



**• DEHYDRATION •**

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**Heat Stress  
PREVENTION**

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**Are You Prepared?**

**KENT**

*Precision Foods Group*

# OSHA

- State Regulations
- Federal Regulations
- Recommendations
- General Duty Clause

## OSHA® QUICK CARD

### Protecting Workers from Heat Stress

#### Heat Illness

Exposure to heat can cause illness and death. The most serious heat illness is heat stroke. Other heat illnesses, such as heat exhaustion, heat cramps and heat rash, should also be avoided.

There are precautions your employer should take any time temperatures are high and the job involves physical work.

#### Risk Factors for Heat Illness

- High temperature and humidity, direct sun exposure, no breeze or wind
- Low liquid intake
- Heavy physical labor
- Waterproof clothing
- No recent exposure to hot workplaces

#### Symptoms of Heat Exhaustion

- Headache, dizziness, or fainting
- Weakness and wet skin
- Irritability or confusion
- Thirst, nausea, or vomiting

#### Symptoms of Heat Stroke

- May be confused, unable to think clearly, pass out, collapse, or have seizures (fits)
- May stop sweating

#### To Prevent Heat Illness, Your Employer Should

- Establish a complete heat illness prevention program.
- Provide training about the hazards leading to heat stress and how to prevent them.
- Provide a lot of cool water to workers close to the work area. At least one pint of water per hour is needed.



For more information:  
**OSHA**® Occupational Safety and Health Administration  
www.osha.gov (800) 321-OSHA (6742)

## OSHA® QUICK CARD

- Modify work schedules and arrange frequent rest periods with water breaks in shaded or air-conditioned areas.
- Gradually increase workloads and allow more frequent breaks for workers new to the heat or those that have been away from work to adapt to working in the heat (acclimatization).
- Routinely check workers who are at risk of heat stress due to protective clothing and high temperature.
- Consider protective clothing that provides cooling.



#### How You Can Protect Yourself and Others

- Know signs/symptoms of heat illnesses; monitor yourself; use a buddy system.
- Block out direct sun and other heat sources.
- Drink plenty of fluids. Drink often and BEFORE you are thirsty. Drink water every 15 minutes.
- Avoid beverages containing alcohol or caffeine.
- Wear lightweight, light colored, loose-fitting clothes.



#### What to Do When a Worker is Ill from the Heat

- Call a supervisor for help. If the supervisor is not available, call 911.
- Have someone stay with the worker until help arrives.
- Move the worker to a cooler/shaded area.
- Remove outer clothing.
- Fan and mist the worker with water; apply ice (ice bags or ice towels).
- Provide cool drinking water, if able to drink.

**IF THE WORKER IS NOT ALERT or seems confused, this may be a heat stroke. CALL 911 IMMEDIATELY and apply ice as soon as possible.**

If you have any questions or concerns, call OSHA at 1-800-321-OSHA (6742).



For more information:  
**OSHA**® Occupational Safety and Health Administration  
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# OSHA RECOMMENDATIONS

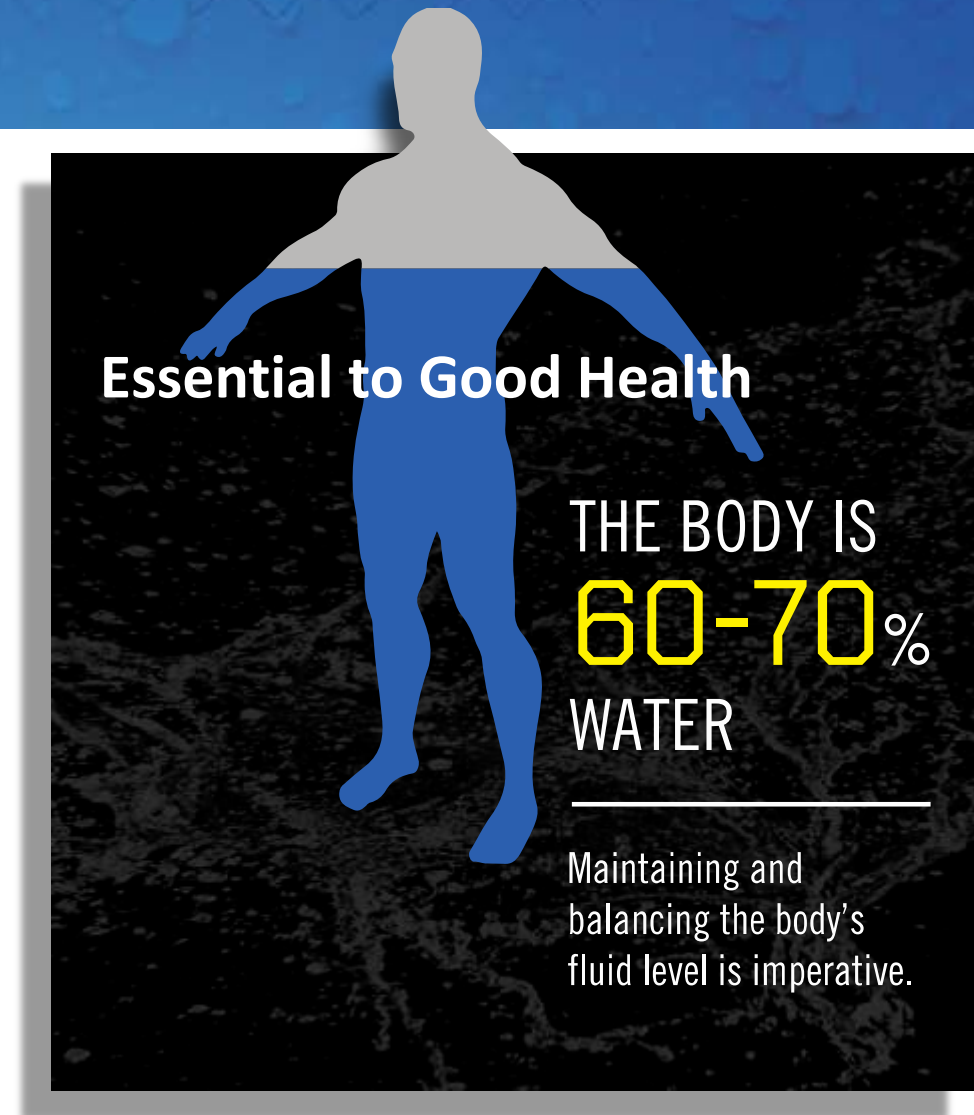
- |                               |  |
|-------------------------------|--|
| • <b>Engineering Controls</b> | Air conditioning and ventilation             |
| • <b>Work Practices</b>       | Work/rest cycles and drinking water often    |
| • <b>Training / Info</b>      | Provide to aid in proper hydration practices |
| • <b>Symptoms</b>             | Know the warning signs of dehydration        |





# H<sub>2</sub>O & YOU

- Over 60% of the body makeup
- Flushes toxins from organs
- Carries nutrients to muscle cells
- Aides in regulating body temperature
- Lost from the body through:
  - Respiration (breathing)
  - Perspiration (sweating)
  - Urination
  - Bowel Movements



# HYDRATION BY THE NUMBERS

*75% of the US population may suffer from chronic dehydration*

- Average man = 15.5 cups (3.7 L) water
- Average woman = 11.5 cups (2.7 L) water

These recommendations cover fluids from water, other beverages and food. About 20 percent of daily fluid intake usually comes from food and the rest from drinks.

<https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/water/art-20044256>

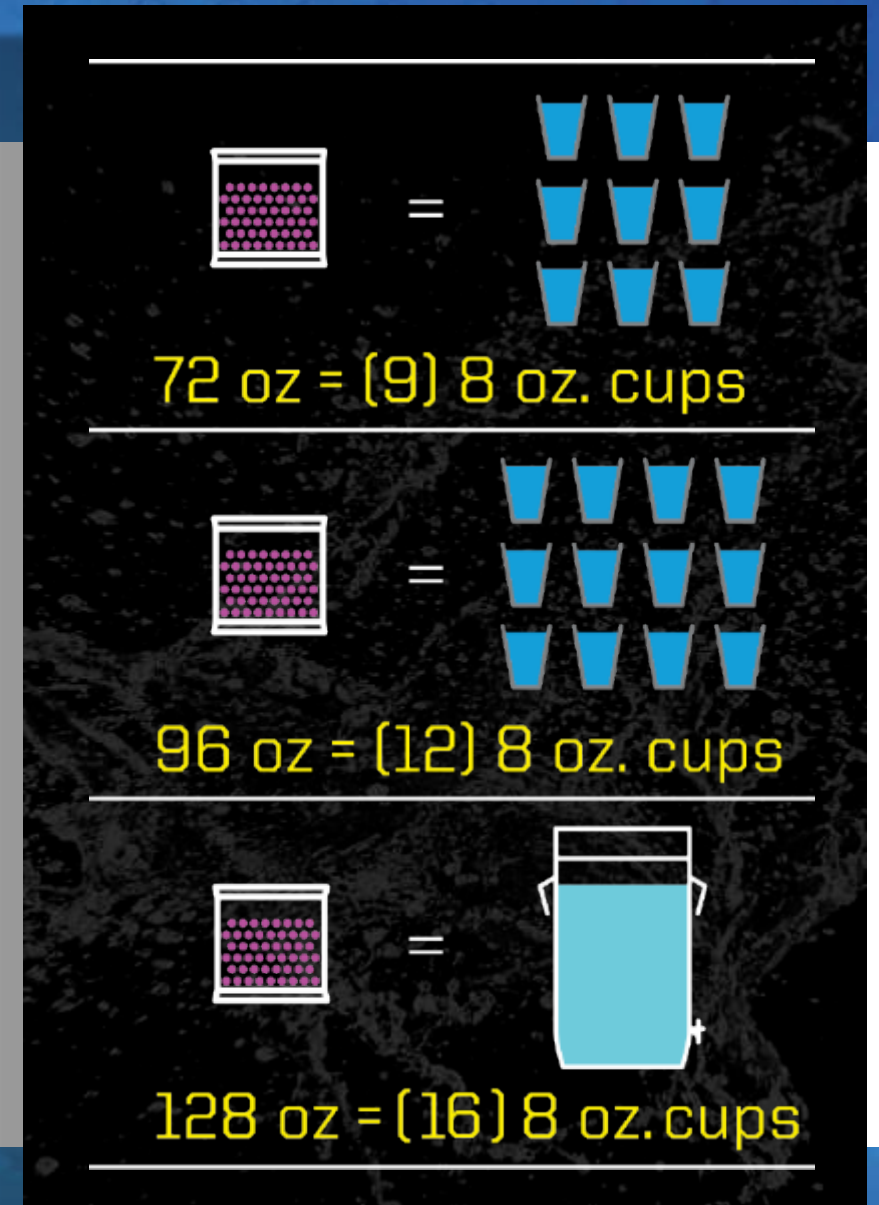
- OSHA recommends drinking 1 cup every 15-20 min when hazard is present

[https://www.osha.gov/dts/osta/otm/otm\\_iii/otm\\_iii\\_4.html](https://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_4.html)

SOURCES: Mayo Clinic; Water: How much should you drink every day?

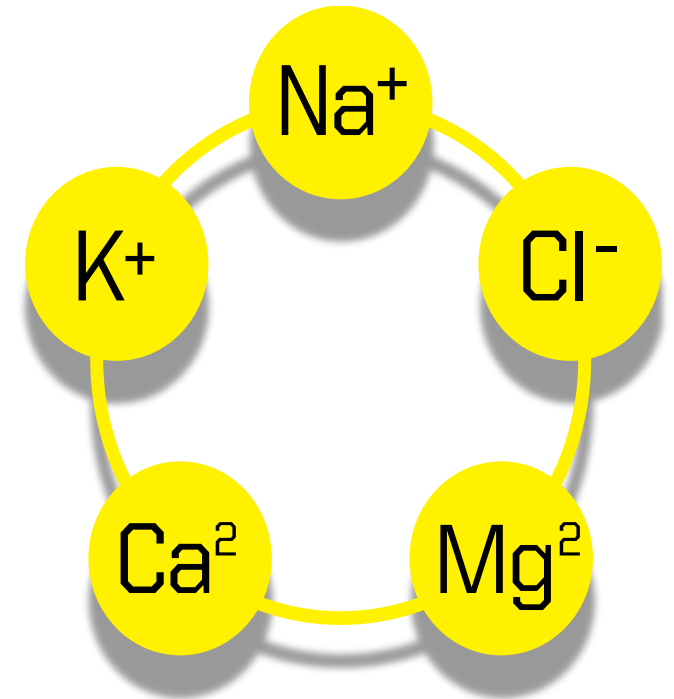
U.S. Department of Labor / Occupational Safety and Health Administration (OSHA)

<https://www.medicaldaily.com/75-americans-may-suffer-chronic-dehydration-according-doctors-247393>



# ELECTROLYTES

- Electrolytes are minerals essential for proper muscle cell function
- Sodium, Potassium, Calcium, and Magnesium
- Loss of body fluids means ELECTROLYTE LOSS
- Purified water typically DOES NOT contain electrolytes
- The body does not produce electrolytes - you must replenish them
- Replenishment of electrolytes is just as important as the water you drink during a work regimen



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# HOW YOU BECOME DEHYDRATED

1

Environment

2

Physical activity

3

Health conditions

4

Diet

## Common Symptoms of Dehydration

- Dry skin
- Headache
- Constipation
- Muscle cramps
- Dry, sticky mouth
- Tiredness & fatigue
- Less frequent urination
- Dizziness or lightheadedness
- **Dark YELLOW Urine** (Pale Yellow indicates proper hydration levels)



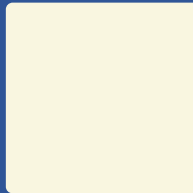
# DEHYDRATION

## HYDRATION LEVEL CHART:

USE THE COLOR CHART TO IDENTIFY HYDRATION LEVEL.

### TARGET LEVEL

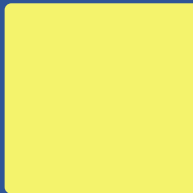
Maintain level



**PROPERLY HYDRATED** — If urine resembles or matches these colors.

### DEHYDRATED

Needs improvement



**DEHYDRATED** — If urine resembles or matches these colors more fluids should be consumed.

### SEVERELY DEHYDRATED

Immediate attention



**SEVERELY DEHYDRATED** — If urine matches these colors, **SERIOUS DEHYDRATION** has occurred. Contact a physician.





# THE SYMPTOMS



## FLUID LOSS CHART:

FLUID LOSS	RESULT
2%	Impaired performance
4%	Muscular function and capacity declines
6%	Heat exhaustion
8%	Hallucination
10%	Circulatory collapse and heat stroke

Source: <https://www.ncbi.nlm.nih.gov>



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# DANGERS OF ON THE JOB DEHYDRATION

- 1. PHYSICAL ABILITY - Dehydration has a significant impact**
  - A 2-3% loss of the body's water volume can result in a 20% decrease in energy levels
- 2. CONCENTRATION & MEMORY - Dehydration causes this to suffer**
  - Mental focus, information retention and hand-eye coordination are impaired
- 3. HEADACHES & FATIGUE – Caused by even mild dehydration**
  - Causes loss of productivity at work and at home
- 4. REACTION TIME – Impacted by dehydration. Increases chances of workplace accidents**
  - Reaction times are slowed or impaired at 3% dehydration levels. As much as an individual with a 0.08% BAC (blood alcohol level)



# ATHLETE VS. INDUSTRIAL ATHLETE

## Everyday Hydration Challenges

- Diet / Nutrition
- Age
- Diuretics
- Alcohol
- Medical Preconditions



# FACTORS THAT AFFECT HYDRATION



## 1. Diet and Nutrition

Soda, energy drinks, and salty foods contribute to dehydration



## 2. Alcohol

Alcohol is a diuretic



## 3. Age

As you get older, your body starts having a harder time retaining water



## 4. Altitude

- Urine output increases
- Breathing increases = vapor loss



## 5. Medication

A range of medications (antihistamines, diuretics to blood pressure meds) can lead to dehydration



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# PREEXISTING MEDICAL CONDITIONS

**Avg. Industrial Worker - 40 years old:**

- **Prediabetes – 34.3%**
- **Diabetes - 11.3%**
- **Hypertension - 33.3%**  
(30% of US population have prehypertension)

*Obesity – 1/3 of US Adults contributes to both of the above*

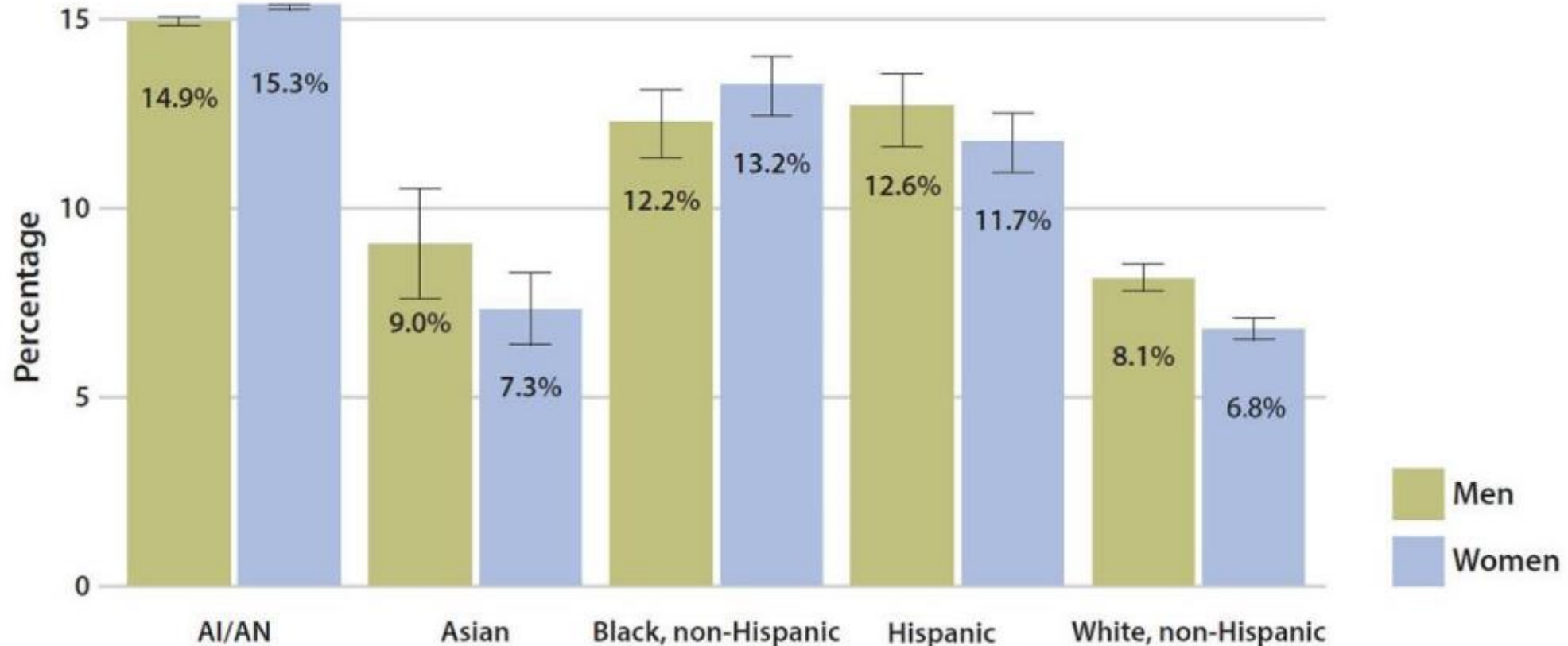
\*From CDC Statistics – [www.cdc.gov](http://www.cdc.gov)



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# AMERICAN DIABETES ASSOCIATION

Estimated age-adjusted prevalence of diagnosed diabetes by race/ethnicity and sex among adults aged ≥18 years, United States, 2013–2015



Estimated age-adjusted prevalence of diagnosed diabetes by race/ethnicity and sex among adults aged ≥18 years, United States, 2013–2015  
[www.cdc.gov/media/releases/2017/p0718-diabetes-report.html](http://www.cdc.gov/media/releases/2017/p0718-diabetes-report.html)



**Table 1. Estimated number and percentage of diagnosed and undiagnosed diabetes among adults aged ≥18 years, United States, 2015**

Characteristic	Diagnosed diabetes No. in millions (95% CI) <sup>a</sup>	Undiagnosed diabetes No. in millions (95% CI) <sup>a</sup>	Total diabetes No. in millions (95% CI) <sup>a</sup>
<b>Total</b>	<b>23.0 (21.1–25.1)</b>	<b>7.2 (6.0–8.6)</b>	<b>30.2 (27.9–32.7)</b>
<b>Age in years</b>			
18–44	3.0 (2.6–3.6)	1.6 (1.1–2.3)	4.6 (3.8–5.5)
45–64	10.7 (9.3–12.2)	3.6 (2.8–4.6)	14.3 (12.7–16.1)
≥65	9.9 (9.0–11.0)	2.1 (1.4–3.0)	12.0 (10.7–13.4)
<b>Sex</b>			
Women	11.7 (10.5–13.1)	3.1 (2.4–4.1)	14.9 (13.5–16.4)
Men	11.3 (10.2–12.4)	4.0 (3.0–5.5)	15.3 (13.8–17.0)
	Percentage (95% CI) <sup>b</sup>	Percentage (95% CI) <sup>b</sup>	Percentage (95% CI) <sup>b</sup>
<b>Total</b>	<b>9.3 (8.5–10.1)</b>	<b>2.9 (2.4–3.5)</b>	<b>12.2 (11.3–13.2)</b>
<b>Age in years</b>			
18–44	2.6 (2.2–3.1)	1.3 (0.9–2.0)	4.0 (3.3–4.8)
45–64	12.7 (11.1–14.5)	4.3 (3.3–5.5)	17.0 (15.1–19.1)
≥65	20.8 (18.8–23.0)	4.4 (3.1–6.3)	25.2 (22.5–28.1)
<b>Sex</b>			
Women	9.2 (8.2–10.3)	2.5 (1.9–3.2)	11.7 (10.6–12.9)
Men	9.4 (8.5–10.3)	3.4 (2.5–4.6)	12.7 (11.5–14.1)

CI = confidence interval.

<sup>a</sup> Numbers for subgroups may not add up to the total because of rounding.

<sup>b</sup> Data are crude, not age-adjusted.

Data source: 2011–2014 National Health and Nutrition Examination Survey and 2015 U.S. Census Bureau data.

<https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>

# A SNAPSHOT: BLOOD PRESSURE IN THE U.S.

## Make Control Your Goal

High blood pressure is a major risk factor for heart disease and stroke, the first and fourth leading causes of death for all Americans.



**American  
Heart  
Association®**

### ◀ HIGH BLOOD PRESSURE BASICS ▶



High blood pressure  
contributes to

**~1,000  
DEATHS/DAY**



When your blood pressure is **high**:

You are **4x** more likely  
to die from a stroke



You are **3x** more likely  
to die from heart disease



of people  
who have a  
first heart  
attack...



of people who  
have a first  
stroke...



of people with  
chronic heart  
failure...

**HAVE  
HIGH  
BLOOD  
PRESSURE**

Annual estimated costs associated with high blood pressure:



**\$51 BILLION**

**\$47.5 BILLION**  
in direct medical expenses



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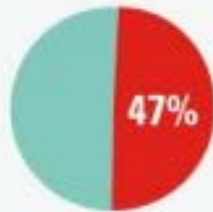
[www.cdc.gov/bloodpressure/facts.htm](http://www.cdc.gov/bloodpressure/facts.htm)



# AMERICAN HEART ASSOCIATION



## ◀ BLOOD PRESSURE CONTROL ▶



**ONLY ABOUT HALF**

of people with high blood pressure  
have their condition under control

Reducing average population systolic blood pressure by  
only 12–13 mmHg could reduce:

**37%**



**Stroke**

**21%**



**Coronary  
heart  
disease**

**25%**



**Deaths from  
cardiovascular  
disease**

**13%**



**Deaths from  
all causes**



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[www.cdc.gov/bloodpressure/facts.htm](http://www.cdc.gov/bloodpressure/facts.htm)

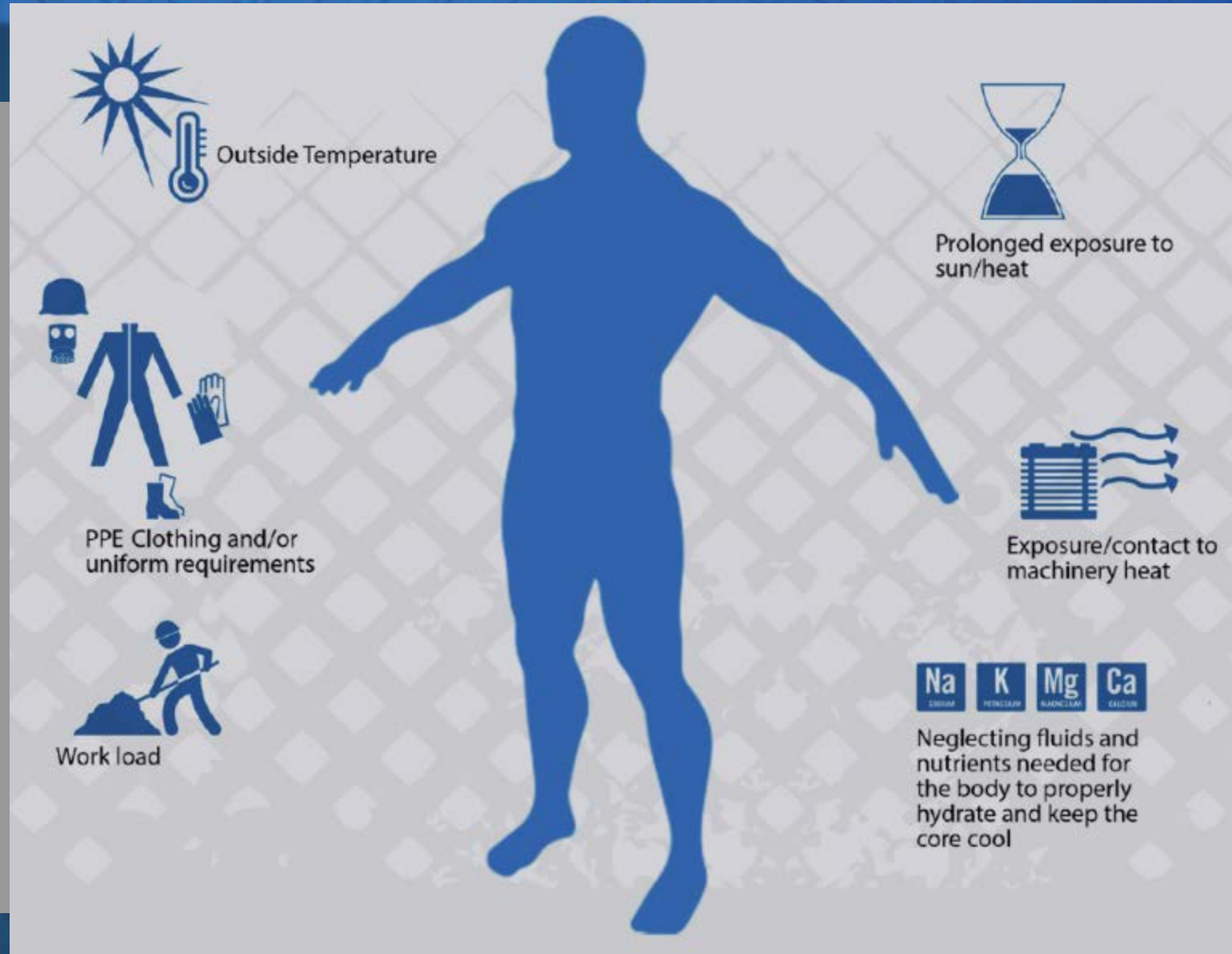
# SAFE WORKERS ARE PRODUCTIVE WORKERS



- Dehydration lowers productivity
- 2% dehydrated = 20% less productive
- Proper hydration plan & action
- Dehydration related incidents are 100% preventable

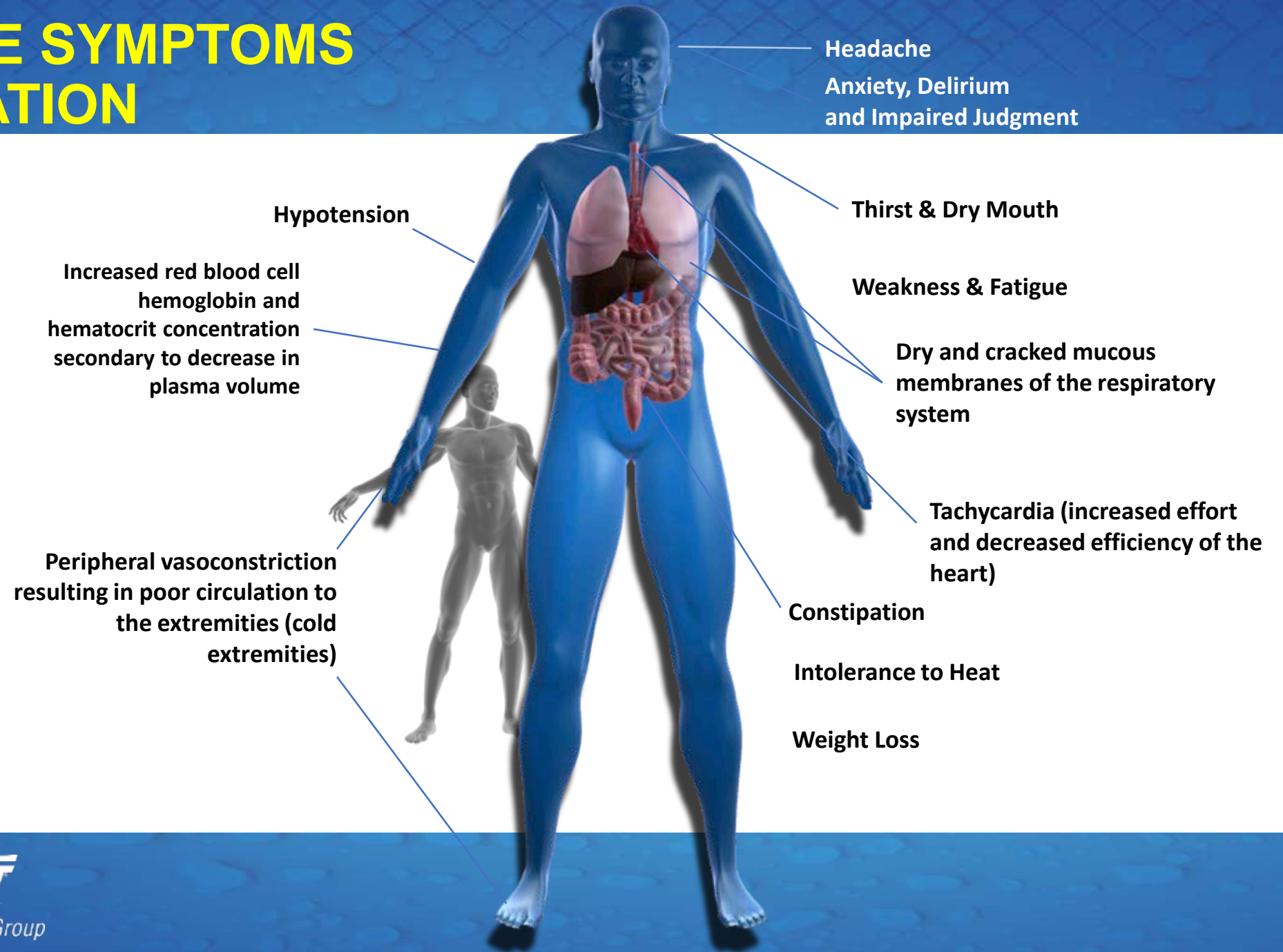


## FACTORS THAT INCREASE BODY HEAT





# OBSERVABLE SYMPTOMS OF DEHYDRATION



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# HEAT INDEX UTILIZATION

## National Weather Service HEAT INDEX CHART



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

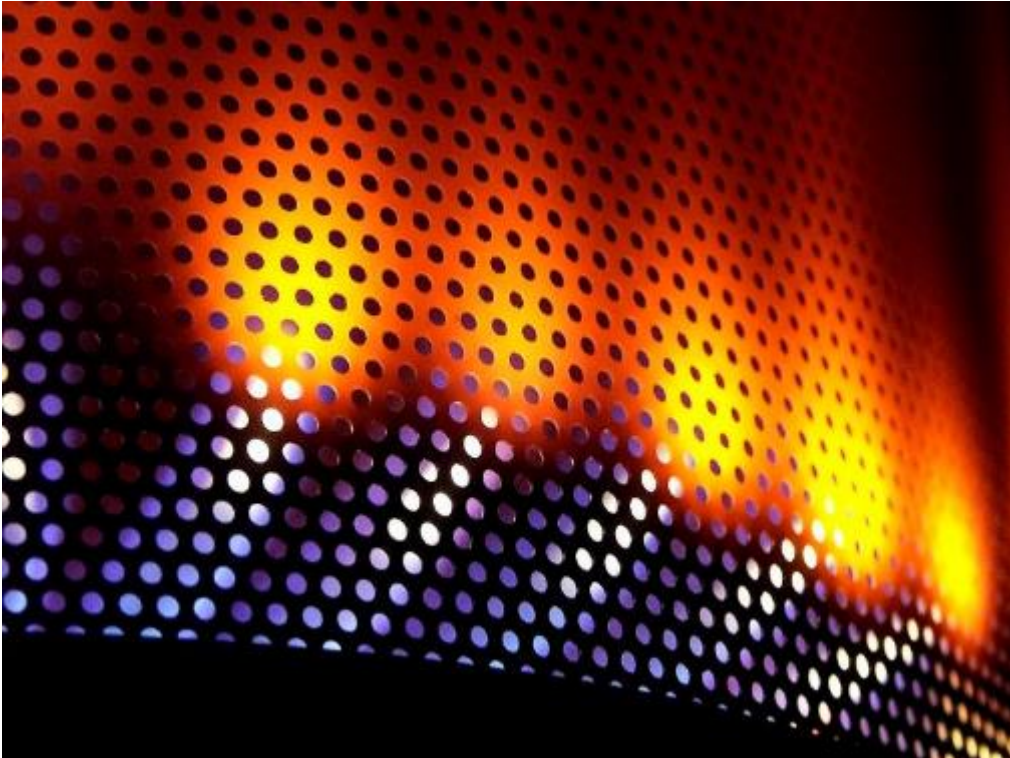
**Likelihood of Heat Disorders with Prolonged Exposure and/or Strenuous Activity**

  Caution
   Extreme Caution
   Danger
   Extreme Danger



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# TEMPERATURE THRESHOLDS



## HEAT INDEX:

### APPARENT DANGERS POSED BY HEAT STRESS

<b>80° to 90° F</b> Acclimate Employees and Monitor for Heat Related Issues		
<b>90° to 100° F</b>	<b>101° to 129° F</b>	<b>130° F +</b>
Possible sunstroke, heat cramps and heat exhaustion with prolonged exposure and physical activity.	Probable sunstroke, heat cramps and heat exhaustion and possible heat stroke with prolonged exposure and physical activity.	Imminent heat stroke or sunstroke.



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# SYMPTOMS & RESPONSES



## HEAT ILLNESSES

Symptoms and responses to unprotected heat exposure.

**Sunburn:**

Redness & painful skin; swelling of skin, blisters, fever and headaches are typical in severe cases.

Ointments for mild cases. DO NOT break blisters. If they do break, apply dry, sterile dressing. For severe cases, consult a physician.

**Heat Cramps:**

Painful muscle spasms, usually in the legs and abdomen. Possible heavy sweating.

Apply firm pressure on cramping muscles, then gently massage to relieve muscle spasm. Give sips of Sqwincher every 15 minutes.

**Heat Exhaustion:**

Heavy sweating, weakness, pale and clammy skin, nausea, low blood pressure, rapid pulse, fainting and possible vomiting.

Stop exertion, move to a cool spot and drink Sqwincher every 15 minutes for an hour. If victim vomits, seek immediate medical attention.

**Exertional Heat Illness:**

Stuporous appearance, tired, nausea with possible vomiting. Unsteady gait, heavy perspiration, dehydrated with high body temperature (up to 104°F), often accompanied by headache, rapid respiration and pulse.

Cease exertion and promptly cool body exterior. Initiate replacement of fluids – water first, then Sqwincher. If victim cannot retain fluids transport to hospital.

**Heat Stroke:**

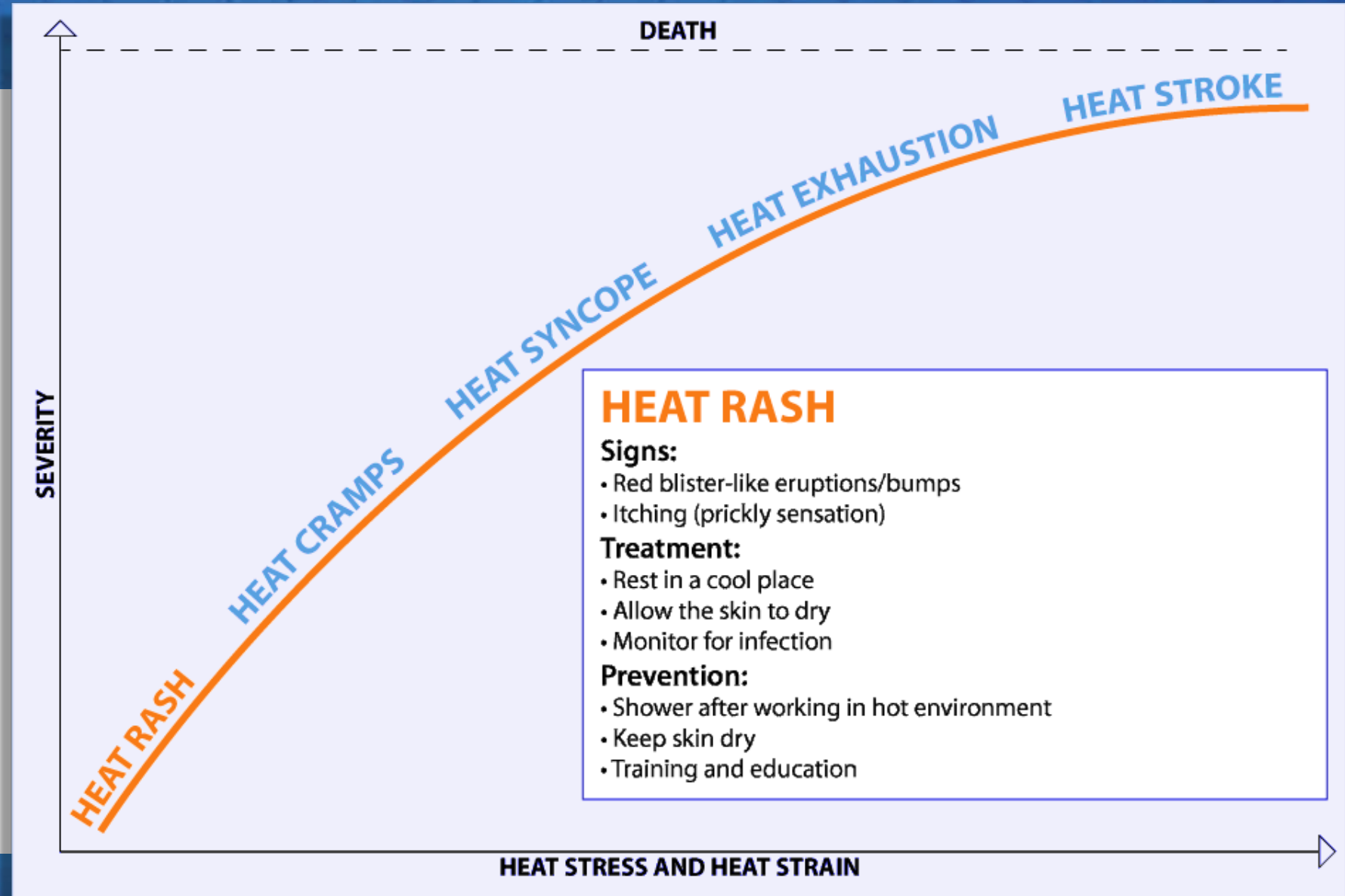
High body temperature (105°F or higher), hot, red and dry skin, strong rapid pulse, possible unconsciousness.

Heat stroke is a severe medical problem. Move victim to cooler area and reduce body temperature with cold bath or sponging. Use fans and air conditioners. Get victim to hospital – **DELAY CAN BE FATAL. DO NOT GIVE FLUIDS!**



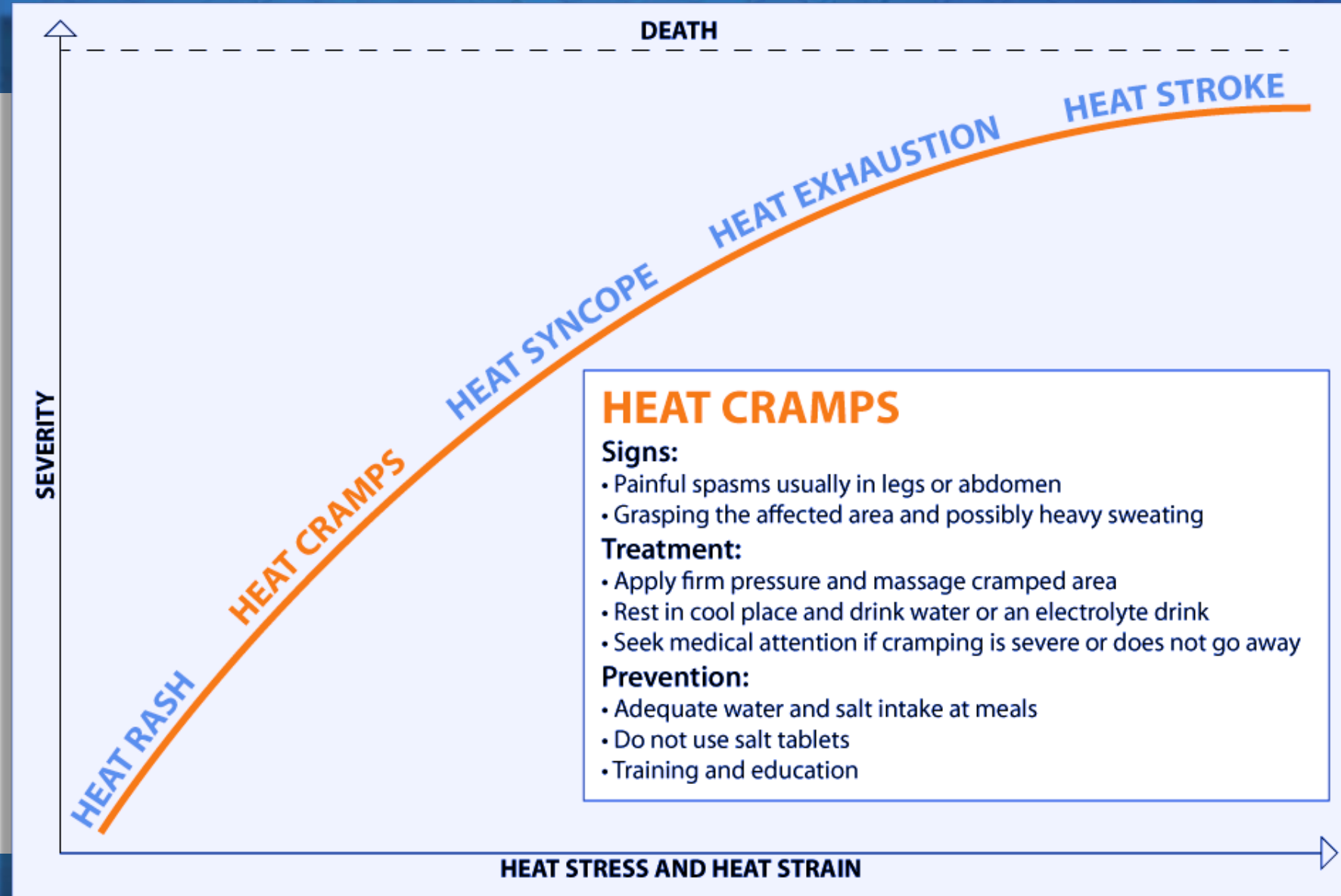
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# HEAT RASH



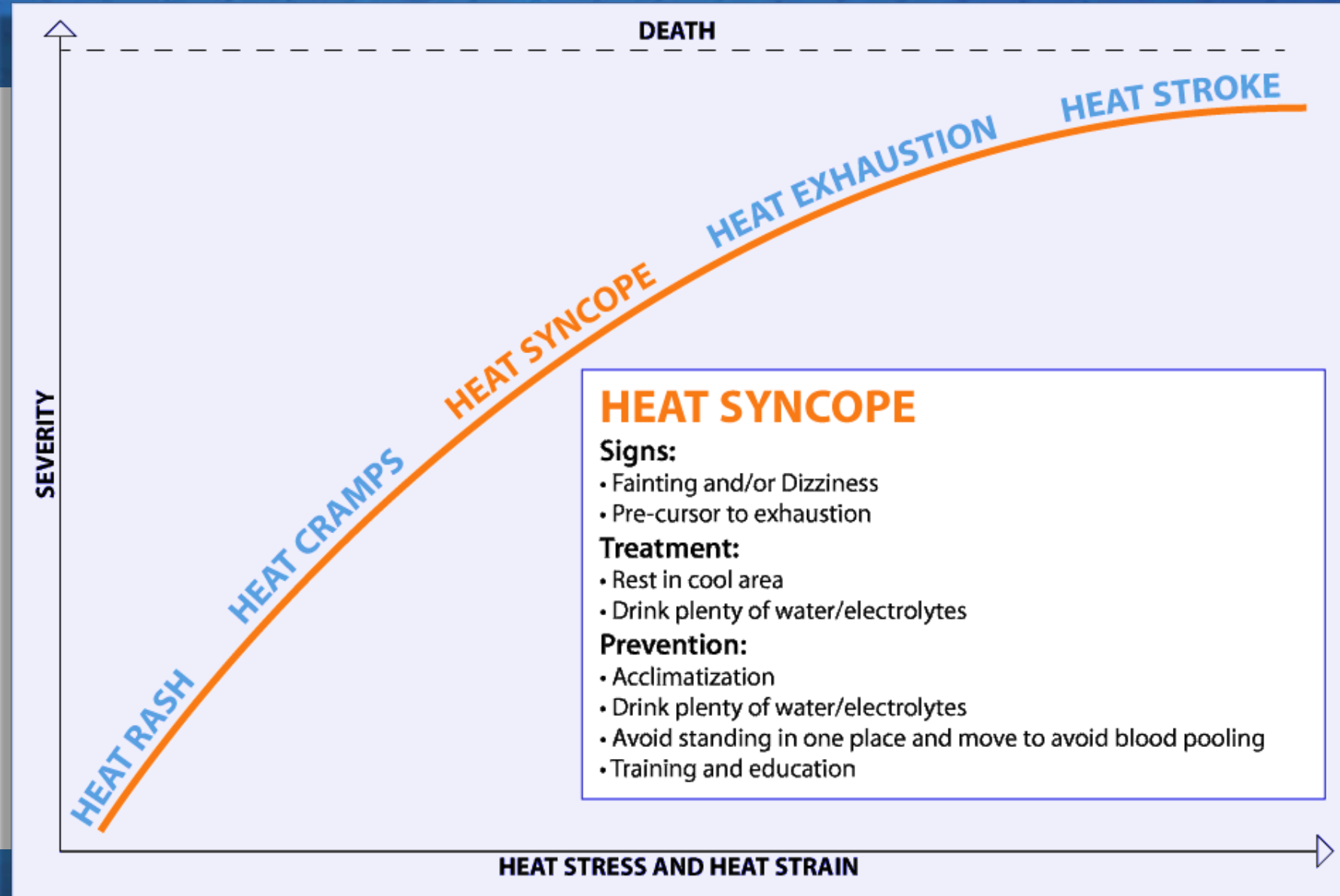


# HEAT CRAMPS



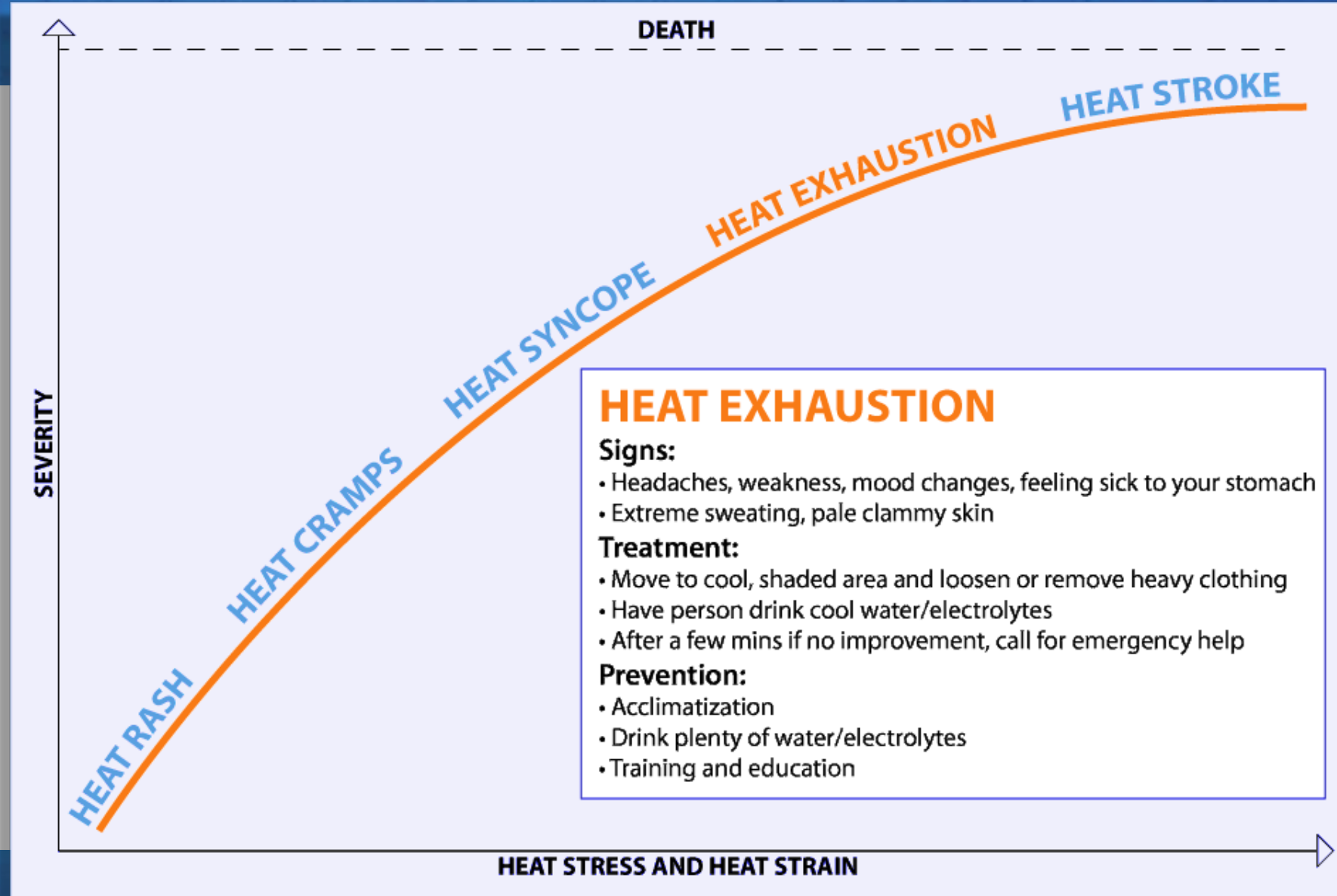
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# HEAT SYNCOPE



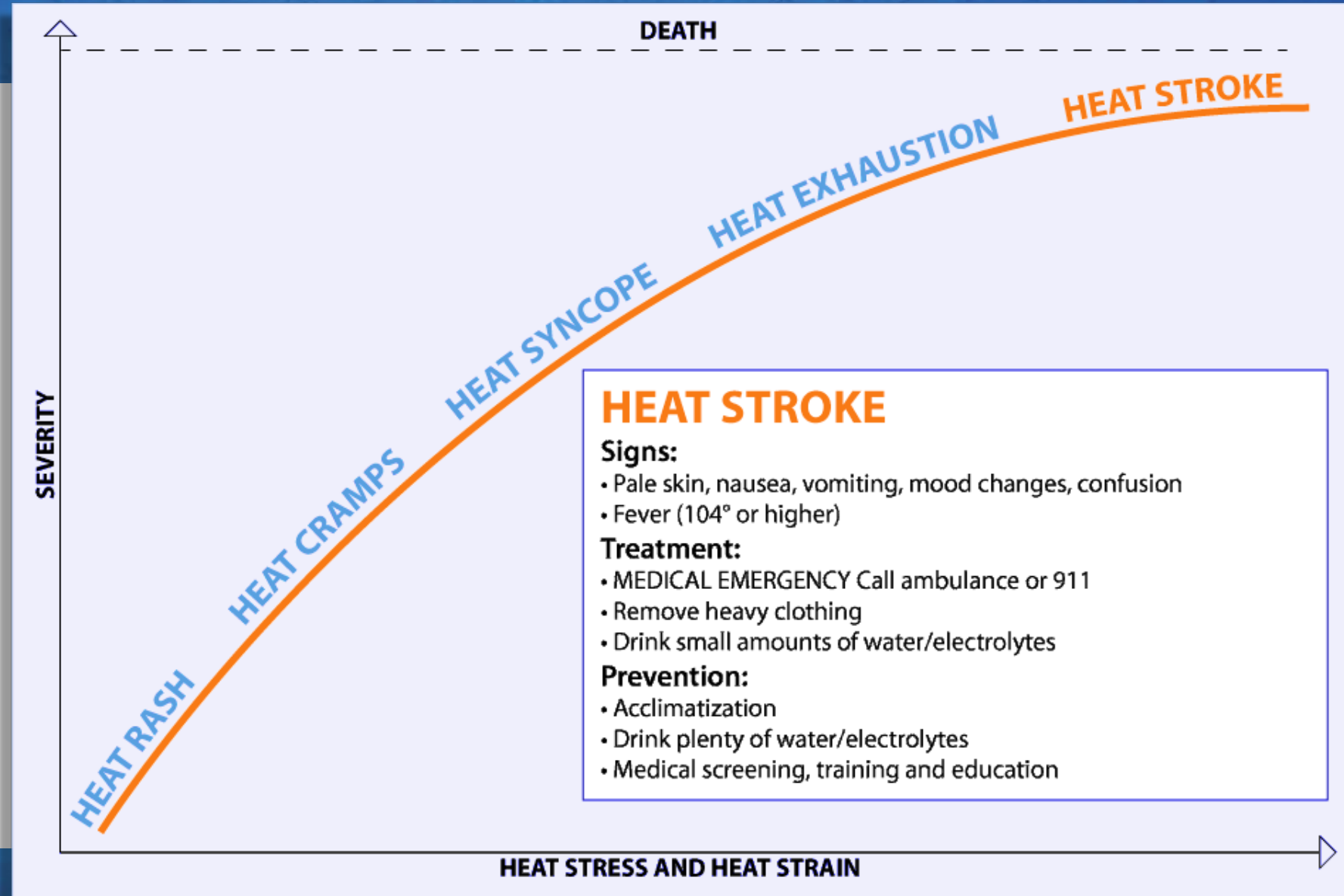
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# HEAT EXHAUSTION



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# HEAT STROKE



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# ACCESSING THE WORKPLACE



# HOW TO START

## WORK OFF OF OSHA RECOMMENDATIONS

- **Engineering Controls** - Air temperature -ventilation
  - Air Temperature
  - Relative Humidity
  - Heat Index
- **Work Practices** - Work/rest cycles and drinking water often
  - Hydration stations
  - Water Sources
  - Dispensing Methods
- **Training** – Provide employee training on proper hydration practices
  - Teach employees to notice symptoms (identify personal symptoms and watch out for co-workers)
  - Set workplace reminders (posters, charts, stickers)



# WORKPLACE ASSESSMENTS

- **Determine Jobsite Issues or Concerns (Cost/Hygiene/Productivity/Recent Incidents)**
- **Evaluate Company Employee Base**
  - Total workforce
  - Weekly work schedules
  - Where and How They are Exposed to Critical Heat & Elements (Temps, Humidity, Equipment, Reflective Temps, Bulky PPE)
  - Age and Predisposition to Diabetes, Hypertension, etc.
  - Are the supervisors and employees trained on hydration safety procedures
- **Access to adequate & proper hydration**
  - Sources
  - Types (water, electrolytes, packaging, etc.)
  - Other items that are part (coolers, dispensers, etc.)
- **Is there a spend on hydration protection?**
- **Engineering controls in place**
- **Is there an occupational nurse on staff and/or infirmary**
  - Other than 911, is there a RESPONSE PROTOCOL in place if a worker falls victim to a heat related illness





# Q & A

Thank you

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