



Heat Education & Awareness Tools (HEAT)

A train-the-trainer guide for the identification, prevention, and treatment of heat illness in outdoor agricultural workers.

©2019 University of Washington.

Duplication or distribution for non-commercial purposes is welcome, provided permission is requested through the UW Pacific Northwest Agricultural Safety and Health Center.

Funded through CDC-NIOSH #5 U54 OH007544



**PACIFIC NORTHWEST AGRICULTURAL
SAFETY & HEALTH CENTER**



SCHOOL OF PUBLIC HEALTH
UNIVERSITY *of* WASHINGTON

Table of Contents

Introduction	1	Personal protective equipment (PPE) and heat	14
What is heat illness?	1	Group discussion questions	14
Why is it important to know about heat illness?	1	PPE and heat	14
How will this training help in complying with the Washington State Outdoor Heat Rule for Agriculture?	1	Activity	15
		Take-home messages	15
		CHART: Personal protective equipment and heat	16
How to use this book	2	Keeping cool in the home and community	17
Types of heat illness and treatments	4	Group discussion questions	17
Group discussion questions	4	Keeping cool in the home and community	17
Types of heat illness and treatments	4	Activity	17
Activity	5	Take-home messages	17
Take-home messages	5	CHART: Cooling off at home and In the community	18
CHART: Symptoms and treatments for heat illness	6		
Risk factors for heat illness	7	Prevention Checklist	19
Group discussion questions	7	Good health	19
Risk factors for heat illness	7	Awareness	19
Activity	8	Work preparedness	19
Take-home messages	8		
CHART: Risk factors for heat illness	9	Heat illness case studies	20
Clothing for work in hot weather	10	Role plays	22
Group discussion questions	10	Additional information	24
Clothing for work in hot weather	10	Acclimatization	24
Activity	10	Urine color chart and hydration	24
Take-home messages	10	Heat illness and pesticide poisoning	24
CHART: Clothing for work in hot weather	11	Reporting unsafe conditions	24
		Links to resources	24
Staying hydrated at work	12		
Group discussion questions	12		
Staying hydrated at work	12		
Activity	12		
Take-home messages	12		
CHART: Staying hydrated at work	13		

Introduction

What is heat illness?

Heat illness is a medical condition resulting from the body's inability to cope with a particular heat load, and includes, but is not limited to, heat cramps, heat rash, heat exhaustion, fainting, and heat stroke. Prolonged or intense exposure to hot conditions and heavy physical work even in cooler conditions can lead to your body overheating. Symptoms of heat illness may not be recognized initially and can quickly progress.

Why is it important to know about heat illness?

People who work outside, especially in the summer, are exposed to heat and can get heat illness. Heat illness can also lead to injuries. Workers are more likely to get injured if they get tired or dizzy from the heat while working. What you learn here will prepare you for helping your co-workers and yourself stay safe when working in hot weather.

How will this training help in complying with the Washington State Outdoor Heat Rule for Agriculture?

It is important for employers and supervisors to review the Washington State Outdoor Heat Rule for Agriculture (WAC 296-307-097) to make sure they have met requirements. The Rule is in effect each year from May 1 through September 30 at the following action levels:

OUTDOOR TEMPERATURE ACTION LEVELS

All other clothing	89°
Double-layer woven clothes including coveralls jackets and sweatshirts	77°
Nonbreathing clothes including vapor barrier clothing or PPE such as chemical resistant suits	52°

Employers are required to address outdoor heat exposure safety in their written accident prevention program and encourage employees to drink enough water and other acceptable beverages to ensure they are hydrated. Employers are required to supply sufficient drinking water (1 quart per hour per employee) and the opportunity to drink that much water every hour during the work shift.

While the information and topics in this guide cover information and training elements in the Washington State Outdoor Heat Rule for Agriculture (WAC 296-307-097), this guide is not required and does not meet all the requirements of the Outdoor Heat Rule for Agriculture. If employees go through the entire training as presented in this guide and also receive training on specific procedures relevant to WAC 296-307-097 as outlined in their workplace accident prevention program, then employees will have met requirements of the Washington State Outdoor Heat Rule for Agriculture (WAC 296-307-097).

Supervisors can meet all the requirements of the Outdoor Heat Rule for Agriculture (WAC 296-307-097) if they go through the training provided in the guide and also have training on the following, which should be included as part of the workplace accident prevention program:

- Responding to signs and symptoms of heat illness including relieving employees from duty, providing them with what they need to cool down, and monitoring heat illness symptoms to determine whether medical attention is necessary.
- Procedures to follow if an employee has signs or symptoms of heat illness, including appropriate emergency response procedures.
- Procedures on moving or transporting an employee to a place where they can be reached by an emergency medical service provider.

If supervisors go through the training provided in this guide, they can then deliver training to workers.

How to use this book

This book is a tool for educators, community health advisors, and workplace managers and supervisors for delivering education on the identification, prevention and treatment of heat illness. The book is designed to be interactive and comprehensive and for use in a classroom setting or in the field.

There are 6 topics in this book, each with a visual aid that can be printed as a poster or handout or projected on a screen. The following are descriptions of the topics and visual aids:

1. Types of heat illness and treatments

The types of heat illness are listed with symptoms depicted in the illustrations. The types of heat illness are on a color-coded background, from mild to severe. Recommended treatments are listed next to each type.

2. Risk factors for heat illness

Three categories of risk factors for heat illness are represented: personal, work-related, and weather-related factors. Specific risk factors are shown within each category.

3. Clothing for work in hot weather

Photos of workers in different clothing ensembles are shown. The appropriate clothing ensembles for working in the heat are in the light green box under the green check mark. The clothing ensembles that are not recommended for working in the heat are in the light red box under the red 'X'.

4. Staying hydrated at work

Quantities of water are shown using two different containers: an eight-ounce bottle and a four-ounce cone. The recommended amount of water that should be consumed during hot weather is shown at the bottom with color-coded emoji drops above each quantity. The colors and facial expressions on the emoji drops represent the urine color and hydration level, with the lightest yellow happy face being the most hydrated and the darkest yellow face with 'X' eyes being the most dehydrated. Each bottle represents eight ounces of water, and the number of bottles is how much a worker needs to drink each hour in hot weather to remain at the hydration level represented by the color-coded emoji drop.

5. Personal protective equipment (PPE) and heat

Workers are shown in different types of personal protective equipment (PPE) as well as regular work clothes. The number of thermometers next to each type of PPE symbolizes how hot a worker can get wearing that type of PPE compared to regular work clothes.

6. Keeping cool in the home and community

Images of inside and outside of the home are shown with recommendations on how to keep cool in the heat. Icons of places to go in the community to keep cool are shown at the bottom.

The topics can be presented in one session. Topics can also be presented as stand-alone modules before a hot day at work to reinforce messages.

Each topic has three parts:

1. Group discussion session to engage participants

Start by asking workers the group discussion questions to learn more about their perspectives and draw out their knowledge. There is a sample response to one group discussion question for each topic to provide an idea of the types of responses that might come up during training.

2. Delivery of education on the topic

Show the visual aid as a poster or handout or on a screen and review the information with the workers. There is a prompt to display the visual aid after the group discussion questions in each section.

3. Reinforcement of key messages through an activity and review of take-home messages

Ask workers what they learned and have them partner up for the activity.

The activity for each section is labeled with .

Finish the topic by reviewing take-home messages which are labeled with .

Each training topic takes approximately ten to fifteen minutes to go through and can be modified to fit the time allotted. For example, the group discussion can be shortened or the activity can be omitted if there are time constraints.

Throughout the guide, there are highlighted boxes labeled with  and “Notes for the facilitator.” These boxes contain extra information we thought would be helpful for the facilitator.

The final sections contain additional resources that can be integrated into training sessions:

- Prevention checklist
- Heat illness case studies
- Role plays
- Additional information

Symptoms and treatments for heat illness

Group discussion questions

- How do you feel when you work outside on a hot, sunny day?
- What are some of the signs and symptoms of heat illness?

Sample question and response

FACILITATOR: *“Have you or a coworker ever gotten get sick from the heat? What did you do?”*

PARTICIPANT: *“Sometimes I get a headache after working when it is very hot outside. I will rest in the shade but not drink cold water. If I drink cold water when my body is too hot it will make me even more sick.”*

FACILITATOR: *“It is true that many of us will avoid drinking cold water when our bodies feel hot. But healthcare providers we respect tell us that the best way to stay hydrated and cool our bodies so we don’t get heat stroke is to drink cold water and to use cool, wet cloths.”*



NOTES FOR THE FACILITATOR

Cultural-related beliefs may be brought up during discussions. It is important to acknowledge and respect cultural beliefs but also point out the importance of treating someone appropriately if they have or are developing a heat illness. Try relating to the participant’s response by responding with “us” or “we.”

Display poster and review types of heat illness and treatments

Symptoms and treatments for heat illness

Heat rash or prickly heat is red, itchy skin bumps caused by blocked sweat glands that prevent sweat from evaporating. To treat this, keep skin cool, clean, and dry. Calamine lotion can be used for itchiness.

Heat cramps are painful muscle spasms in the arms, legs, and belly caused by heavy physical work in the heat. If someone gets heat cramps, they should rest in a cool place. Drinking some sports drinks (try to find a sports drink with low sugar) may help. Seeing a healthcare provider is recommended if cramping is severe or does not go away.

Fainting and light-headedness is caused when blood vessels get larger to help the body lose heat. Resting in a cool place, lying down, and elevating legs is recommended. Drinking some sports drinks (try to find a sports drink with low sugar) may help. Seeing a healthcare provider is recommended if symptoms do not improve after lying down and elevating legs.

Heat exhaustion is when your body cannot stay cool and is not getting enough hydrating fluids. Symptoms include:

- Cool, clammy, sweaty, pale skin
- Weak, tired, light-headed, headache
- Feeling sick to stomach, vomiting
- Decreased/dark urine
- Body temperature between 98.6°F-104°F(37°C-40°C)

Resting in a cool place, lying down, and elevating legs is recommended. Drinking some sports drinks (try to find a sports drink with low sugar) may help. Seeing a healthcare provider is recommended if symptoms do not improve after lying down and elevating legs.

Heat stroke can be fatal. This is when your body cannot control its own temperature to stay cool enough. Symptoms include:

- Very high body temperature above 104°F (40°C)
- Hot, dry, red skin (some sweat possible)
- Feeling sick to stomach, vomiting
- Confusion, irritability, seizure, no response

Heat stroke is an emergency! Call 911 immediately!

Resting in a cool place, lying down, and elevating legs is recommended. Have the person lie on their side if they are sick to their stomach. Remove heavy, outer clothing. Wet and fan. Put ice packs in armpits and groin if they are available.



Activity

Prepare by having pieces of paper with the types of heat illness written on them (with illustrations if needed) that can be handed out. Have participants pair up and assign each pair a type of heat illness by handing them the paper with the heat illness type so only one person can see the type. This person will act out the symptoms, and the other person will help them with the correct treatment. If time allows, the pairs can reenact for the group or the papers can be traded with other pairs.



Take-home messages

Don't ignore early symptoms. Ignoring symptoms will only lead to more serious heat illness and more missed time at work.

Heat stroke is a medical emergency! If you see someone with heat stroke symptoms, call 911 immediately and be able to tell the dispatcher where you are, what happened, and a phone number in case you get disconnected.



NOTES FOR THE FACILITATOR

Make sure everyone can say "heat stroke" in English when they call 911. Do a practice round of saying "heat stroke" since there are dispatchers who do not understand Spanish. You can pretend to be the dispatcher and have the workers call 911 and explain what has happened.



Symptoms and treatments for heat illness

Symptoms of heat illness can be mild or severe. Know symptoms and treatments to prevent serious heat illness and death.

TYPES AND SYMPTOMS

TREATMENTS

Rash

Red, itchy skin bumps



- Keep skin clean and dry
- Use calamine lotion



Cramps

Painful muscle spasms in the arms, legs, and belly



- Water, rest, shade
- Have a snack
- Tell supervisor



Dizziness or Fainting



- Water, rest, shade
- Elevate legs
- Tell supervisor



Exhaustion

- Feeling sick to stomach, vomiting
- Cool, clammy, sweaty, pale skin
- Weak, tired, light-headed, headache



- Water, rest, shade
- Elevate legs
- Lay on side if vomiting
- Cool, wet cloths
- Tell supervisor



EMERGENCY! CALL 911!

Heat Stroke

- Feeling sick to stomach, vomiting
- Hot, dry, red skin (some sweat possible)
- Confusion, irritability, seizure, no response



- Move to shade
- Elevate legs
- Lay on side if vomiting
- Cool, wet cloths
- Tell supervisor



Risk factors for heat illness

Group discussion questions

- What kind of weather can cause heat illness?
- What are some personal risk factors for heat illness?

Sample question and response

FACILITATOR: *“What are some reasons you might get heat illness at work?”*

PARTICIPANT: *“When we are harvesting and the weather is hot, we have to carry heavy loads up and down ladders and to the bins.”*

FACILITATOR: *“Yes, heavy physical work in the heat can cause heat illness. Many times we don’t have control over the type of work we have to do, but we do have control over some things like the type of clothing we wear and what we choose to drink. Choosing light-colored clothing and drinking water are actions we can take to reduce our chances of getting heat illness.”*



NOTES FOR THE FACILITATOR

Questions about how to prevent heat illness may come up during the group discussion. Review prevention strategies in the Prevention Checklist at the end of this guide to provide recommendations. The Washington State Outdoor Heat Rule for Agriculture (WAC 296-307-097) states that employees are responsible for monitoring their own personal risk factors, so it is important for workers to be aware of their risk factors as well as preventative strategies.

Display poster and review risk factors for heat illness

Activity



Hand out copies or display the Prevention Checklist. Have participants pair up and pick a risk factor. Ask them to discuss the risk factor and what they could do about the risk factor to reduce the risk of heat illness using strategies in the Prevention Checklist. Have participants check or write three prevention strategies they already practice or will start practicing.

Risk factors for heat illness

Risk factors, or causes, of heat illness are split up into three categories: weather, work-related, and personal risk factors:

Weather risk factors

- High temperature
- High humidity
- Direct sun
- No wind or hot wind

Work-related risk factors

- Not drinking enough water
- Not being acclimatized
- Wearing lots of layers or non-breathable clothing
- Having a heavy workload
- Working near hot machinery
- Working inside in an area with no cooling or ventilation

Personal risk factors

- Age (being older)
- Overweight or out of shape
- Sleep deprived
- Diabetes
- Heart disease
- Previous heat illness
- Having a cold, flu, or fever
- Being hungover
- Certain medications, for example for:
 - High blood pressure
 - Heart disease
 - Mental health
 - Thyroid
 - Constipation
 - Losing weight
 - Allergies



Take-home messages

There are weather-related, work-related, and personal risk factors for heat illness. Make simple changes to reduce risks you can control. When there are risk factors you can't control, pay more attention to how you are feeling on hot days or when you are doing heavy physical work. Detecting early symptoms helps prevent more severe heat illness.

Certain medications and health conditions can make you more likely to get heat illness. It is important to talk to your healthcare provider if you have questions about your health and working in the heat.

Risk factors for heat illness

There are personal, work-related, and weather-related causes of heat illness.
Awareness of your risk factors can help prevent heat illness!

Personal

 <p>Hungover</p>	 <p>Heart disease</p>	 <p>Diabetes</p>	 <p>High blood pressure</p>	 <p>Not enough sleep</p>	
 <p>Cold, flu, fever</p>	 <p>Certain medications</p>	 <p>Previous heat illness</p>	 <p>Overweight</p>	 <p>Older age</p>	 <p>Pregnancy</p>

Work

 <p>Heavy workloads</p>	 <p>Working near hot machines</p>	 <p>Indoors with no cooling or ventilation</p>	 <p>Wearing personal protective equipment</p>	 <p>Wearing dark clothes and lots of layers</p>
 <p>Too much caffeine and sugar</p>	 <p>Not being used to hot weather</p>	 <p>Not drinking enough water</p>	 <p>Not enough breaks</p>	

Weather

 <p>Direct sun</p>	 <p>High temperature</p>	 <p>No wind or hot wind</p>	 <p>High humidity</p>
--	--	---	---

Clothing for work in hot weather

Group discussion questions

- What clothing is good for hot weather and why?
- What clothing is NOT good for hot weather and why?

Sample question and response

FACILITATOR: "How do you choose the type of clothing you wear for work?"

PARTICIPANT: "When it is sunny and dusty, I wear long sleeves to protect my skin from sun and dust. It can also get itchy when working around certain types of crops."

FACILITATOR: "Protecting your skin is very important and healthcare providers recommend wearing long sleeves to protect your skin from sun damage. They also recommend wearing lightweight, light colored clothing to help prevent heat illness. Wearing layers of long-sleeved shirts can be helpful as you can remove the outer layers as it gets warmer and still protect your skin."



NOTES FOR THE FACILITATOR

Bring or wear an example of appropriate clothing for working in hot weather.

Display poster and review appropriate clothing for work in hot weather

Clothing for work in hot weather

- Layer clothing so you can be warm in the early morning and then keep cool later in the day. Make sure all layers are long-sleeved to protect skin from the sun.
- Do not wear layers that are too loose because clothing can get caught on branches or in machinery.
- Check the forecast so you can wear the appropriate clothing to keep you comfortable and protected.
- Wide brimmed hats are better than hoods or ball caps.
- Lightweight, light colored shirts are better than hooded sweatshirts.
- Wear all light colors, even pants.
- Use sunscreen! Frequent laundering of clothing with UV absorbent agents increases protection.

Activity



Have participants pair up and talk about their own clothing. They can point out to each other clothing that is good for hot weather or what they would change if it is going to be a very hot day. Pair up women with other women and men with other men.



Take-home messages

Light colored, lightweight, breathable long pants and shirts keep you cooler than dark, heavy, cotton clothes and protect against scratches, dust, and sun damage.

Remove layers as it gets hotter. Remove PPE during rest breaks to keep your body from overheating.

Clothing for work in hot weather

Wear light colored, lightweight clothing and a hat when working in the heat.



Staying hydrated at work

Group discussion questions

- How much water do you need to drink to stay hydrated?
- What types of actions or activities can lead to dehydration?

Sample question and response

FACILITATOR: *“Do you drink water when you are thirsty at work? Why or why not?”*

PARTICIPANT: *“I don’t drink much water because I don’t want to take the time to walk to the porta-potty. It is far and dirty.”*

FACILITATOR: *“Yes, the toilets can be located a few minutes walk from where people are working in the field and they are not always as clean as we want them to be. However, taking the few minutes to walk to the bathroom is worth it if you are staying hydrated. If you get heat illness because you are dehydrated, then you will miss more time from work and lose more money.”*



NOTES FOR THE FACILITATOR

Bring in cones and bottles so workers can see the sizes of 4-ounce cones and 8-ounce bottles.

Display poster and review recommendations for staying hydrated at work.

Staying hydrated at work

- Let workers know that employers are responsible for providing safe drinking water for employees. They are also responsible for giving workers the opportunity to drink at least 1 quart (or 1 liter) of water every hour.
- Drink small sips of water throughout the day.
- Don’t compare yourself to other workers. Some people may need to drink more than 1 quart in an hour if it is very hot outside.
- Drinking energy drinks and sugary drinks like juice are not good for hydration. Drinking these beverages in moderation is okay, like drinking a small cup of coffee in the morning, but it is important to drink water.
- Eating a healthy snack and drinking water during breaks can help your body stay hydrated.



Activity

Have participants pair up and quiz each other on how many bottles of water they should drink on hot days. If they bring their own bottles or jugs to work, have them estimate how much liquid their containers hold so they know how much they need to drink.



Take-home messages

- Drink water before you are thirsty. When you are thirsty, you are already dehydrated!
- Remember **“½ liter of water every ½ hour”** on hot days (½ liter is about the same as two 8-ounce bottles.)



NOTES FOR THE FACILITATOR

Print out urine color charts for workers to take home so they can see how hydrated they are before and after work. An example of a urine color chart is at the end of this guide.

Staying hydrated at work

If you are thirsty, you are already dehydrated. Sip water throughout the day when it is hot to make sure you drink enough water.

Water



8-ounce plastic bottle



x 2
4-ounce paper cone

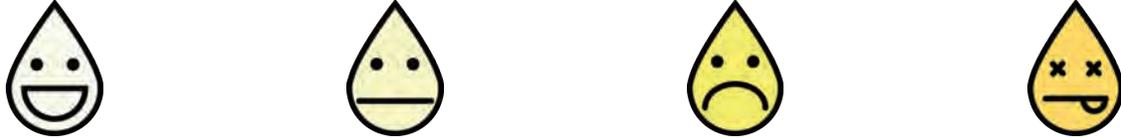


Water each hour



Urine Color

GOOD BAD



Personal protective equipment (PPE) and heat

Group discussion questions

- What types of PPE do you usually wear?
- Have you or a coworker ever felt sick when applying pesticides? What were your symptoms? What did you do?

Sample question and response

FACILITATOR: *“Do you take PPE off during your breaks? Why or why not?”*

PARTICIPANT: *“I don’t take my PPE off. It is hard to take off and put back on again, especially because it is wet with pesticide spray on the outside and I don’t want to contaminate my clothing or skin.”*

FACILITATOR: *“Taking PPE off during a break can be difficult if you don’t have a long break or chance to change into different PPE. If your PPE is breathable, then you could unbutton or unzip the top part to cool off during a break. If you are wearing nonbreathable PPE, it is very important to take it off during breaks so you don’t overheat. Bring a clean set of PPE with you to change into if you can.”*



NOTES FOR THE FACILITATOR

Different types of PPE are required depending on the work task and pesticides that are being used. For pesticide applicators, the directions on the pesticide label should always be followed. Work coveralls are not considered PPE. Different jobs that require work coveralls or PPE are jobs as mechanics or in the shop, irrigation crew, and pesticide applicators.

Display poster and review education on PPE and heat

PPE and heat

Regular work clothes is the coolest option and recommended for most field workers.

Polypropylene or polyolefin coveralls are the coolest PPE options and are recommended when permitted by the pesticide label.

Work coveralls over regular clothing may be necessary for some jobs. These are not considered PPE. In some cases a lighter weight polyolefin suit may be used instead of work coveralls. If coveralls are being worn in direct sun, a lighter color is recommended.

Vapor barrier suits are required for certain pesticides. This type of PPE can heat your body up the most and is used for protection from the most toxic chemicals. Applicators should be aware of how they are feeling because there is increased risk of heat illness and exposure to some of the more toxic pesticides.

Respirators add to the overall heat load. It is also important to consider the differences between half-face, full-face, and other respirator types when planning for work in the heat.

Activity



Have workers pair up and share ideas for how they stay cool when wearing PPE. After a couple minutes, ask each person to give one example of what they do to stay cool. They may use a cooling vest under their PPE or have other ideas.



Take-home messages

Always follow the pesticide label when selecting PPE. If the label allows for polypropylene or polyolefin suits, these are recommended as the cooler option.

Signs and symptoms of heat illness may be harder to detect when you are wearing PPE, and it can be hard to tell the difference between pesticide poisoning and heat-related illness. If you think you or a co-worker are getting sick from heat or pesticides, get medical attention right away. Do not spend time trying to figure out if symptoms are from heat or pesticides.

Personal protective equipment (PPE) and heat

PPE and work coveralls can be much hotter than regular work clothes and can cause more heat stress. Remove PPE during breaks to cool off!



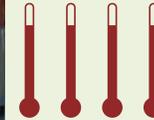
Regular work clothes without PPE

HEAT LEVEL



Work coveralls over regular work clothes

HEAT LEVEL



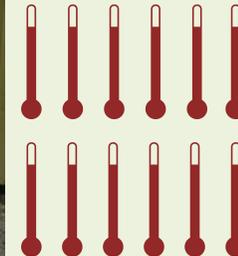
Polypropylene or polyolefin coveralls

HEAT LEVEL



Vapor barrier non-breathable PPE

HEAT LEVEL



Keeping cool in the home and community

Group discussion questions

- Where are the coolest areas inside where you live?
- Where are your favorite places to go in the summer to stay cool?

Sample question and response

FACILITATOR: "How do you keep your house cool in the summer?"

PARTICIPANT: "We use fans. We would like to open our windows when it is cool but we do not feel like it is safe to leave our windows open."

FACILITATOR: "Staying cool during heat waves is not easy. Sometimes opening windows is not an option if it does not feel safe, there are pesticides being sprayed nearby, or there is a lot of wildfire smoke in the air. During these times, the best options are to close the curtains or blinds to prevent sun from shining in the home during the day, try to not cook with heat inside the home, and find other places to cool off, like the library."

Display poster and review ways to keep cool in the home and community.

Activity



Have participants pair up and share their own ideas for places to go and what to do to stay cool when they are not working. After a couple minutes, ask each person to give one example of what they do to keep cool in the home or community.

Keeping cool in the home and community

Inside the home:

- Use fans to move air around in home. Put a bowl of ice in front of a fan to help cool the air.
- Open windows in the early morning and evening.
- Close windows and curtains during the day to keep cool air inside, especially on the sides of the house that get the most sun.
- Use curtains that are white on the side facing the window to help heat from coming into the home.
- Use a fan to pull cool air inside during morning and blow warm air out during evening.
- Hang a damp sheet in an open window when the air outside is dry and cooler than the air inside. Breezes coming into the home are cooled by the evaporating water from the sheet.
- Air dry dishes instead of using a dishwasher.
- Hang clothes outside to dry instead of using an electric dryer.
- Cook outside when possible.

Outside the home:

- Find or make shade in the yard. Making shade does not have to be expensive. A simple sunshade can be made with a tarp and PVC pipe.
- Use a grill or outside stove for cooking.
- Fill a kiddie pool or use a sprinkler to keep kids cool. Supervise kids using the pool.
- Find places to go where there is shade, water, or air conditioning.

Cool yourself:

- Take a quick, cold shower
- Keep a spray bottle with water in the refrigerator and spray yourself when you are hot.
- Fill a plastic bottle with water and put it in the freezer the day before going out in the heat. The ice in the bottle will melt and water will stay cool longer.



Take-home messages

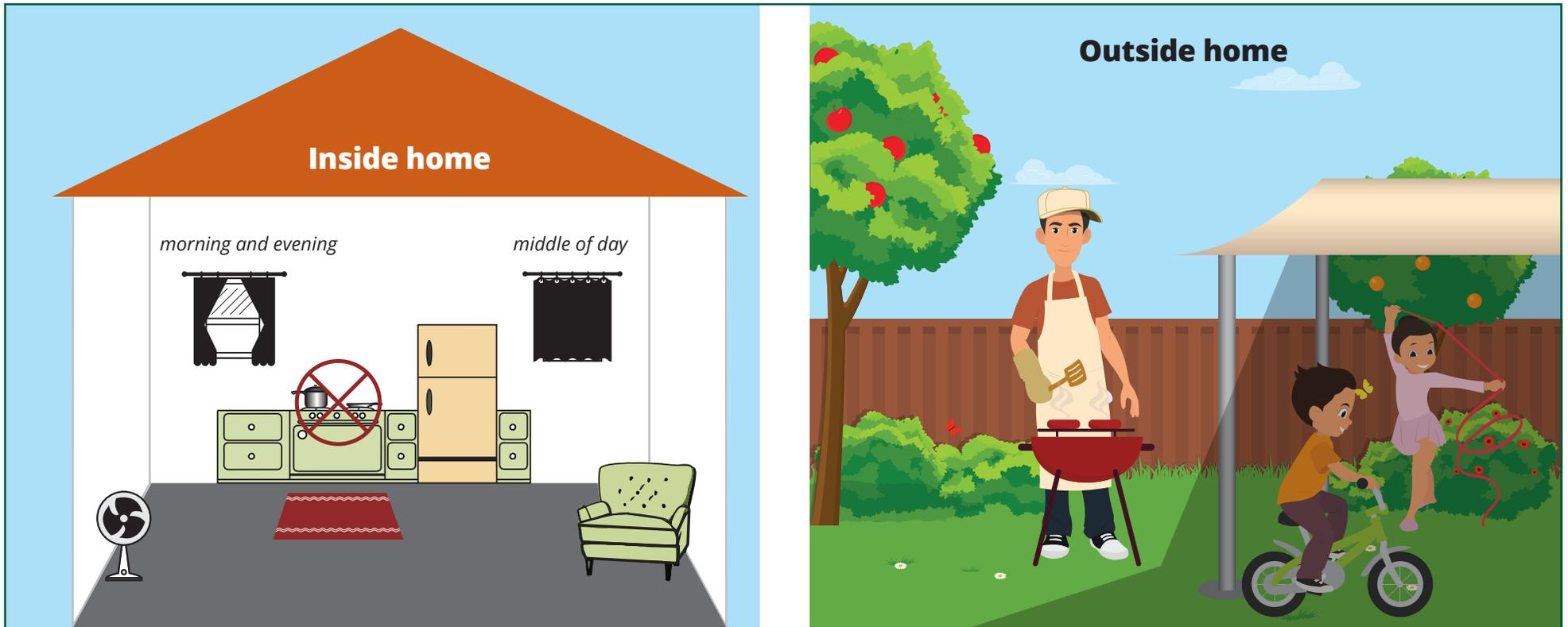
There are actions you can take to make your home cooler during heat waves like using fans, opening and closing windows at certain times, not cooking inside when it is hot, and closing blinds and curtains so the sun does not shine in the home.

There are places you can go for free to cool off like parks, libraries, malls, and community centers when it is not possible to stay cool in your home.

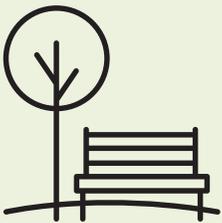


Keeping cool in the home and community

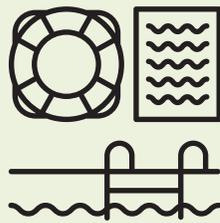
Keep your family cool during hot weather.



Go to these places in the community to cool off



Parks



Lakes or swimming pools



Community centers



Malls



Libraries

Prevention Checklist

Good health

- Get enough sleep at night (7-9 hours)
- Eat healthy foods
- Don't drink too much alcohol
(don't drink more than 1 drink on most nights)
- Drink lots of water, especially when it is hot
- Exercise regularly
(at least walk 30 minutes 5 days per week)
- Don't smoke cigarettes or use products with nicotine

Awareness

- Pay attention to how your body is feeling- watch out for early signs and symptoms
- Check out the weather forecast before work so you know how hot it will be that day

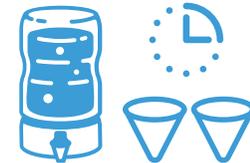
Work preparedness

- Know how to call 911, tell dispatcher what happened, and your location
- Drink ½ liter every ½ hour when it is hot out (two 8-ounce water bottles)
- Wear light colored, lightweight clothing
- Make sure your body is used to working in hot weather



EMERGENCY CALL

911



Heat illness case studies

This section describes heat illness incidents and fatalities that have occurred in the United States. These descriptions are adapted from investigative reports and media reports. Integrating case studies into worker trainings can help workers realize the risks associated with working in the heat and the importance of being aware of heat illness symptoms.

2005 – Washington State

A 64-year-old, and dedicated employee of 40 years, was found unconscious in the hop field he was working. The high temperature that day was 99°F and it was reported that he had arrived feeling unwell that day and brought extra water. It took only 8 to 10 minutes for the EMTs to arrive. They found no vital signs, but were able to revive a heart rhythm while he was being transported to the hospital. He died several hours later. He died of heat stroke.

SOURCE: Washington Department of Labor and Industries
www.lni.wa.gov/rules/AO06/40/0640CES.pdf

2015 – California

Around 10:30 a.m. a crew began picking from a row of trees at the back of the grove, not far from where a supervisor had set up shade and water—complying with California’s heat illness prevention standards. Forty-five minutes into the shift, a picker, 48, sat down in a shaded area, saying he didn’t feel well. Supervisors asked if he wanted to go to a nearby clinic, but he declined and said he was fine. He asked for water. Minutes later, he collapsed. One picker, who could speak English, called 911. A supervisor jumped into a pickup and sped to meet the medics. When they arrived, it was too late to revive him. The father of three died on the field at 12:35 p.m.

SOURCE: Desert Sun News Online, May 11, 2017
www.desertsun.com/story/news/2015/11/19/death-fields/74058984/

2016 – Florida

A 50-year-old Haitian farmworker, Jean Francois Alcime, died of heat exhaustion during a two-hour bus ride back to Immokalee from the tomato fields. He had appeared tired and was stumbling earlier in the day, so was given water and ice for his neck. He appeared better and was told to head home on the bus. He appeared to be sleeping on the ride, but when co-workers attempted to wake him, he was not responding or breathing. He was pronounced dead Tuesday evening.

SOURCE: Naples Daily News Online, May 11, 2017 and May 19, 2016
bit.ly/2Gmxjej

2008 – California

While tying grape vines in a Stockton area vineyard with temperatures soaring above 100 degrees, 17-year-old Maria Isabel Vasquez Jimenez collapsed from heat exhaustion. By the time she arrived at a hospital, Jimenez was in a coma, and her body temperature topped 108 degrees. She died two days later. It was only at the hospital that it was found out she was two months pregnant. The San Joaquin County Coroner officially confirmed that Maria died of heat stroke. Maria had been working 8 hours in the blistering heat without shade or sufficient water. Other workers reported that the strict foreman didn’t allow them a long enough break to stop and get a drink, which was a 10 minute walk away.

SOURCE: NPR News Online, June 06, 2008
www.npr.org/templates/story/story.php?storyId=91240378

SOURCE: Daily Kos, Monday June 23, 2008
[www.dailykos.com/stories/2008/6/23/540765/-](http://www.dailykos.com/stories/2008/6/23/540765/)

2012 – Maine

It was a cool spring day. A field worker filled in for another in a prescribed burn at a blueberry field. He had never worked a burn before. He became disoriented in the early afternoon but did not recognize the signs of heat stroke. He collapsed and was taken to the hospital, where his temperature was measured at 108 degrees and he was unresponsive and in respiratory failure. He fortunately survived, but he suffers from permanent damage to muscles in his legs and shoulders.

SOURCE: Bangor Daily News Online, May 11, 2017
bangordailynews.com/2016/10/27/news/bangor/judge-awards-blueberry-worker-nearly-730000-in-heat-stroke-collapse

2011 – Illinois

In July, as the Midwest simmered in a heat wave, an employer got a call from an H-2A worker from Mexico who couldn't find his brother after a day in the corn fields. He was told the 36-year-old man had fainted earlier that morning, but returned to work. The worker was missing for 50 days before his body was found in the fields. The county coroner reported he died of hyperthermia from extreme heat. He left behind a wife and three daughters in Mexico.

SOURCE: Chicago Tribune Online, August 6, 2016

<http://www.chicagotribune.com/business/ct-migrant-farm-workers-corn-detassling-0807-biz-20160805-story.html>

2006 – North Carolina

A 44-year-old Hispanic migrant farm worker died after succumbing to heat stroke while working in a tobacco field. The weather was hot and humid with a heat index (a measure of the combined effects of high temperatures and high humidity on the body) between 100 and 110. Around 3 p.m. he complained to the crew leader that he was not feeling well. He drank some water and was driven back to the workers' housing and left alone to rest. At approximately 3:45 p.m. he was found unconscious on the steps of the house. 911 was called immediately and responded within five minutes. At the hospital his core body temperature was recorded at 108° F and he was pronounced dead.

SOURCE: NIOSH FACE Reports, August 7, 2007

www.cdc.gov/niosh/face/in-house/full200604.html

2018 – Georgia

On June 16, Miguel Angel Guzman Chavez arrived in Georgia from Mexico. He was 24 years old and went right to work picking tomatoes. The Georgia heat was consistently more than 90 degrees, and on June 21, the temperature soared to 95 degrees. That day, Chavez collapsed in the field, suffering from heat stroke, which then led to cardiac arrest. Less than two hours later, he was pronounced dead at the Colquitt Regional Medical Center.

The Colquitt County coroner confirms that a 24-year-old man went into cardiac arrest last Thursday while picking tomatoes on a farm in extremely hot temperatures. OSHA says there is an open investigation which is a standard protocol when someone dies on the job.

SOURCE: WALB News, June 25, 2018

www.walb.com/story/38503828/farmer-makes-first-heat-related-death-in-south-ga/

2013 – California

In 2013, California state officials shut down the Etchegaray Farms after a farmworker, Juan Ochoa, aged 37, collapsed and died on a lemon orchard outside of Bakersfield, California. Juan Ochoa was checking irrigation equipment with his brother, Alejandro Ochoa, in 106-degree weather when he collapsed. The brothers were working alone and were six rows apart when Alejandro Ochoa looked around and did not see his brother. He then spotted him lying on the ground. Alejandro Ochoa said he had noticed his brother was fanning himself with his hat but thought nothing of it, as it was a hot day. "We did not have shade or water provided by the company," said Alejandro Ochoa. "When I saw him, I got scared and immediately ran to him," said Alejandro Ochoa. But, Juan Ochoa was unresponsive. Alejandro Ochoa slapped his brother and yelled in an effort to revive him. There was no cellphone reception in the area. Alejandro Ochoa said he ran to his pickup truck, which he parked at least a mile away, and then drove to summon help. Ochoa was from Mexico and had been working for almost a year. When officials came to inspect the farm, they found several violations of California's heat regulations, including no access to shade. The farm was allowed to reopen once it was compliant.

SOURCE: Bakersfield Now, July 7, 2013

bakersfieldnow.com/news/local/cal-osh-investigating-farmworker-death

Role plays

Role playing can provide a safe environment to encounter different scenarios for the first time and enhance preparation for situations that occur in the real world. Taking the role play seriously is the best way to ensure preparedness if something does happen in the field and fast action is needed. To encourage workers to take the role play seriously, let them know that being prepared can save a life in the field. If workers seem hesitant to participate, facilitators can also act out role plays to help reinforce messages.

Each role play requires two people. The role plays describe a scenario that two people will act out, followed by follow-up questions for a group discussion. There is a role play for each topic.

Symptoms and treatments for heat illness

Worker 1 and Worker 2 are working together outside on a hot, sunny day. They are sweating a lot but want to finish up their work before taking a water break.

WORKER 1: *Starts getting a headache and tells Worker 2.*

WORKER 2: *Starts talking and becomes confused and angry for no reason then passes out.*

WORKER 1: *Remembers safety training and takes action to help Worker 2.*

FOLLOW-UP QUESTIONS:

What symptoms did each worker have?

Would you have done anything differently to treat the worker who passed out?

Did 911 get all the information they needed?

Risk factors for heat illness

Worker 1 and Worker 2 are harvesting pears in a hilly block on a hot August day and there is no wind. They are trying to harvest as many bins as they can before the end of the day. They are carrying heavy loads of pears up and down ladders and to their bins.

WORKER 1: *Gets dizzy and almost falls off a ladder.*

WORKER 2: *Remembers safety training on heat illness and takes action to help Worker 1.*

FOLLOW-UP QUESTIONS:

What are some of the risk factors you saw?

Are there other possible risk factors that can't be seen? What action would you take in this situation?

Clothing for work in hot weather

Worker 1 and Worker 2 are together in the field on a hot, sunny day where there is no shade. Worker 1 is wearing a dark sweatshirt and Worker 2 is wearing a light-sleeved button down.

WORKER 1: *Wants to take a layer off because they are getting very hot but is afraid they will get itchy and dusty and exposed to too much sun.*

WORKER 2: *Listens to Worker 1 talking about why they don't want to remove a layer and then lets them know why they chose a lightweight and light colored shirt.*

FOLLOW-UP QUESTIONS:

What would you rather wear and why?

How would you encourage workers to wear lightweight, light colored clothing?

Staying hydrated at work

Worker 1 and Worker 2 are talking at the beginning of the work day.

WORKER 1: *Says they were out late at a birthday party and had a lot of alcoholic drinks. They are now drinking a large energy drink to wake up.*

WORKER 2: *Drinking from a bottle of water and tells Worker 1 what they learned about the importance of staying hydrated*

FOLLOW-UP QUESTIONS:

What advice would you give to the person who stayed out late?

What are some ideas for encouraging co-workers to drink more water and less energy drinks?

Personal protective equipment (PPE) and heat

Worker 1 and Worker 2 are in the pesticide loading area together. Worker 1 is getting ready to apply pesticides and is putting on PPE. Worker 2 is checking on Worker 1 to make sure they are wearing PPE according to the pesticide label.

WORKER 1: *Talks about how hot it gets when they are applying pesticides because of the PPE.*

WORKER 2: *Listens to Worker 1 and tells them they need to follow the label. Worker 2 tells Worker 1 to make sure to be aware of their symptoms because sometimes it is harder to notice when wearing PPE.*

FOLLOW-UP QUESTIONS:

What other advice would you give the pesticide applicator?

What would you tell a worker if they wanted to know the difference between heat illness and pesticide poisoning?

Keeping cool in the home and community

Worker 1 and Worker 2 are talking about how hot it is in their houses during the day.

WORKER 1: *Talks about opening their windows in the morning when the air is cooler.*

WORKER 2: *Says they can't open their windows or spend time outside in their yard because the smell from the dairy is so strong. Worker 1 talks to them about places to go to cool off.*

FOLLOW-UP QUESTIONS:

What advice would you give the worker who lives close to the dairy?

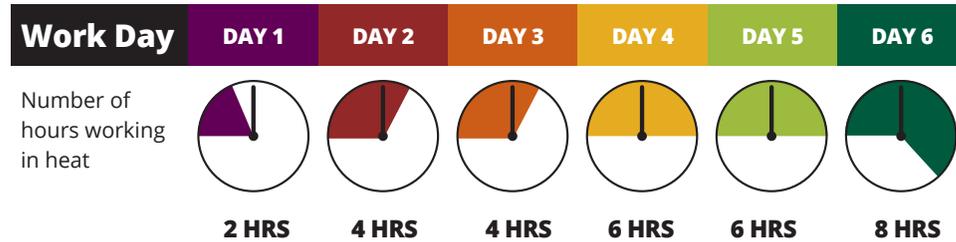
Do you have other ways to keep your home and family cool when it is hot?

Additional information

Acclimatization

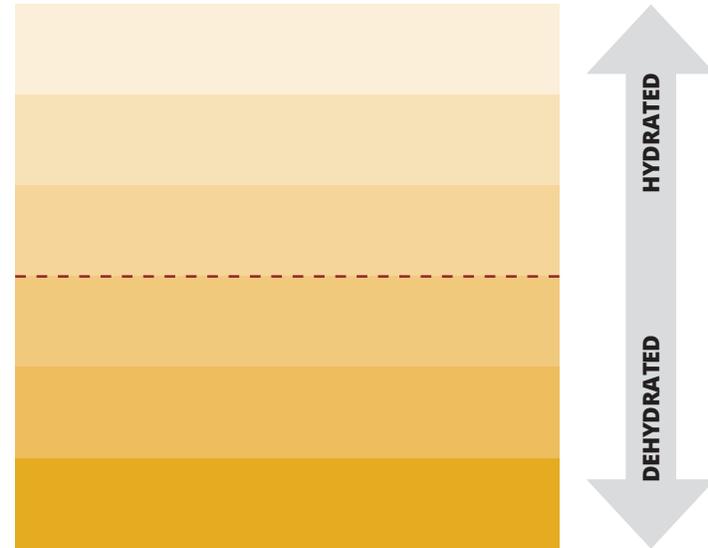
Acclimatization is the body's temporary adaptation to work in heat that occurs as a person is exposed to hot conditions over time. It usually takes a person about one to two weeks to get used to working in heat. If a person stops working in hot conditions for longer than a few days, they will need to acclimatize again.

Below is an example of an acclimatization schedule. The recommended increase to heat exposure for new and unacclimatized workers is a 20% increase per day. These are general guidelines. Each person will vary in the amount of time they take to acclimatize to the heat based on their experience and personal factors.



Urine color chart and hydration

Below is an example of a urine color chart. This chart can be copied and pasted into a separate document and printed out to give to workers.



Heat illness and pesticide poisoning

Certain symptoms of heat illness and pesticide poisoning are similar. The table below compares symptoms of heat exhaustion and organophosphate or carbamate pesticide poisoning.

Heat exhaustion	Organophosphate or carbamate pesticide poisoning
Sweating	Sweating
Headache	Headache
Fatigue	Fatigue
Dry mouth and no tears (dry membranes)	Salivation and tearing (moist membranes)
Large (dilated) pupils	Small (constricted) pupils
Nausea	Nausea and diarrhea
Fast pulse	Slow pulse
Loss of coordination	Loss of coordination
Irritability	Irritability
	Loss of consciousness

Links to resources

WA Outdoor Heat Exposure Rule for Agriculture (WAC 296-307-097):

www.lni.wa.gov/safety/rules/chapter/307/WAC296-307.PDF#PartG1

OSHA's Campaign to Keep Workers Safe in the Heat

www.osha.gov/heat/index.html

WA L&I Outdoor Heat Exposure Resources*

www.lni.wa.gov/Safety/Topics/AtoZ/HeatStress/resources.asp

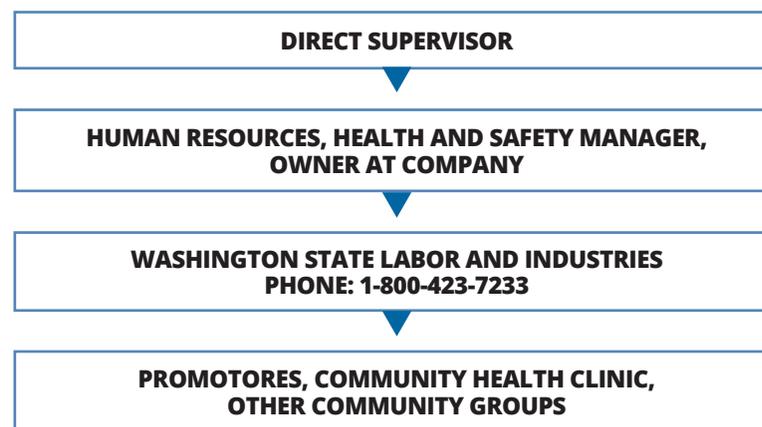
* This website has a link to a sample accident prevention program for outdoor heat exposure

Pacific Northwest Agricultural Safety and Health Center Resources

deohs.washington.edu/pnash/heat_illness

Reporting unsafe work conditions

During trainings, workers may ask what they can do if there are unsafe conditions at their workplace. The following flow diagram is the recommended hierarchy of who to contact. If a worker does not feel comfortable or cannot get in touch with the first person, then they should move down the list.



The following information should be collected:

- Address or location of workplace
- Date and time
- Description of hazard
- Record of action taken – who worker talked to and their response
- Photographs if possible

This information does not need to be typed on a formal report, it just needs to be written somewhere by the worker (or a friend or coworker if the worker cannot write) and can be used as documentation.

Acknowledgments:

We would like to thank the following groups for their contributions to the content of this guide:

The project advisory group and expert working group members

UW PNASH outreach and administrative staff and students

Quincy Community Health Center

WA State Department of Labor and Industries

Photographs courtesy of Sarah Fish, Jen Krenz.

Illustrations courtesy of Stacey Holland.