Concentra®

Heat Related Illness

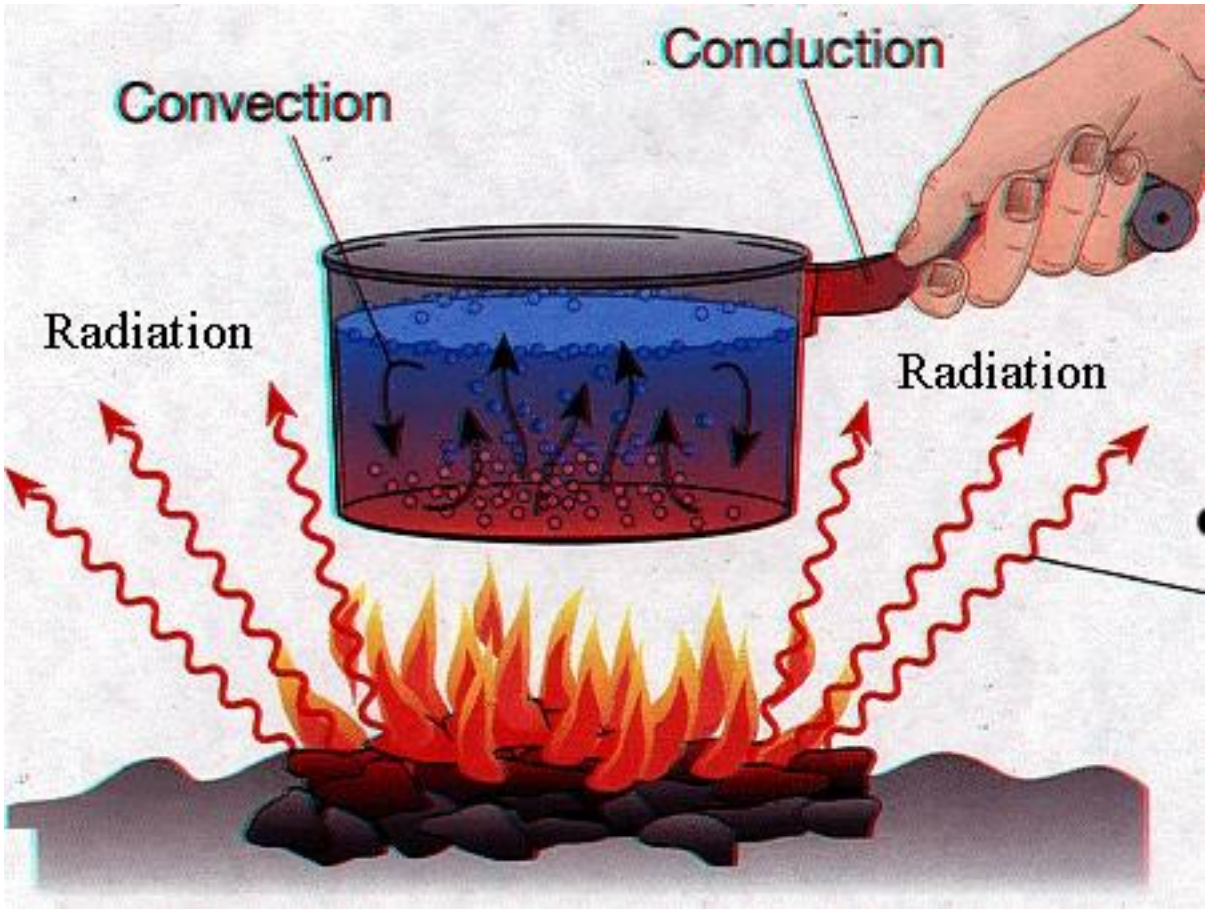
Presented by Dr. Robert Csorba

Heat Related Illness

- Results from overexposure to high temperatures, dehydration, excessive exercise, excess clothing, alcohol use, certain medications, or heart disease.
- Critical to recognize and treat quickly because:
    1. The severity of a heat illness may not be apparent at first.
    2. Risk of injury and death are directly related to the duration of core temperature elevation.

- Learn about the physiology of heat related illness.
- Review the 5 different forms of Heat Related Illness
- Discuss how to prevent their occurrence.
- Discuss how to treat them when they do occur.
- Learn what other resources are available.

Physiology of Heat Illness



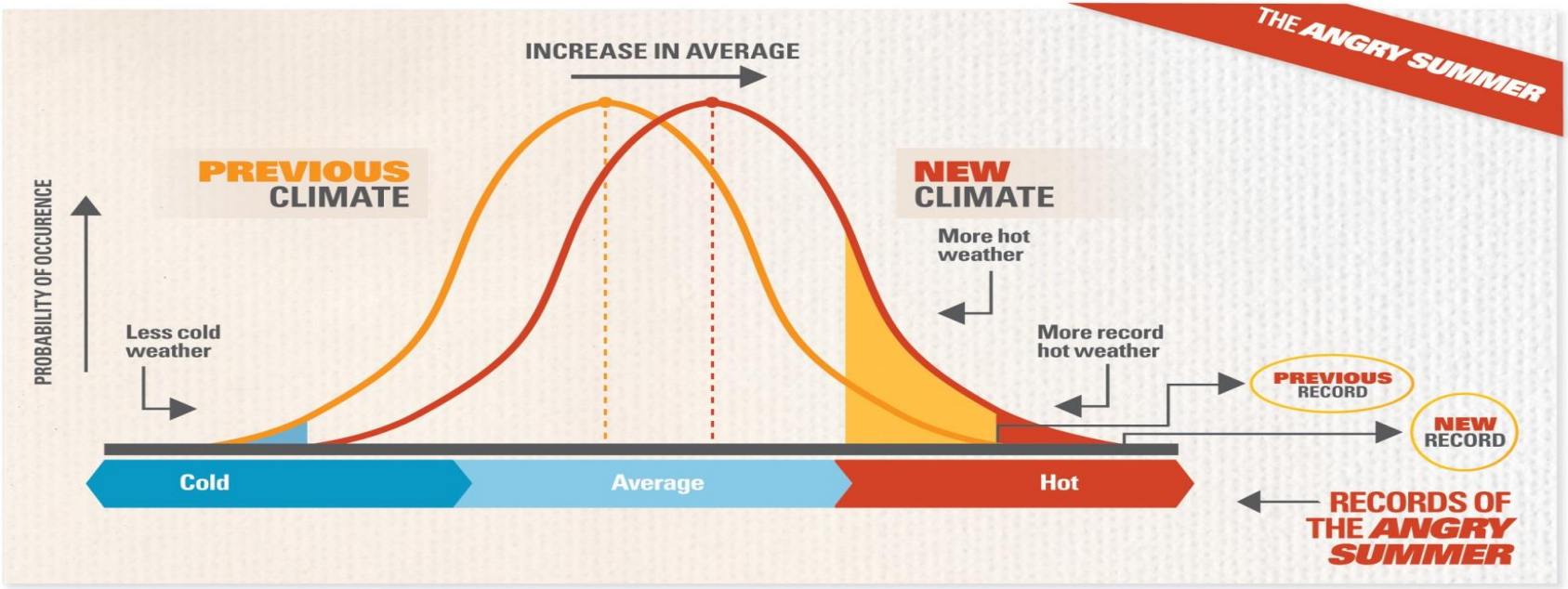
- The body has many mechanisms to reduce or dissipate heat.
- ***Evaporation*** occurs directly from skin or respiratory tract.
- ***Radiation*** is the emission of heat waves directly via skin.
- ***Convection*** transfers heat to gas or liquid flowing over the body.
- ***Conduction*** is a direct transfer of heat to a cooler object.

Physiology of Heat Illness

- Heat Illness occurs when the outside temperature is higher than the body's core temperature
- The body can no longer use compensatory mechanisms to reduce core temperature.
- In high humidity, the body cannot effectively use evaporation to transfer heat. This is why it's important to consider the heat index not just temperature.
- The body can acclimate or become accustomed to the higher ambient temperatures, dissipating heat even when doing strenuous activity.
- This requires several days of exposure, and the accommodation is lost in about one week after return to "normal" temperatures.

Incidence of Heat Illness

- From 1999 to 2010, 8,081 heat-related deaths were reported in the United States.
- But rates are increasing, the incidence between 2005-2009 was higher than in the previous 35 years.
- Almost all heat-related deaths occurred during May–September, with the highest numbers in July and August.
- Arizona, Texas and California account for 43% of all heat-related deaths.



SOURCE: Modified from: Intergovernmental Panel on Climate Change (IPCC). (2007). Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K., Tignor, M.M.B., Miller, H.L. Jr and Chen, Z. (eds). Cambridge, UK and New York, NY, USA: Cambridge University Press.

Risk Factors

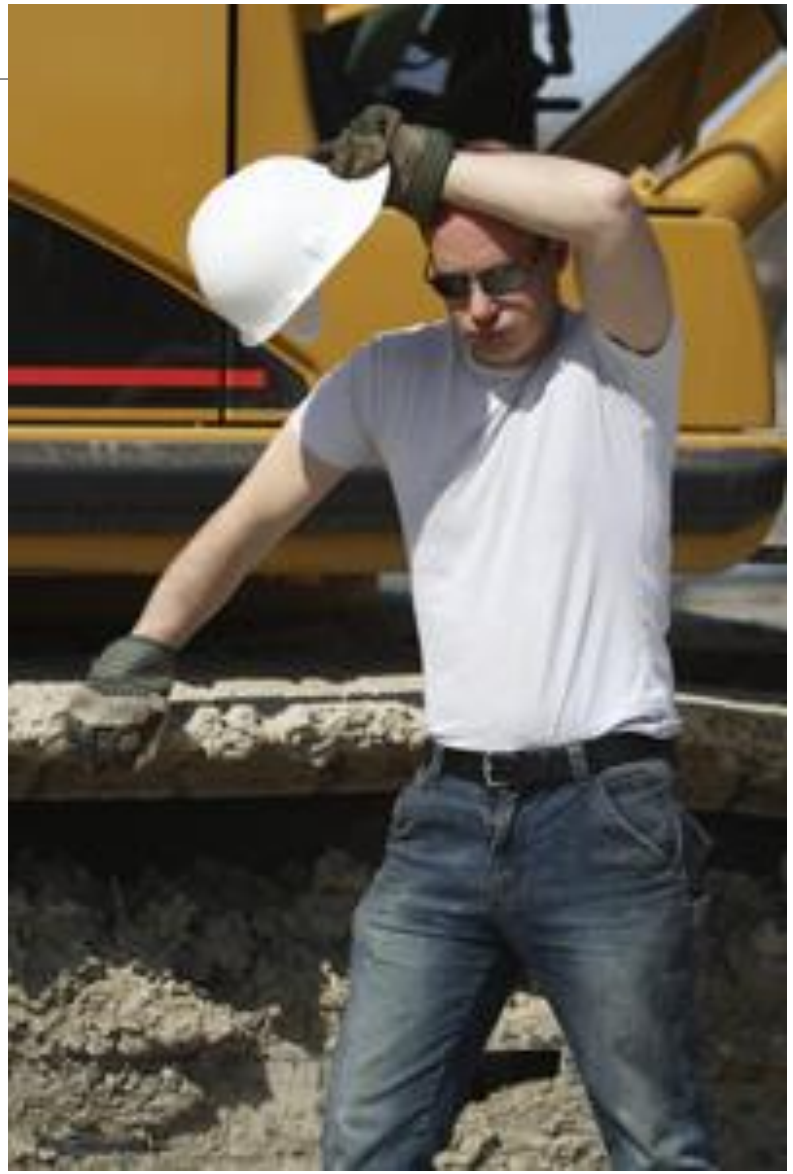
- Occupational risk of heat illness is increased in those working in agriculture, the oil and gas industry, the military, foundries, construction, emergency response, bakeries, baggage handling, healthcare, and construction.
- Risk factors for heat stress include age ≥ to 65 years, obesity, pre-existing disorders such as hypertension, or heart disease, and medications.

Medications and Substances that Increase Risk for Heat Illness

- Alcohol
- Blood pressure medication
- Amphetamines
- Antihistamines
- Benzodiazepines
- Cocaine
- Water pills
- Ephedra-containing supplements
- Laxatives
- Thyroid medication
- Tricyclic antidepressants

Heat Stress

- Heat stress responses include a continuum of disorders from heat stress and rash to heat cramps, heat syncope, heat exhaustion and heat stroke.
- Symptoms of heat stress (mildest form) include: dizziness and sweaty palms, safety concerns due to fogged safety glasses and the worker being distracted.
- Treatment is providing fluids and rest in a cool area.
- Patients should be able to return to their regular jobs the same day if they can stay in a cool environment for the rest of their shift.



Heat Rash

- Chronic moisture on the skin blocks sweat ducts, and can cause a rash which is distracting and uncomfortable.
- Heat rash manifests as clusters of red bumps on the skin, typically appearing on the neck, upper chest, and the folds of the skin.
- Treatment consists of keeping the skin clean and dry, avoid ointments and creams, shower after work, and wearing breathable clothing.
- A "breathable fabric" (such as cotton, linen or rayon) lets air pass through it easily, and allows moisture vapor to be transmitted through the material.

Heat Cramps

- Muscle cramps that immediately follow vigorous activity in the heat, resulting from fluid and salt depletion.
- Symptoms include painful skeletal muscle contractions lasting 1-3 minutes and tender muscles.
- Physical findings include skin that is moist and cool; normal pulse, breathing rate and body temperature.
- The victim is ALERT, with no evidence mental status changes.
- If symptoms are severe, consider transportation to the ER (call 911 if necessary).

Heat Cramps (cont'd)

- Treatment consists of rehydration with fluid and salt replacement (salt in water or sports drink), removal from the hot environment, as well as gentle massage and stretching of the involved muscle/s.
- Please note, salt tablets are NOT recommended as part of the treatment.
- Patients should be coached about prevention upon returning to work.
- Muscle cramps are best prevented through adequate conditioning, hydration, electrolyte replacement, and acclimatization.
- As this is a relatively minor condition, once it is treated, the patient should be able to return to work.
- It may be wise to allow patients to go home for the rest of the day to make sure that they are fully hydrated prior to returning to their jobs the next day.

Heat Syncope

- There is sudden collapse, perhaps even brief loss of consciousness, while standing or suddenly rising from a seated or supine position.
- It results from cutaneous vasodilatation combined with volume depletion due to peripheral blood pooling.
- Physical findings include cool, moist skin, low blood pressure and a weak pulse.
- Generally occurs during the first few days a person is exposed to high environmental temperatures, before acclimatization is complete, and is typically self-limited.
- Initial treatment measures involve laying the patient down with legs elevated, and oral rehydration. Cooling measures can also be helpful (don't forget evaporative cooling and fanning the patient).
- Patients typically recover in 15-20 minutes with these measures. If they do not, patients should go to the ER for further evaluation.
- Patients may return to work when other causes of syncope have been ruled out, they are rehydrated, and their symptoms have resolved.

Heat Exhaustion

- Symptoms may include fatigue, weakness, dizziness, confusion, anxiety, impaired judgement, tingling of extremities, nausea, vomiting and headache.
- Patients present with moist, clammy skin, may be pale or flushed, have a fast pulse and breathing rate. Temperature is only slightly elevated (above 100.4° F).
- Treatment consists of cooling measures, including removal of any equipment or excess clothing, application of ice packs to the neck, axillae and inguinal regions, and use of fans if available. Again, lie the worker down with legs elevated above the level of the head.
- Rehydrate with chilled water or a sports drink (if no nausea/vomiting).
- Heat exhaustion may signal impending heat stroke so it is important to recognize this immediately, act swiftly and CALL 911.
- Avoid activity in a hot environment for 24-48 hours and must be medically cleared by a doctor prior to returning to work.

Heat Stroke

- *A LIFE THREATENING EMERGENCY, CALL 911 IMMEDIATELY*
- Body temperature > 104 ° F which causes brain injury and significant mental status changes.
- Symptoms: dizziness, nausea/vomiting, headache, seizures, bizarre or confused behavior, loss of consciousness, rapid pulse and respiratory rate, NO sweating with dry, hot, red skin.
- While waiting for ambulance, remove excess clothing and any equipment. Ice/wet sheets/towels placed to the top of the head, neck, axillae, trunk, and inguinal regions (areas adjacent to large blood vessels).
- Spray tepid water over the patient's body and use fans to blow air over the moist skin for evaporative cooling.
- Return to work: No exercise permitted for at least seven days.Must follow up with the doctor one week after hospital discharge for clearance.
- The worker should begin working in a cool environment and gradually increase the duration of work, intensity of activity, and heat exposure over two weeks to demonstrate heat tolerance and initiate acclimatization.

OSHA

- OSHA has no specific standards.
- However in the general Duty Clause (Section 5(a) (1) of Occupational Safety and Health Act (1970), employers are required to provide environment "free from recognizable hazards that are causing or likely to cause death or serious harm to employees.“
- This has led to OSHA's Heat Illness Prevention Campaign (begun in 2011 and updated in 2016), as well as development of various state specific regulations.
- More info available on OSHA Occupational Heat Exposure website: https://www.osha.gov/SLTC/heatstress/index.html
- Also download the CDC’s OSHA-NIOSH Heat Safety Tool App: https://www.cdc.gov/niosh/topics/heatstress/heatapp.html

OSHA PREVENTION CAMPAIGN

- Water- drink BEFORE thirst is noted. Drink eight fluid ounces every twenty minutes of exertional activity in the heat, avoiding sugary or caffeine products.

- Rest- avoid double shifts and overtime. Work in morning and evening, and initiate work-rest cycles.

- Shade- provide shade in close proximity to the work area for the resting worker for designated periods of time.

What can you do to reduce workers' exposure to heat?

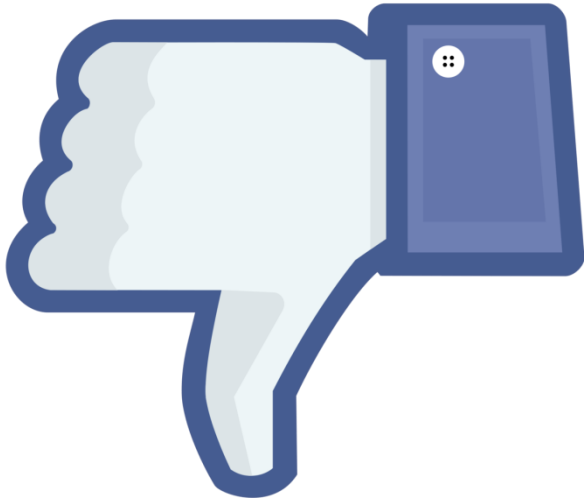
- Air conditioning (in cranes or construction equipment cabs, break rooms) or increase general ventilation, use cooling fans.
- Local exhaust ventilation at points of high heat production or moisture (ex., exhaust hoods in laundry rooms).
- Install reflective shields to redirect radiant heat, insulate hot surfaces (ex., furnace walls) and eliminate steam leaks.
- Schedule workers to gradually build up exposure to heat, especially workers who are new to working in the heat or have been away from work for a week or more.
- Workers must have adequate potable (safe for drinking) water close to the work area, and should drink small amounts frequently.
- Schedule heavier work for cooler times of the day.

What can you do to reduce workers' exposure to heat?

- Special cooling devices can protect workers in hot environments.
- Insulated gloves, insulated suits, reflective clothing, or infrared reflecting face shields may be needed.
- A garment with a self-contained air conditioner in a backpack or compressed air source that feeds cool air through a vortex tube.
- A plastic jacket whose pockets can be filled with dry ice or containers of ice.
- Workers should watch out for each other for symptoms of heat-related illness and administer appropriate first aid to anyone who is developing a heat-related illness.
- Workers and supervisors should be trained about the hazards of heat exposure and their prevention.

Don’t’s for Prevention

- DO NOT underestimate the seriousness of heat illness, especially if the person is a child, elderly, or injured.
- DO NOT treat with medications that are used to treat fever (such as aspirin, ibuprofen or acetaminophen). They will not help, and may be harmful.
- DO NOT use salt tablets.
- DO NOT give liquids that contain alcohol or caffeine. They will interfere with the body’s ability to control its internal temperature.
- DO NOT use alcohol rub on the skin.
- DO NOT give anything by mouth if the person is vomiting or unconscious.

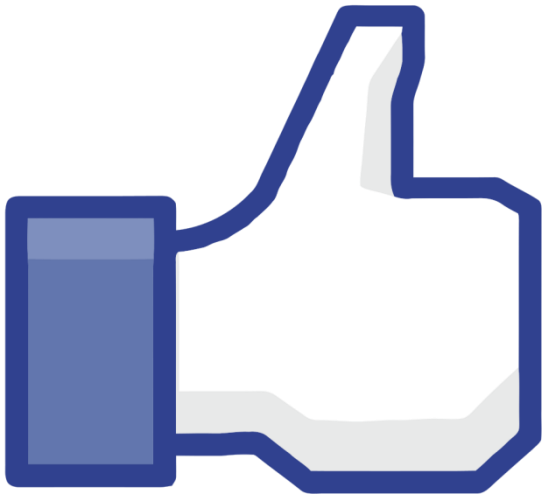


Do’s for Prevention

- Wear loose-fitting, lightweight clothing in hot weather.
- Rest regularly in a cool area; seek shade when possible.
- Avoid strenuous physical activity in hot or humid conditions.
- Drink plenty of fluids every day. Drink more fluids before, during, and after physical activity.
- Be especially careful to avoid overheating if you are taking drugs that impair heat regulation, or if you are overweight

or elderly.

- Be careful of hot cars in the summer. Allow the car to cool off before getting in.
- Avoid heavy meals and hot foods.



First Aid

- Have the person lie down in a cool, shady place. Elevate the person's feet about 12 inches.
- Apply cool, wet cloths (or cool water directly) to the person's skin and use a fan to lower body temperature.
- Place cold compresses or ice packs on the person's neck, groin, and armpits.
- If the person is alert, give cool water or sports beverages. It's advisable to drink slowly and steadily, particularly if they are nauseas.
- For muscle cramps, give beverages as above, and massage and stretch affected muscles gently, but firmly, until they relax.
- If the person shows *confusion, signs of shock (bluish lips and fingernails, and decreased alertness), starts having seizures or loses consciousness*, CALL 911 and continue cooling procedures, as described above.