Safety is a 'Hot' Topic:
Heat Illness Prevention for Outdoor Workers

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Objectives

1. Identify symptoms of heat related illness
2. Understand heat stress factors
3. Describe the components of a heat illness prevention plan

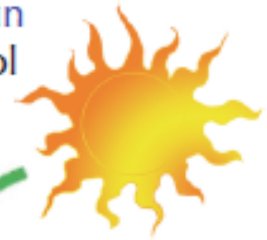
Understanding Heat & Heat Illness

Heat Illness

A serious medical condition resulting from the body's inability to cope with a particular heat load.

How Does It Happen? - Como Ocurre?

Sun
Sol

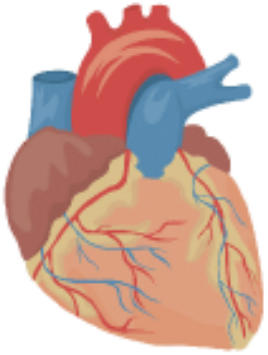


Work
Trabajo

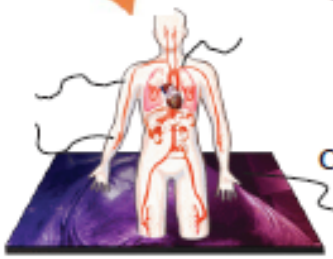
Body heat rises
Calor del cuerpo
aumenta

Heart
pumps
faster

Corazón
palpita
mas
rapido



Blood vessels dilate
asos sanguíneos dilatan



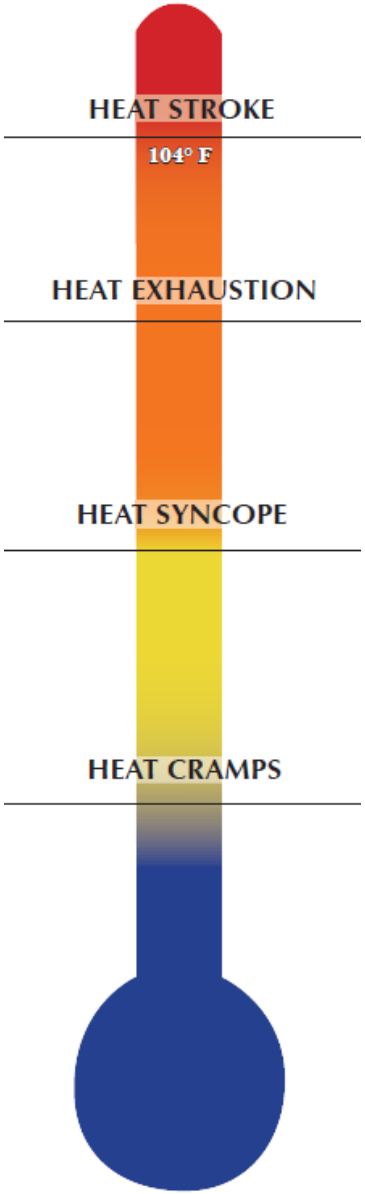
Heat Escape
conduction, convection,
radiation

Escape de Calor
conducción, convección,
radiación

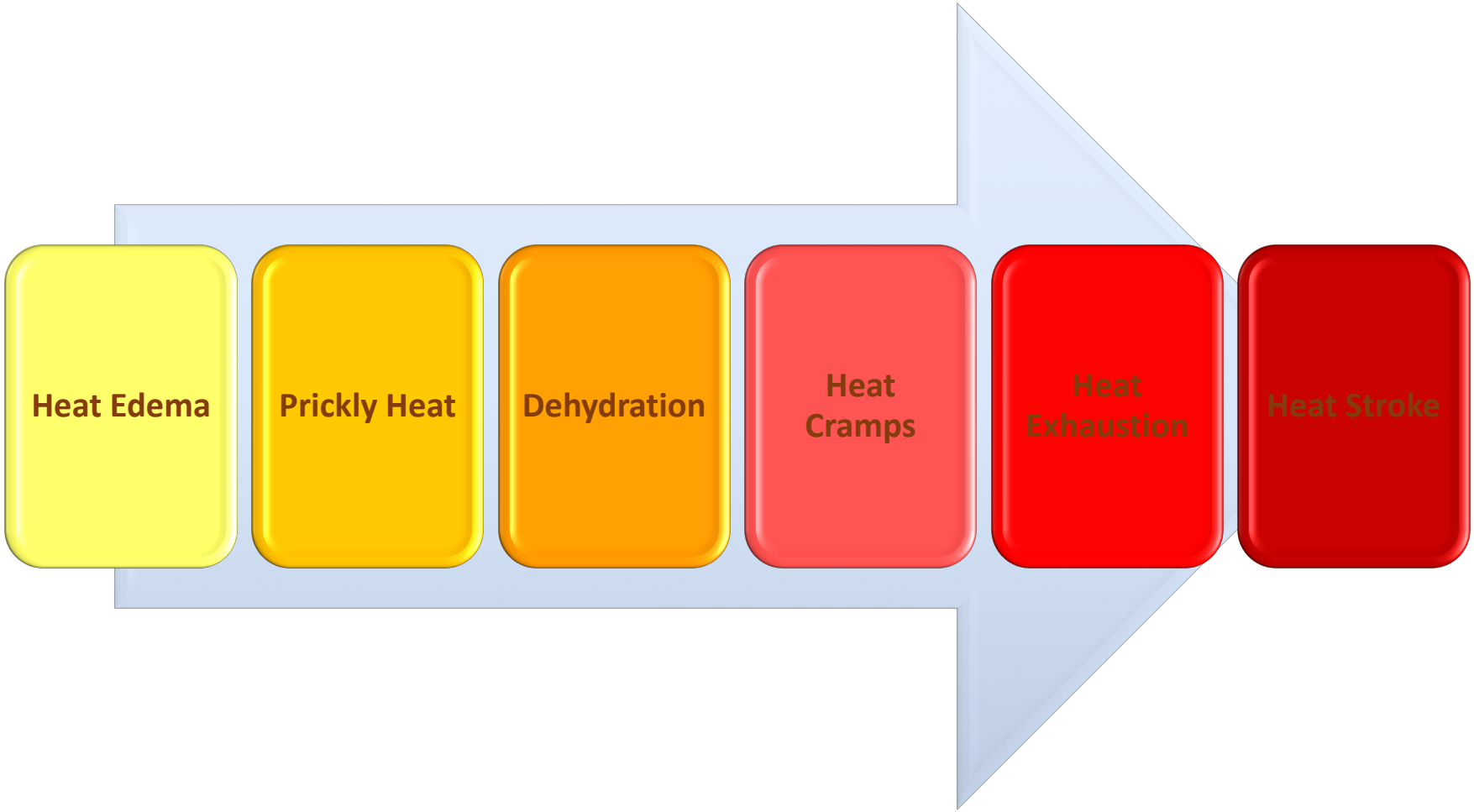
SWEAT
heat escape by evaporation
SUDOR
calor escapa por evaporación

Body Core Temperature

- Ideal body core temperature is about 98.6°F.
  - Safe body core temp = up to 100.4°F
  - Short excursion safe body temp = 101.3°F



Continuum of Heat Illness



Symptoms of Heat Exhaustion

- Fatigue, weakness
- Dizziness, faintness
- Nausea
- Headache
- Moist, clammy skin
- Pale or flushed
- Rapid pulse
- Normal or slightly elevated temperature

Symptoms of Heat Stroke

- Hot, dry skin; can be red, mottled or bluish
- Confusion
- Loss of consciousness
- Convulsions
- Rapid pulse
- Body core temperature > 40°C (104°F)

Signs and Symptoms - Síntomas y Señales

Fainting
Desmayo

Dizziness
Mareo

Anxiety - poor judgment
Inquietud – pobre criterio

Fatigue-weakness
Fatiga-debilidad

Heat Stroke
1. Dry, hot skin
2. Very high body temperature
3. Confusion!

Ataque de Calor
1. Piel seca, caliente
2. Temperatura muy alta del cuerpo
3. Confusión!

Heat Exhaustion
1. Moist clammy skin
2. Normal or subnormal temperature

Agotamiento de Calor
1. Piel mojada, húmeda
2. Temperatura normal o subnormal

Nausea-vomiting
Nausea-vomito

Headache
Dolor de cabeza

Weak-rapid pulse
Pulso débil-rapido

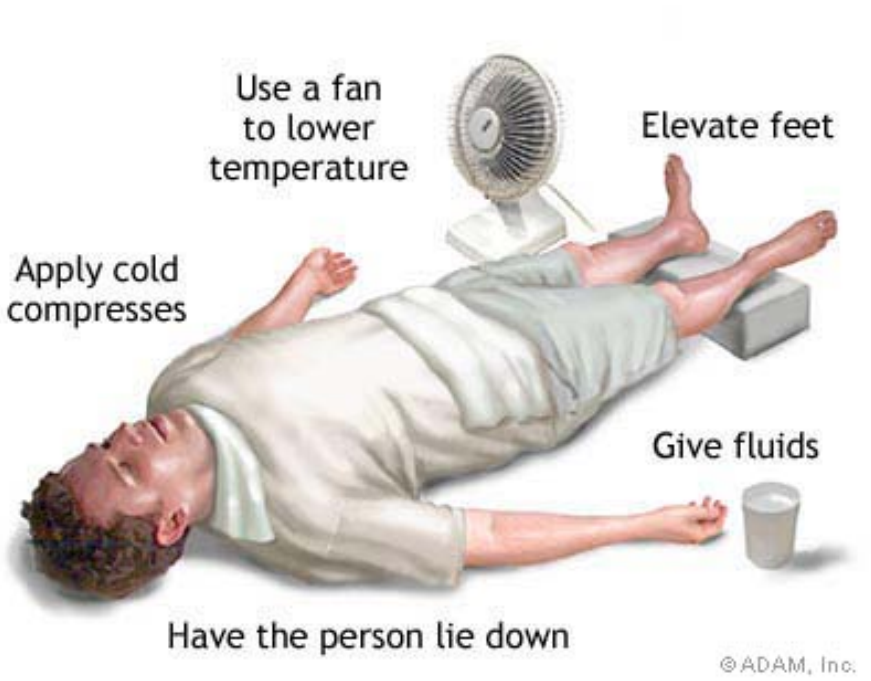
Signs & symptoms of heat stroke and heat exhaustion
Senales y sintomas de ataque de calor y agotamiento de calor

Serious Outcomes

- Death
- Coma
- Organ failure
- Prolonged hyperthermia
- Shock
- Coagulation difficulties
- Mechanical ventilation

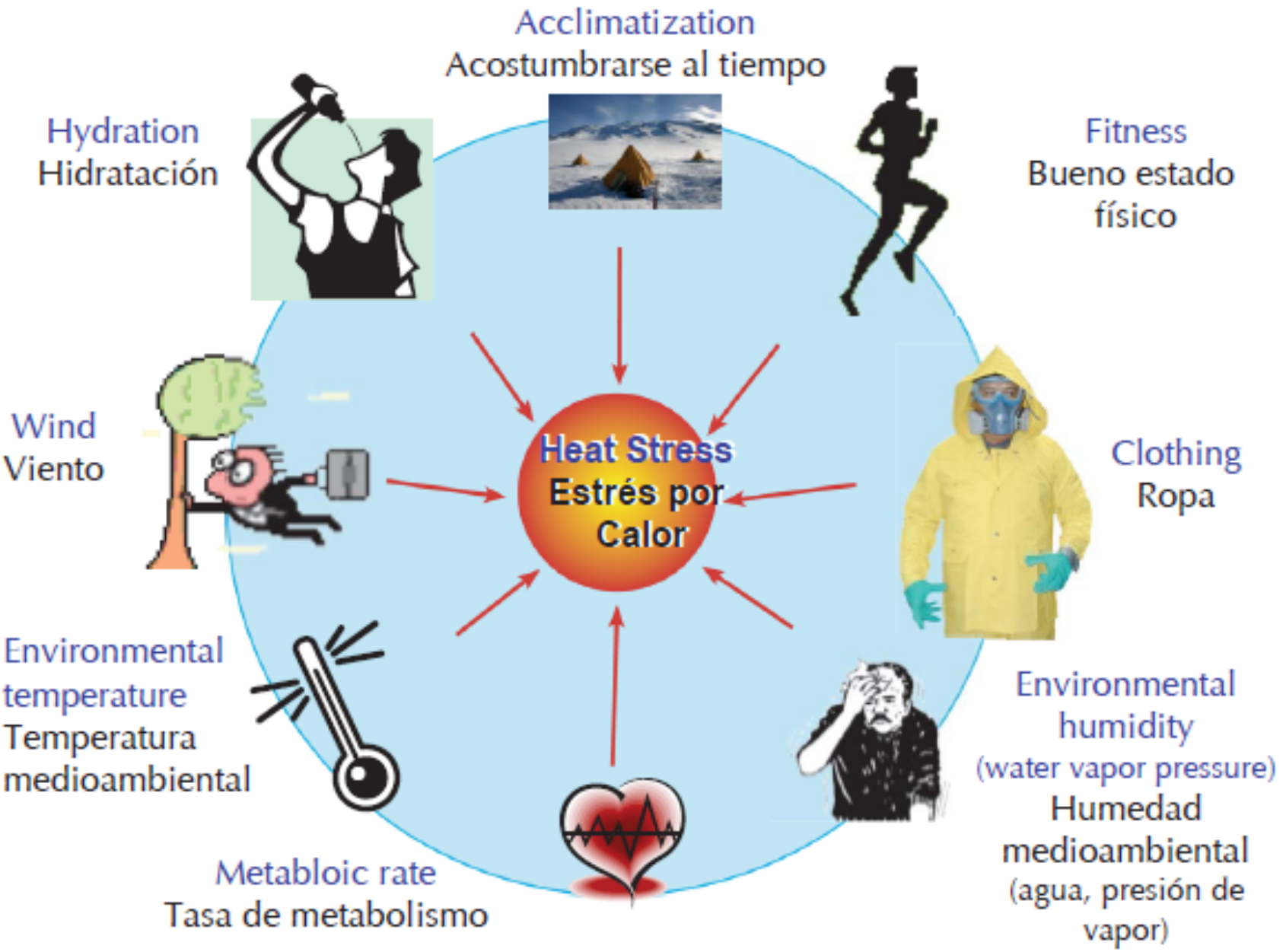
Principles of Treatment

- Rest in cool environment
- Drink plenty of water
- Rapid cool down
- Medical care



Heat Stress Factors

Heat Stress Factors - Factores de Estrés por Calor



Populations at Risk and Risk Factors

- Outdoor occupations, particularly afternoon work
- New outdoor workers
- Industrial plant workers
- Vigorous outdoor sports
- Military recruits
- Women
- Pregnancy (1st trimester)
- Poor
- Aged

Heat-Related Deaths

TABLE 1. Number and Average Annualized Rate of Occupational Heat-Related Deaths Among Crop Workers, United States, 1992–2006[14]

	Number of deaths	Rate (deaths/100,000 FTE*)
Industry sector/subsectors		
All industries	423	0.02
Ag/For/Fis/Hun	102	0.16
Crop production and support activities	68	0.39
Crop production and support activities (crop workers)		
Crop production	52	0.36
Vegetable and melon	15	—
Fruit and tree nut	11	—
Other crops	19	—
Other/unspecified	7	—
Support activities	16	0.59
State of injury (crop workers)		
California	20	0.49
Florida	6	0.74
North Carolina	13	2.36
Other states	29	—

*FTE = full-time equivalent worker based on 2000 hours worked per year.

Table Source: Jackson JAgroMed 2010

Case 1

17 year old female was tying grape vines at a California farm in May of 2008. The temperature was above 95°F. The nearest water cooler was a 10-minute walk away. Workers reported that breaks were too short to get a drink and there wasn't adequate shade. The female farmworker collapsed after working for many hours. Medical attention was delayed. When she arrived at a hospital, she was in a coma and her body temperature topped 108°F. She died two days later. They discovered at the hospital that she was two months pregnant.

Case 2

38 year old male began a new job during the summer performing land excavation/ digging. Ambient temperature by noon approached 95°F. He was not feeling well during the day, complaining of disorientation and demonstrating confusion. By late afternoon, he was sent to wait in his parked vehicle alone. He was later found unconscious and taken to the ER. Rectal temperature was 107.2 F. He died 10 days later of multi-system organ failure.

Heat Illness Prevention

Education & Training

- At the beginning of spring + frequent reminders during hot season (>85°F)
- Topics to cover:
  - **Hydration**
  - **Acclimatization**
  - **Rest & shade**
  - **Clothing**
  - Environmental & personal risk factors
  - Symptoms of heat illness
  - Responding to symptoms of heat illness
  - Procedures for contacting emergency medical services
  - How to monitor weather reports & weather advisories

Hydration

- Cool & desirable
- Adequate & frequent
  - 1 quart (4 cups) per person per hour
- Accessible
- Electrolyte replacement if necessary (not “salt tablets”)

Acclimatization

- Lesser increase in body temperature
- Lesser increase in heart rate
- Sweating starts sooner
- Sweat more dilute and increased in volume
- Less perceived discomfort
- Improved knowledge of drink and dress requirements
- Can be lost in absence of heat over 3 weeks
- Not as effective during heat wave

Rest & Shade

- Shaded rest areas should be accessible
- Allow for recovery from exertion-derived heat
- Provide reprieve from direct sunlight

Medical Risk Factors - Factores de Riesgo Médico

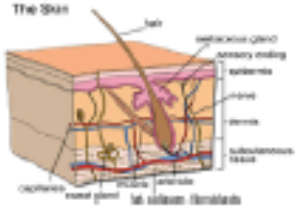
Acute Illnesses - Enfermedades Agudas

Stomach flu

Enfermedades del estómago

Fever for any reason

Fiebre por cualquier razón



Skin Infections (extensive)

Infecciones de la piel (extenso)

Hang over

Cruda o reseca

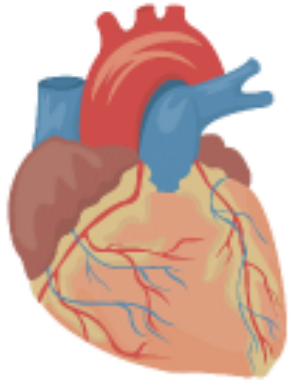
Malaria

Respiratory infection

Infecciones respiratorias

Chronic Diseases - Enfermedades Crónicos

Diabetes



Heart disease

Enfermedad de corazón

Personal Risk Factors - Factores de Riesgo Personal

Lifestyle - Estilo de Vida

Overweight
Sobrepeso

Out of shape

Estar fuera de forma

Lack of Sleep

No dormir bien

Diet & Drinks - Bebidas & Dietas

High caffeine (Red Bull)

Mucha cafeína (Red Bull)

High sugar drinks >6%

Bebidas con mucha azúcar >6%

Low salt diet

Dieta baja en sal

Drugs - Drogas

Alcohol

Ecstasy

Cocaine

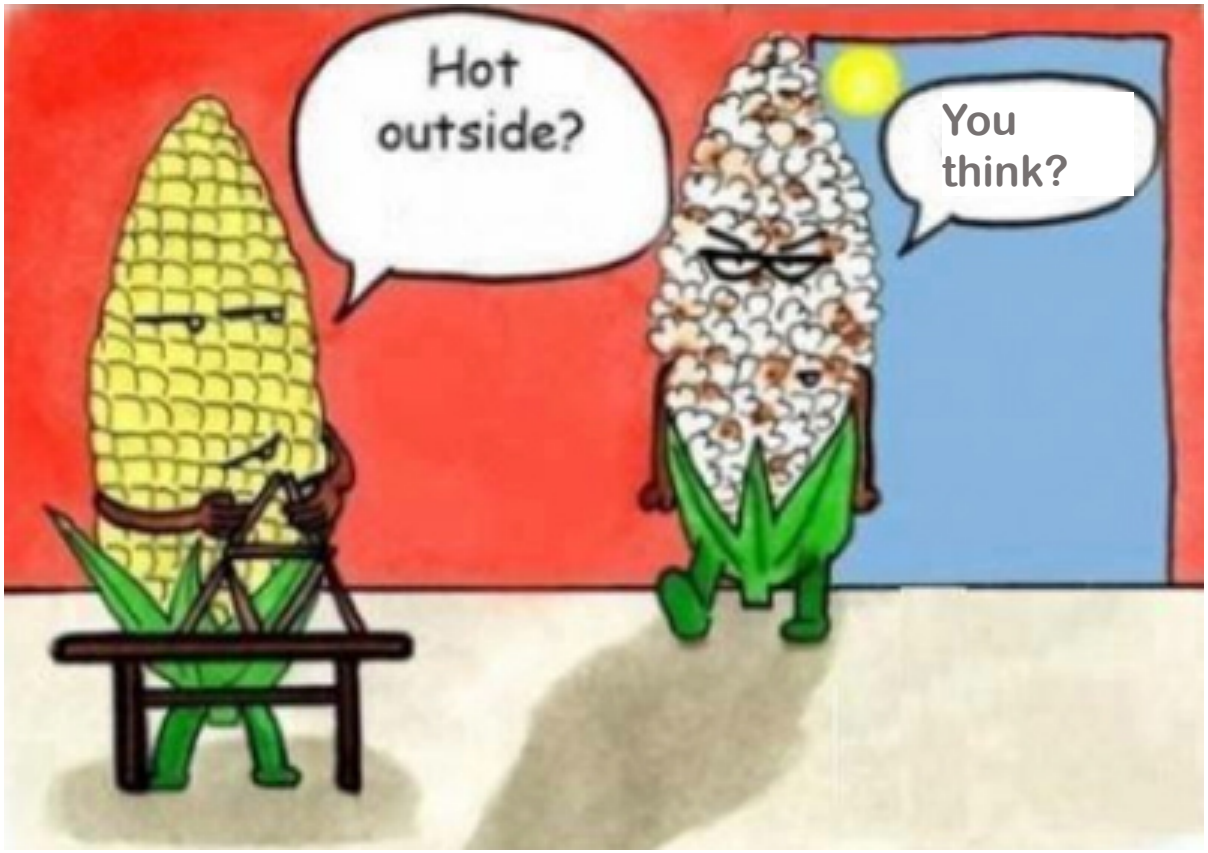
Cocaina

Meth

Mentafetamina

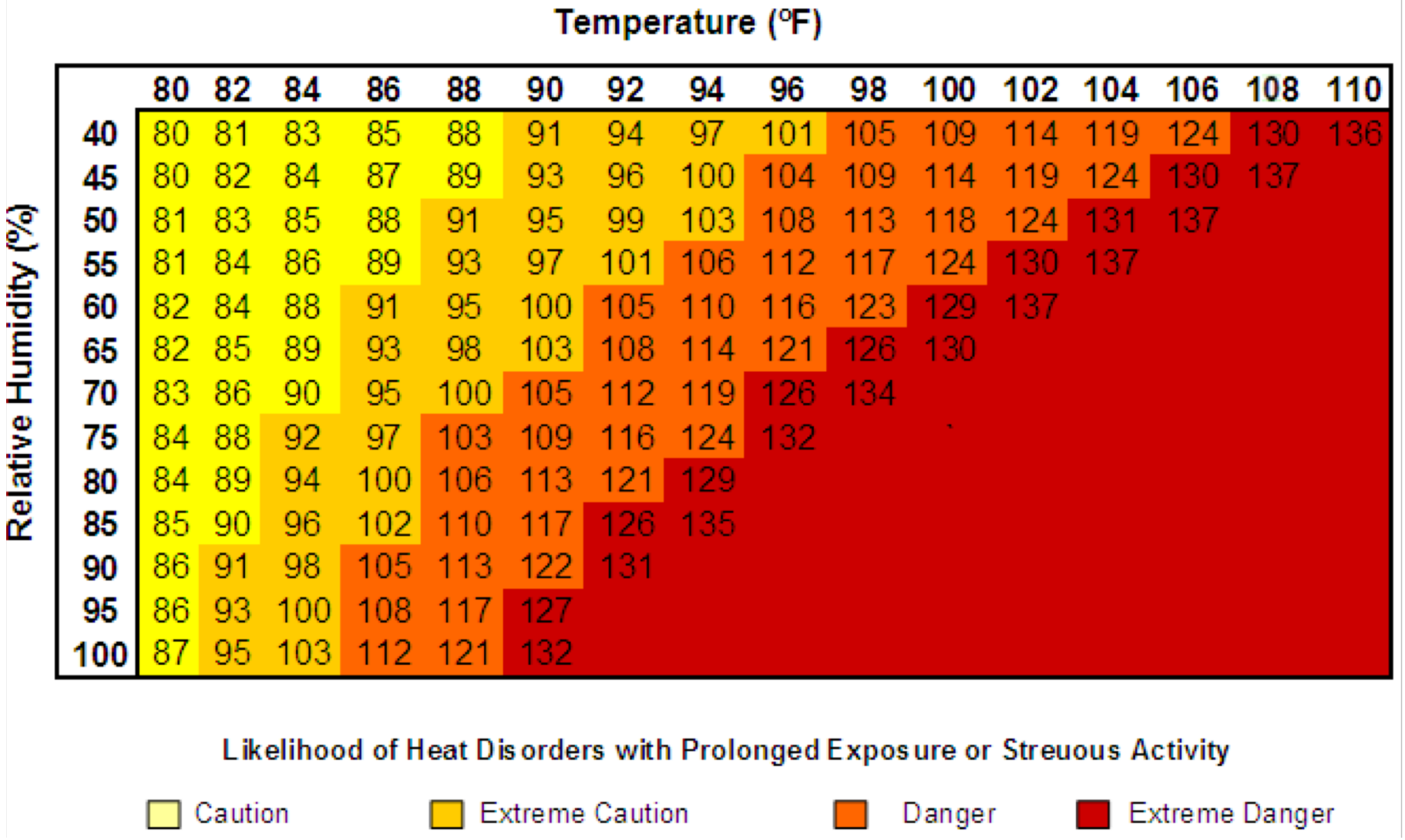
There's an App for That!

- OSHA Heat Safety Tool-Eng & Span
- The Thermometer App


Hot outside?
You think?

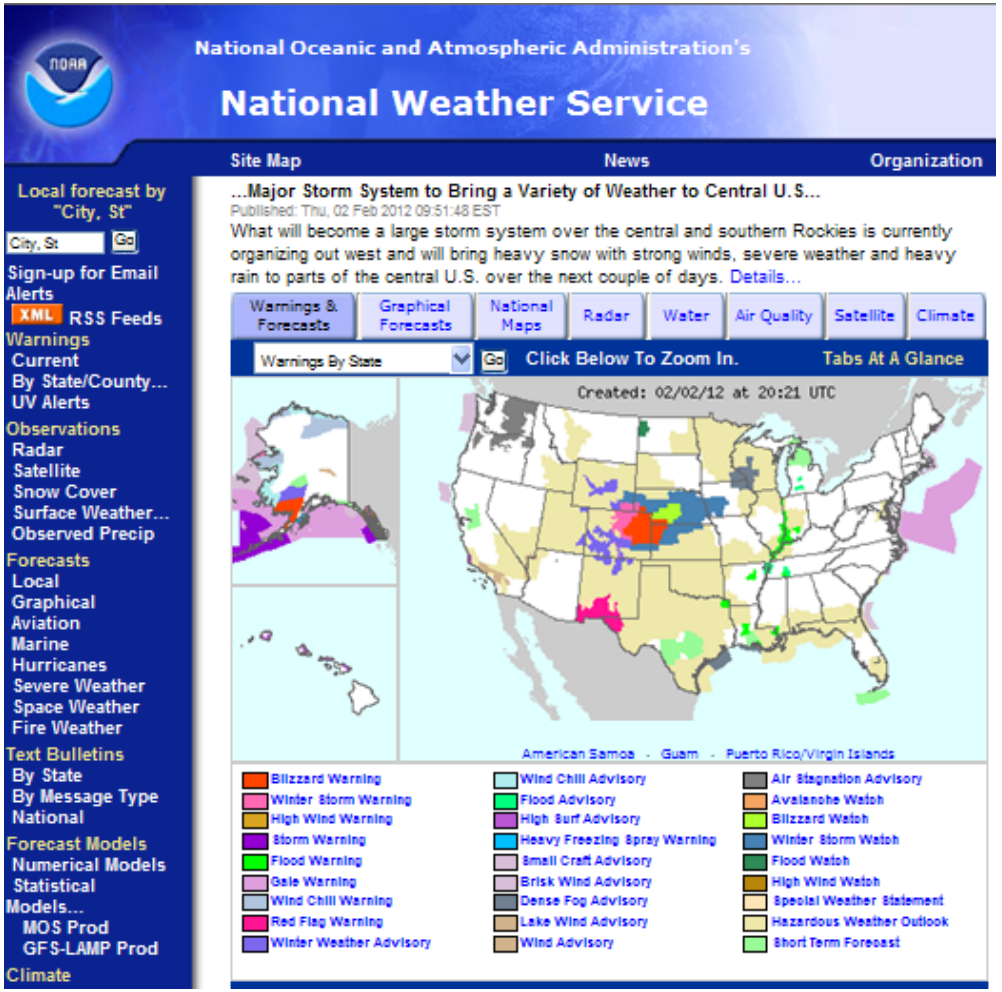
NOAA's National Weather Service

Heat Index



National Weather Service

- Email alerts
- Text bulletins



Online Resources

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Search NIOSH | SEARCH

CDC A-Z INDEX

The National Institute for Occupational Safety and Health (NIOSH)

Workplace Safety and Health Topics
Heat Stress
Heat Related Illness
HHE and FACE reports
Recommendations
Additional Resources

Hazards to Outdoor Workers
Physical Hazards
Heat Stress
Cold Stress
Sun Exposure
Noise
Biological Hazards
Insects and Scorpions
Poisonous Plants
Venomous Spiders
Venomous Snakes
Vector-Borne Diseases

Promoting productive workplaces through safety and health research / NIOSH

NIOSH > Workplace Safety and Health Topics > Heat Stress

Heat Stress - Heat Related Illness

Types of Heat-related Illnesses

Heat Stroke | Heat Exhaustion | Rhabdomyolysis | Heat Syncope | Heat Cramps | Heat Rash

Heat Stroke

Heat stroke is the most serious heat-related illness. It occurs when the body becomes unable to control its temperature: the body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106°F or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given.

Symptoms

Symptoms of heat stroke include:

- Confusion, altered mental status, slurred speech
- Loss of consciousness (coma)
- Hot, dry skin or profuse sweating
- Seizures
- Very high body temperature
- Fatal if treatment delayed

First Aid

UNITED STATES DEPARTMENT OF LABOR

Find it in OSHA | A TO Z INDEX

Occupational Safety and Health Administration

English | Spanish

ABOUT OSHA | WORKERS | EMPLOYERS | REGULATIONS | ENFORCEMENT | TOPICS | NEWS & PUBLICATIONS | DATA | TRAINING

Language

WATER. REST. SHADE.
The work can't get done without them.

Home | Educational Resources | Using the Heat Index | Training | Online Toolkit

Photos by: CAL-OSHA

HEAT ILLNESS CAN BE DEADLY.

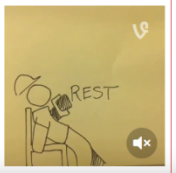
The body normally cools itself by sweating. During hot weather, especially with high humidity, sweating isn't

Highlights

Heat Safety Tool Smartphone App

OSHA

Listen to OSHA's Heat Advisory Call from June 27, 2016 [MP3] [Transcript]



SCHOOL OF PUBLIC HEALTH | UNIVERSITY of WASHINGTON

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Search...

HEAT ILLNESS PREVENTION: TRAINING MATERIALS FOR EDUCATORS

GO TO: Four Types of Heat Illness | Identification & Treatment | Heat Illness Prevention in Three Steps | Resources | Articles & Links

Heat illnesses are preventable but if left unchecked can lead to death. Anyone working in the sun will find this site's information critical to learn for themselves and their coworkers.

Four Types of Heat Illness

"He went to lie down, collapsed, became delirious, and had a seizure. His recorded body temperature in the emergency room was 111°. He died of heat stroke." Illustrated by Stacey Holland

Heat Cramps. Athletes are familiar with this syndrome caused by salt depletion. It is easily treated with rest and drinking electrolyte-balanced fluids such as sports drinks or plain water and eat salty chips or nuts. Avoid salt tablets due to the risks of overdosing.

Heat Syncope/Fainting. Fainting happens when blood pools in the legs, often after standing too long. It is temporary; being horizontal usually prompts a return to consciousness. The biggest risk is an injury from falling. To help blood return to the heart, elevate the person's legs, and cool the body with wet compresses and fanning. Turn the unconscious person on his or her side to prevent choking. One exception is if the person has been working hard; then consider the fainting due to heat stroke and call 911. Check the ABCs (airway, breathing and circulation) and cool him or her down immediately. Anyone who faints should be medically evaluated and not return to work.

Heat Exhaustion. This condition is serious and is caused by severe dehydration. Symptoms can include fatigue, dizziness, nausea and vomiting, plus early neurological signs such as headache, impaired judgment and anxiety. Exhaustion causes profuse sweating and cool, clammy skin. Move the person out of the heat, provide fluids as tolerated, strip off extra clothing, and cool them by wetting clothing and fanning. Have them medically evaluated.

Heat Stroke. This is a medical emergency. It can look like exhaustion except the body temperature is 104 degrees F or higher, and the brain is seriously affected. Neurological effects can include confusion, irrational or aggressive behavior, incoherent speech, collapse,

MONTHLY SAFETY BLAST
HEAT ILLNESS PREVENTION PLAN

Although, it may not feel uncomfortably hot outside yet, it is not too early to design and initiate your Heat Illness Prevention Plan. Each agricultural operation needs a well-communicated plan to protect workers from heat-related illnesses including heat exhaustion and fatal heat stroke.

At a minimum, your Heat Illness Prevention Plan should include the following:

Training for Supervisors and Employees– Supervisors/managers should be trained every spring. Employees should be trained and reminded more frequently. In some cases, employees should be briefed daily depending on workforce turnover. Training should include guidance on the following:

- Acclimation-temporary adaptation of the body to work in the heat
- Adequate water intake– CalOSHA requires 1 quart per hour per employee
- Rest breaks
- Shade-CalOSHA requires shaded rest areas when the temperature exceeds 85°F
- Clothing-loose fitting, light colored clothing is ideal
- Symptoms of heat-related illness-see link in the Resources box
- Personal factors that contribute to heat-related illness-caffeine & alcohol consumption, medication & drug use, certain health conditions, pregnancy

Emergency Response Plan– All supervisors, managers, and workers should know who to contact in the event of an emergency and how to perform supportive care.

- Procedure for monitoring weather reports and advisories
- Symptom and weather-related action levels
- Clear and precise directions to the worksite
- Meeting location for emergency personnel

Resources:

California Heat Regulations
http://www.dir.ca.gov/title8/3

Additional prevention measures could include:

Stay Cool!


STOPPING FOR WATER
KEEPS YOU GOING.


A LITTLE BIT OF SHADE GOES
A LONG WAY.

Questions?