, which is life threatening.

Appendix D

NOAA's National Weather Service
Heat Index

Temperature (°F)

| | 80 | 82 | 84 | 86 | 88 | 90 | 92 | 94 | 96 | 98 | 100 | 102 | 104 | 106 | 108 | 110 |
|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 40 | 80 | 81 | 83 | 85 | 88 | 91 | 94 | 97 | 101 | 105 | 109 | 114 | 119 | 124 | 130 | 136 |
| 45 | 80 | 82 | 84 | 87 | 89 | 93 | 96 | 100 | 104 | 109 | 114 | 119 | 124 | 130 | 137 | |
| 50 | 81 | 83 | 85 | 88 | 91 | 95 | 99 | 103 | 108 | 113 | 118 | 124 | 131 | 137 | | |
| 55 | 81 | 84 | 86 | 89 | 93 | 97 | 101 | 106 | 112 | 117 | 124 | 130 | 137 | | | |
| 60 | 82 | 84 | 88 | 91 | 95 | 100 | 105 | 110 | 116 | 123 | 129 | 137 | | | | |
| 65 | 82 | 85 | 89 | 93 | 98 | 103 | 108 | 114 | 121 | 128 | 136 | | | | | |
| 70 | 83 | 86 | 90 | 95 | 100 | 105 | 112 | 119 | 126 | 134 | | | | | | |
| 75 | 84 | 88 | 92 | 97 | 103 | 109 | 116 | 124 | 132 | | | | | | | |
| 80 | 84 | 89 | 94 | 100 | 106 | 113 | 121 | 129 | | | | | | | | |
| 85 | 85 | 90 | 96 | 102 | 110 | 117 | 126 | 135 | | | | | | | | |
| 90 | 86 | 91 | 98 | 105 | 113 | 122 | 131 | | | | | | | | | |
| 95 | 86 | 93 | 100 | 108 | 117 | 127 | | | | | | | | | | |
| 100 | 87 | 95 | 103 | 112 | 121 | 132 | | | | | | | | | | |

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

- Caution
- Extreme Caution
- Danger
- Extreme Danger