



BEAT THE HEAT

*EXERCISING IN HOT WEATHER
CONDITIONS CAN PLACE
PARTICIPANTS AT RISK OF
HEAT ILLNESS, AND IN
EXTREME CIRCUMSTANCES,
EVEN DEATH.*

Playing safely in hot weather

Heat exhaustion is not a trifling matter—it is a serious health risk. But there are common sense steps that coaches and players can take to minimise the risks.

WHY BEAT THE HEAT?

Hot weather can harm the performance and the health of all athletes—from the elite to weekend and amateur.

Exercising in hot weather conditions can place participants at risk of heat illness, and in extreme circumstances, even death.

Beat the Heat will help you recognise and manage potentially dangerous situations that may arise as a result of participation in hot conditions. For more details, sporting clubs should also obtain a copy of the Sports Medicine Australia Heat Policy. It can be downloaded for free from www.sma.org.au or www.coachesedge.com.au

HOW DO YOU TELL IF SOMEONE HAS HEAT INJURY?

Heat injury may present itself in varied forms, including cramps, heat exhaustion and heat stroke.

During exercise an athlete may produce 15–20 times the amount of heat produced at rest. In normal circumstances the adult body uses physiological mechanisms such as sweating to overcome the production of excess heat. However, in extremely hot conditions adults may experience difficulties dissipating the heat being produced, and as a consequence heat injury or illness may be experienced.

FACTORS WHICH CAN CONTRIBUTE TO HEAT INJURY INCLUDE:

- ▶ High ambient (air) temperature
- ▶ Solar radiation
- ▶ Humidity
- ▶ Dehydration

HEAT EXHAUSTION

Dehydration can lead to heat exhaustion. Symptoms of heat exhaustion may include:

- ▶ high heart rate,
- ▶ dizziness,
- ▶ loss of endurance/skill,
- ▶ confusion,
- ▶ nausea,
- ▶ cool skin, but paler than normal,
- ▶ little urine passed, but highly concentrated
- ▶ cramps (associated with dehydration)

If a player is exhibiting signs of heat stress or heat exhaustion take the following action:

- ▶ remove from the field
- ▶ lay the victim down in a cool place
- ▶ give plenty of cool water
- ▶ If the player is confused or unable to drink water seek medical help immediately

HEAT STROKE

Severe dehydration may lead to heat stroke which is potentially fatal and must be treated immediately by a medical practitioner. Athletes who keep participating when suffering from heat exhaustion may experience heat stroke. Heat stroke can still occur even if the athlete has been drinking plenty of fluid. It is important to cool the athlete as quickly as possible

Heat stroke symptoms include:

- ▶ dry skin,
- ▶ confusion,
- ▶ collapsing.

Sports Medicine Australia recommends that events or activities requiring moderate to high intensity exercise that are conducted in conditions that exceed 28 degrees WBGT should be postponed or cancelled

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If a player is showing any symptoms of heat stroke take the following action:

- ▶ Call a Doctor or Ambulance immediately
- ▶ Remove from the field and lay the victim down in a cool place
- ▶ Give cool water to drink if conscious
- ▶ Cool the players by putting in a cool bath, shower or under hose, applying wrapped icepacks to the groin and armpits or use wet towels
- ▶ Maximise airflow over the player through the use of a fan or fan them with towels.

HOW DO WE KNOW WHEN IT IS SAFE TO PLAY IN HOT CONDITIONS?

All hot environments present athletes with some level of risk. The most effective way of evaluating the risk of playing in hot weather for adults is by measuring Wet Bulb Globe Temperature (WBGT) which takes into account both ambient air temperature and humidity. This is important because the higher the humidity, the less likely cooling will occur through the evaporation of sweat.

WBGT ranges have been determined to reflect the risk of heat injury. These are as follows:

| WBGT | Risk of heat injury |
|-------------------|---------------------|
| less than 18 | Minimal |
| Between 18 and 22 | Moderate |
| Between 23 and 28 | High |
| Greater than 28 | Extreme |

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Measuring WBGT is done using a Wet Bulb Globe Thermometer. These devices are not readily available and are often costly. However, if a WBGT Thermometer is not available, there is another way. It is possible to obtain an ambient temperature and 'dew point' readings from the Bureau of Meteorology, then use the chart below to work out the WBGT. (Dew Point thermometers can also be purchased from specialist weather suppliers.) The Bureau of Meteorology website is also useful: www.bom.gov.au

Alternatively Dew Point thermometers can also be purchased from specialist weather suppliers- allowing you to take a measurement at the site for a more accurate reading of conditions.

CALCULATING THE WET BULB GLOBE TEMPERATURE (WBGT)

| | | Ambient Temperature | | | | | | | | | | | | | | | |
|-----------|----|---------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| Dew Point | 20 | 27 | 28 | 28 | 29 | 30 | 30 | 31 | 31 | 32 | 32 | 33 | 34 | 34 | 35 | 35 | 36 |
| | 19 | 27 | 27 | 28 | 28 | 29 | 30 | 30 | 31 | 31 | 32 | 32 | 33 | 34 | 34 | 35 | 35 |
| | 18 | 26 | 27 | 27 | 28 | 28 | 29 | 30 | 30 | 31 | 31 | 32 | 32 | 33 | 34 | 34 | 35 |
| | 17 | 26 | 26 | 27 | 27 | 28 | 29 | 29 | 30 | 30 | 31 | 31 | 32 | 33 | 33 | 34 | 34 |
| | 16 | 25 | 26 | 26 | 27 | 28 | 28 | 29 | 29 | 30 | 30 | 31 | 31 | 32 | 33 | 33 | 34 |
| | 15 | 25 | 25 | 26 | 27 | 27 | 28 | 28 | 29 | 29 | 30 | 30 | 31 | 32 | 32 | 33 | 33 |
| | 14 | 24 | 25 | 26 | 26 | 27 | 27 | 28 | 28 | 29 | 30 | 30 | 31 | 31 | 32 | 32 | 33 |
| | 13 | 24 | 25 | 25 | 26 | 26 | 27 | 27 | 28 | 29 | 29 | 30 | 30 | 31 | 31 | 32 | 33 |
| | 12 | 24 | 24 | 25 | 25 | 26 | 26 | 27 | 27 | 28 | 28 | 29 | 29 | 30 | 30 | 31 | 32 |
| | 11 | 23 | 24 | 24 | 25 | 26 | 26 | 27 | 27 | 28 | 28 | 29 | 30 | 30 | 31 | 31 | 32 |
| | 10 | 23 | 24 | 24 | 25 | 25 | 26 | 26 | 27 | 27 | 28 | 29 | 29 | 30 | 30 | 31 | 31 |
| | 9 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 28 | 29 | 29 | 30 | 31 | 31 |
| | 8 | 22 | 23 | 23 | 24 | 25 | 25 | 26 | 26 | 27 | 27 | 28 | 29 | 29 | 30 | 30 | 31 |
| | 7 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 28 | 29 | 29 | 30 | 31 |
| | 6 | 22 | 22 | 23 | 23 | 24 | 25 | 25 | 26 | 26 | 27 | 27 | 28 | 29 | 29 | 30 | 30 |
| | 5 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | 26 | 26 | 27 | 27 | 28 | 28 | 29 | 29 | 30 |
| 4 | 21 | 22 | 22 | 23 | 24 | 24 | 25 | 25 | 26 | 26 | 27 | 28 | 28 | 29 | 29 | 30 | |
| 3 | 21 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | 26 | 26 | 27 | 27 | 28 | 28 | 29 | 30 | |
| 2 | 21 | 21 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 28 | 29 | 29 | |
| 1 | 21 | 21 | 22 | 22 | 23 | 24 | 24 | 25 | 25 | 26 | 26 | 27 | 27 | 28 | 29 | 29 | |
| 0 | 21 | 21 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | 26 | 26 | 27 | 27 | 28 | 28 | 29 | |
| -1 | 20 | 21 | 21 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 28 | 29 | |
| -2 | 20 | 21 | 21 | 22 | 22 | 23 | 24 | 24 | 25 | 25 | 26 | 26 | 27 | 28 | 28 | 29 | |
| -3 | 20 | 21 | 21 | 22 | 22 | 23 | 23 | 24 | 25 | 25 | 26 | 26 | 27 | 27 | 28 | 29 | |
| -4 | 20 | 20 | 21 | 22 | 22 | 23 | 23 | 24 | 24 | 25 | 26 | 26 | 27 | 27 | 28 | 28 | |
| -5 | 20 | 20 | 21 | 21 | 22 | 23 | 23 | 24 | 24 | 25 | 25 | 26 | 27 | 27 | 28 | 28 | |

For example, events should be postponed or cancelled when the ambient (air) temperature is as low as 26 if the dew point is 20!

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WHAT STEPS CAN BE TAKEN TO PREVENT PLAYERS GETTING HEAT INJURY?

There are circumstances when players are required to participate in hot conditions. The risk of experiencing heat illness, particularly in such conditions, can be reduced by employing any of a number of strategies. These include:

1. TIMING OF GAMES

Games and sporting activities involving moderate to high intensity exercise should be scheduled to avoid conditions where WBGT exceeds or is likely to exceed 28.

Where possible, especially during the summer months, games should not be scheduled during the hottest part of the day (usually between 11am and 3pm, or noon and 4pm daylight saving time). Early morning or night games minimise the risk of encountering unacceptable playing conditions.

2. HYDRATION – DRINK UP!

The more an athlete sweats, the more fluid they must consume to avoid dehydration. High levels of dehydration may increase the risk of heat illness. To diminish the risk of heat illness fluids should be consumed before, during and after activity.

Thirst should not be relied upon as an indicator of a participant's fluid needs. Dehydration can even occur when lots of fluid has been consumed. It is recommended participants drink at least 7-8ml of fluid per kg of body mass (about 500 ml for a 65 kg person) no more than 2 hours before exercising to promote adequate hydration and allow time for excretion of excess water.

During exercise it is recommended that participants should drink fluid at regular intervals to replace water lost through sweating. Participants should aim to drink at

least 3ml per kg of body mass (about 250ml for the average athlete of around 70 kilograms every 15 to 20 minutes). However this may vary dependent on the rate of sweating. Fluid taken should be cooler than the ambient (air) temperature.

Research indicates that sports drinks such as Gatorade can be beneficial for replacing fluids, energy and electrolytes lost during exercise. They are formulated for fast absorption giving muscles energy to work longer and harder as they replace electrolytes lost through sweating. Water is also considered an adequate option to replace fluids, but only for activities lasting up to one hour.

3. PLAYER REST AND ROTATION

In conditions of high risk participants should be provided opportunities to rest through the use of player interchange or substitution. The period of rest should be determined by the WBGT at the time of the event or activity. In moderate risk conditions players should be rested for at least 10% of the period they would normally participate. For example, if the activity normally runs for 60 minutes the rest period for the player should comprise at least 6 minutes during the period.

In high-risk conditions players should be rested for at least 25% of the period they would normally participate.

This may involve shortening the whole game by the appropriate period of time

The positive effects of rest breaks should also be maximised by employing the following strategies:

- ▶ Allowing players to rest in naturally shaded areas, or providing portable structures that create shade where and when required

- ▶ Providing fans, ice packs (for application to groin and armpits) or ice vests
- ▶ Providing additional fluids to allow participants to spray or douse themselves

4. CLOTHING

Light coloured, loose fitting clothes, of natural fibres or composite fabrics, with high wicking (absorption) properties, that provide for adequate ventilation are recommended as the most appropriate clothing in the heat. This clothing should further complement the existing practices in Australia that protect the skin against permanent damage from the sun.

5. PRE-COOLING

Pre-cooling by cool water immersion or the wearing of ice vests may be of benefit to many athletes. However, the effects of a pre-cooling can be reduced by a warm up. Therefore, any pre-cooling strategy is better done in conjunction with a modified warm-up.



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6. ACCLIMATISATION

If games or activities are to be conducted after long periods of cooler conditions participants should be fully acclimatised prior to participation. This is particularly the case at the change of climatic seasons or for participants travelling from cool to hot climates for events such as sports carnivals.

Physiological adaptations to exercising in the heat are rapid and can occur after 3-5 days in a hot environment. Full acclimatisation can take 10-14 days.

7. OTHER ISSUES

Surface Type

A shaded /protected grass exercise surface does not retain as much heat as some other surfaces (eg solid black asphalt).

Prior Medical Conditions

It is important to know if any of the participating athletes have any medical condition or are taking medication that may predispose them to heat illness. Examples include asthma, diabetes, pregnancy, heart conditions and epilepsy. Some medications and conditions may need special allowances.

Any player that is experiencing a high temperature, viral infection, diarrhoea, or vomiting should be excluded from participating due to the increased risk of heat illness.

Hats and sunscreen

Hats and sunscreen should also be used to assist in the prevention of heat illness. Sunscreens should be water soluble. Hats should be well vented.

Sports Trainers and First Aid Personnel

It is important to have trained personnel available to manage heat injuries. In situations where heat problems may be expected an experienced medical practitioner should be present. Heat stroke is potentially life threatening. Any indication of this condition should be immediately referred for medical assessment and every effort made to cool the athlete in the meantime.

CHILDREN AND HEAT

Children's bodies are different to adults and they are at greater risk of heat illness.

At an ambient temperature greater than 34 degrees Celsius there is an extreme risk of thermal injury to all children and also adolescent participants.

SMA believes that events and activities involving children and adolescents that are conducted or scheduled for times likely to present conditions where the ambient air temperature is greater than or equal to 34 degrees Celsius should be postponed or cancelled. Once puberty is completed, the WBGT applies.

Drinking water should be provided whenever children are being active. It may be easier to have children accept the need for regular drinking if sports drinks such as Gatorade are provided. Research shows that children will drink more when lightly flavoured drinks or sports drinks are offered.

WHEN TO CANCEL OR POSTPONE.

For adults:

WBGT exceeds 28.

For children or adolescents:

Ambient temperature 34 degrees Celsius or greater.

For further information visit

WWW.SMA.ORG.AU

This brochure was produced with the assistance of Dr Bruce Mitchell (Melbourne University Centre for Sports Medicine Research and Education, Professor John Carlson and Dr Geri Naughton (Victoria University Centre for Rehabilitation, Exercise and Sports Science).

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