

Heat Illness Care Guide

August 2026



Information contained in the Care Guide is not a substitute for a health care professional's clinical judgment. Evaluation and treatment should be tailored to the individual patient and the clinical circumstances. Furthermore, using this information will not guarantee a specific outcome for each patient. Refer to "Disclaimer Regarding Care Guides" for further clarification.

<https://cchcs.ca.gov/clinical-resources/>

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GOALS

- Identify patients who have an increased risk for heat illness.
- Recommend acclimatization a week before expected increased heat threat, especially patients who have an increased risk for heat illness.
- If heat illness is suspected, remove patient from heat source and start cooling.
- If heat stroke is suspected, initiate rapid active cooling with ice-water or cold-water immersion to decrease core temperature <38.9°C (102°F) within 30 minutes.
- If available, measure core temperature rectally, since oral and axillary measurements do not provide accurate readings.
- **Exercise-associated hyponatremia (EAH)** can present similarly to **heat exhaustion** or **heat stroke** but requires different treatments.

ALERTS

- Identify **heat stroke**, a medical emergency, which is characterized by core (rectal) temperature of >40°C (104°F) and central nervous system abnormalities like altered mental status (AMS), seizure, or ataxia.
- Treat heat stroke with supportive care, intravenous (IV) hydration, and rapid active cooling with water immersion.
- Send patients with heat stroke to higher level of care (HLOC).
- **Heat exhaustion** and **acute heat stress** can precipitate electrocardiographic (ECG) changes, symptomatic arrhythmias, and cardiac arrest.

INTRODUCTION

Due to extreme heat events, heat illness is a more common occurrence, which leads to significant morbidity and mortality, including cardiovascular deaths. Heat illness manifests as a range of clinical presentations from minor to severe, which can be due to ineffective or inefficient heat dissipation as well as thermoregulatory dysfunction.

Condition	Definition
Hyperthermia	Rise in body temperature above the hypothalamic set point when heat-dissipating mechanisms are impaired (by clothing or insulation, medications or other substances, or disease) or overwhelmed by external (environmental) or internal (metabolic) heat production
Sunburn	A radiation burn from ultraviolet (UV) exposure
Heat rash	Also known as "prickly heat" or miliaria, transient cutaneous disorder caused by blockage within eccrine sweat ducts; characterized by widely spread erythematous 2-4 mm papules, which are typically associated with itching or stinging that worsens sweating
Heat edema	Dependent extremity swelling due to interstitial fluid pooling
Heat cramps	Exercise-associated painful involuntary muscle contractions during or immediately after exercise
Heat syncope	Transient loss of consciousness with spontaneous return to normal mentation
Heat exhaustion	Mild-to-moderate heat illness due to exposure to high environmental heat or strenuous physical activity, which manifests as intense thirst, weakness, discomfort, anxiety, lightheadedness, and/or syncope; core temperature is normal or slightly elevated >37°C (98.6°F) but <40°C (104°F) <u>without</u> a change in mental status
Heat stroke	Severe heat illness characterized by a core temperature >40°C (104°F) and central nervous system changes, such as AMS (e.g., encephalopathy), seizure, or ataxia resulting from passive exposure to environmental heat (classic heat stroke or non-exertional heat stroke) or strenuous exercise (exertional heat stroke)

Table 1: Definitions of Heat Illnesses

PREVENTION

HEAT RISK ASSESSMENT

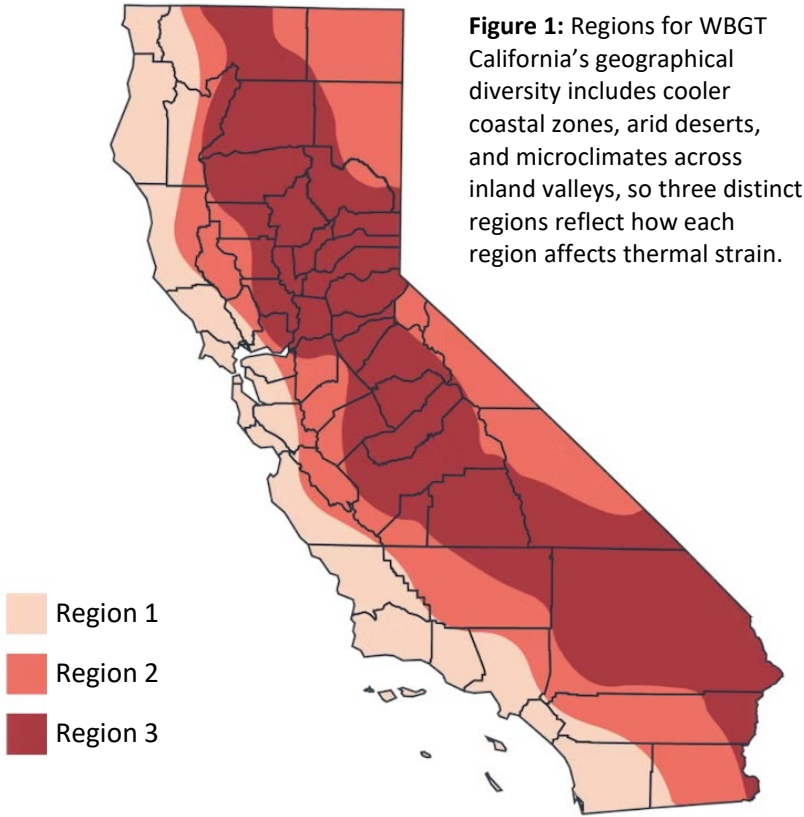
Identify patients who are at increased risk of heat illness, which is based on environmental factors, activity considerations, chronic conditions, medications, clothing and equipment, and acclimatization.

Environmental factors that can contribute to heat illness. Wet-bulb globe temperature index (WBGT) is a composite index of temperature, humidity, and solar radiation that expresses the total thermal strain on a patient. It is the preferred metric when it is available. However, when WBGT is unavailable, use heat index as the second-line metric to assess heat risk. Since heat index values are measured in shady locations, it can be increased by up to 15°F for exposure to direct sunlight:

- Increased ambient temperature
- Increased humidity
- Lack of shade or direct sun exposure
- Limited air movement
- Other heat sources

WBGT	Heat Index
Measured in sun	Measured in shade
Uses temperature	Uses temperature
Uses humidity	Uses humidity
Uses wind speed	X
Uses sun angle	X
Uses cloud cover	X

Table 2: Difference between WBGT & Heat Index



WBGT by Region (°F)			WBGT Threat Level	Risk of Heat Illness
Region 1	Region 2	Region 3		
> 84.0	> 87.6	> 90.0	Extreme Threat	
80.1 - 84.0	83.8 - 87.6	86.1 - 90.0	High Threat	
76.2 - 80.1	78.8 - 83.7	82.1 - 86.0	Moderate Threat	
72.3 - 76.1	75.9 - 78.7	78.3 - 82.0	Elevated Threat	
< 72.3	< 75.9	< 78.3	Low Threat	

Adapted content: Regions are from Grundstein, A., Williams, C., Phan, M. and Cooper, E., 2015. Regional heat safety thresholds for athletics in the contiguous United States. *Applied Geography*, 56, pp. 55-60. 10.1016/j.apgeog.2014.10.014.

Table 3: Wet-Bulb Globe Temperature Index

PREVENTION CONT'D

	Humidity												
	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
80°F	80	80	81	81	82	82	83	84	84	85	86	86	87
82°F	81	82	83	84	84	85	86	88	89	90	91	93	95
84°F	83	84	85	86	88	89	90	92	94	96	98	100	103
86°F	85	87	88	89	91	93	95	97	100	102	105	108	112
88°F	88	89	91	93	95	98	100	103	106	110	113	117	121
90°F	91	93	95	97	100	103	105	109	113	117	122	127	132
92°F	94	96	99	101	105	108	112	116	121	126	131		
94°F	97	100	103	106	110	114	119	124	129	135			
96°F	101	104	108	112	116	121	126	132					
98°F	105	109	113	117	123	128	134						
100°F	109	114	118	124	129	136							
102°F	114	119	124	130	137								
104°F	119	124	131	137									
106°F	124	130	137										
108°F	130	137											

Table 4: Heat Index

Heat Index	Risk	Risk of Heat Illness
80°-89°F	Minor	Tolerated by most, but minor risk for heat-sensitive groups, especially when outdoors without effective cooling and/or adequate hydration. Fatigue possible with prolonged heat exposure and/or physical activity.
90°-102°F	Moderate	Tolerated by many, but moderate risk for those exposed to the sun for longer periods of time and for heat-sensitive groups, especially those without effective cooling and/or adequate hydration. Heat stroke, heat cramps, or heat exhaustion possible with prolonged heat exposure and/or physical activity.
103°-124°F	Major	Major risk to all who are exposed to the sun and physically active as well as those from heat-sensitive groups. Dangerous for those without adequate cooling and/or proper hydration. Poor air quality possible. Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged heat exposure and/or physical activity.
≥125°F	Extreme	Extreme risk for the entire population. Very dangerous for anyone without adequate cooling and/or proper hydration. Poor air quality likely. Heat stroke highly likely.

Table 5: Risk of Heat Illness

Heat-sensitive groups include older adults, patients with chronic medical conditions, outdoor workers, those doing strenuous physical activities outdoors during the heat of the day, those who are pregnant, etc.

PREVENTION CONT'D

Activity considerations that can contribute to heat illness:

- Physical activity intensity
- Physical activity duration
- Lack of designated breaks during physical activity to optimize cooling and rest

Heat Index	Risk	Activity Modification and Precautionary Action
80°-89°F	Minor	Increase hydration Reduce time spent outdoors or stay in the shade when the sun is strongest Open windows at night and use fans
90°-102°F	Moderate	Stay hydrated Reduce time in the sun during the warmest part of the day Stay in a cool place during the heat of the day, usually 10:00AM to 5:00PM Move outdoor activities to cooler times of the day For those without air conditioning, use fans to keep air moving and open windows at night to bring cooler air inside buildings
103°-124°F	Major	Stay hydrated Cancel outdoor activities during the heat of the day, usually 10:00AM to 5:00PM Move activities to the coolest part of the day Stay in a cool place especially during the heat of the day and evening If you have access to air conditioning, use it or find a location that does; fans may not be adequate Even a few hours in a cool location can lower risk
≥125°F	Extreme	Stay hydrated Cancel outdoor activities Stay in a cool place, including overnight Stay in a cool place especially during the heat of the day and evening If you have access to air conditioning, use it or find a location that does; fans may not be adequate Even a few hours in a cool location can lower risk

Table 6: Heat Risk Prevention Based on Heat Index

PREVENTION CONT'D

Individual factors that can contribute to heat illness:

- Medications and substances that could limit thermoregulatory response
 - Upon prescribing a Heat Alert Medication, inform patient of heat stress symptoms, which could be a result of taking the medication, as well as any recommended precautions, using effective communication. Document this discussion with the patient in the health record.
 - Use available decision-support tools, such as reports and registries, as well as processes outlined in policy that provide direction to health care and custody staff on identifying and monitoring those at risk for heat illness.
- Older age (≥65 years old)
- Pregnancy
- Chronic medical conditions, including overweight and obesity
- Mental health conditions
- Substance use disorder
- Physical or mental disability
- History of heat injury (relative risk factor for recurrence)
- Decreased aerobic fitness level
- Fluid losses and dehydration
- Impaired sweating from recent sunburn, hypohidrosis, extensive scars, decreased cardiopulmonary reserve, etc.

Alcohol
Alpha adrenergics
Amphetamines
Anticholinergics
Antihistamines
Antipsychotics
Benzodiazepines
Beta blockers
Calcium channel blockers
Clopidogrel
Cocaine
Diuretics
Laxatives
Neuroleptics
Phenothiazines
Thyroid agents
Tricyclic antidepressants

Clothing and equipment that can contribute to heat illness:

- Occluded skin compromises evaporation, convective, radiative, or conductive heat transfer
- Not removing clothing or protective gear that insulates or creates a vapor barrier during designated breaks

Table 7: Medications and Substances That Increase Risk of Heat Illness

ACCLIMATIZATION

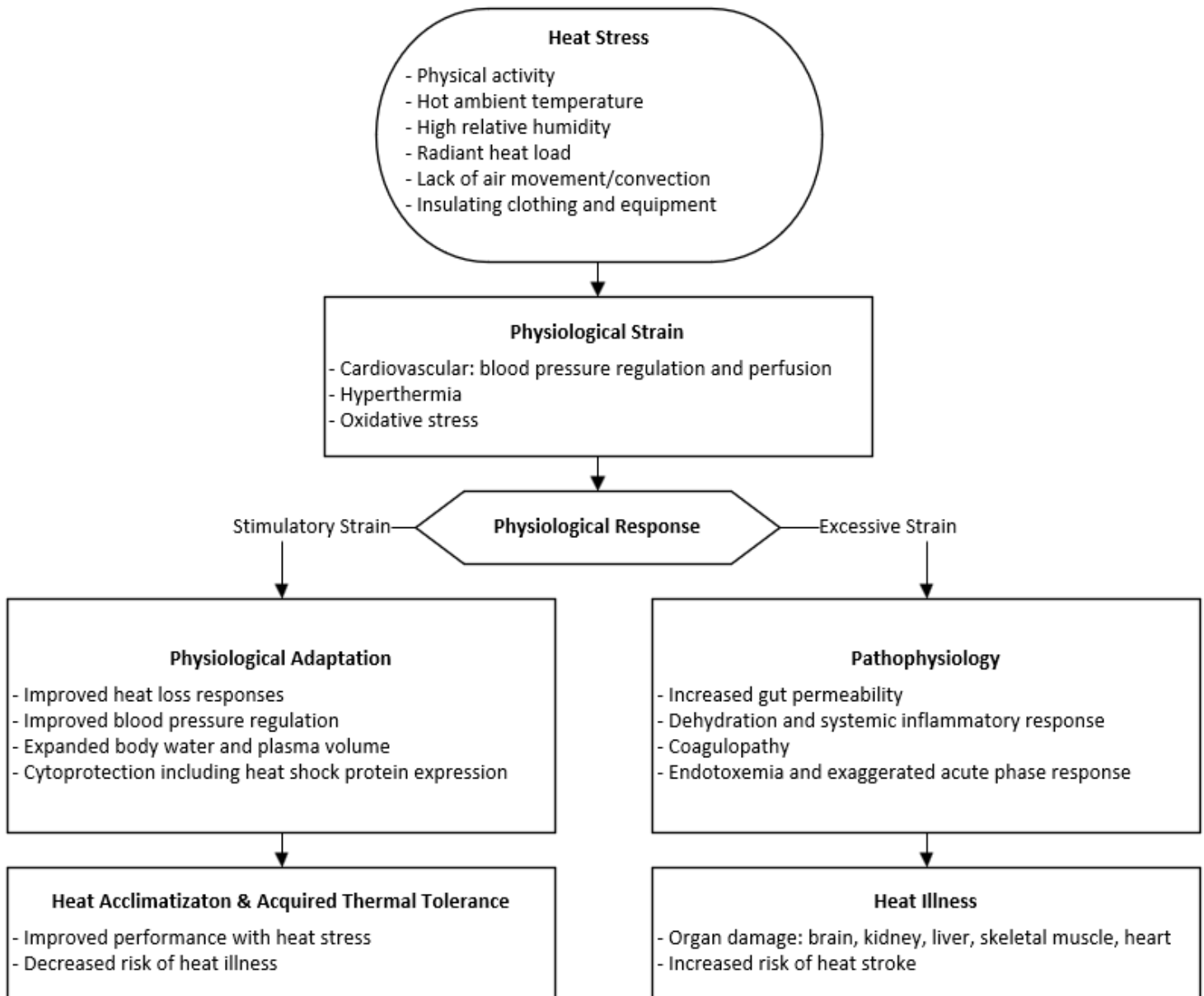
Heat acclimatization is achieved through gradual exposure. As few as three exposures of 90-minute duration over the course of a week can reduce physiological strain by approximately 20%, although individual responses vary. Additional heat-exposed exertion for 1–2 hours per day for 10–14 days results in adaptations that further reduce heat-related physiological strain.

Therefore, to prepare for heat exposure:

- Optimize general aerobic fitness with 1–2 hours per day of moderate exertion in the heat for at least 7 days
- Recommend hydration prior to any physical activity
- Recommend a “drink-to-thirst” approach sufficient to prevent loss of fluids

PREVENTION CONT'D

PHYSIOLOGICAL RESPONSE OF HEAT STRESS

**Algorithm 1:** Types of Physiologic Responses to Heat Stress

EVALUATION

Prompt medical attention should be provided whenever staff observe or patient reports heat stress symptoms. When a patient is observed to have or complains of one or more of the following heat stress symptoms or signs, proceed with evaluation and/or treatment as clinically appropriate. All heat-related clinical encounters should be documented in the health record.

SYMPTOMS AND SIGNS OF HEAT ILLNESS

- Dizziness or lightheadedness
- Headache
- Unsteady gait
- Generalized weakness and fatigue
- Nausea
- Muscle cramps
- Chills
- Decreased attention and cognitive function
- Sweaty or clammy skin, which may be warm or cool to touch
- Skin color varies from pale to flushed
- Tachycardia
- Systolic hypotension

SYMPTOMS AND SIGNS OF HEAT STROKE

- AMS such as delirium
- Seizure
- Ataxia
- Inappropriate behavior or aggression
- Flaccid muscles or persistent rigidity
- Recurrent vomiting
- Sphincter incontinence
- Tachycardia
- Systolic hypotension
- Skin assessment:
 - Sweaty or clammy skin for exertional heat stroke
 - Dry and hot skin for non-exertional (classic) heat stroke

HEALTH EQUITY ALERT

A [2019 article](#) demonstrated that emergency department visits for heat illness increased in the past decade by 35% for racial and ethnic minorities and by 27% for White patients. Further analysis revealed that the overall, White, and Hispanic/Latino populations follow a similar trajectory until the last 2 years, when the rate in the Hispanic/Latino population increases disproportionately, relative to the White population, to match the high rate of other minorities. The trend for Black and Asian patients was always higher than that for the overall and white populations, particularly in the last 4 years, when the gap became more evident.

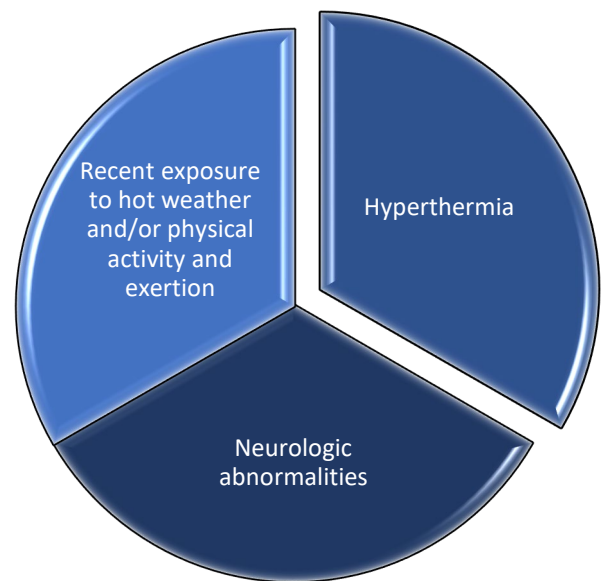


Figure 2: Triad of Heat Stroke

Non-exertional (or classic) heat stroke occurs due to environmental heat exposure, whereas exertional health stroke follows physical exertion in heat. Patients with non-exertional heat stroke have dry, hot skin, whereas patients with exertional heat stroke are sweating. Irrespective of presentation, patients can also present with tachycardia, hypotension, and tachypnea. Heat stroke is a medical emergency that can progress to multisystem organ failure and death.

EVALUATION CONT'D

DIFFERENTIAL DIAGNOSIS OF HEAT STROKE

- Sepsis
- Ischemic or hemorrhagic stroke
- Toxicologic emergency
- Endocrinologic emergency
- Exercise-associated hyponatremia (EAH)
 - Serum sodium concentration <135 mmol/L during or up to 24 hours after prolonged physical activity
 - Severe EAH can present with dyspnea and frothy sputum from noncardiogenic pulmonary edema

TEMPERATURE MEASUREMENT

Accurate measurement of core temperature is an important step in differentiating heat stroke from less severe heat illness or an alternative diagnosis, as AMS with a core temperature <40°C (104°F) should not be attributed to heat stroke.

- Recommend rectal temperature, which is considered the standard measurement because it is a reliable and practical measure of core temperature that is more accurate than temporal, axillary, oral, or tympanic thermometry.
- In a hyperthermic patient with an altered sensorium and a presentation suspicious for heat stroke, recommend empiric use of active cooling even if the core temperature is unknown or measured and below the diagnostic threshold of 40°C (104°F).

DOCUMENTATION

List of heat-illness codes to accurately document diagnosis:

- T67: Effects of heat and light
- T67.0: Heatstroke and sunstroke
- T67.1: Heat syncope/Heat collapse
- T67.2: Heat cramp
- T67.3: Heat exhaustive, anhidrotic
- T67.4: Heat exhaustion due to salt depletion
- T67.5: Heat exhaustion, unspecified
- T67.6: Heat fatigue, transient
- T67.7: Heat edema
- T67.8: Other effects of heat and light
- T67.9: Effect of heat and light, unspecified
- T67.01: Heatstroke and sunstroke
- T67.02: Exertional heatstroke
- X30: Exposure to excessive natural heat

Furthermore, consider documenting the following codes in addition to T67.X, X30, and X32 to identify more serious presentations of heat illness:

- Coma and stupor (R40.-)
- Rhabdomyolysis (M62.82)
- Systemic inflammatory response syndrome (R65.1-)

TREATMENT

MINOR HEAT ILLNESS

- For a patient's first occurrence of minor heat illness, recommend removing patient from heat source and providing supportive care, including rest in a cool area and replenishment of basic fluid and nutritional needs. See [Table 9](#)
- For patients with episodes of syncope in hot environments that are recurrent with known or suspected cardiovascular disease, consider sending to higher level of care (HLOC) or referral for further cardiology diagnostics.

HEAT STROKE

- In a hyperthermic patient with AMS and suspected heat stroke, recommend immediate empiric rapid active cooling and cold-water IV fluid hydration even if core temperature is unknown or below diagnostic threshold of 40°C (104°F).
 - Note: IV fluid treats dehydration and is not sufficient for rapid active cooling.
- Symptomatic EAH may present similarly to heat exhaustion, but severe EAH may present more like heat stroke with AMS (e.g., obtundation, coma, or seizures) without another explanation such as hypoglycemia, trauma, or hyperthermia >40 °C (104°F).
 - In absence of point-of-care testing, if clinical suspicion is high for severe EAH, then rapid transfer to HLOC.
- Recommend using ice-water (1-5°C) immersion for the treatment of heat stroke
 - If ice-water immersion is not logistically possible or available at the institution, then use cold-water (9-12°C) for immersion therapy.
 - If immersion therapy is not logistically possible or available at the institution, then apply ice packs with water (to increase surface area for conductive cooling) to cover the entire body to optimize conductive cooling. Ice packs have greater cooling capacity than chemical cold packs and, if used, are most efficacious when wet and covering the entire body to optimize conductive cooling. If too few ice packs are available to cover the entire body, recommend they be applied to the cheeks, palms, and soles rather than the skin covering the major vessels to maximize cooling. Also start evaporative cooling by misting/spraying water with fanning.
- Treat heat stroke to a target temperature of 38.3–38.8°C (100.9-101.8°F).
- Do not use antipyretic agents (i.e., acetaminophen, nonsteroidal anti-inflammatory drugs, salicylates) or dantrolene for treatment of heat stroke.
- Do not use body-cavity lavage, noninvasive external cooling systems, or cooling blankets for treatment in heat stroke

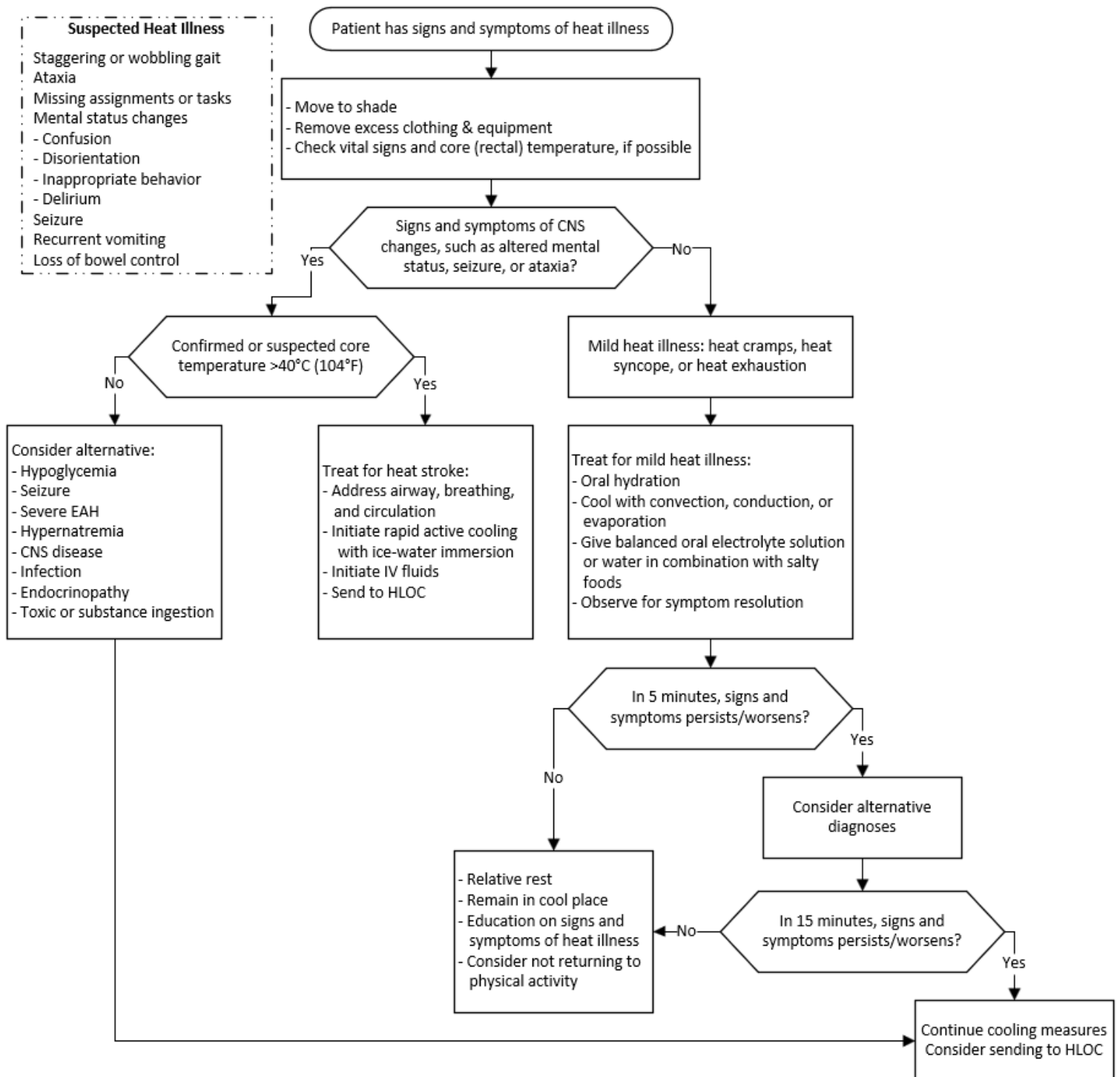
TREATMENT CONT'D

Severity	Diagnosis	Treatment
Minor	Sunburn	Remove from UV source and heat source Maintain euhydration with oral fluid replacement Treat by cleansing and moisturizing the area to avoid secondary infection Cool compresses or soaks, calamine lotion, or aloe vera-based gels provide pain relief Prevention includes midday sunlight avoidance and use of broad-spectrum sunscreen SPF 30 or higher that is reapplied every 2 hours or more frequently as needed for sweating
	Heat Rash	Remove from heat source Maintain euhydration with oral fluid replacement Wear breathable clothing (such as cotton) that does not occlude the skin Remove occlusive bandages or medication patches in the affected area and use more porous alternatives if needed Cool compresses or soaks provide relief Calamine lotion, aloe vera-based gels, or lowest potency (Class 7) topical corticosteroids (not to be used on face) can also alleviate itching
	Heat Cramps	Remove from heat source Oral isotonic or hypertonic fluid replacement
	Heat Edema	Remove from heat source Extremity elevation Compression stockings
Moderate	Heat Syncope	Remove from heat source Passive cooling Oral hydration with isotonic or hypertonic fluid
	Heat Exhaustion	Remove from heat source Evaporative, convective, or conductive cooling Oral hydration with isotonic or hypertonic fluid For severe heat exhaustion, IV hydration with isotonic fluid Consider HLOC if clinically unstable or if there is no clinical improvement or clinical worsening after 15 minutes of treatment
Severe	Heat Stroke	Remove from heat source Send to HLOC Supportive care of airway, breathing, and circulation Ice-water (preferred) or cold-water immersion to - Cool to goal core temperature of <38.9°C (102°F) within 30 minutes IV hydration with isotonic fluids (0.9% saline or lactated Ringer's) - If concern for exercise-associated hyponatremia (EAH) as cause of encephalopathy, send to HLOC

Table 8: Treatments for Heat Illnesses

TREATMENT CONT'D

HEAT ILLNESS TREATMENT ALGORITHM



Algorithm 2: Clinical Workflow to Diagnose and Treat Heat Illnesses

MONITORING

LOW RISK

Did not present with heat stroke and does not require HLOC:

- Normal or normalizing core temperature and other vital signs
- Check for evidence of end organ damage on exam (e.g., neurologic dysfunction)
- Also consider checking the following, if clinically appropriate:
 - Consider electrocardiogram (ECG) for patients with known or suspected cardiovascular disease and/or chest pain. See [Acute Chest Pain Care Guide](#).
 - Complete Blood Count (CBC)
 - Comprehensive Metabolic Panel (CMP)
 - Phosphate
 - Total Creatine Kinase (CK)
 - Lactate Dehydrogenase (LDH)
 - Uric acid
 - Urinalysis with microscopy

HIGH RISK

Presents with heat stroke or severe heat exhausting requiring HLOC:

- Cool to <38.9°C (102°F) within 30 minutes, then transport to HLOC.
- Monitor vitals including core (rectal) temperature, if possible.
- Monitor mental status.

FOLLOW-UP CARE

After heat illness, a patient is at increased risk for recurrence, so follow up and patient education are paramount. Advise patient to:

- Stay in a shaded area with good air circulation for at least 24 hours.
- Stay well hydrated and eat well-balanced meals.
- Limit physical activity during recovery for at least 24 hours. After heat stroke, recovery can take a week or more.

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Revision History

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