



Heat Related Illnesses

An Occupational Health Concern for Farmworkers

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OVERVIEW OF THE PROBLEM

Illnesses caused by heat are often overlooked when considering occupational health and safety issues of farmworkers because they are not specific to any crop, task, or equipment, and can develop in commonly occurring environmental conditions. Farmworkers are frequently at higher risk for these illnesses than workers in other industries: they work outdoors in direct sunlight and humidity of summer and the work activity generates large amounts body heat by, which is then retained in the body by heavy work clothing [1]. The resulting heat buildup – *heat stress* – can become more than the body can handle, creating a dangerous and potentially fatal situation.

According to Centers for Disease Control and Prevention (CDC) data, approximately 208 deaths directly attributable to hot weather conditions occurred each year in the US between 1979 and 2002 [2]. However, these data underestimate the true extent of the problem. When deaths for which extreme heat exposure was a *contributing* factor are included, the number of heat-related deaths jumps to 668 per year [3]. Mortality rates from heat stroke, the most serious manifestation of heat illness, ranges from 10% [4] to 20% [5], which translates into many hundreds, if not thousands, of cases of heat stroke each year. When added to the number of cases of less severe forms, heat illness is clearly a substantial health concern in the US.

While workers in many occupations are at risk for heat illness, farmworkers face special challenges because of the nature of their workplace. Most farmwork is performed in direct sunlight and sufficient quantities of potable water may not be readily available or may not be imbibed due to reluctance to take time away from work. The work involves health physical labor, at times requires heavy or impermeable protective clothing, and usually takes place during the warmest season in a region. As heat stress develops, workers become disoriented and impair judgment, thereby reducing their ability to take protective measures (e.g., drink water, move to shade) and increasing their risk of injury [1;5]. Often the victim is not aware of the developing problem because of impaired mental function, which is an early symptom of developing heat-related illness [5]. But heat-related illnesses are largely preventable [4;6] if simple precautions are followed and workers have the opportunity to adjust to working in hot climates. Monitoring the environmental and work conditions, coupled with appropriate preventive measures, can greatly reduce, if not eliminate, the likelihood that workers will develop a heat-related illness while working in the fields.

TYPES AND SYMPTOMS OF HEAT-RELATED ILLNESS

Heat-related illness occurs when the body is subjected to and/or produces more heat than it can dissipate due to ambient environmental factors or to physical activity, and can be exacerbated by predisposing medical conditions or other individual factors. The resulting increase in core body temperature can lead to dehydration, electrolyte imbalance, and if permitted to continue, to neurological impairment, multi-organ failure, and death. This sequence of pathological events manifests in different forms of heat-related illnesses that occur along a continuum of severity [6]. The first three listed below, edema, cramps, and syncope, are less severe manifestations of heat stress, while the last two, exhaustion and stroke, require immediate attention to reduce the likelihood of long-term adverse effects or even death.

HEAT EDEMA, or swelling of the hands and/or feet, is the mildest form of heat-related illness. It is caused by blood pooling in the extremities during extended periods of sitting or standing in a hot environment [4].

HEAT CRAMPS are spasms of the muscles of the arms, legs or abdomen, and are a warning sign of developing heat stress [4].

HEAT SYNCOPE is dizziness that occurs when abruptly moving from sitting to standing, or from prolonged standing or exercising without first becoming acclimated to the heat. It is usually preceded by lightheadedness and/or weakness [4].

HEAT EXHAUSTION occurs as a result of water or salt depletion when the body subjected to more heat than it can handle, usually in a situation of high temperatures combined with high humidity. Symptoms include intense thirst, weakness, anxiety, dizziness, fainting, headache, and excess sweating. Core body temperature may or may not be outside the normal range, and neurological functioning is not seriously affected [7].

HEAT STROKE is life-threatening medical emergency that occurs when the heat buildup becomes more than the body can handle. Symptoms include all of the above for heat exhaustion, as well as dilated pupils, decreased concentration, impaired judgment, and confusion. Core body temperature is significantly above normal. Heat stroke occurs in two forms, classic and exertional [7].

CLASSIC heat stroke occurs as a result of excessive environmental temperatures, and mainly affects members of vulnerable populations, such as children or the elderly, those already in poor health, or those who do not have access to air conditioning. Classic heat stroke is characterized by little or no sweating as a result of excessive dehydration.

EXERTIONAL heat stroke is caused by the production of excess heat in the body, and is more common among generally healthy individuals such as athletes and others who do strenuous activity out of doors. The ability to sweat may not be impaired, but the individual is unable to cool down quickly enough after ceasing activity. This variant of heat-related illness can come on quickly relatively moderate temperatures during heavy activity [8].

Contributing factors

Environmental factors are the first and most obvious considerations in assessing the risk of heat stress. In addition to the ambient air temperature, humidity plays a crucial role in determining the risk of heat stress. As the humidity increases, the temperature at which heat stress can occur becomes lower. Humidity slows the evaporation of sweat from the body, which is the body's primary means of eliminating heat. The risk of heat stress associated with high humidity is reflected in the Heat Index, which combines air temperature with relative humidity to calculate the effective temperature, or heat index [9]. As the relative humidity passes 40% and air temperature rises above 80°, the heat index will start to exceed the air temperature as measured with instruments. For example, at 95% relative humidity, an air temperature of 82°F will affect a person as if it were 93°F. At a heat index of 90°F, at-risk individuals should exercise extreme caution to avoid becoming ill. Note that the Heat Index charts assume air temperature as measured *in the shade*; direct sunlight increases the index by 15°F [10].

Weather conditions in the recent past also must be considered in assessing risk of heat stress. A slow increase in temperature over a period of weeks, e.g., the transition from winter to spring, allows workers to naturally adjust to the higher temperatures, particularly if they have been working full time throughout the season [1]. However, an abrupt increase in temperature does not permit workers to develop a natural tolerance for the heat. Under these conditions it is important that the workers be allowed to acclimatize over a period of time before they are expected to work regular shifts. Workers just joining an employer may also need to acclimatize if they have not been working in hot conditions previously. Unfortunately, employers rarely give agricultural workers an opportunity to acclimatize before they must begin working full-time. (*Acclimatization* will be described in more detail in the section on Prevention.)

The *work situation* plays an important role in determining risk for heat stress. Over-exposure to certain pesticides, notably organophosphate insecticides, can produce sweating, contributing to the likelihood of overheating [5]. Heavy or impermeable work clothes or personal protective equipment (PPE) reduces the body's ability to eliminate heat by trapping heat produced by activity close to the body. PPE also reduces the body's ability to cool itself by sweating since it is not exposed to open air or breezes. Worksites are often located far from a ready source of water, which must then be provided in large quantities by the employer. (See discussion of the Field Sanitation Standard, below.) Much of agricultural hand labor requires working long hours in direct sunshine with little or no shade nearby. Some work is performed underneath canopies of tall crops that trap heat and humidity. Yet other agricultural work is performed in enclosed areas, such as nurseries or processing with little or no ventilation.

A number of *individual and behavioral factors* strongly influence predisposition to succumbing to heat stress. Individuals who are in poor physical condition, overweight, very small, or over age 40 are at increased risk. Some illnesses and medications may also create a predisposition for overheating. New farmworkers or workers who have limited experience in the particular work setting may be unaware of the physical demands of the job or the danger posed by heat. And finally, consumption of alcohol and recreational drugs lowers an individual's tolerance to heat.

DIAGNOSING HEALTH-RELATED ILLNESS

Because the symptoms of the variants of heat-related illness follow a continuum of severity, the crucial point is to be able to distinguish heat *exhaustion* from heat *stroke*, since the latter is a major medical emergency requiring immediate treatment and removal to a medical site as soon as possible. Heat stroke is clinically defined as a core body temperature over 105°F (40.6°C) [11], while temperature may not be abnormal with heat exhaustion. In classic heat stroke, the individual stops sweating because his/her body has become dangerously dehydrated. By contrast, the individual experiencing exertional heat stroke may continue sweating. The other major defining characteristic of heat stroke is the presence of significant central nervous system dysfunction. While individuals with heat exhaustion may be anxious, dizzy or fatigued, in the case of heat stroke, victims will also exhibit confusion, irritability, altered mental status, irrational behavior, or lack of muscle coordination (i.e., ataxia). In the worst case scenario they may experience seizures, shock, or coma [6].

The other important consideration in diagnosing heat illness is that many of the same symptoms appear with organophosphate poisoning [5]. Pesticide poisoning should be considered when individuals who have been working on or near pesticide-treated areas present with symptoms such as nausea, vomiting, weakness, salivation, sweating, blurred vision, etc. Three ancillary symptoms are helpful in making a differential diagnosis of pesticide poisoning: pinpoint pupils (as opposed to dilated pupils, which occurs with heat-related illness), slow pulse (rather than rapid, which occurs with heat illness), and wet membranes, i.e., mouth, eyes (rather than dry.) Both conditions are serious and potentially deadly, and they can co-occur. If there is any possibility of pesticide poisoning in addition to heat-related illness, treatment for both conditions should be initiated immediately.

TREATING HEAT-RELATED ILLNESS

Because of the cognitive impairment that accompanies heat illnesses, individuals may not recognize the symptoms in themselves. Workers and supervisors need to monitor one another for any behavioral changes that may indicate developing heat stress and initiate remedial measures as soon as they appear [1]. Prompt attention to signs of heat stress reduces the likelihood of developing full-blown heat stroke, which is far more difficult to manage.

Treatment for any form of heat illness is based on reducing core body temperature as quickly as is safe. In the early stages, marked by general discomfort and mild symptoms, this includes removing the individual to a shaded area, ceasing all heat-producing activity, removing heat-retaining clothing and PPE, and drinking as much water as possible. The water may be lightly salted if the individual is clearly in early stages of heat stress or if cramps are present. S/he should rest in the shade for at least 30 minutes.

Once heat exhaustion has developed, which is indicated by more extreme symptoms such as muscle weakness or fainting, additional measures are needed. To supplement the steps outlined above, the individual needs to rest lying down for the rest of the day and overnight and drink as much *unsalted* water as possible. Additional first aid includes massaging the arms and legs and splashing cold water on the body or taking a cold shower.

If the individual exhibits signs of heat stroke, s/he needs to be transported to an emergency medical treatment as soon as possible. If diagnosed with heat stroke (core body temperature over 104°F), the primary focus will be on lowering body temperature and rehydrating as quickly as possible. If the individual is conscious, s/he should be encouraged to drink as much unsalted water as possible. Methods for reducing core body temperature include wrapping the individual in wet sheets or pouring water on the clothing and fanning him/her vigorously. An ice bath is another option, but may be difficult to arrange quickly enough and can interfere with monitoring vital signs. Care must be taken not to over-cool the individual and to avoid over-hydration as this can lead to cerebral edema [6].

The clinical indicator of core body temperature over 104°F should not be over-relied upon for diagnosing heat stroke, as the temperature may come down during transportation to the clinic. The health care provider should speak with co-workers and other bystanders to determine the patient's mental status and other signs and symptoms prior to being moved. Because of the high risk of long-term health damage or death, it is safer to err on the side of treating for heat stroke if there is any question about the diagnosis.

PREVENTING HEAT-RELATED ILLNESS

Since heat-related illness is fully preventable, taking a few straightforward precautions can reduce its incidence and severity significantly. Because farmworkers are predictably at risk for heat-related illnesses, it makes sense for employers to develop and implement a plan in advance. An important first step is to ensure that workers become acclimated to working in the heat before they are expected to work at full capacity. Acclimatization lessens the increase in core body temperature, limits salt depletion, and improves sweating capacity, all of which reduces the workers' discomfort while working in heat as well as their risk for overheating [12]. The process of acclimatization consists of roughly two weeks of limited activity in the heat starting with at least two 60-minute periods per day, then adding an hour per day until the workers are able to complete a full shift without excessive discomfort. Workers will continue to be acclimatized as long as they continue working in the same conditions, e.g., heat, humidity, activity, equipment. De-acclimatization starts after about four days of not working in the same conditions; full de-acclimatization occurs after about three weeks. At this point it will be necessary to initiate the process from the beginning when returning to work. If there is an abrupt increase in temperature mid-season, workers should reduce their shifts to half of a normal day, then add one hour per day until they are able to work their regular shift [1].

Acclimatization is a necessary, but not sufficient, means of preventing heat-related illness. Employers need to take additional measures to ensure the health and safety of their workers. Current policy on drinking water, toilets and handwashing water can be found in the Code of Federal Regulations (the *Field Sanitation Standard*, 29 CFR 1928.110; see Appendix A). Under this standard, employers of 11 or more workers must provide sufficient quantities of "suitably cool," potable water without charge to their employees within one quarter mile of the worksite. In addition, the federal standard requires agricultural employers to provide toilets and handwashing facilities within ¼ mile of where employees are laboring in the fields. In a number of states, employers with fewer than 11 workers are also required to provide water. For example, in California and Virginia an employer of even one worker must provide a sufficient amount of potable water for all workers [Appendix B].

Recommendations for the minimum amount needed per worker range from six to 10 quarts per day depending on heat, humidity, work activity, and personal characteristics [1]. Workers often do not drink enough water during the day because they do not want to take time away from work to go to a restroom. Female workers are particularly likely to forego drinking enough water because

the portable toilets in the fields are dirty. In addition, workers may not be aware of their need to drink water because severe dehydration does not necessarily trigger a strong thirst response. Workers should therefore be advised to drink approximately one quart per hour, or an 8-ounce glass every 15 minutes, throughout the workday [13]. Water should be kept at a reasonably cool, but not cold, temperature, and individual or single-use cups must be supplied.

Another important work place measure for reducing heat stress is work scheduling. To the extent possible, activities that must be carried out in hot locations should be scheduled for cooler times of day, and tasks should be rotated among workers to reduce any one individual's exposure to prolonged heat. Frequent short rest periods are preferable to fewer longer breaks, and workers should have access to a shaded area near the worksite in which to rest, since direct sunlight adds as much as 15 degrees F to the heat index. In very hot weather conditions, efforts should be made to reduce workloads. Typically, the only accommodation made for high heat conditions is to begin the workday in the early morning hours so that work can be ended around noontime. Oftentimes, workers are reluctant to take breaks, even if allowed by law, because their piece-rate earnings depend directly on the amount of time spent working.

Finally, supervisors need to monitor the weather conditions at worksites in order to identify as early as possible any potential for heat stress-inducing conditions. Ideally, they should collect the information onsite with portable instruments, but when that is not possible, they can consult with other sources of climate information, such as the Agricultural Weather Service. Supervisors should also visit the worksite throughout the day to make sure that appropriate prevention measures such as fluid intake and rest breaks are being followed.

Recently, clusters of heat-related deaths have brought this issue to the fore in some states. In 2005, California adopted heat illness prevention regulations (Title 8 CCR Section 3395) that require employers of outdoor workers to address four areas: shade, water, training, and written procedures. Compliance with these requirements is still inadequate.

RECOMMENDATIONS FOR HEALTH CARE PROVIDERS

In order to reduce the number of workers presenting with heat stress-related problems, outreach and education efforts should be undertaken to address:

- The risks of heat-related illness
- How much water workers should drink during the workday
- The importance of taking frequent short rest breaks in the shade
- The benefit of working during the cooler hours of the day

Efforts should also be made to communicate with employers, and to:

- Advise them that workers do better work when properly protected from the heat.
- Reinforce the need to help their employees acclimatize to heat, remembering that it is necessary to start over at each new heat wave.
- Reminding them to provide adequate potable water and to create shaded areas where workers can go to take frequent, short rest breaks.

FOR MORE INFORMATION:

- Centers for Disease Control & Prevention. *Extreme Heat: A Prevention Guide to Promote Your Personal Health and Safety*.
http://emergency.cdc.gov/disasters/extremeheat/heat_guide.asp
- NIOSH Safety and Health Topic: Heat Stress, available at
<http://www.cdc.gov/niosh/topics/heatstress>
- OSHA Technical Manual on heat stress, available at
http://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_4.html
- California Department of Occupational Safety & Health, Heat Related Illness Prevention and Information, available at
<http://www.dir.ca.gov/DOSH/HeatIllnessInfo.html>
- Environmental Protection Agency. *A Guide to Heat Stress in Agriculture*. EPA-750-b-92-001, 1993.
- Bay Area Environmental Safety Group, The Heat List: Heat Stress Resources on the Internet. <http://www.baesg.org/heatlist.htm>
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ACKNOWLEDGEMENTS:

This publication is a joint project of Farmworker Justice and Migrant Clinicians Network, supported by the Health Resources and Services Administration's Bureau of Primary Health Care.

The contents of this publication are solely the responsibility of Farmworker Justice and Migrant Clinicians Network and do not necessarily reflect the official views of the Bureau of Primary Health Care or the Health Resources and Services Administration.

Please send comments, questions or suggestions for future topics you would like to see covered to prao@nclr.org or to the contact information provided below.

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12. Centers for Disease Control and Prevention. *Working in Hot Climates*. updated 1992. Washington DC, US Government Printing Office. 1986.
13. *Cal/OSHA Heat Advisory*. California Department of Industrial Relations, Division of Occupational Safety & Health . 2006.

APPENDIX A: OSHA FIELD SANITATION REGULATIONS

[Code of Federal Regulations]
[Title 29, Volume 9]
[Revised as of July 1, 2003]
From the U.S. Government Printing Office via GPO
Access
[CITE: 29CFR1928.110]

[Page 14-15]

TITLE 29--LABOR

CHAPTER XVII--OCCUPATIONAL SAFETY AND HEALTH
ADMINISTRATION, DEPARTMENT
OF LABOR (CONTINUED)

PART 1928--OCCUPATIONAL SAFETY AND HEALTH STANDARDS
FOR AGRICULTURE--Table of Contents

Subpart I--General Environmental
Controls

Sec. 1928.110 Field sanitation.

(a) Scope. This section shall apply to any agricultural establishment where eleven (11) or more employees are engaged on any given day in hand-labor operations in the field.

(b) Definitions. Agricultural employer means any person, corporation, association, or other legal entity that:

(i) Owns or operates an agricultural establishment;

(ii) Contracts with the owner or operator of an agricultural establishment in advance of production for the purchase of a crop and exercises substantial control over production; or

(iii) Recruits and supervises employees or is responsible for the management and condition of an agricultural establishment.

Agricultural establishment is a business operation that uses paid employees in the production of food, fiber, or other materials such as seed, seedlings, plants, or parts of plants.

Hand-labor operations means agricultural activities or agricultural operations performed by hand or with hand tools. Except for purposes of paragraph (c)(2)(iii) of this section, hand-labor operations also include other activities or operations performed in conjunction with hand labor in the field. Some examples of hand-labor operations are the hand-cultivation, hand-weeding, hand-planting and hand-harvesting of vegetables, nuts, fruits, seedlings or other crops, including mushrooms, and the hand packing of produce into containers, whether done on the ground, on a moving machine or in a temporary packing shed located in the field. Hand-labor does not include such activities as logging operations, the care or feeding of livestock, or hand-labor operations in permanent structures (e.g., canning facilities or packing houses).

Handwashing facility means a facility providing either a basin, container, or outlet with an adequate supply of potable water, soap and single-use towels.

Potable water means water that meets the standards for drinking purposes of the state or local authority having jurisdiction or water that meets the quality standards prescribed by the U.S. Environmental Protection Agency's National Interim Primary Drinking Water regulations, published in 40 CFR part 141.

Toilet facility means a fixed or portable facility designed for the purpose of adequate collection and containment of the products of both defecation and urination which is supplied with toilet paper adequate to employee needs. Toilet facility includes biological, chemical, flush and combustion toilets and sanitary privies.

(c) Requirements. Agricultural employers shall provide the following for employees engaged in hand-labor operations in the field, without cost to the employee: (1) Potable drinking water. (i) Potable water shall be provided and placed in locations readily accessible to all employees.

(ii) The water shall be suitably cool and in sufficient amounts, taking into account the air temperature, humidity and the nature of the work performed, to meet the needs of all employees.

(iii) The water shall be dispensed in single-use drinking cups or by fountains. The use of common drinking cups or dippers is prohibited.

(2) Toilet and handwashing facilities. (i) One toilet facility and one handwashing facility shall be provided for each twenty (20) employees or fraction thereof, except as stated in paragraph (c)(2)(v) of this section.

(ii) Toilet facilities shall be adequately ventilated, appropriately screened, have self-closing doors that can be closed and latched from the inside and shall be constructed to insure privacy.

(iii) Toilet and handwashing facilities shall be accessibly located and in close proximity to each other. The facilities shall be located within a one-quarter-mile walk of each hand laborer's place of work in the field.

(iv) Where due to terrain it is not feasible to locate facilities as required above, the facilities shall be located at the point of closest vehicular access.

(v) Toilet and handwashing facilities are not required for employees who perform field work for a period of three (3) hours or less (including transportation time to and from the field) during the day.

(3) Maintenance. Potable drinking water and toilet and handwashing facilities shall be maintained in accordance with appropriate public health sanitation practices, including the following:

(i) Drinking water containers shall be constructed of materials that maintain water quality, shall be refilled daily or more often as necessary, shall be kept covered and shall be regularly cleaned.

(ii) Toilet facilities shall be operational and maintained in clean and sanitary condition.

(iii) Handwashing facilities shall be refilled with potable water as necessary to ensure an adequate

supply and shall be maintained in a clean and sanitary condition; and

(iv) Disposal of wastes from facilities shall not cause unsanitary conditions.

(4) Reasonable use. The employer shall notify each employee of the location of the sanitation facilities and water and shall allow each employee reasonable opportunities during the workday to use them. The employer also shall inform each employee of the importance of each of the following good hygiene practices to minimize exposure to the hazards in the field of heat, communicable diseases, retention of urine and agrichemical residues:

(i) Use the water and facilities provided for drinking, handwashing and elimination;

(ii) Drink water frequently and especially on hot days;

(iii) Urinate as frequently as necessary;

(iv) Wash hands both before and after using the toilet; and

(v) Wash hands before eating and smoking.

(d) Dates--(1) Effective date. This standard shall take effect on May 30, 1987.

(2) Startup dates. Employers must comply with the requirements of paragraphs:

(i) Paragraph (c)(1), to provide potable drinking water, by May 30, 1987;

(ii) Paragraph (c)(2), to provide handwashing and toilet facilities, by July 30, 1987;

(iii) Paragraph (c)(3), to provide maintenance for toilet and handwashing facilities, by July 30, 1987; and

(iv) Paragraph (c)(4), to assure reasonable use, by July 30, 1987.

APPENDIX B: STATES PROVIDING GREATER FIELD SANITATION PROTECTION THAN THE FEDERAL STANDARD

State	Citation	Ratios – Toilet:Workers & Handwashing Facilities:Workers	Potable Water	Applicable size of business
OSHA Field Sanitation Standard	29 CFR 1928.110	<ul style="list-style-type: none"> • 1:20 • Within ¼ mile [exception if working for 3 hrs or less (including transportation time)] 	<p>Suitably cool</p> <p>Sufficient amounts</p>	11+ employees
California	Field Sanitation - Title 8, § 3457	<ul style="list-style-type: none"> • 1:20 for each sex if 5+ workers • Located either ¼ mile or 5 minute walk, whichever is closer 	<p>Suitably cool</p> <p>Sufficient amounts</p>	Water is required of all agricultural establishments; employers of 5 - 10 workers must place toilets and handwashing facilities within ¼ mile or a five minute walk; employers of < 5 workers must provide transportation to such facilities
Maryland	COMAR 09.12.36.00	<ul style="list-style-type: none"> • 1:20; 1:30 is permitted if the frequency of servicing is increased to ensure that the facility is maintained in a clean and sanitary condition • Within ¼ mile 	<p>Suitably cool</p> <p>Sufficient amounts</p> <p>Readily accessible</p>	Toilet facilities provision applies to employers with 11+ workers; water and handwashing facilities requirements apply to all agricultural establishment
Michigan	MCL 408.1014n incorporates the Federal OSHA by reference, rescinding R 325.61751 to R	<ul style="list-style-type: none"> • 1:20 • Within ¼ mile 	<p>Suitably cool</p> <p>Sufficient amount</p> <p>Readily accessible</p>	<p>11+ workers</p> <p>Employers with 11+ workers shall ensure that toilet/ handwashing facilities are provided or available</p>

State	Citation	Ratios – Toilet:Workers & Handwashing Facilities:Workers	Potable Water	Applicable size of business
	325.61757 Agricultural Operations 1928.21/Part 500			
Nevada	§ 618.720	<ul style="list-style-type: none"> • Separate designated facilities for men and women 		Unlawful to employ 5+ males and 3+ females without designated separate toilet facilities
New Jersey	12:102-1.1 to -1.12	<ul style="list-style-type: none"> • 1:20 for each sex • Within 5 minute walk or 1,300ft or 5 minute travel by approved vehicle 	Within 500ft of workers	Federal FSS covers agricultural establishments with 11+ workers; state regulation governs employers with <11 workers; permitted to drive workers to toilet facilities
New York	NY CLS Labor § 212 (2001)	<ul style="list-style-type: none"> • 1:20 • If 20+ workers and at least 50% female, separate designated toilet facilities must be provided • Within a ¼ mile walk or closest point accessible by motor vehicle. 	Safe drinking water Reasonably accessible	Employers with 5+ paid farm hand labor workers, farm field workers, or farm food processing workers
Oregon	OAR 437-004	<ul style="list-style-type: none"> • 1:20 for each sex where practicable • Within 5 minute walk or a ¼ mile (unobstructed) 	Immediately available Suitably cool	Any establishment where hand-labor is done
Virginia	16 VAC 25-180-10	<ul style="list-style-type: none"> • 1:20 	Suitably cool	Applies to employers of 1+ workers

State	Citation	Ratios – Toilet:Workers & Handwashing Facilities:Workers	Potable Water	Applicable size of business
		<ul style="list-style-type: none"> • Within ¼ mile 	Sufficient amounts	
Washington	WAC 296-307 WAC 296-307-095	<ul style="list-style-type: none"> • 1:20 • Within ¼ mile 	Suitably cool (60°F or less) Sufficient amounts (3 gallons per worker on hot day)	Applies to employers of 1+ workers