RER HEAT SAFETY

The heat is on…..

So Be Careful!

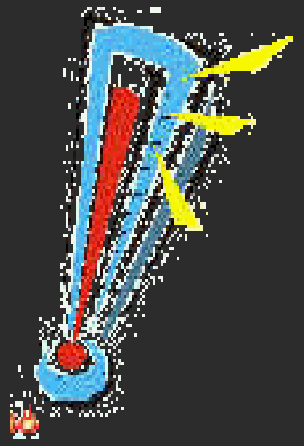
THE HEAT IS ON

- The Summer months are fast approaching, and you will soon find yourself working in hot temperatures. The danger of working in hot or elevated temperatures range from simply being uncomfortable to suffering from life threating heat-related illness known as heat stress.

- You can beat the heat and protect yourself and others working in the heat by taking preventative measures to avoid heat stress. Having the ability to recognize and respond to the signs of heat stress will make it easier for you to prevent heat stress yourself or assist another staff member from suffering a heat stress incident.

What is Heat Illness?

- The body normally cools itself by sweating. During hot weather, especially with high humidity, sweating isn't enough. Body temperature can rise to dangerous levels if precautions are not taken. Heat illnesses range from heat rash and heat cramps to heat exhaustion and heat stroke. Heat stroke can result in death and requires **immediate medical attention**



HEAT ILLNESS PREVENTION POLICY

- MIAMI DADE COUNTY Administrative Order (AO) No. 7-48, Heat Illness Prevention Policy, establishes uniform requirements and a procedure to proactively manage and monitor heat-related illnesses and injuries, thereby safeguarding employees from potentially fatal working conditions in high-heat environments.

OSHA Standards

- General Industry 29 CFR 1910 highlights OSHA standards, Federal Registers (rules, proposed rules, and notices), and standard interpretations (official letters of interpretation of the standards) related to heat stress.
- 29 CFR 1910.132 (d) mandates the employer to perform a hazard assessment of the workplace to determine if the use of PPE is necessitated; select and mandate

employee use of the necessary PPE; communicate selection of PPE decisions to employees; and select PPE that properly fits the employees.

- OSHA requires the use of personal protective equipment (PPE) to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective in reducing these exposures to acceptable levels. Employers are required to determine if PPE should be used to protect their workers.

- If PPE is to be used, a PPE program should be implemented. This program should address the hazards present; the selection, maintenance, and use of PPE; the training of employees; and monitoring of the program to ensure its ongoing effectiveness. PPE is addressed in specific standards for the general industry, shipyard employment, marine terminals, and longshoring.

- Twenty-five states, Puerto Rico and the Virgin Islands have OSHA-Approved State Plans and have adopted their own standards and enforcement policies. For the most part, these States adopt standards that are identical to Federal OSHA. However, some States have adopted different standards applicable to this topic or may have different enforcement policies.

The General Duty Clause

- The **General Duty Clause** describes the employer's obligation to **"furnish to each of his employees' employment and a place of employment which are free from recognized hazards that are**

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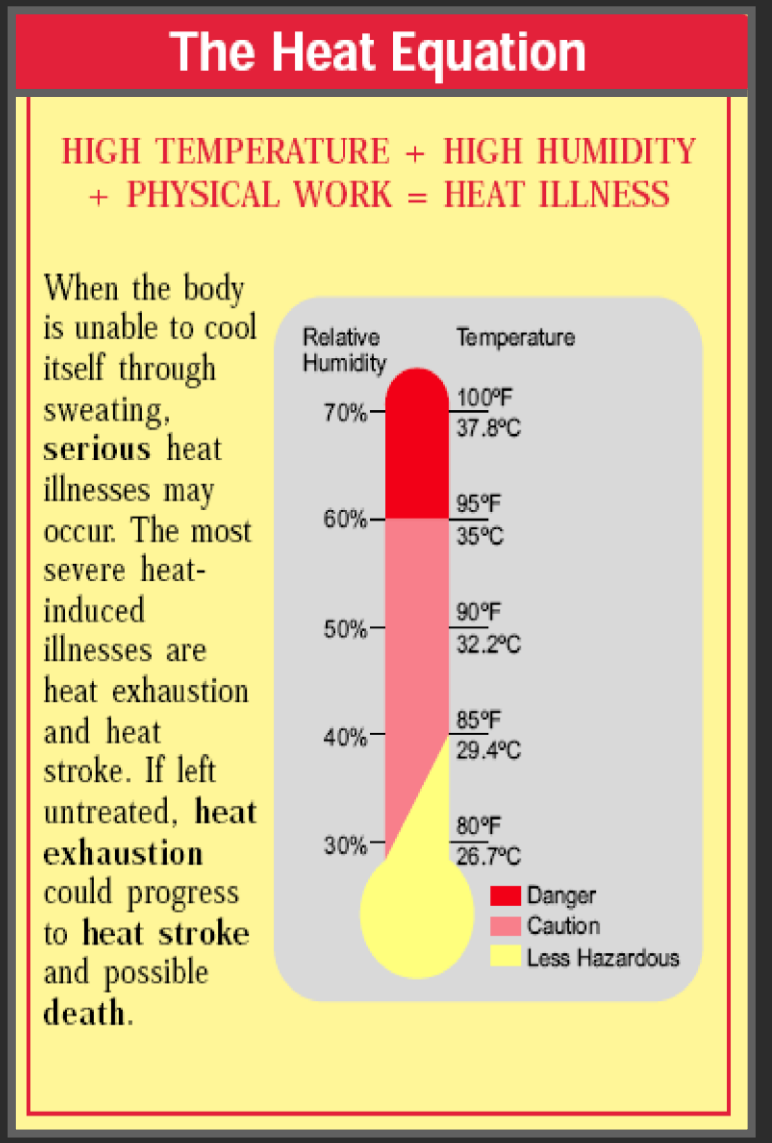
1.
2.
3.
4.

Heat-related injuries

- Statistics
  - ***Heat-related illnesses claim 650 lives annually in the US***
  - ***More than tornadoes, hurricanes, floods, and lightning combined***
- Heat-related illness is a concern in any weather at any time, anywhere!
- A worker must understand the ways the body handles excessive heat and the factors that increase the risk of developing a heat related illness
  - ***Heat syncope (fainting)***
  - ***Heat rash***
  - ***Heat cramps***
  - ***Heat exhaustion***
  - ***Heat stroke***



The body regulates a consistent temperature

- The body's optimal core temperature is 98.6 degrees
  - ***When the body burns calories, it produces heat***
  - ***Heat can be created during strenuous activity***
  - ***Heat can be transferred to the body through the air, sunlight and radiant heat***
- The body rids itself of excessive heat in various ways
  - ***Increased respiration allows some heat to be exhaled***
  - ***Dilation of blood vessels allows blood, brought to the skin surface) to release heat***
  - ***The hypothalamus signals to sweat glands to open, bringing sweat to the skin's surface (the evaporation of sweat is a cooling process)***

OSHA Heat Illness Study

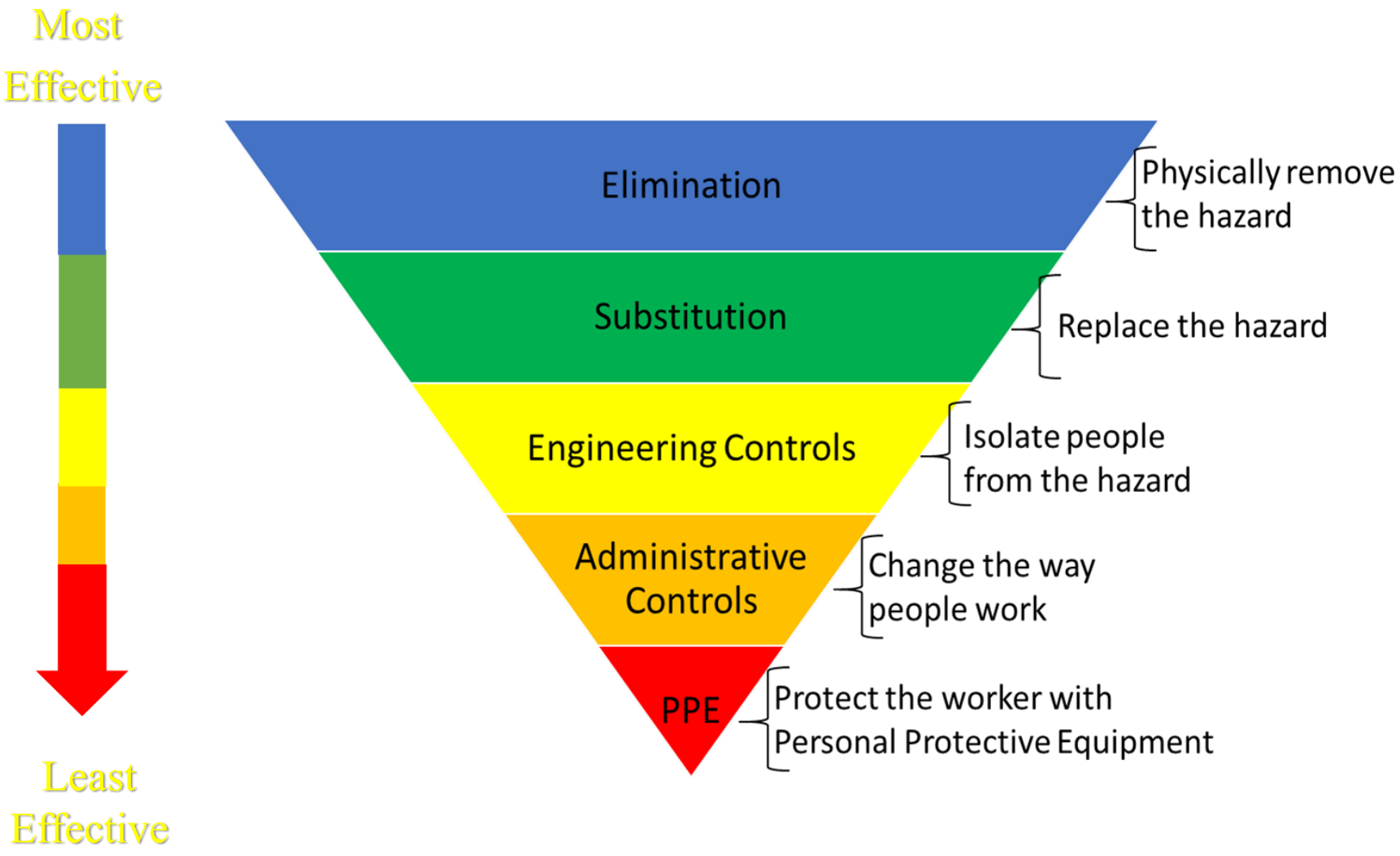
- Half of the workers suffered heat illnesses on the first day of work.

- 80% of the workers had been on the job for four or fewer days.

https://www.dir.ca.gov/DOSH/heatillnessinvestigations-2005.pdf

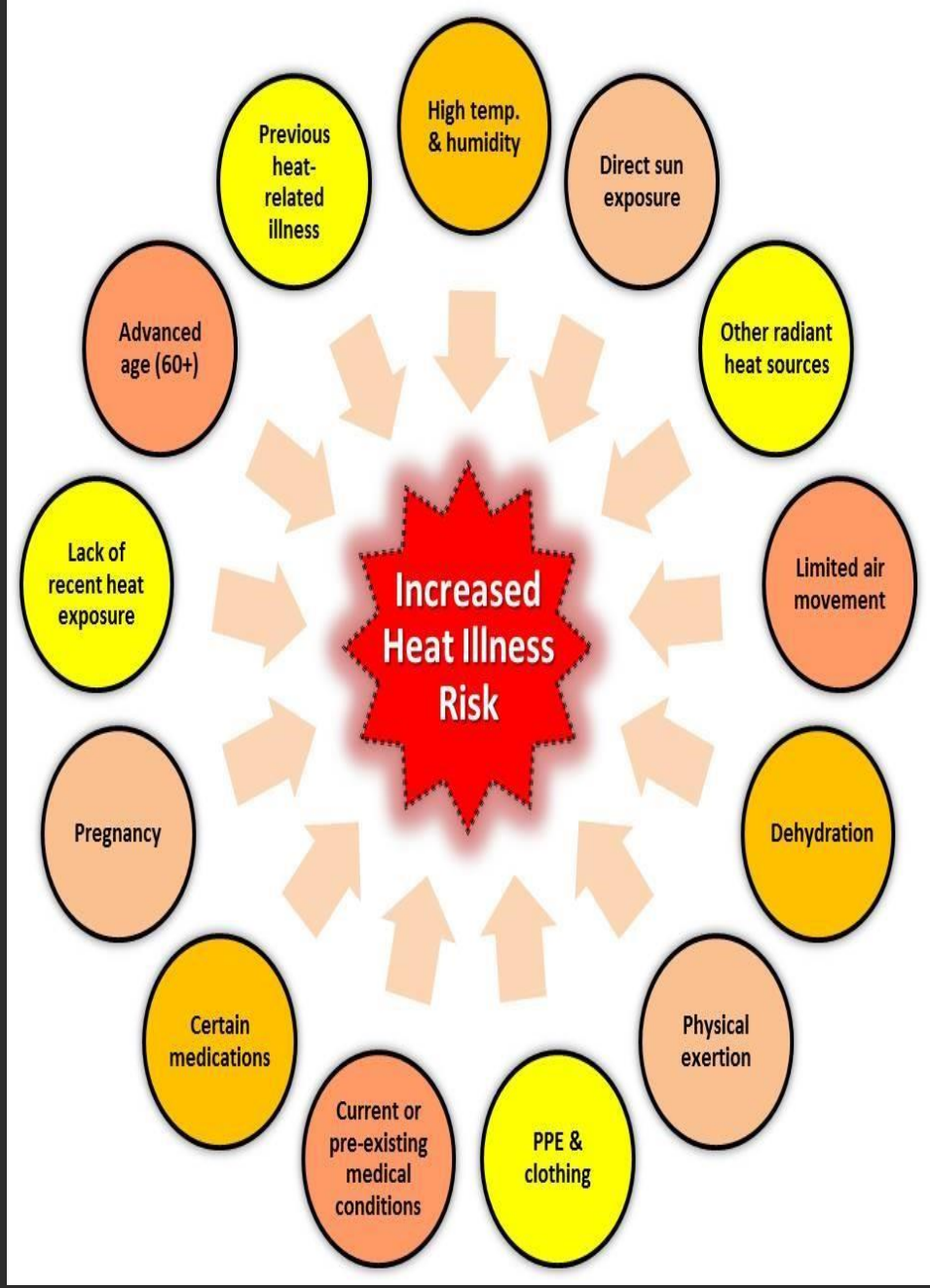
- Problems develop when the body can't rid itself of excess heat
  - ***The heart beats faster and the pulse increases***
  - ***Concentration and focus becomes more difficult to maintain***
- Examples of when the body's cooling mechanisms aren't able to work properly
  - ***Air temperature exceeds body temperature and the body cannot easily cool itself (heat always travels from hot to cold)***
  - ***When the atmosphere is very humid, sweat doesn't evaporate effectively***
  - ***Also, sweat doesn't evaporate easily from a person who works hard while wearing protective clothing***

Hierarchy of Controls



Wearing PPE:

- Significantly increases the heat burden and heat illness risk:
  - ***Reduces the body's normal way of getting rid of heat by sweat evaporation***
  - ***Holds excess heat and moisture inside PPE, making the worker's body even hotter***
  - ***Increases the physical effort to perform duties while carrying the extra weight of the PPE***
- Is one of many personal and environmental factors that increases risk
- A *balanced approach* is best to mitigate both heat stress and potential safety hazards:
  - ***PPE can also help to reduce risk of heat illnesses***
  - ***May include: uniform/clothing with SPF protection, sunscreen, County-issued refillable water bottle, electrolyte packages, cooling rags, brimmed hard hats, hats with neck shade, cooling vests***



Heat Syncope

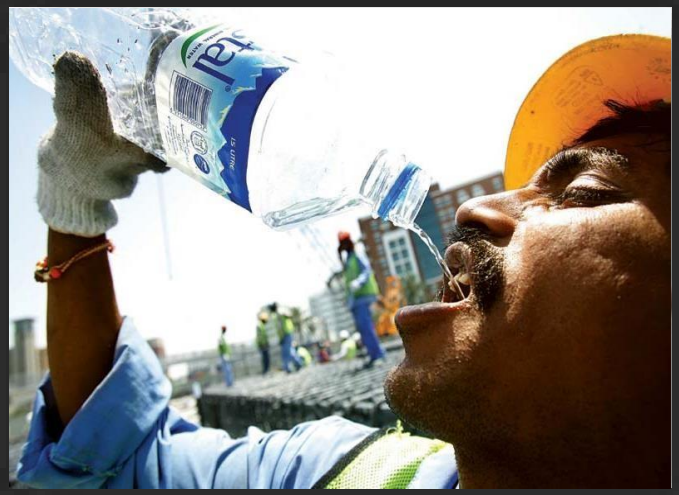
- A victim becomes light-headed and faints when blood flow to the brain decreases
  - ***This is because blood pressure is lowered when blood vessels dilate to rid the body of heat***
  - ***Blood pressure lowers further when blood volume drops as water is evaporated from the blood***
- Treatment
  - ***Position the person on the back***
  - ***Loosen belts, collars or other tight clothing***
  - ***To reduce the chance of fainting again, don't allow the victim to get the person up too fast***
  - ***If the person doesn't regain consciousness within one minute, call 911***
  - ***Sometimes, heat syncope is a symptom of a nervous system, metabolic, or cardiovascular problem that needs further medical evaluation***

Heat Rash

- Symptoms
  - ***Clogged sweat glands result in red cluster of pimples or blisters***
  - ***Occurs on neck, upper chest, groin, under the breast and elbow creases***
  - ***Rash can be irritating or painful***
- Treatment
  - ***Remove sweaty / restrictive clothing***
  - ***Apply cool compress (5 minutes)***
  - ***Cleanse with antibacterial soaps***
  - ***Keep area dry and apply powder for discomfort***
  - ***Don't use ointments and creams***
- Warning
  - ***More common in workers not acclimatized***
  - ***Substantially reduces the worker's ability to sweat and cool the body***

Heat Cramps

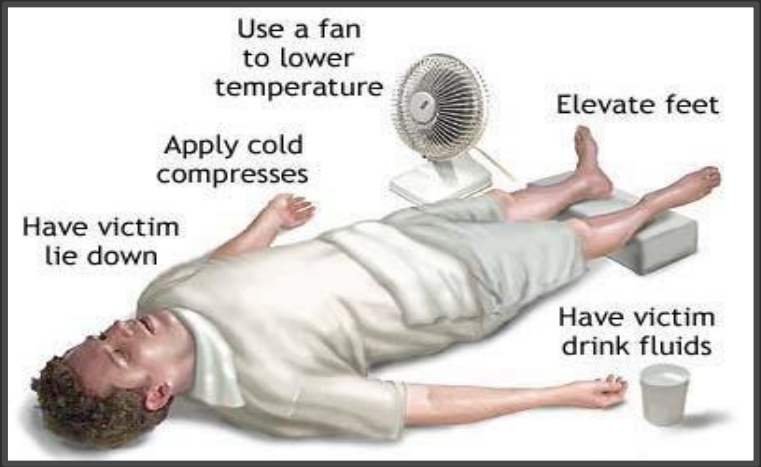
- Symptoms
  - ***Muscle spasms or cramps in abdomen, arms, or legs***
  - ***Caused by profuse sweating***
  - ***More common in workers who are not acclimatized***
  - ***May occur suddenly or hours later***



- Treatment
  - ***Stop work***
  - ***Rest in a cool place***
  - ***Administer fluids***
  - ***Avoid salt tablets***
  - ***Don't return to strenuous work until cramps subside***
- Seek medical attention if the worker:
  - ***Has heart problems***
  - ***Is on a low sodium diet***
  - ***If cramps don't subside within one hour***

Heat Exhaustion

- Symptoms
  - ***Elevated body temperature***
  - ***Rapid heartbeat***
  - ***Headache, dizziness, weakness and irritability***
  - ***Fast shallow breathing***
  - ***Profuse sweating***
  - ***Nausea or vomiting***



- Treatment
  - ***Remove worker from heat***
  - ***Remove PPE/clothing***
  - ***Sit worker in cool area or allow worker to lay down***
  - ***Apply cool compresses or wet head, face and neck with cool water***
  - ***Increase air movement***
  - ***Administer fluids***
  - ***Seek medical evaluation***
- Left untreated, it can quickly lead to heat stroke

Heat Stroke

- Symptoms may include
  - ***High core body temperature***
  - ***Red hot skin (residual moisture may appear) or profuse sweating***
  - ***Throbbing headache***
  - ***Extreme dizziness***
  - ***Strong, rapid pulse***
  - ***Convulsions, collapse, fainting or unconscious***
  - ***SHOCK***
    - ***Severe confusion***
    - ***Irrational behavior***
    - ***Disorientation***
- Symptoms may appear similar to heat exhaustion

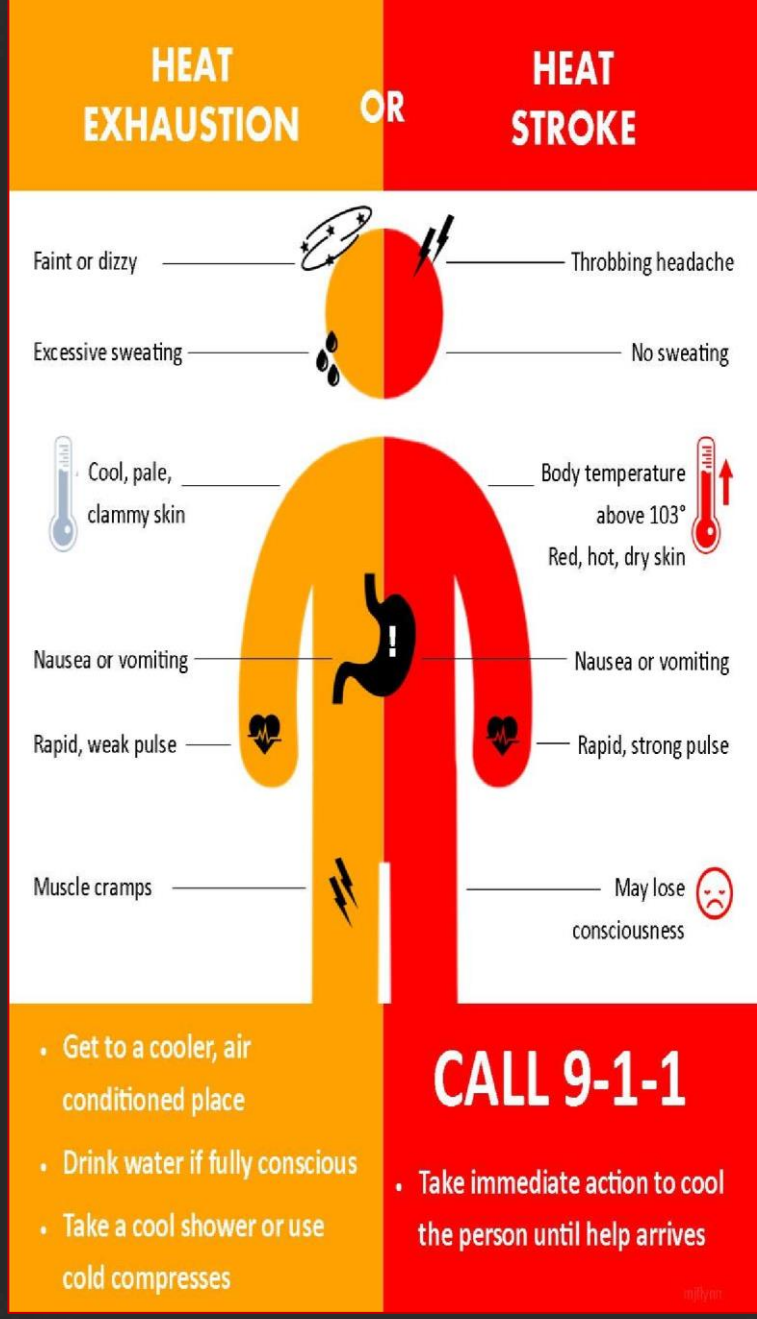
- Treatment
  - ***Call – cool – care***
  - ***Dial 911 immediately***
  - ***Heat stroke is a medical emergency***
  - ***50% of heat stroke victims die or suffer permanent disability***

Warning!

- Not all workers respond the same to heat - related illnesses
- Workers may have a few or all of the symptoms
- If the worker can't answer three simple questions:

  1. ***What is your name?***
  2. ***Do you know where you are?***
  3. ***What day is today?***

- Assume it's heat stroke (shock) or a medical emergency
- Immediately call for help and implement heat stroke treatment



HOW HOT IS IT?

HEAT INDEX CHART

TEMPERATURE F°	RELATIVE HUMIDITY								
	10 %	20%	30%	40%	50%	60%	70%	80%	90%
104°	98	104	110	120	>130	>130	>130	>130	>130
102°	97	101	108	117	125	>130	>130	>130	>130
100°	95	99	105	110	120	>130	>130	>130	>130
98°	93	97	101	106	110	125	>130	>130	>130
96°	91	95	98	104	108	120	128	>130	>130
94°	89	93	95	100	105	111	122	128	>130
92°	87	90	92	96	100	106	115	122	128
90°	85	88	90	92	96	100	106	114	122
88°	82	86	87	89	93	95	100	106	115
86°	80	84	85	87	90	92	96	100	109
84°	78	81	83	85	86	89	91	95	99
82°	77	79	80	81	84	86	89	91	95
80°	75	77	78	79	81	83	85	86	89
78°	72	75	77	78	79	80	81	83	85
76°	70	72	75	76	77	77	77	78	79
74°	68	70	73	74	75	75	75	76	77

Directions: Locate the current temperature on the left column and then locate the relative humidity on the top row. Follow the temperature across and the humidity down until they meet; this measurement is the heat index. The heat index will increase 15 degrees in direct sunlight.

HEAT INDEX 90°-100°:
Sun stroke, heat cramps and heat exhaustion are possible with prolonged exposure and physical activity.

HEAT INDEX 105°-129°:
Sun stroke, heat cramps and heat exhaustion likely. Heat stroke possible with prolonged exposure and physical activity.

HEAT INDEX 130° OR HIGHER:
Heat stroke or sun stroke imminent.

PREVENTING HEAT-RELATED HEALTH PROBLEMS

- **Prevention**– Heat stress can usually be prevented, or the risk of developing it can be reduced by following a few preventive measures.
- Consult your doctor regarding possible risk factors that may affect heat tolerance, such as age, weight, physical fitness, medication, or pre-existing medial conditions.
- Know the signs and symptoms; monitor yourself and co-workers.
- Allow your body to become acclimated to the heat.
- Avoid energy or power drinks containing caffeine.
- Stand in shaded areas out of direct sunlight whenever possible.

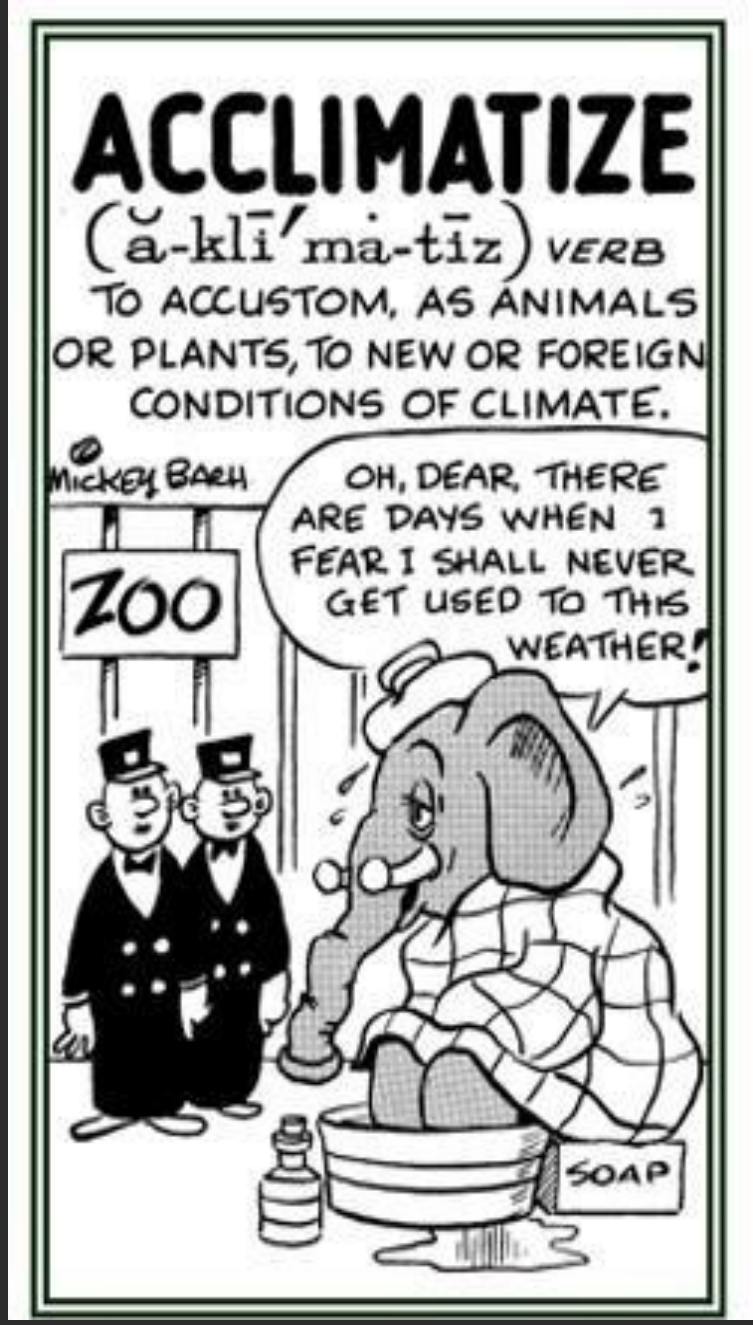
Causal Factors

- **Age, weight, degree of physical fitness**

- Degree of acclimatization, metabolism
- Use of alcohol or drugs
- A variety of medical conditions such as hypertension all affect a person's sensitivity to heat
- Prior heat injury predisposes an individual to additional injury.
- Type of clothing worn must be considered.

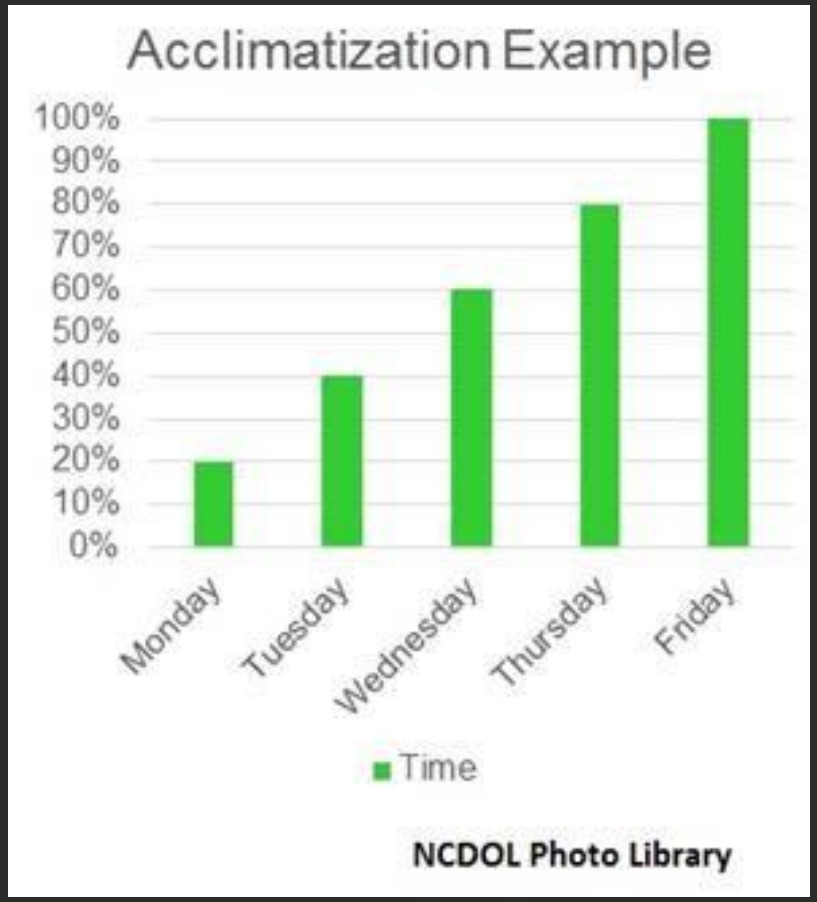
Take time to acclimatize

- Gradually increase work time in hot climate over a 7-14 day period
- For workers new to the climate:
  - ***Schedule no more than 20% of the usual work shift on day 1***
  - ***Increase shift by no more than 20% on each additional day***
- For workers with previous experience with job and climate:
  - ***Schedule no more than a 50% of the usual work shift on day 1***
  - ***Increase to 60% on day 2, 80% on day 3, and 100% on day 4***



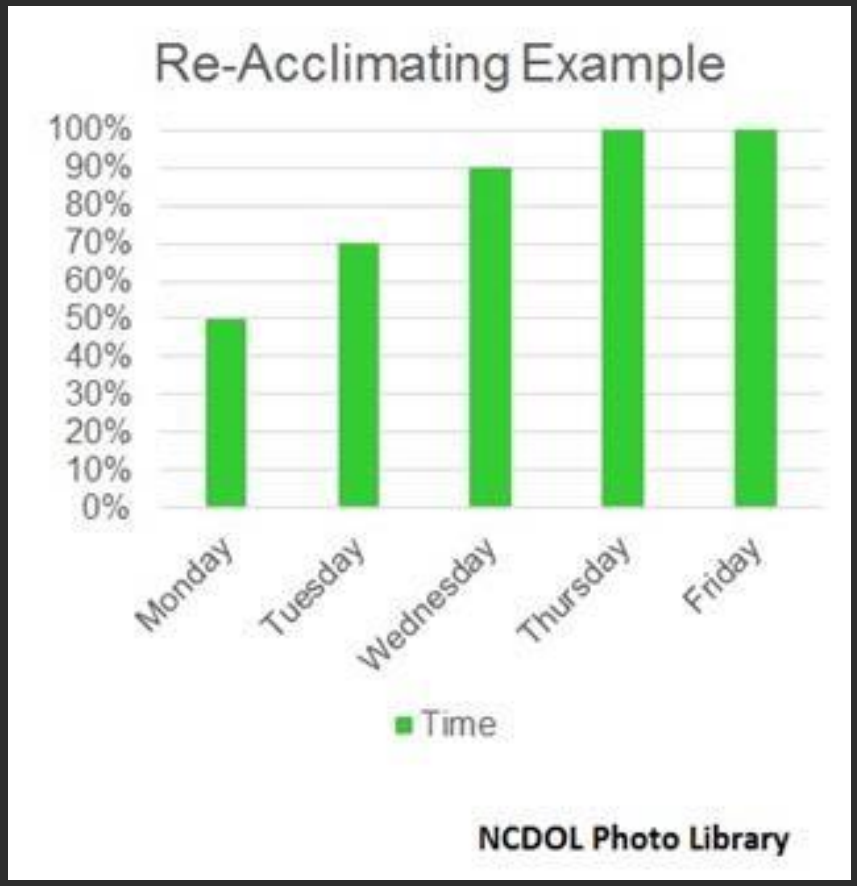
Acclimatization

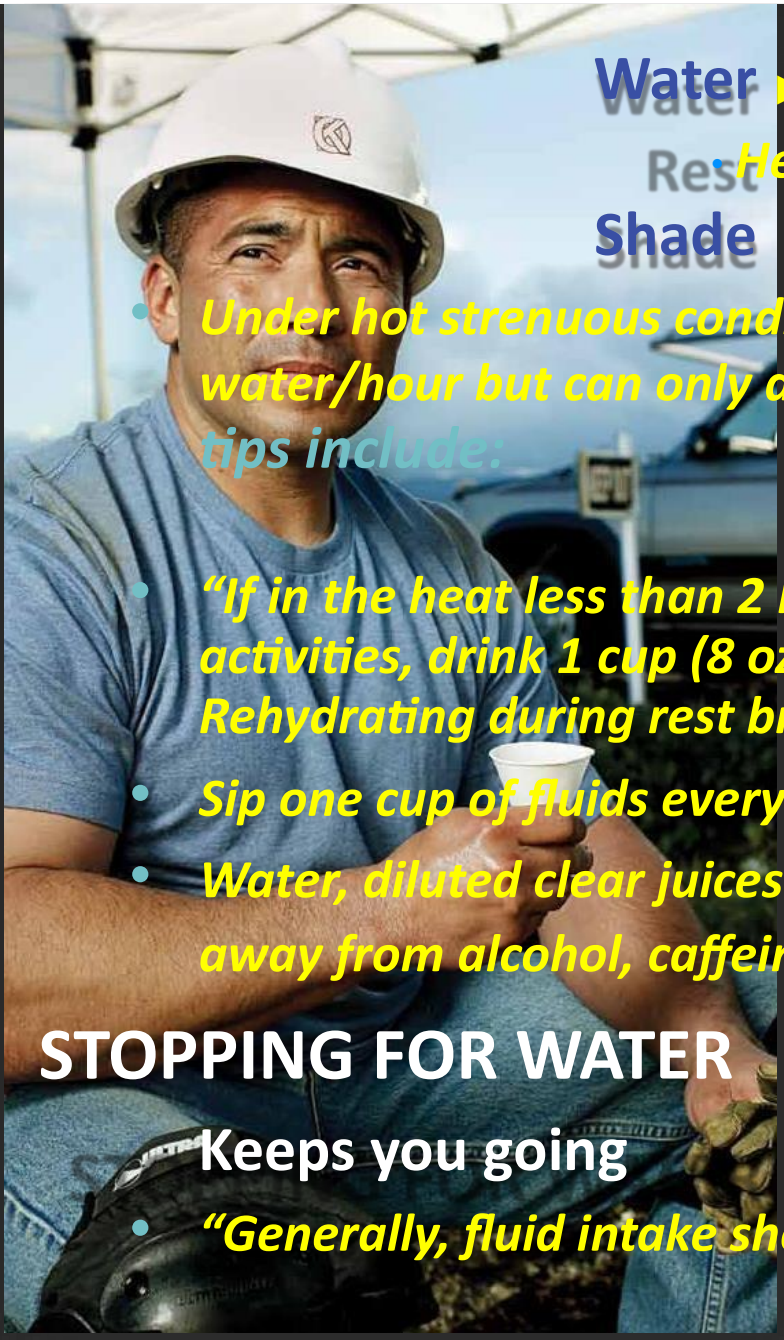
- Successive heat exposures of at least one hour per day.
- Initially, 20% exposure for the first day, followed by 20% per day increase in exposure over the next four days.



Re-Acclimating

- **After long absences**
  - 50% exposure on day back
  - 20% per day increase for the next 2 days
  - Final 10% on the 3rd day





Proper hydration

Water ►Is essential in heat illness prevention **Rest**

- *Helps the muscles work efficiently and is critical to a worker's heart health*
- *Under hot strenuous conditions, a worker can lose 2 quarts of water/hour but can only absorb 1.5 quarts of water/hour* **Shade**

Hydration tips include:

►Starting the day well hydrated

- *"If in the heat less than 2 hours and involved in moderate work activities, drink 1 cup (8 oz.) of water every 15 to 20 minutes."*
- *Rehydrating during rest breaks*
- *Sip one cup of fluids every 15 minutes and increase intake as necessary*
- *Water, diluted clear juices and electrolytic solutions work best (stay away from alcohol, caffeine, and stimulants)*

STOPPING FOR WATER

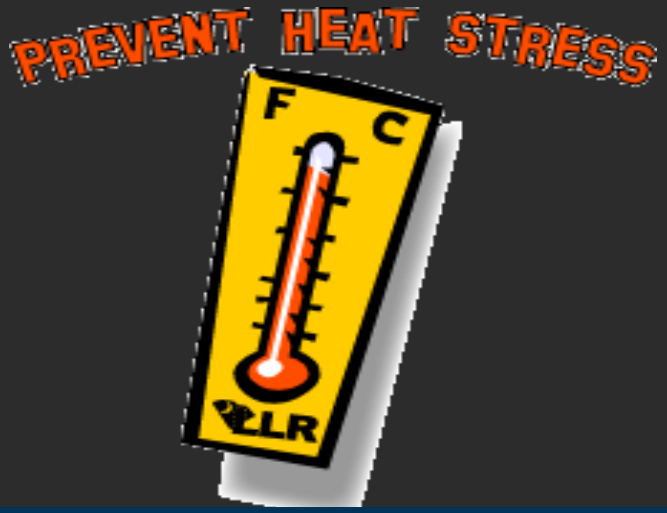
- *Thirst is a lagging and unreliable indicator of dehydration, so drink even if not thirsty*

Keeps you going

- *"Generally, fluid intake should not exceed 6 cups per hour."*

Take time to rest in a shaded or cooler area

- Adjusted air temperature
- Work rate
- Humidity



American Industrial Hygiene Association (AIHA) Recommendations

TA ADJ	*NORMAL WORK ENSEMBLE*	*IMPERMEABLE ENSEMBLE*
90°F or above	*After each 45 minutes of work*	*After each 15 minutes of work*
87.5°-90°F	*After each 60 minutes of work*	*After each 30 minutes of work*
82.5°-87.5°F	*After each 90 minutes of work*	*After each 60 minutes of work*
77.5°-82.5°F	*After each 120 minutes of work*	*After each 90 minutes of work*
72.5°-77.5°F	*After each 150 minutes of work*	*After each 120 minutes of work*

Calculate adjusted air temperature (ta adj) by this equation: ta adj °F = ta °F + (13 x % sunshine)
A normal work ensemble = cotton coveralls or other cotton clothing with long sleeves and pants

Provide Water

- Adequate supply of potable water
- 2 - 4 cups per hour per worker
- 50º - 60º F
- Marked container (e.g., “Drinking Water”)
- Closed container
- No shared container (e.g., cup, dipper, bottle)

The Effect of Fluid Loss On Performance

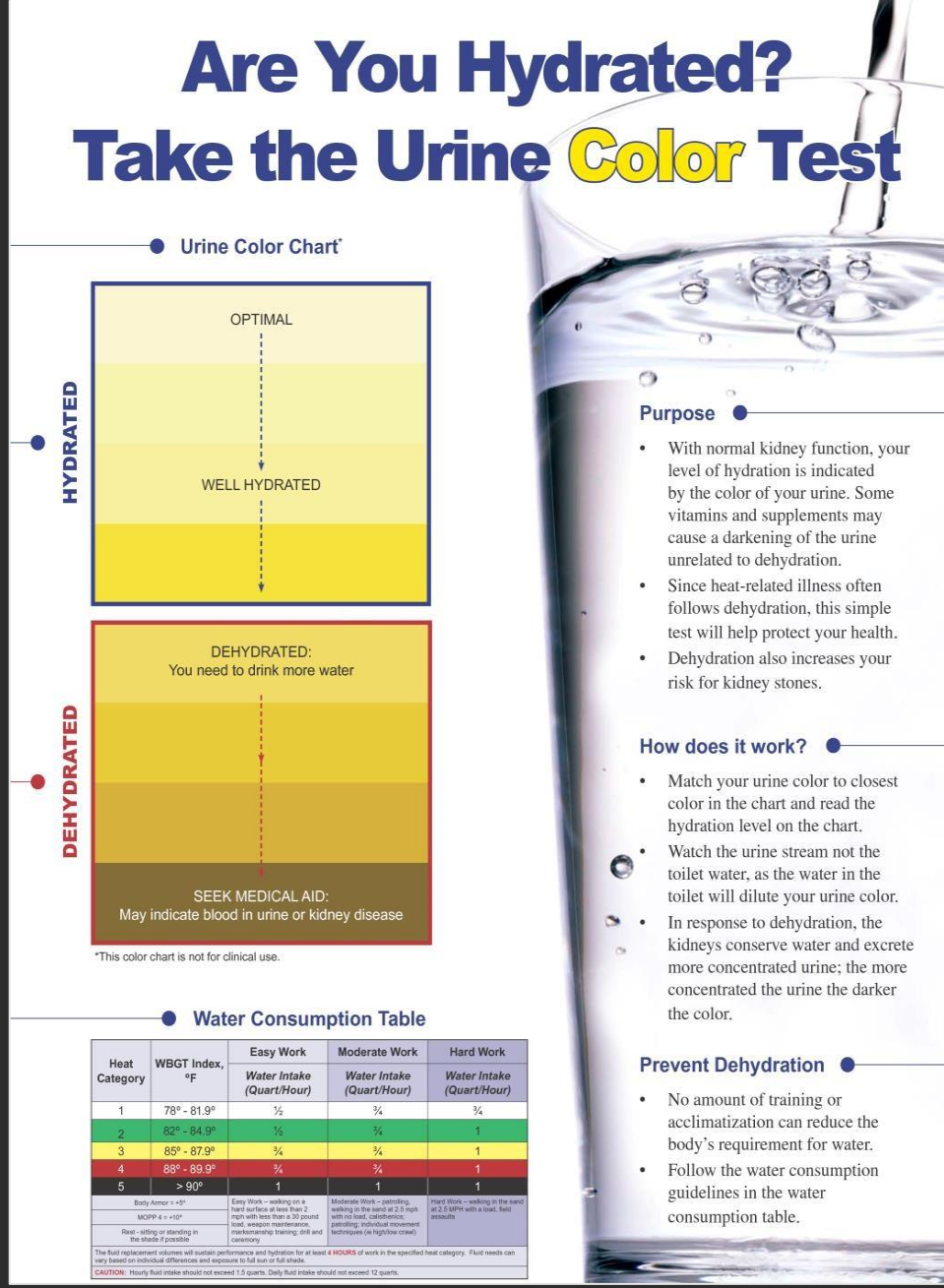
- 2% - Impaired Performance
- 4% - Capacity for muscular work declines
- 6% - Heat Exhaustion
- 8% - Hallucination
- 10% - Circulatory collapse and heat stroke

Electrolytes

- “During prolonged sweating lasting several hours, drink sports drinks containing balanced electrolytes.”
- Without electrolytes, the body overheats during intense use, the harder it is worked the quicker it overheats.

Physiological Monitoring

- Heart rate
  - ***Measure pulse early in rest period***
  - ***If >110 BPM, shorten work by 1/3***
  - ***If >110 BMP at next rest period, shorten work by 1/3***
- Temperature
  - ***Measure early in rest period***
  - ***If >99.6°F, shorten work by 1/3***
  - ***If >99.6°F at next rest period, shorten work by 1/3***
  - ***Never permit a worker to wear a semi-permeable PPE if >100.6°F***
- Body water loss
  - ***Measure at start and end of workday***
  - ***Shouldn't exceed 1.5% total weight***
- P-O-P-C (pee often – pee clearly)



Heat Category	WBGT Index, °F	Easy Work	Moderate Work	Hard Work
		Water Intake (Quart/Hour)	*Water Intake (Quart/Hour)*	*Water Intake (Quart/Hour)*
1	78° - 81.9°	½	¾	¾
2	82° - 84.9°	½	¾	1
3	85° - 87.9°	¾	¾	1
4	88° - 89.9°	¾	¾	1
5	> 90°	1	1	1
Body Armor = +5°		Easy Work – walking on a hard surface at less than 2 mph with less than a 30 pound load, weapon maintenance, marksmanship training; drill and ceremony	Moderate Work – patrolling, walking in the sand at 2.5 mph with no load, calisthenics; patrolling; individual movement techniques (ie high/low crawl)	Hard Work – walking in the sand at 2.5 MPH with a load, field assaults
MOPP 4 = +10°				
Rest - sitting or standing in the shade if possible				

The fluid replacement volumes will sustain performance and hydration for at least 4 HOURS of work in the specified heat category. Fluid needs can vary based on individual differences and exposure to full sun or full shade.

CAUTION: Hourly fluid intake should not exceed 1.5 quarts. Daily fluid intake should not exceed 12 quarts.

Conclusion

- ***Search the OSHA-NIOSH Heat Safety Tool app on a daily basis and as needed thereafter (especially during peak heat days and at the beginning of your work shift).***
- ***Follow any indicated precautions from the app. NOTE: you may enter the zip code or city of your field site for planning purposes. • Follow any indicated first aid measures***
- ***Report and document any heat related injury or illness and seek treatment promptly, as per RER's Incidents/Accidents Reporting Guidelines.***
- ***Report hazardous conditions and dangers to your immediate supervisor.***

Any Questions