A GUIDE TO HEAT STRESS MANAGEMENT

Keeping workers safe and productive in hot workplaces

hydration that works®

RS RICHARDS SUPPLY COMPANY

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WHAT IS DEHYDRATION?

What is Dehydration?

Dehydration occurs when you use or lose more fluid than you take in, and your body doesn't have enough water and other fluids to carry out its normal functions. If you don't replace lost fluids, you will get dehydrated. The human body weight is made up of around 60% to 70% fluid. Dehydration causes the body to not perform maximally.

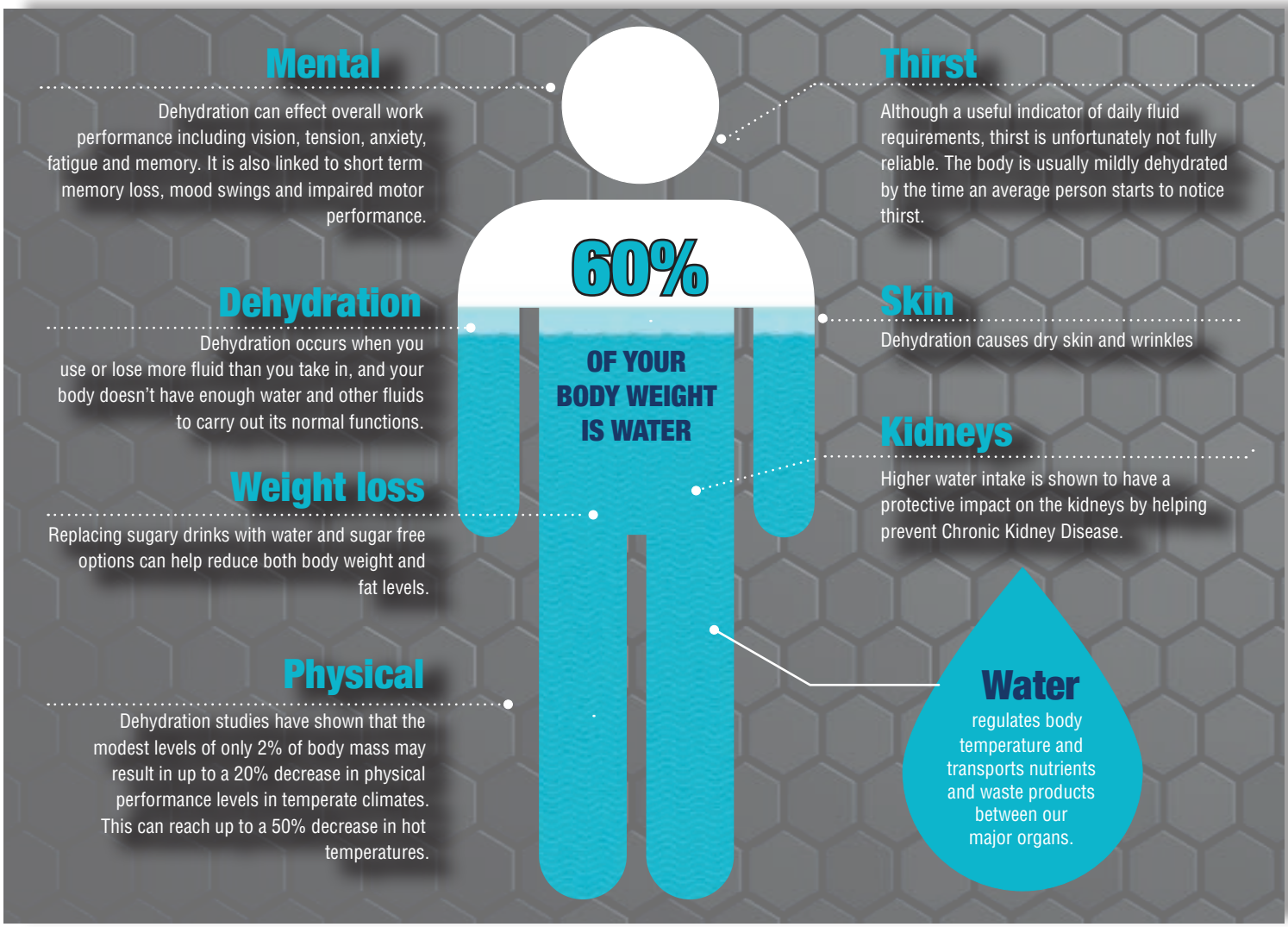
Thirst is an early indicator of dehydration, approximately 1% to 2% loss in body mass, but typically is only effective while at rest. It is important to note that thirst is not a reliable indicator of dehydration, because most people do not sense thirst until they are already dehydrated. Fluid loss from the body through normal daily activity; breathing, perspiration, urination, and defecation, is around 2.5L that needs to be replaced daily. Even in mild dehydration, losses of 2% body mass or more, can cause a decrease in performance of up to 50%.

Electrolytes Explained

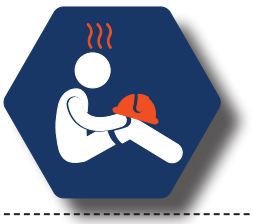
Your body runs on electricity, whether it's the neurons firing in your brain or the pumping of your heart. Electrolytes are chemicals that conduct electricity when dissolved in water. When they interact with other electrolytes and with cells, they keep the body's small electric currents flowing. Not only does this help your body's natural processes run smoothly, but it's also essential for your survival.

We use one word to describe them, but electrolytes are really a family of chemicals. There are different types, each providing a different charge, either positive or negative, to trigger a reaction in the body. In fact, you probably know a few of the most common ones already by their more familiar names:

Na^+	K^+	Cl^-	Mg^+
Sodium	Potassium	Chloride	Magnesium

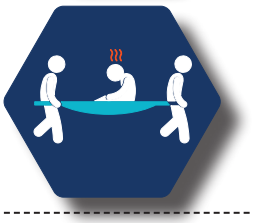


HOW DOES DEHYDRATION AFFECT WORKERS?



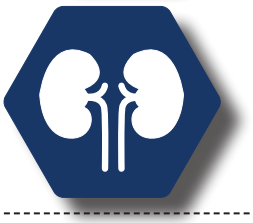
Decline in Productivity

Mild dehydration, loss of 2% body mass or more can cause a decrease in performance of up to 50%. Symptoms create dangerous working environments.



Heat Injury or Illness

Heat injury or illness can take hold if you don't drink enough while you're active and perspiring heavily. Injuries and illnesses range from mild heat cramps to heat exhaustion and life-threatening heatstroke.



Urinary and Kidney Problems

Urinary and kidney issues can arise after repeated or prolonged periods of dehydration. Common issues include urinary tract infections, kidney stones, and kidney failure.

Hypovolemic Shock

One of the most serious and life-threatening complications arising from dehydration is hypovolemic shock, or low blood volume shock. It happens when you lose more than 20% of your blood or fluid supply, which prevents the heart from pumping enough blood to keep the body running. It can lead to organ failure and requires immediate emergency medical attention. Common issues include urinary tract infections, kidney stones, and kidney failure.

Seizure and Loss of Consciousness

Electrolytes like potassium and sodium help transmit electrical signals between cells. If they're unbalanced as a result of dehydration, these messages can become mixed up and lead to seizures and, occasionally, loss of consciousness.

Decreased Cognitive and Motor Skills

Dehydration reduces concentration and reaction time, resulting in decreased cognitive and motor skills. Mild dehydration (a body water loss of 1–2%) - can impair cognitive abilities. Studies show that it only takes 2 percent dehydration to cause impaired performance in tasks that require attention, motor, and memory skills. This kind of impaired performance is risky for anybody, but it poses a particularly severe risk to workers who operate or work near heavy machinery. A 2015 study* out of Loughborough University found that participants committed a significantly higher number of driving errors when they were dehydrated. Shockingly, their performance was just as poor as that of people who complete similar tests while at the legal blood alcohol content limit.

CASE STUDY

* Citation
Phillip Watson...et al., 2015. Mild hypohydration increases the frequency of driver errors during a prolonged, monotonous driving task. Physiology & Behavior

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THE EFFECTS OF HEAT STRESS ON WORKERS.

The below information will assist your business to protect your workforce and manage the risk of working in hot & dangerous environments.

Working in heat can be hazardous and can cause harm to workers. The human body needs to maintain a body temperature of approximately 98.6 degrees Farenheit.

If the body has to work too hard to keep cool or starts to overheat, a worker begins to suffer from heat-related illness. This is a general term to describe a range of progressive heat related conditions including fainting, heat rash, heat cramps, heat exhaustion, and heat stroke.

Some other common effects of working in heat include:

HEAT RASH

Skin can become irritated and cause discomfort when working in heat.

HEAT CRAMPS

Muscles can cramp as a result of heavy sweating without replacing salt and electrolytes.

FAINTING

Can occur when workers stand or rise from a sitting position.

DEHYDRATION

Increased sweating can lead to dehydration if workers aren't drinking enough water.

HEAT EXHAUSTION

Occurs when the body is working too hard to stay cool.

HEAT STROKE

Occurs when the body can no longer cool itself. This can be fatal.

BURNS

Can occur if a worker comes into contact with hot surfaces or tools.

SLIPS

A worker will sweat more in hot conditions which can increase the risk of slips - for example, a worker might slip when using sharp tools if their hands are damp.

REDUCED CONCENTRATION

When working in heat it is more difficult to concentrate and a worker may become confused. This means workers may be more likely to make mistakes, such as forgetting to guard machinery.

INCREASED CHEMICAL UPTAKE INTO THE BODY

Heat can cause the body to absorb chemicals differently and can increase the side effects of some medications.

WHEN SHOULD WE BE HYDRATING?

Hydration 365

Understanding how worker performance and efficiency is affected by environmental conditions is critical to reducing dehydration-related illnesses and accidents. Sqwincher is committed to providing hydration education and hydration solutions that help companies meet the needs of all workers - 365 days a year.

FIRST THING IN THE MORNING | **BEFORE WORK** | **DURING WORK** | **AFTER WORK** | **BEFORE DINNER / BED**

How much water do you need?

Every day you lose water through your breath, perspiration, urine and bowel movements.
For your body to function properly, you must replenish its water supply by consuming beverages and foods that contain water.

So how much fluid does the average, healthy adult living in a temperate climate need?
The Mayo Clinic states that an adequate daily fluid intake is:

About 15.5 cups (3.7 liters) of fluids for men

About 11.5 cups (2.7 liters) of fluids a day for women

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

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.

Keep in mind these levels of intake, on top of electrolytes, will increase as physical exhaustion occurs in a heat exposed worksite.

EST. 1975 HYDRATION SAFETY 365

Source: Water: Mayo Clinic - http://www.mayoclinic.com/healthy-lifestyle/nutrition-and-healthy-eating/indepth/water/art-20044256

AN EFFECTIVE HYDRATION PROGRAM.

Educate & Inform

Ensure that workers are informed & aware of the dangers associated with dehydration and heat stress in the workplace.

It costs less to prevent a heat related workplace accident or illness than it does to recover from one.

Sqwincher® White Papers and articles are available and provide important information on proper hydration practices, common hydration questions and important issues to consider when developing workplace hydration programs.

Before Work Induction

- **Always keep cold fluid close to where the hot work is performed**
- **Ensure workers are aware of where the hydration is located**
- **Provide the contact details of on-site medical personnel and what to do in the event of an emergency**
- **Encourage regular hydration practices with both water and electrolyte beverages**

HOW TO ENCOURAGE HYDRATION

MANDATE WATER BREAKS

Have employees take three-minute breaks at regular intervals throughout the day. Keep large jugs of cold filtered water easily accessible.

POST HYDRATION REMINDERS

Sometimes workers simply forget to drink until that feeling of thirst creeps up.

PROVIDE REUSABLE BOTTLES

These encourage workers to keep water and other fluids on hand at all times.

Tips on Monitoring Hydration

URINE CHART

Urine color is a great indication of your body fluid levels.

- SEVERELY DEHYDRATED
- DEHYDRATED
- HYDRATED
- OVER HYDRATED

REQUIRED WATER

♂ 15.5 cups (3.7L)

♀ 11.5 cups (2.7 L)

RECOMMENDED ELECTROLYTES*

During strenuous activity as well as in colder environments;

6 – 8 oz of electrolytes every 15 – 20 minutes.

KEY FACTORS THAT LEAD TO DEHYDRATION.

Diet & Nutrition

Proper nutrition is important for keeping up your strength and energy levels, but it will also help you stay hydrated. Before you decide to give a low carb diet a try, consider that carbs like oatmeal and whole grain pasta increase your hydration levels. If you eliminate these from your diet, you will need to compensate with extra fluid intake.

Soda, energy drinks, and salty foods also contribute to dehydration because they absorb fluids meant for the body. If you're working out in the sun or have to wear bulky or heavy equipment, try consuming these only in moderation.

Alcohol

Now, here's one kind of fluid intake that might work against you. If you've ever had a hangover, you know that the best way to recover is to drink lots of water. Why? Because alcohol is a diuretic and it forces water through your system before it can be absorbed. And just because you don't drink alcohol on the job or show up to work inebriated doesn't mean you're in the clear. Regularly consuming alcohol makes it harder for your body to absorb liquid and stay hydrated even when you're stone-cold sober.

Age

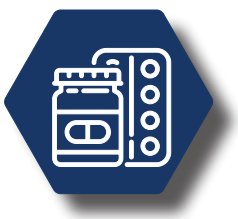
Even if you're just as strong and spry as your younger co-workers, you might still need to take extra care to prevent dehydration as you get older. There are two things at play here. First, as you get older, your body starts having a harder time retaining water. So, it might take a few more swigs to get to the same level of hydration.

Second, the older you are, the less likely you are to feel thirsty, even when your body needs fluids. That means dehydration can set in before you even feel parched. If you're an older worker, it's a good idea to track how much liquid you take in instead of relying on cues like thirst.

Altitude

Oxygen levels are lower at higher altitudes. Your body compensates for this by breathing more quickly and deeply. Not everyone realizes that we're constantly losing some of our body's water content by breathing it out as vapor. As our body works harder to take in oxygen at higher altitudes, we can lose as much as twice the amount of water we normally do.

In addition to changes in our breathing, urine output also tends to increase at higher altitudes. So, the higher you go, the more you need to drink to stay safe.



Medication

Taking medication is one of those small things that can make a big difference to hydration levels. Taking a pill or two every day might not seem like a big deal, but a range of medication from antihistamines to blood pressure meds can lead to dehydration. If you take any of these, you will need to take in more fluids to keep your body balanced.

If you take medication regularly, review your prescription or consult your doctor or pharmacist to find out whether it puts you at added risk of dehydration.

Lifestyle choices affect how susceptible workers are to dehydration.

A BALANCED APPROACH TO HYDRATION

Dehydration makes the body weaker and it can have some dangerous effects. So don't take chances. Make sure you look beyond liquid intake while working and consider all the factors that might prevent your body from absorbing those fluids.

EMERGENCY PROGRAM - EXAMPLE

WHY IMPLEMENT AN EMERGENCY PLAN?

An emergency plan provides everyone with a clearly documented set of instructions to outline what workers and others at the workplace SHOULD BE PREPARED TO DO in an emergency situation. Emergency plan procedures must provide for the following:

- an effective response to an emergency
- evacuation procedures
- notifying emergency service organizations at the earliest opportunity
- medical treatment and assistance
- effective communication between the person authorized to coordinate the emergency response and all people at the workplace
- testing of the emergency procedures, including the frequency of testing
- information, training and instruction to relevant workers in relation to implementing the emergency procedures

An emergency plan may include practical information for workers such as:

- emergency contact details for key personnel who have specific roles or responsibilities under the emergency plan, for example fire wardens, floor wardens and first aid officers
- contact details for local emergency services, for example police, fire brigade and poison information center
- a description of the mechanisms for alerting people at the workplace to an emergency or possible emergency, for example siren or bell alarm
- evacuation procedures including arrangements for assisting any hearing, vision or mobility impaired people

Disclaimer Note:
This fact sheet provides general information only and should not be used as a substitute for seeking professional advice for your specific safety circumstances. The contents of this fact sheet are correct and based on available information gathered at the time of writing. Please visit the OSHA website for more details regarding Heat Related Illness and First Aid and to review the standard general duty clause.

https://www.osha.gov/SLTC/heatstress/heatrelated_illness_firstaid.html

EMERGENCY RESPONSE

Employers and workers should become familiar with the heat symptoms listed on page 4. When any of these symptoms are present, be prepared to promptly provide first aid to the affected individual. Do not try to diagnose which illness is occurring. Diagnosis is often difficult because symptoms of multiple heat-related illnesses can many times occur together. TIME IS OF THE ESSENCE. These conditions can worsen quickly and result in lost time, hospitilization and even fatalities.

When in doubt, always cool the worker and call 911.

SEE BELOW FOR FURTHER FIRST AID RECOMMENDATIONS.

OSHA's Medical Services and First Aid standard and the Medical Service and First Aid in Construction require the ready availability of first aid personnel and equipment. First aid for heat-related illness involves the following principles:

- Take the affected worker to a cooler area (e.g., shade or air conditioning).
- Cool the worker immediately. Use active cooling techniques such as:

— Immerse the worker in cold water or an ice bath. Create the ice bath by placing all of the available ice into a large container with water.

— Remove outer layers of clothing, especially heavy protective clothing.

— Place ice or cold wet towels on the head, neck, trunk, armpits, and groin.

— Use fans to circulate air around the worker.

- Never leave a worker with heat-related illness alone. The illness can rapidly become worse. Stay with the worker. **When in doubt, call 911!**

Confusion, slurred speech, or unconsciousness are signs of heat stroke. When these types of symptoms are present, call 911 immediately and cool the worker with ice or cold water until help arrives.

If conscious and not nauseous, give sips of cool water or Sqwincher®.

Workers who are new to working in warm environments are at increased risk of heat-related illness.

Refer to the Protecting New Workers section of the OSHA website for more details. Especially during a worker's first few days, absolutely all symptoms should be taken seriously.

Workers who develop symptoms should be allowed to stop working. They should receive evaluation for possible heat-related illness.

When it comes to heat stress,

KNOWLEDGE IS KEY.

We can help!

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