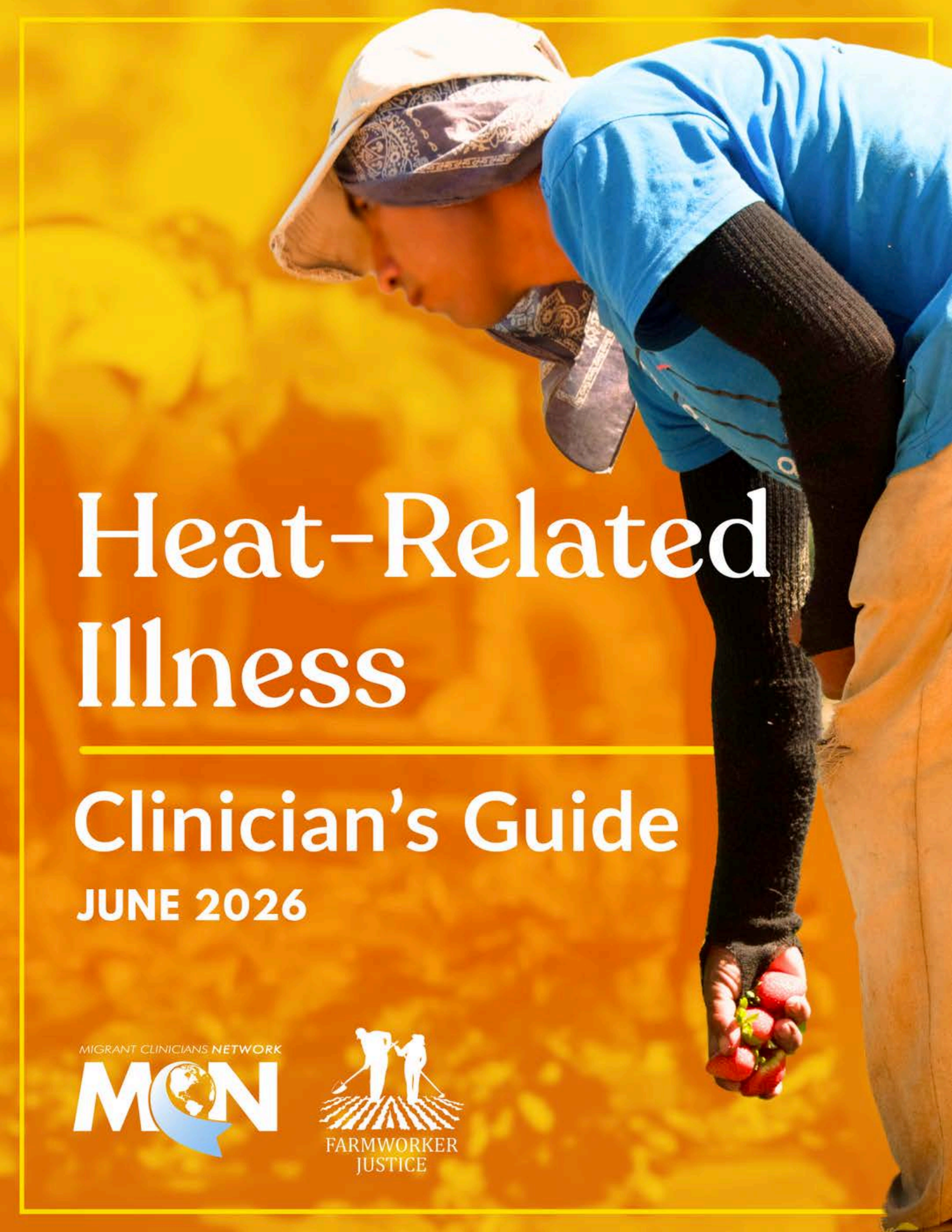


Heat-Related Illness

Clinician's Guide

JUNE 2026

MIGRANT CLINICIANS NETWORK

MCN

FARMWORKER JUSTICE

Outdoor Workers at Risk

An estimated 70% of worker deaths from heat occur in the first week of work. Almost half of the deaths occur on the worker's *very first day on the job*, or first day back after an extended absence.[1]

Migratory and seasonal agricultural workers are particularly at risk. **These farmworkers are 35 times more likely to die from exposure to heat** than people working in other industries.[2]

This guide provides information to clinicians on the prevention and treatment of heat-related illnesses (HRIs) among farmworkers and other outdoor workers. Since workers may not be familiar with all of the symptoms of various HRIs, it is important that clinicians discuss HRI symptoms and heat stress prevention with outdoor workers.

Starting with an Understanding of the Patient

Many workers in informal industries may work at multiple jobs, some of which may result in excessive exposure to heat. Farmworkers, construction workers, and day laborers may work all day outside. Warehouse, commercial kitchen, and gig workers like rideshare drivers may work in unconditioned indoor workspaces that also have significant risk. It is important to know what your patients do for work. A detailed, thorough work history will help clinicians fully understand the risks patients face.

What is Heat Stress?

Exposure to heat can cause heat stress, an increase in heat storage in the body.[3] High levels of heat stress may lead to heat-related illnesses (HRIs), including heat exhaustion, heat cramps, rhabdomyolysis, heat stroke, and even death if left untreated.[4]

Three primary factors cause occupational heat stress:

Environmental

High temperatures and humidity, low- or no-wind conditions, and sun exposure are examples of environmental conditions.

Metabolic

Thermal energy is generated by the body, a result of physical exertion or other bodily functions.

Physical barriers

Clothing, including type of body coverage and clothing material, and personal protective equipment (PPE) can trap heat against the body and limit evaporation.[5]

Many other factors covered in this guide – like lack of acclimatization, dehydration, alcohol consumption, certain medications, wildfire smoke, additional heat exposure from equipment (e.g., furnace, stove), work restrictions and worker behaviors, age and experience, and pre-existing conditions – amplify heat stress by worsening heat storage or impairing heat dissipation across these three factors.

Recognition & Treatment of Heat-Related Illnesses

Since environmental and work conditions put outdoor workers at increased risk of heat illness, it is important that clinicians discuss this risk with patients and encourage workers to watch for symptoms not just for themselves but for fellow workers. Table 1, which clinicians can provide to workers, shows the different types of HRIs, symptoms, and recommendations that clinicians can share with workers to respond to the HRI.

Table 1[6]

Do you work in agriculture?

Get to know these heat-related illnesses, what their symptoms are, and how to respond!

HEAT CRAMPS

HEAT EXHAUSTION

RHABDOMYOLYSIS/ RHABDO

(Rapid breakdown of muscle)

HEAT STROKE

SYMPTOMS

- Muscle cramps, pain, or spasms in the abdomen, arms or legs.

- Headache
- Rapid heartbeat
- Heavy sweating
- Extreme weakness or fatigue
- Dizziness
- Nausea, vomiting
- Irritability
- Fast, shallow breathing
- Slightly elevated body temperature

- Severe muscle cramps*
- Very dark, tea-colored urine
- Weakness
- Swelling
- May be asymptomatic

- High body temperature
- Confusion
- Loss of coordination (ataxia)
- Hot, dry skin or profuse sweating
- Throbbing headache Seizures, coma

RESPONSE

- Stop activity, move to a cool shady place, rest, and drink water or electrolyte-rich drinks.
- Get medical help if the worker has heart problems, is on a low sodium diet, or if cramps continue for more than an hour.

- Take worker to ER or clinic.
- When in doubt, call 911.
- Do not leave them alone.
- Stay with the worker until the worker connects with a clinician.
- Cool the worker: find shade, remove unnecessary clothing including shoes/socks, use cold compresses on head, face, neck, encourage the worker to take sips of cool water.

- Take worker to ER or clinic; call 911 if care is unavailable.
- Ask clinician to check for rhabdo.
- Stop activity, move to a cool shady place, rest, and drink small sips of water or electrolyte-rich drinks.

- Call 911. This is life threatening.
- Stay with the worker until emergency services arrive.
- Cool the worker while waiting: find shade, remove outer clothing/PPE, apply cool water on the skin or clothing.

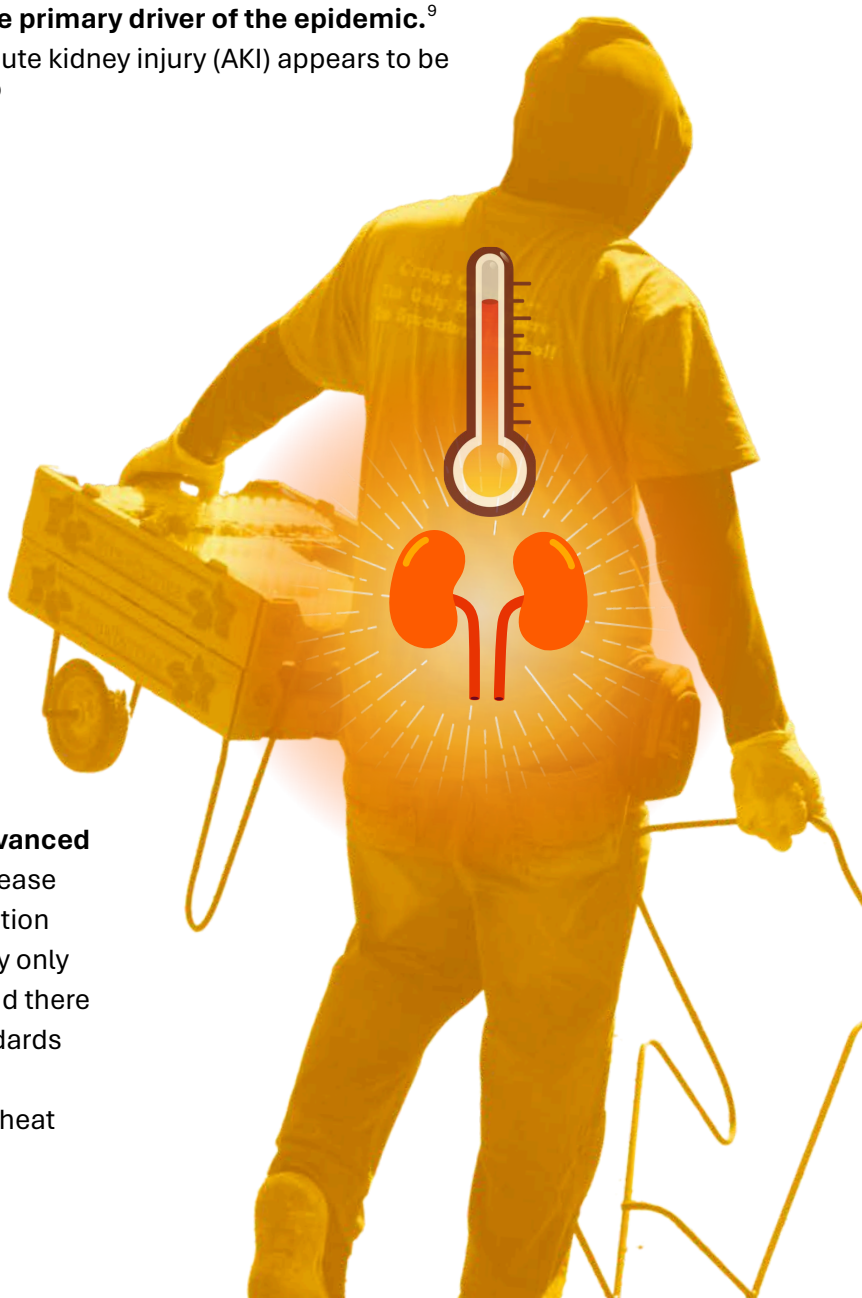
*Sometimes workers have muscle cramps but have a high tolerance for pain or ignore their symptoms. If muscle cramps are more than expected, find a clinician.

Chronic heat stress is associated with the development of Chronic kidney disease of nontraditional origin (CKDnt).[7]

CKDnt is a form of kidney disease in patients who do not have the usual risk factors such as diabetes, hypertension, cardiovascular disease, or old age.[8] Some agricultural workers come to the U.S. from farms in Central America, where a CKDnt epidemic has killed tens of thousands of agricultural workers. The success of water-rest-shade interventions and the lack of CKDnt in subsistence farmers led researchers to conclude that **occupational heat stress is the primary driver of the epidemic.**[9] While rates of CKDnt in the U.S. are unknown, acute kidney injury (AKI) appears to be relatively common among agricultural workers.[10]

Studies of U.S. agricultural workers have shown an AKI incidence of up to **43%** following a single work shift.

Recurrent AKI without sufficient recovery is thought to lead to CKD,[11] and one review suggested that **15%** of individuals working in hot environments have either AKI or CKD.[12]



Anecdotal information suggests that cases of illness consistent with CKDnt are increasingly being found in the U.S.[13]

CKDnt is typically asymptomatic except at advanced stages. Traditional clinical markers of kidney disease such as elevated serum creatinine, protein excretion and urinary albumin to creatinine ratio (ACR) may only develop when CKDnt is at an advanced stage, and there are currently no widely accepted reference standards for other biomarkers that might allow for early detection.[14] This underscores the importance of heat stress prevention among at-risk workers.

Risk Factors

Importance of a thorough clinical history.

Risk factors such as past episodes of heat illness and medical conditions or medications that affect the body's heat-regulation mechanism can make workers more susceptible to the effects of heat. Additionally, a clinical history will ascertain workplace environments and the patient's understanding of the risks of heat stress. Therefore, ascertaining a detailed and comprehensive clinical history is a key step toward identifying those at higher risk.

Some physiological risk factors are associated with a greater risk of HRI:

Table 2 Health conditions and individual factors that may increase workers' risk of heat-related illness (non-exhaustive)

- **Advanced age**
- **Allergies**
- **Altered cytokine production**
- **Cardiovascular disease**
- **Diabetes**
- **Hypohidrosis**
- **Kidney disease**
- **Low physical fitness**
- **Lung disease**
- **Malignant hyperthermia**
- **Mental health conditions**
- **Overweight/obesity**
- **Pregnancy**
- **Previous episodes of heat illness**
- **Recent fever, diarrhea, cold**
- **Seizures**
- **Sickle cell trait**
- **Small body size**
- **Sunburn**
- **Sympathectomy**
- **Type II fiber predominance**

Many pharmacological risk factors increase a worker's risk of HRI. This non-exhaustive list points to the wide range of medications that clinicians need to be aware of. Please see CDC's more comprehensive list which includes example medications and mechanism for increasing risk:
www.cdc.gov/heat-health/hcp/clinical-guidance/heat-and-medications-guidance-for-clinicians.html

Table 3 Medications/drugs that may increase workers' risk of heat-related illness

- **Alpha-adrenergic agonists**
- **Amphetamines**
- **Analgesics including NSAIDs**
- **Anticholinergics**
- **Antihistamines**
- **Antihypertensives**
- **Antiseizure medications**
- **Antipsychotics**
- **Antidepressants** (especially SSRI/SNRI)
- **Benzodiazepines**
- **Beta blockers**
- **Calcium channel blockers**
- **Cardiovascular medications**
- **Cocaine**
- **Diuretics**
- **Ephedra-containing supplements**
- **Lithium**
- **Laxatives**
- **Neuroleptics**
- **Phenothiazines**
- **Stimulants**
- **Thyroid receptor agonists**
- **Tricyclic antidepressants**

For agricultural workers, these risks are amplified by the environmental and occupational conditions that they may experience. **Here are some factors, why they increase risk, and a suggested question that clinicians may ask during clinical history taking.**

Table 4 Environmental and occupational conditions that may increase workers' risk of heat-related illness[15,16,17]

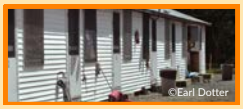
Poor air quality (wildfire smoke, pollution) 	Co-exposure to heat and wildfire smoke is worse for health than either of them alone. Chronic diseases including asthma, other lung diseases, and cardiovascular diseases, may be triggered by smoke. These same conditions may be exacerbated by heat stress. Use of N95 masks to avoid smoke may increase risk of HRI. Smoke may travel hundreds of miles away. Workers across the US and very far from forests are now experiencing smoke exposure more frequently as fires increase in duration and location.[18]	"How does your body react when the air quality is bad?" "Here's how to check the AQI before you go to work." **Use AirNow's AQI:** www.airnow.gov/aqi/
Exposure to pesticides 	Certain pesticides may interfere with thermoregulation or organ function. For example, organophosphates inhibit acetylcholinesterase, which can result in dysregulated sweating and heart rates. Use of PPE to avoid pesticides may increase risk of HRI. Some pesticide exposure symptoms mirror HRI symptoms.	"Do you apply pesticides?" "Do you know when your farm is applying or has applied pesticides?" "Have you experienced pesticide drift?"
Substandard or unstable housing 	Structure deficiencies like poor insulation and drafty windows lead to outdoor exposures like poor air quality and indoor exposures like mold. Even with air conditioning, substandard housing may not stay cool due to compromised thermal efficiency.	"Describe your housing. Does it keep your air clean and cool?"
Lack of air conditioning/inability to cool at home	Many workers arrive at work dehydrated the next day because of insufficient cooling at night.	"Do you have air conditioning? How do you stay cool at home/after work?"
Limited access to clean, cool water	Prevents workers from taking frequent water breaks.	"Where do you get water during the day? In the evening? Is your water clean and cool?"
High humidity	Reduces sweat evaporation from the body. 	"Here's how to check the wet bulb temperature before you go to work." **Use the HeatRisk tool:** ephtracking.cdc.gov/Applications/HeatRisk/
Clothing & PPE	Traps heat against the body, reduces sweat evaporation from the body. 	"What clothes do you wear to work? Is it loose fitting? How do you protect your skin and face? Do you know what material your clothing is?"

Table 4 - Continued

Piece-rate compensation	Piece-rate is associated with a greater risk of HRI. Workers may be less likely to take rest/shade/water breaks when their pay will drop.	"Do you get paid by the hour or by how much you pick?"
Length of time spent outdoors	More hours correspond to greater risk.  	"How many hours a day do you work, and which hours are they?"
Shade access while working	Access to shade during work hours, not just on breaks or after work, reduces risk. 	"How many hours a day do you work in the sun? Are there any options to work in the shade?"
Transportation schedules that extend heat exposure	Workers may be transported back to worker housing in unconditioned vehicles (e.g., long rides without cooling) 	"Do you get a chance to cool off right after work ends?"
Increasing number of hot days	The annual frequency of heat waves has tripled. Heat waves have both increased in frequency and in intensity.[19]	
High nighttime temperatures	Growing frequency of hot nights decreases a worker's ability to cool overnight.	"Do you have air conditioning? Do you have fans in the house? Do they keep you cool?"
Post-disaster environments	After a disaster like a storm, flood, or wildfire, health services may be interrupted, medications may be impacted by heat without cooling, and agricultural workers may experience other occupational exposures like mold or unsafe water.	

Some physiological risk factors are associated with a greater risk of HRI:

Table 5 Social conditions that may increase workers' risk of heat-related illness

Fear of losing job or retaliation by asking for water/rest/shade	Lack of awareness of medication interactions	Substance use including alcohol
Arrival to new work environments with immediate full workload*	Limited ability to pace work or request lighter duties during adjustment period*	Limited access to safety information that is low-literacy and in their preferred language
Language barriers	Poor access to health care	Lack of awareness of other health risks

*In agriculture, for example, H-2A workers arrive at peak harvest, and are expected to immediately begin their work without gradual acclimatization to local climate conditions or options to ease into work duties.

In the Exam Room, Step By Step

Prevention: Water, Rest, and Shade

Drinking water frequently, taking shade and rest breaks, and allowing for a period of acclimatization to working in the heat are key steps to prevent heat illness. Under the Occupational Safety and Health Act, **all employers, including small farms with 10 or fewer employees, must provide fresh, potable drinking water at all times to protect workers from dehydration and heat stress.** While OSHA exempts farms without labor camps and with 10 or fewer employees from enforcement, they are still legally required to provide a safe workplace under OSHA's "General Duty Clause".[20]

Every 15 Min

It is recommended that workers drink **1 cup (8 oz.) of water or other fluids every 15-20 minutes** when working in hot conditions. Agricultural workers should also take rest/shade breaks, which should increase in duration and frequency according to the temperature and the intensity of their work activity.[21]

Other basic messages include:

- **avoid alcohol and caffeinated drinks** like soda or energy drinks and to opt for water instead;
- **wear clothing like loose-fitting, lightweight, light-colored cotton clothes**, a wide-brimmed hat, and a bandana;
- and to **monitor oneself and coworkers** closely during heat events.

Agricultural workers may be paid by piece rate rather than by the hour, disincentivizing workers from taking time to get water and take rest/shade breaks. Clinicians should emphasize the importance of close monitoring of signs and symptoms in addition to strongly advocating for water, rest, and shade. Clinicians may also contact employers to encourage worker and supervisor training to prevent heat-related deaths.

Treatment and Medical Attention

If the worker has symptoms of heat stress or heat exhaustion, he/she should be removed from the heat immediately, taken to a shaded, cool place, and given fluids to drink. **If the symptoms continue after 20 or 30 minutes, emergency medical attention may be needed.** Any loss of consciousness, decline in mentation (e.g., confusion, aggressive behavior), ataxia, seizures, regardless of core temperature, must be considered heat stroke. Immediate and aggressive cooling must begin.[22]

While emergency medical services are summoned, the worker should be placed in a cool location, have clothing removed, and ideally put in ice-water immersion (gold-standard method).[23] Cooling must take priority and should happen at 0.27F/0.15℃ per minute rate until the patient's core temperature is reduced to below 100.4 ℉/38 ℃. **If ice-water immersion is not available, other cooling methods shall be applied such as ice sheets, wetting, or cooling vests.** Once the cooling process is underway, laboratory tests and monitoring of renal function may be performed.[24]

Post-Treatment Follow-Up

After counseling the worker on how to prevent the recurrence of heat illness, the clinician should provide the worker with a note for their employer indicating the reason the worker required medical treatment and any accommodations the employee may need upon their return to work. OSHA recommends that if a clinician determines that work conditions at a worksite are unsafe, they should discuss this with the employer while maintaining patient confidentiality. The clinician may also file a complaint with their state OSHA Office.
If the conditions at a worksite are life-threatening, they should be reported immediately through OSHA's emergency number: 1-800-321-OSHA.

Messaging to prevent heat-related illness

While work conditions may not always provide an environment that is favorable to preventive practices, it is important that agricultural workers be aware of the need to drink water throughout the day and take regular shade and rest breaks without waiting to feel sick. The Centers for Disease Control and Prevention (CDC) has an online resource with answers to frequently asked questions about heat illness in English and Spanish.

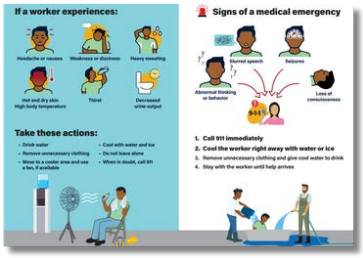
Resources

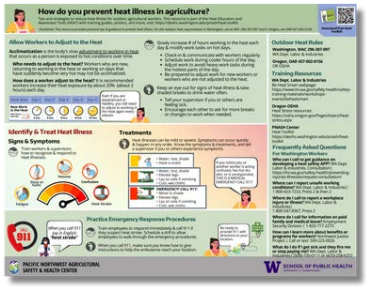
Clinician resources

- Heat-Related Illnesses, by R. Gauer, R. McNutt, and K. Bryan[25]
- Emergency Management of Heat-Related Illness, by W. Troyer and J. Kiel[26]
- Heat Illness, by D. Leiva and B. Church[27]
- Evaluation and Management of Heat Stroke, by K. Li[28]
- Heatstroke, by Y. Epstein and R. Yanovich[29]
- Management of exertional heat stroke: update for primary care physicians, by E.Walter and K. Steel[30]
- Management of Environmental Heat Injury in the ED, by S. Watts, P. Jackson and G. Chiampas[31]
- Management of Heatstroke and Heat Exhaustion, by J.L. Glazer[32]

Patient resources

The following are some useful resources designed specifically for workers on how to prevent, recognize, and address heat illness in the workplace.





- **Centers for Disease Control and Prevention**
  - Heat-Related Illnesses (English)
  - Enfermedades Relacionadas con el Calor (Spanish)
- **National Institute for Occupational Safety & Health**
  - NIOSH Fast Facts (English)
  - NIOSH Datos Breves (Spanish)
- **Occupational Safety and Health Administration**
  - Water. Rest. Shade. The Work Can't Get Done Without Them (Low literacy)
  - Agua. Sombra. Descansos. Sin ellos no se puede trabajar (Spanish)
- **Pacific Northwest Agricultural Safety and Health Center**
  - Heat Illness Prevention
- **Western Center for Agricultural Health and Safety**
  - Heat Illness Prevention
- **Association of Farmworker Opportunity Programs**
  - Heat Illness Prevention

Employer resources

Clinicians may share resources with local employers.

- **Occupational Safety and Health Administration**
  - Using the Heat Index: A Guide for Employers
  - Agua. Sombra. Descansos. Sin ellos no se puede trabajar (Spanish)
- **California* Occupational Safety and Health Administration**
  - Heat Illness Prevention
  - Prevención de Enfermedades Causadas por el Calor

*California requires employers to provide trainings on heat illness prevention. However, much of these materials – including trainings, posters, and a pocket guide, are applicable to employers around the country to train workers.

For more information, contact **Alexis Guild**, Vice President of Strategy and Programs, Farmworker Justice at *aguild@farmworkerjustice.org* or **Amy Liebman**, Chief Program Officer, Migrant Clinicians Network, at *aliebman@migrantclinician.org*.

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