

## Hot Weather Guidelines



# Contents

*Why Use Guidelines?* ..... 3

*Heat Exhaustion* ..... 3

*Heat Stroke* ..... 3

*Dehydration* ..... 4

*Environmental Factors* ..... 4

*Host (personal) Factors* ..... 6

*Acknowledgements/References* ..... 7

*Document Revision History* ..... 7



## Why Use Guidelines?

Every year in hot weather Sports Medicine Australia (SMA) receives requests from sporting clubs and associations, individuals and members of the media asking:

- Should our sporting event be modified or cancelled?
- Should our training be modified or cancelled?
- When is it safe to play sport, or be physically active in the heat?

To help organisations, coaches, teachers and other individuals when conducting sport in hot weather, SMA has produced this revised set of guidelines. These new guidelines are based on the latest research as well as the expertise of SMA's medical and scientific members.

Most people understand the importance of physical activity for good health but it is just as important that, when levels of activity rise, the risk of harm is minimised. And it is even more important for those who have not recently or regularly taken part in sport or physical activity.

These guidelines are not binding, but SMA reminds all parties that they must act responsibly. We encourage a common sense approach and consideration of the comfort and well-being of all individuals including participants and officials.

Modification or cancellation of events, training or withdrawal from participation may be appropriate even in circumstances falling outside these recommendations.

There are many factors to be considered when clubs and associations are contemplating modifying, postponing or cancelling sporting events or training.

Sporting organisations need to be aware of the difficulty of settling "one size fits all" guidelines in this area. For normally healthy active people, the only dangers from heat illness are likely to arise from high intensity exercise such as endurance running. Most community sport does not reach this level for periods long enough to cause serious harm. Many types of sport, such as cricket and tennis, are usually safe at higher temperatures because of the lower intensity of the play.

One area of higher risk for organisers of community-level sport is in the conduct of marathons and fun runs and bike rides. These events are more likely to see participants push themselves beyond their normal boundaries of activity, and organisers need to take extra precautions.

However, at any time, high intensity exercise in a hot environment, with the associated elevation of body temperature, can lead to heat illness. Heat illness in sport presents as **heat exhaustion** or the more severe **heat stroke**.

## Heat Exhaustion

- Characterised by a high heart rate, dizziness, headache, loss of endurance/skill/confusion and nausea.
- The skin may still be cool/sweating, but there will be signs of developing vasoconstriction (eg, pale colour).
- The rectal temperature may be up to 40°C and the athlete may collapse on stopping activity. Rectal temperature should only be measured by a doctor or nurse.

To avoid heat exhaustion, if people feel unwell during exercise they should immediately cease activity and rest. Further benefit comes if the rest is in a shaded area with some passing breeze (from a fan if necessary) and the person takes extra hydration. Misting or spraying with water can also help.

## Heat Stroke

- Characteristics are similar to heat exhaustion but with a dry skin, confusion and collapse.
- Heat stroke may arise in an athlete who has not been identified as suffering from heat exhaustion and has persisted in further activity.
- Core temperature measured in the rectum is the only reliable diagnosis of a collapsed athlete to determine heat stroke.

This is a potentially fatal condition and must be treated immediately. It should be assumed that any collapsed athlete is at danger of heat stroke. The best first aid measures are “Strip/Soak/Fan”:

- strip off any excess clothing;
- soak with water;
- fan;
- ice placed in groin and armpits is also helpful.

The aim is to reduce body temperature as quickly as possible. The athlete should immediately be referred for treatment by a medical professional.

Important: heat exhaustion/stroke can still occur even in the presence of good hydration.

## Dehydration

Dehydration is fluid loss which occurs during exercise, mainly due to perspiration and respiration. It makes an athlete more susceptible to fatigue and muscle cramps. Inadequate fluid replacement before, during and after exercise will lead to excessive dehydration and may lead to heat exhaustion and heat stroke.

To avoid dehydration, SMA recommends that:

- athletes drink approximately 500 mls (2 glasses) in the 2 hours prior to exercise;
- during exercise longer than 60 minutes, 2-3 cups (500-700ml) of cool water or sports drink are sufficient for most sports.
- after exercise replenish your fluid deficit to ensure that you are fully re-hydrated, but not over-hydrated.
- refer to SMA’s free DRINK UP brochure available as a web download at [www.smartplay.com.au](http://www.smartplay.com.au) or from your local National Pharmacies store.

Points to consider:

- Will your players and officials be able to consume enough water during the event?
- Even a small degree of dehydration will cause a decrease in performance.
- Take care not to over-hydrate. Drinking too much fluid can lead to a dangerous condition known as hyponatraemia (low blood sodium). Aim to drink enough to replace lost fluids, but not more than that.

## Factors to consider before cancelling or modifying a sporting event or training

Remember not only to take players into account but also umpires, officials and volunteers.

The following tables provide estimates of risk related to the weather and also guidelines to managing activity in order to minimise heat stress.

## Environmental Factors

### 1. Temperature

Ambient temperature is the most easily understood guide available, and is most useful on hot, dry days.

Ambient Temperature	Relative Humidity	Risk of Heat Illness	Possible Management for Sustained Physical Activity
15 - 20		Low	Heat illness can occur in distance running. Caution over-motivation.
21 - 25	Exceeds 70%	Low to Moderate	Increase vigilance. Caution over-motivation.
26 – 30	Exceeds 60%	Moderate	Moderate early pre-season training. Reduce intensity and duration of play/training. Take more breaks.
31 – 35	Exceeds 50%	High to very High	Uncomfortable for most people. Limit intensity, take more breaks. Limit duration to less than 60 minutes per session.
36 and above	Exceeds 30%	Extreme	Very stressful for most people. Postpone to cooler conditions (or cooler part of the day) or cancellation.

OR

Further guidance might be gained from what is known as the Wet Bulb Globe Temperature (WBGT) index. The WBGT is useful when humidity is high.

WBGT	Risk of Thermal Injury	Possible modifying action for vigorous sustained activity
< 20	Low	Heat illness can occur in distance running. Caution over-motivation.
21 - 25	Moderate to High	Increase vigilance. Caution over-motivation. Moderate early pre-season training intensity and duration. Take more breaks.
26 - 29	High to Very High	Limit intensity. Limit duration to less than 60 minutes per session.
30 and above	Extreme	Consider postponement to a cooler part of the day or cancellation (allow swimming).

The Bureau of Meteorology (BOM) produces ambient and WBGT readings for many locations in Australia. You can check these readings and a guide for the relative risk for your location at

[www.bom.gov.au/info/thermal\\_stress/index.shtml](http://www.bom.gov.au/info/thermal_stress/index.shtml)

N.B. It is important to watch for unusual “heatwave” conditions or variations from the average temperature for the time of year. This is one situation where there may be a greater danger of heat illness.

**Heat stress increases with increases in air temperature but be aware that there are not clear demarcations in risk between temperature ranges. At relative humidity levels above those indicated in the tables, stress increases markedly.**

## 2. Duration and intensity of an event

The combination of extreme environmental conditions and sustained vigorous exercise is particularly hazardous for the athlete. The greater the intensity of the exercise, the greater the risk of heat related symptoms; e.g. distance running is more of a problem than stop-start team events.

- Player and official rotation may also be considered
- Reducing playing time and extending rest periods with opportunities to rehydrate during the event would help safeguard the health of participants.
- Provision of extra water for wetting face, clothes and hair is also important.
- A fan to enhance air movement would be beneficial.

## 3. Conduct of competition and training (hydration and interchange opportunities)

- Associations may consider dividing games into shorter playing periods rather than halves to allow for extra breaks.
- Coaches may consider alternative training times and venues during hot weather.
- Remember, even five minutes rest can cause a significant reduction in core temperatures.
- It is important to consider the welfare of officials, as well as players.

## 4. Time of Day

- Avoid the hottest part of the day (usually 11 am-3 pm). Scheduling events outside this time should be a consideration throughout any summer competition, training or event, regardless of the temperature.

## 5. Local Environment

- Radiant heat from surfaces such as black asphalt or concrete can exacerbate hot conditions.
- The type of exercise surface and the amount of sunlight vary significantly with different sporting activities and therefore must be analysed for each individual sport.
- An air-conditioned indoor venue will provide less of a problem. A hot indoor venue or an outside venue without shade cannot be considered an acceptable environment.
- Airflow should be considered, including fans in change rooms or appropriately placed.

Remember, air movement decreases heat stress. However, a following wind can increase problems for runners or cyclists by actually reducing air movement.

## **Host (personal) factors**

### **1. Clothing**

- Type of clothing is vital in minimising health risks associated with exercise in heat.
- Fabrics that minimise heat storage and enhance sweat evaporation should be selected.
- Light weight, light coloured, loose fitting clothes, made 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 complement the existing practices in Australia that protect the skin against permanent damage from the sun.
- This should apply to the clothing worn by players, umpires, other officials and volunteers.

### **Protective clothing**

If clothing is worn for protective reasons, ensure that it is worn only while training and competing in hot weather. Some examples include leathers in motorcycling and mountain biking, protective equipment for hockey goalkeepers and softball and baseball umpires. Remove non-breathable clothing as soon as possible if the participants or officials are feeling unwell in hot conditions. Start cooling the body immediately via ventilation and/or a cool spray such as a soaker hose or a hand-held spray and a fan.

### **2. Acclimatisation of the participant**

- Acclimatisation of the participant includes umpires, other officials and volunteers as well as players.
- Preparation for exercise under hot conditions should include a period of acclimatisation to those conditions, especially if the athlete is travelling from a cool/temperate climate to compete in hot/humid conditions.
- It has been reported that children will acclimatise slower than adults.
- Regular exercise in hot conditions will facilitate adaptation to help prevent performance deteriorating, or the athlete suffering from heat illness, during later competitions. Sixty minutes acclimatisation activity each day for 7-10 days provides substantial preparation for safe exercise in the heat.

### **3. Fitness levels/athletic ability of participant**

- A number of physical/physiological characteristics of the athlete will influence the capacity to tolerate exercise in the heat, including body size and endurance fitness.
- In endurance events, accomplished but non-elite runners, striving to exceed their performance, may suffer from heat stress. The potential for heat-related illnesses would be exacerbated if they have not acclimatised to the conditions and have failed to hydrate correctly.
- Overweight and unconditioned athletes, umpires, officials and volunteers will generally also be susceptible to heat stress.
- Refer to SMA's free **DRINK UP** brochure available from [www.sma.org.au/information](http://www.sma.org.au/information) or your local National Pharmacies store.

### **4. Age and gender of participant**

- Female participants may suffer more during exercise in the heat because of their greater percentage of body fat.
- Young children are especially at risk in the heat. Prior to puberty, the sweating mechanism, essential for effective cooling, is poorly developed. The ratio between weight and surface area in the child is also such that the body absorbs heat rapidly in hot conditions.
- In practical terms, child athletes must be protected from over-exertion in hot climates, especially with intense or endurance exercise.
- Although children can acclimatise to exercise in the heat, they take longer to do so than adults.
- Coaches should be aware of this and limit training for non-acclimatised children during exposure to hot environments.

NB: Children tend to have a more “common sense” approach to heat illness than adults. They “listen to their bodies” more and will usually slow down or stop playing if they feel distressed in the heat. ***On no account should children be forced to continue sport or exercise if they appear distressed or complain about feeling unwell.***

- Veteran participants may also cope less well with exercise in the heat. Reduced cardiac function is thought to be responsible for this effect.

## 5. Predisposed medical conditions

- It is important to know if athletes, umpires, officials or volunteers have a medical condition or are taking medication that may predispose them to heat illness.
- Examples of illnesses that will put the participant or official at a high risk of heat illness include asthma, diabetes, pregnancy, heart conditions and epilepsy. Some medications and conditions may need special allowances.
- Participants and officials who present with an illness such as a virus, flu or gastro or who are feeling unwell are at an extreme risk of heat illness if exercising in moderate to hot weather.
- Participants or officials who may be affected by drugs or alcohol may be at an extreme risk of heat illness if exercising in moderate to hot weather.
- SMA has produced Pre-exercise Health Check Guidelines. These should be used if pre-existing medical conditions are suspected or if the participant has no recent record of activity. The Guidelines can be downloaded from [www.sma.org.au](http://www.sma.org.au)

## 6. Other factors to consider

- Preventative measures can be undertaken to minimise heat injuries. Examples include the provision of shade, hats, appropriate sunscreen, spray bottles and drinking water.
- It is important to have trained personnel available to manage heat injuries and designated recovery areas for patients.
- 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.

## Acknowledgements/References

Department of Health Western Australia [www.health.wa.gov.au](http://www.health.wa.gov.au)

[www.athleticsireland.ie](http://www.athleticsireland.ie)

[www.vinsurancegroup.com](http://www.vinsurancegroup.com)

Sports Medicine Australia [www.sma.org.au](http://www.sma.org.au)

## Document Revision History

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