

## **Heat & Hydration- THE FAULT WITH URINE CHARTS**

On the surface, dehydration and heat related illnesses make up a small fraction of worker compensation claims. In 2010-2011, they accounted for about \$238,000 of a \$57 billion bill. With figures like these, it's not surprising that heat stress management isn't exactly the cornerstone of every employer's OHS agenda. But it should be.

You see, cases of dehydration and heat stress only become documented if the symptoms are so severe as to require medical attention, time off work and financial compensation. What these figures don't reflect are the far more prevalent cases of 'mild' dehydration (classified as anywhere from 1-5% dehydration), and the increased incident rates/reduced productivity that happens as a result.

### **Mild Dehydration Impacts Productivity**

Just 1% dehydration has been found to decrease worker productivity by 12%. The more dehydrated the worker becomes, the further his or her physical work capacity degrades, with 3-4% dehydration bringing about a 25-50% decline in worker performance.

### **Mild Dehydration Effects Worker Health & Safety**

At just 1% dehydration, workers begin experiencing decreased cognitive abilities, reduced concentration and alertness, and slower reaction times.

1% dehydration represents about an 800ml fluid deficit for an 80kg adult male. With average Australian industrial workers sweating anywhere from 1L to 2.5L/hr, dehydration can set in very quickly if lost fluids are not actively replaced.

### **Drugs & Alcohol Are Not The Only Form of Impairment**

3% dehydration can slow your reaction time to the same extent as 0.08 Blood Alcohol Content (BAC). At 0.08 BAC you are 5 times more likely to crash your car, which begs the question – how much more likely are you to have a workplace accident when dehydrated?

### **4. 60% of Australian Workers Show Up Unfit For Work**

Studies of Australian mine sites have found that 60% of workers report to work insufficiently hydrated for working in hot conditions, with over half found to be at least 2% dehydrated. Once dehydrated, the situation usually deteriorates throughout the day with workers typically replacing only half of the fluid they lose through sweat.

## **The Problem With Urine Charts**

Urine charts are commonplace in many organisations but are a very unreliable way to assess hydration status. Urine color can be changed by factors such as food consumed and medications taken. As an example a hydrated individual can be classed as dehydrated if they have vitamin C tablets as this may change the colour of their urine to bright orange, which a chart will show as dehydrated. The only way to assess hydration status effectively is through USG (urine specific gravity) testing. This can be done using a refractometer or USG test strips.

## **Educated Workers Do Not Become Dehydrated**

Studies have found that workers who are educated on the importance of hydration and engage in program drinking (as opposed to drinking ad lib) report for work hydrated and maintain this status for the duration of their shifts.

## **Workers Cannot Keep Hydrated by Drinking Water Alone**

When we sweat we not only lose water but also essential salts and minerals known as electrolytes. Electrolytes play a number of key roles in the body, and one of these is water retention. If lost electrolytes are not replaced, a phenomena known as ‘involuntary dehydration’ can occur, whereby the body struggles to rehydrate even when fluid intake exceeds sweat rate.

## **Dehydration & Heat Stress Are Two Sides Of The Same Coin**

Our body’s core temperature is about 37°C. When external temperatures are below our core temperature, we lose heat via radiation (the movement of heat energy from a warmer to a colder object). When external temperatures rise above our core temperature, radiation cannot work and the body relies solely on evaporation to expel excess heat. To do this it produces sweat which evaporates from the surface of the skin, cooling surface blood cells. The cooled blood then returns to the bodys’ core, lowering our core body temperature.

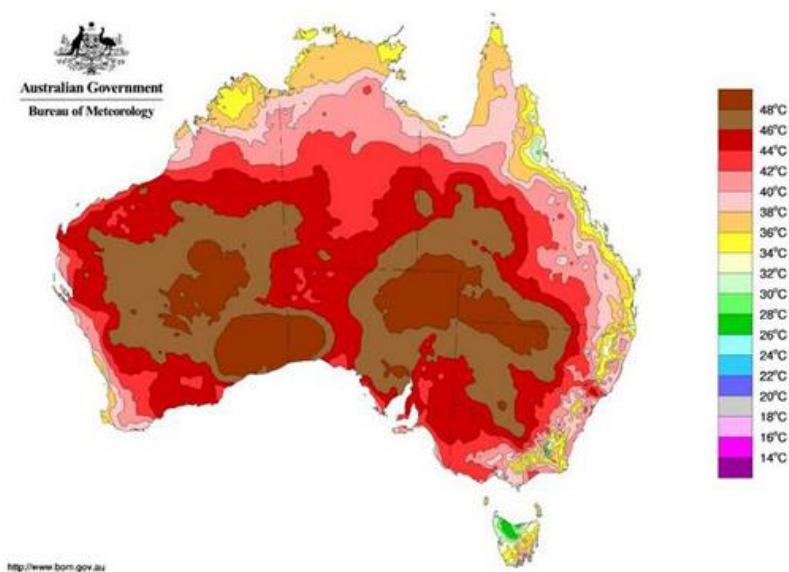
If we fail to replace the fluids lost through sweat, the body must borrow water from our vital organs. This puts them under strain and causes many of the symptoms associated with dehydration. As dehydration worsens, the body has insufficient fluid to produce the amount of sweat required to cool itself and the core temperature rises. This in turn results in the onset of heat related illnesses such as heat stress, fatigue and heat stroke.

## Workplace Risk Rises With Temperatures

Recent research examined the correlation between rising temperatures and accident rates. It found that the rate of workplace incidents rose dramatically in hotter summer months, with a rise in temperature from 20°C to 24°C corresponding with a 30% increase in workplace accidents.

Similarly, a recent performance study by NASA examined the effect of ambient temperature on the error rates of telegraph key operators. The results were as follows:

Temperature	Mistakes in first hour	Mistakes over 3 hours
27°C	5	19
32°C	9	27
35°C	60	138



The elevated risk associated with these high temperatures pervades Australian work sites all year round, with workers frequently exposed to temperatures in excess of 35°C. For those working in the Northern Territory, and northern parts of WA and QLD, it's an everyday reality – regardless of time of year.