

Heat Illness Prevention Handbook

Supervisors Copy



April 2009

Note to Supervisors:

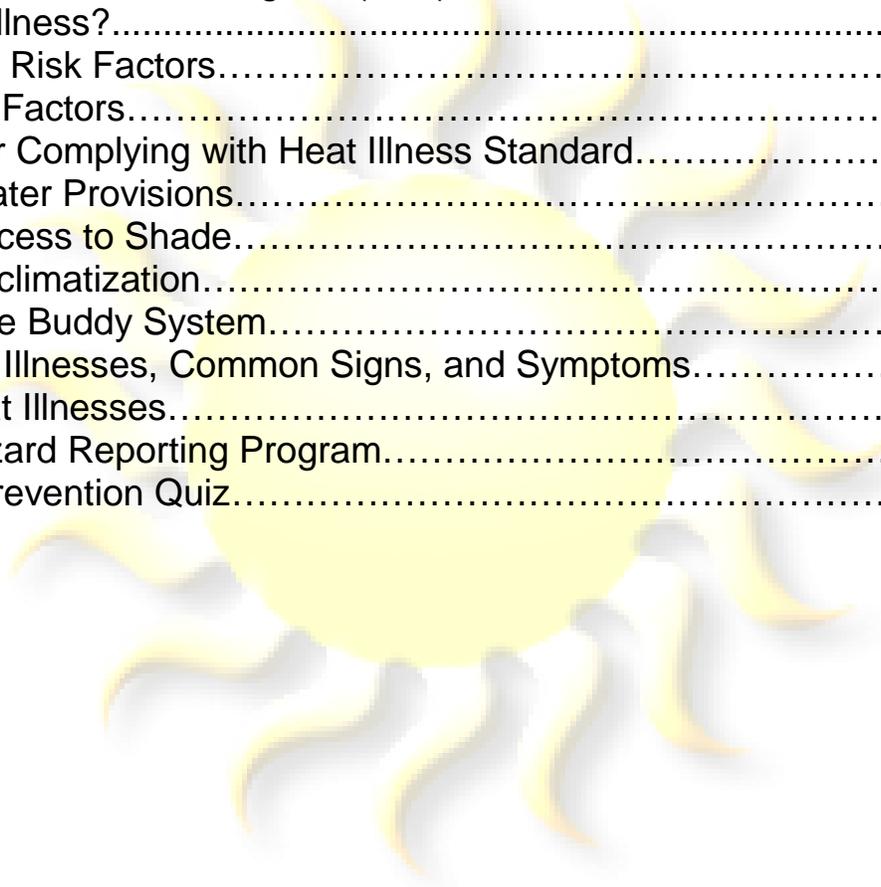
This handbook was developed to help you satisfy the training requirement for educating employees and supervisors of the dangers of working in the heat per the California Code of Regulations (CCR) Title 8, section 3395. Please look over the training tips below before you begin this training.

Training Tips:

- ❖ This handbook was designed to keep employees engaged throughout the training process. There will be exercises and fill-in sections throughout the handbook. Your version has the answers ***italicized*** and highlighted in **grey**.
- ❖ The training will be more effective if you do not simply run through each page and give the employees the answers. Read through each page and ask the employees to write down the answers as you go along. The exception to this is you do not have to read through the definitions page as all definitions will be discussed in the handbook in detail.
- ❖ Be patient as you deliver this training. If your employees need any answers repeated, you may elect to ask the employees to hold off on requesting answers until you get through the handbook. Make sure they receive the answers before the quiz at the end of the handbook.
- ❖ The quiz is designed to recap some of the important elements of the training. You do need to have the employees go through the quiz on their own. Give the employees ample time to go through the quiz and answer the questions. Once everyone has completed the quiz, read through the questions and get a consensus as to the correct answer. Provide the correct answers if necessary and explain why the false answers are false.
- ❖ The decision to collect and retain the employees' quizzes shall be at the discretion of the department.
- ❖ This handbook is a tool for recognizing heat illnesses and prevention techniques. Therefore employees should keep it handy in their work environment.

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Scope

Employees working outdoors in extreme heat may be at risk for heat related illnesses. It is important to know and understand the symptoms that can lead to serious illness and even death so appropriate steps can be taken to minimize these illnesses from occurring. This handbook has been developed to educate employees and supervisors of the dangers of working in the heat and to help satisfy the training requirement for preventing heat illness as required by the California Code of Regulations (CCR), Title 8, section 3395. It is not intended to replace the written Heat Illness Prevention Program established in any given department which shall be the authority for establishing responsibilities among employees, supervisors, and procedures for mitigating heat related illnesses.



Authority

CCR, Title 8; section 3395- Heat Illness Prevention. Title 8 Section 3203- Injury & Illness Prevention Program and Management Directive 1610- Injury and Illness Prevention Program also apply.

Additional Title 8 sections include 1230(a), 1512, 1524, 3363, 3400, 3439, 3457, 6251, 6512, 6969, 6975, 8320, and 8602 (e).

Resources

Cal/OSHA Consultation- Heat Prevention etool
DOSH Heat Illness Prevention Q&A



Definitions

Acclimatization- Means 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 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.

Personal risk factors for heat illness- Means 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.

Preventative recovery period- Means a period of time to recover from the heat in order to prevent heat illness.

Shade- Means 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 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.



Injury & Illness Prevention Program (IIPP)



Question: What is an IIPP?

Answer: In a nut shell it is the County's safety program. The goal of this program is to communicate hazards that may exist in the work environment to reduce injuries and illnesses in the work environment.

The IIPP must have the following components:

- ❖ Effective procedures for **hazard identification**.
- ❖ Evaluation and **control**.
- ❖ Hazard correction.
- ❖ **Investigation** of employee injuries and illnesses.
- ❖ **Communication** with employees about health and safety matters.



Fresno County has adopted Management Directive 1610 as the authority for the IIPP.



Question: Do you know what is expected of you under the County's IIPP?

Answer: All employees shall comply with occupational safety and health standards applicable to their actions and conduct on the job.

Employees shall:

- ❖ Use **personal protective equipment** and safety devices as required.
- ❖ **Advise** supervisors about safety or health hazards and report accidents/injuries in a **timely manner**.

The last bulleted item above is particularly important when it comes to working in the heat. Communication among employees and supervisors could mean the difference between making it safely through a hot workday and a serious heat illness.



Your department has an IIPP that is specific to its operations. Know what your role is under the program. Your department depends on you to work safely!

Talking Point

If you hurt your back at work and were off work for three weeks, how would this disabling injury affect you?

Loss of part of your income, inability to do the things you like to do, moral decreases, may not be able to go back to your job.

How would it impact those you work with?

Co-workers will have to work harder, which may lead to another injury, cost to department.



What Is Heat Illness?

Your body needs to maintain an internal body temperature of a very narrow range of a few degrees above or below 98.2°F. You can suffer from a heat related illness if your body is not able to get rid of excess heat and properly cool.

Think of your body working like a car. In order for the car to operate and not overheat, it must have a functioning cooling system.



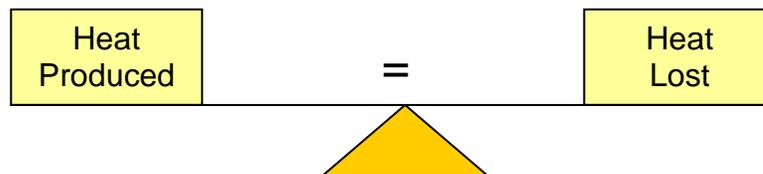
The Heat Balance Effect

When the body functions as it should:

The heat produced from the body **equals** the heat that is lost.

When the body is out of Heat balance it produces and retains **more** heat than it loses causing heat illness.

The goal here is to maintain a balance between heat produced and heat that is lost.



When the body starts to over heat:

1. The blood vessels get **bigger**.
2. The **heart** beats faster and harder.
3. The body tries to get rid of heat by increasing blood flow to the **outer** layers of the skin from the internal **core** so heat can be released into the cooler outside environment.

If this process does not cool the body fast enough or the outside air is warmer than the skin:

1. The brain triggers **sweating** to cool the body.
2. Sweat glands in the skin **draw water** from the blood stream making sweat.
3. The sweat **evaporates** and releases the heat from the body.

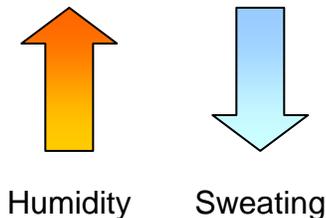
When blood is shifted to the outer body layers, this causes less blood to go to the brain, muscles, and other organs. If the body sweats for a long time, it can deplete the body of water and salt causing dehydration.



Environmental Risk Factors

Per the Cal OSHA regulation on Heat Related Illness, environmental risk factors that can possibly lead to a heat illness include:

- ❖ The air temperature.
- ❖ **Relative Humidity**. This is the measurement of water vapor in the air. When the humidity is high in the summer the effectiveness of sweating is reduced which reduces evaporation from the skin.



- ❖ **Radiant Heat** from the sun and other sources.
- ❖ Conductive heat sources such as the ground.
- ❖ Air movement.
- ❖ Workload severity and duration.
- ❖ **PPE** and **clothing** worn by employees.

Body Heat Loss and Gain

The body loses and gains heat in various ways. Complete each sentence with the list of possible terms.

A. Evaporation	B. Conduction	C. Inhalation/Exhalation	D. Radiation
E. Convection	F. Heat Storage	G. Excretion	

- The loss of heat through sweating is called **Evaporation (A)**.
- The transfer of heat through space is called **Radiation (D)**.
 - ▶ Our body loses or radiates heat to surrounding surfaces if the body is hotter than these surfaces. Have you ever put your bare arm on a cool surface? What happens moments later? That's right, that surface becomes warm!
- The transfer of heat in a moving fluid like air is **Convection (E)**.
 - ▶ Air flowing past the body can cool the body if the air temperature is cooler than 95°F. The body can gain heat if the air is hotter than 95°F.
- The transfer of heat between surfaces touching each other is **Conduction (B)**.
- The loss of heat from warming and wetting of the air by breathing in and out is **Inhalation/Exhalation (C)**.
- Some heat is lost through storage in the body. This is known as **Heat Storage (F)**.
- Excretion (G)** of urine and feces accounts for about 3% of the body's heat loss.

Talking Point

What are some ways you can reduce the environmental risk factors in your work environment?
Wear loose, light colored clothing. Plan your day! Perform more strenuous work activities when it is cooler out.

Personal Risk Factors

Some personal risk factors for heat illness include:

- ❖ Water consumption
- ❖ **Alcohol consumption** increases dehydration and the body's requirement for water. Since the body can sweat up to one quart per hour under certain conditions, it will be hard to sweat when you don't have any water to begin with.
- ❖ Degree of **acclimatization**.
- ❖ Alcohol and **caffeine** can lead to dehydration. Avoid caffeinated drinks like soda and any other beverages before and during work.
- ❖ Some **prescription medications** may affect the body's ability to retain water or other physiological responses to heat. Speak with your doctor if this becomes an issue.
- ❖ An individual's **age**.
- ❖ Health. A person's weight and degree of physical fitness can have an impact on a person's ability to work out in the heat.



Procedures for Complying with Heat Illness Standard

Water Provisions

- ❖ While working in the heat, you should have a sufficient quantity of water to supply you with **one quart** of water per hour or **two gallons** for the entire shift (8 hours).
- ❖ This equals **four 8-ounce** glasses of water per hour.
- ❖ Drink sufficient amounts of water **before** and **after** work to reduce the risk of heat illness for the following day.
- ❖ Keep water **near** your worksite and in a shaded area.
- ❖ Water should always be kept fresh, pure, and suitably cool.



Per the IIPP you are responsible for working safely. If you are provided with the equipment and means of maintaining the appropriate amount of water and are expected by your supervisor to do so, it needs to be done.



Don't let your thirst for water be the trigger for consuming it. A heat related illness may have already started. Drink water **frequently because you know you have to keep the body hydrated.**

Some signs of dehydration may include:

- ❖ Dark yellow or brown urine
- ❖ Reduced output of urine
- ❖ Rapid heart rate, muscle fatigue
- ❖ Loss of strength and dexterity
- ❖ Dizziness
- ❖ Headache, blurred vision



If you experience these symptoms:

- ❖ Notify your supervisor
- ❖ Stop work and rest in the shade
- ❖ Drink plenty of small amounts of water frequently

Access to Shade

- ❖ If you feel like you are suffering from a heat related illness or a brief recovery period is needed (no less than 5 minutes), find a place that has **sufficient** shade.
- ❖ Shade is blockage of direct sunlight.
- ❖ Blockage is always sufficient when objects **do not** cast a shadow in the shaded area.
- ❖ Shade can be provided by buildings, canopies, lean-tos, or other partial or temporary structures that are either ventilated or open to air movement.
- ❖ Trees and other types of vegetation are accepted provided that they completely block direct sunlight. Flecks of sunlight are acceptable as long as the shade provides complete blockage of sunlight.
- ❖ Inside automobiles are acceptable only if the air conditioner is operating.
- ❖ Access to shade should be no more that **¼ mile** or a **5 minute** walk, which ever is shorter.
- ❖ Shade must be up or provided as of the beginning of the shift and present throughout the day if it is predicted by the National Weather Service as of 5p.m. the previous day that the temperature will exceed **85°F**.



Shade is not adequate when it does not allow the body to cool!

Which one of these is **not** an acceptable way to provide shade?

- A. Wearing a wide brimmed hat.
- B. Under a grader or a tractor truck trailer.
- C. A portable canopy along the side of the road.
- D. In the shade cast by a building.



The answer is.....**A & B!**

Acclimatization

Acclimatization means temporary adaption of the body to work in the heat that occurs gradually when a person is exposed to it.

- ❖ Acclimatization peaks within most people between **4 to 14** days for at least **two hours** in the heat.
- ❖ Fully acclimatized people are still susceptible to heat illness when:
 - ▶ There is more physically demanding work tasks.
 - ▶ Working with required respiratory or personal protective equipment which reduce heat loss from the body.
 - ▶ Work locations with hotter temperatures.
 - ▶ A **heat wave**

Note: A heat wave is a sudden and temporary rise of temperature above the seasonal average for a particular region, which lasts for a prolonged period of time. Heat waves can be worse in low lying regions like valleys and depressions where stagnant atmospheric conditions trap the lower layer of hot air preventing air circulation. Air temperatures in the shade may still be extremely high and not allow the body to cool.

The Buddy System

During a heat wave, the signs and symptoms of a heat related illness may not be obvious to someone suffering this condition. Therefore it is always a good idea to be extra vigilant. Consider these steps while working in a heat wave:

- ❖ Avoid working alone whenever possible and establish a **buddy system** to watch over each other very closely.
- ❖ Encourage **communication** frequently among each other to make sure everyone is okay.
- ❖ Account for the whereabouts of fellow co-workers at **more frequent** intervals throughout the workshift and at the end of the workshift.



Types of Heat Illnesses, Common Signs, and Symptoms

So you know what to look for in someone who may be suffering from a heat related illness, let's look at some of the signs, symptoms, and the ways you can assist yourself or a victim.

Condition	Symptoms	Solution
HEAT RASH (Prickly Heat)	Skin irritation caused by sweat clogging the pores. <ul style="list-style-type: none"> ▪ Looks like a red cluster of pimples or small blisters. ▪ Often occurs on the neck, chest, groin, under breast, or in elbow creases. ▪ Can disrupt sleep 	Place the victim in a cool place and allow the skin to dry.

HEAT CRAMPS	Painful spasms of the muscles caused by the body's loss of salt.	<ul style="list-style-type: none"> ▪ The victim should drink an electrolyte solution such as Gatorade. ▪ Seek medical attention in the case of severe cramping, vomiting, or loss of consciousness.
FAINTING	Dehydration and lack of acclimatization in hot weather can make you susceptible to fainting. Symptoms include: <ul style="list-style-type: none"> ▪ Dizziness ▪ Light-headedness ▪ Unconsciousness 	<ul style="list-style-type: none"> ▪ Lay the victim down on their back. ▪ If no head, back or neck injuries or broken bones in the hips/legs are suspected, raise the person's legs 8 to 12 inches. ▪ Do not give the victim anything to eat or drink. ▪ Position victim on their side if the victim vomits.
HEAT EXHAUSTION	The body's response to an excessive loss of water and salt. The person still sweats but experiences the following; <ul style="list-style-type: none"> ▪ Extreme weakness or fatigue ▪ Giddiness ▪ Nausea ▪ Headache ▪ Clammy or moist skin The body temperature may be normal or slightly elevated.	<ul style="list-style-type: none"> ▪ Victim should rest in a cool place and, like for Heat Cramps, consume an electrolyte solution like Gatorade. ▪ Get medical treatment ASAP if victim loses consciousness. ▪ Loosen tight clothing.
HEAT STROKE 	This is the most serious of heat illnesses and is fatal in most cases. The body can no longer regulate its core temperature. Sweating stops and the body can no longer release excess heat. Signs include: <ul style="list-style-type: none"> ▪ Mental confusion, delirium, loss of consciousness, convulsions, or coma. ▪ Body temperature of 106°F or higher. ▪ Hot, dry skin that may be red, mottled, or bluish. 	Immediately call for medical assistance! While waiting for medical assistance, move the victim to the coolest, shadiest spot available. <ul style="list-style-type: none"> ▪ Fan the victim vigorously. ▪ Gradually soak the victim's skin and clothing with cool water.



Victims of heat illness may not report the full range of symptoms they are feeling because they;

- ❖ May **deny** that the symptoms are not serious.
- ❖ Are not **physically** able to report (may have fainted).
- ❖ Not fully aware of what is happening to their bodies.

Let's Practice! You are working on a crew out at one of the County Parks repairing sprinkler pipes and clearing brush on a day where it is expected to reach 100°F. Your co-worker complains of being dizzy. Which of the heat illnesses above could he/she be experiencing?

Answer: Fainting

How would you help this co-worker? **Answer: Lay the person on their back out of the sun and elevate the legs 8 to 12 inches if no head, neck, back, or broken bones in the legs or hips are suspected.**



Reporting Possible Heat Related Illnesses



Never discount any discomfort or symptoms that you may be experiencing while working in the heat, after work, or before the next workday. **Immediately** report any problems you may be experiencing to your **supervisor** if you are at work and to a family member or friend outside of work to seek prompt medical attention.



Make sure you know the correct procedures for contacting **medical services** and getting **Emergency Responders** to the job site. Consult with your department's Heat Illness Prevention Program.



Employee Hazard Reporting Program



The County has an Employee Hazard reporting program for employees to anonymously (if so desired) report hazards that may exist in the work environment. If you think there is a condition in your work environment that needs attention, you are encouraged to report it ASAP!

This report should be posted in a location in which you report. It is also available on eServices under Personnel Services, Risk Management's webpage, under the Reports and Resources section.

EMPLOYEE HAZARD REPORT	
TO: _____	DATE SUBMITTED: _____
<small>(Name of Supervisor)</small>	
<small>(Plant or Division)</small>	
I WOULD LIKE TO REPORT WHAT I BELIEVE TO BE A HAZARD THAT COULD CAUSE EMPLOYEE INJURY/ILLNESS/DEATH, DAMAGE TO COUNTY PROPERTY, OR INJURY/ACCIDENT TO A PUBLIC PATRON OR COUNTY PROPERTY.	
HAZARD ID: <small>(Describe hazard in detail, including exact location.)</small>	
If more space is needed, please use the TAB key and answer YES - (1) to automatically move to the appropriate area on Page 2.	
SUGGEST THE FOLLOWING CORRECTIVE ACTION:	
If more space is needed, please use the TAB key and answer YES - (1) to automatically move to the appropriate area on Page 2.	
SIGNED: _____	Dept. or Division: _____
<small>(Signature Optional)</small>	
<small>(By Supervisor Use Only)</small>	
RECORD YOUR ANALYSIS AND/OR CORRECTIVE ACTION TAKEN IN 30 DAYS:	
If more space is needed, please use the TAB key and answer YES - (1) to automatically move to the appropriate area on Page 2.	
Date: _____	Supervisor's Signature: _____
SEND COMPLETED REPORT WITH CORRECTIVE ACTION TO: COUNTY SAFETY OFFICER - STOP 188	
REQUIREMENTS: SEE ADMINISTRATION MANUAL - PLEASE MAKE THE APPROPRIATE NUMBER OF COPIES AND INDICATE THE CORRECTIVE ACTION TAKEN IN 30 DAYS.	
Distribution: Original - County Safety Officer - Stop 188	One Copy - Completed Report To Employees
One Copy - Department Safety Coordinator	One Copy - Department File
FD-499 (11/2008) 01-01-08	

Heat Illness Prevention Quiz

Employee Name: _____ Date: _____

Instructions: Place a “T” for a True response or an “F” for a False response at the end of each question:

- 1.) The County and your department are responsible for your safety **False**.
The employee is equally responsible.
- 2.) If the heat produced by your body does not equal heat loss, you are at risk for a heat related illness **True**.
- 3.) You should avoid drinking caffeinated drinks before and during your work shift **True**.
- 4.) You should always have at least one quart of water per hour for your entire work shift **True**.
- 5.) You should only drink water when you feel thirsty **False**.
You should drink water because you need to.
- 6.) Shade is not adequate when it does not allow your body to cool **True**.
- 7.) The process of temporarily adapting the body to the heat while working is called adaptation **False**.
Acclimatization is the process.
- 8.) Heat Stroke is the most serious of Heat Illnesses and workers suffering from it should get treatment at the end of their shift **False**.
It is the most serious of Heat Illnesses but it should be addressed immediately.
- 9.) You should always report any suspected Heat Illness to your supervisor **True**.
- 10.) Any potential hazard that may be associated with work in the heat or a Heat Illness should be reported using the Employee Hazard Report **True**.