

Title: Hot Weather Guidelines
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Approved by: TriSA Committee
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Background

Triathlon SA concerns itself with creating a healthy environment for its athletes. Vigorous exercise while training for, or competing in triathlons places some people at risk of heat illness. Even in cool weather, heat illnesses may occur, especially in people exercising at high intensity for more than 45 minutes.

Hyperthermia can be viewed as three levels

Dehydration

- Is fluid loss which occurs during exercise. It makes an athlete more susceptible to fatigue and muscle cramp.
- Any more than a 2-3 % loss in body weight is a sign of significant dehydration
- Dehydration is rarely the sole cause of sports heat illness

Sport Heat exhaustion is characterized by

- Low blood pressure at the cessation of exercise
- High heart rate, dizziness, headache, loss of endurance/skill/confusion and nausea
- The skin may be cool/sweating, but there will be signs of developing vasoconstriction (pale colour)
- Rectal temperature may approach 40 degrees celcius, and the athlete may collapse on stopping activity.

Heat stroke is characterized by

- Same symptoms as heat exhaustion but with dry skin, confusion and collapse.
- Heat stroke may arise in athletes who have not been identified as suffering from heat exhaustion and has persisted in further activity

Heat Stroke is not a trivial matter. Left untreated it can lead to severe conditions and even cause death.

These guidelines address minimum standards that are to be adhered to by clubs, coaches, race directors and other stakeholders when considering their duty of care responsibilities. These guidelines are based on Sports Medicine Australia guidelines (February 2008).

The risks

During competition competitors may produce 15-20 times the heat they produce when the body is at rest. Dissipation of the heat is primarily achieved through sweating. If the body's ability to dissipate heat is compromised, core temperature in an average sized individual may rise by one degree Celsius for every 5 minutes of exercise if no temperature regulating mechanisms are activated (Nadel 1977). If an individual's core temperature is above 40 degrees Celsius the risk of heat injury is significant.

The ability of the body to dissipate heat and prevent heat injury is affected by, high ambient temperature, solar radiation, humidity, athlete acclimatization and body shape and age, and dehydration.

Race specific risk

The swim poses few risks due to the cooling effect of water. However athletes, especially children or older ones wearing a wetsuit in water approaching 24 degrees celcius may experience the effects of hyperthermia, especially where time in the water exceeds 30 minutes.

The bike leg poses some risks however due to the evaporative effect of riding in the wind the impact in most instances is not severe unless extended periods of time are involved. Normally individuals can carry adequate fluid with them. The primary problem occurs on excessively hot and/or humid days where the athlete rides for over 1 hour at high intensity without consuming adequate fluid. Long rides over 2-3 hours at a moderate intensity also constitute a significant risk.

The run leg poses the greatest risk, especially when the distance approaches and exceeds 10 km and the heat and humidity are high.

The combined effect of competing in a triathlon as opposed to competing in a single discipline race also compounds the risk.

Training specific risks

Venue based club training session should pose few concerns as athletes have the ability to stop and hydrate at any time. Significant vigorous training poses the greatest risk on days of extreme heat and/or high humidity or where training time exceeds one hour and adequate breaks or re-hydration is not allowed. It is vital coaches are aware of risks on hot days and ensure athletes adequately hydrate.

Long club rides and runs on the weekend pose significant risk as it is very difficult for individuals to drink enough fluid under these circumstances.

Management

1- Pre- race or training,

It is recommended that all event owners, clubs and coaches adequately inform participants of the risks associated with exercising in the heat. At a minimum the following should be provided

Awareness raising: Athletes should be informed, via the following, of the risks presented by training or racing in hot conditions

- on the entry form or website
- race briefing or event registration or before training commences

Information provided should include, but not be limited to; that

- Light coloured loose fitting clothing made from natural fibres should be worn
- At training Athletes should be educated on fluid loss, by pre and post training weigh ins
- Athletes should drink at least 500 ml prior to the event /training and at least 500-1000 ml per hour during. Ideally fluid should be taken at regular intervals (15-20 minutes)
- Water is adequate for events up to 1 hr, carbohydrate based drinks up to 6-7% solution should be promoted to enhance hydration in events over 1 hr.
- Being over weight adds to the risk
- Lack of fitness increases the risk
- Predisposed medical conditions may also increase the risk i.e. Asthma, diabetes, heart conditions, pregnancy epilepsy, and some medications and conditions may need special allowances.
- Participants and or 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
- Athletes should be acclimatized to the heat
- Younger athletes pose a greater risk because the sweating mechanism has not fully developed pre puberty and they have a larger surface area to mass ration.
- In practical terms the risk to children, the overweight and the elderly needs increased monitoring
- Shade should be made available at all events and training sessions.

2- Canceling or modifying a sporting event or training

Environmental factors

Ambient temperature is the most easily accessible and understood guide however WBGT is a far more valid measure of risk as it includes the impact of humidity on evaporation rates. EO/ coaches/ TriSA technical officials should have access to a portable temperature and/or hygrometer or use the Australian Bureau of Meteorology website on days of risk. WBGT can be calculated using Table 1.

Management starts prior to the event, with the race referee contacting the race director to ensure they are aware of the situation and requirements should the hot weather guidelines be called into play.

WBGT + 30 &/or ambient temperature exceeds 36 degrees

- When WBGT exceed 30 one hour prior to the event or at the time of training the event/training should be cancelled

WBGT 26-29 &/or Ambient temperature is between 31-36

- When WBGT is between 26-29 one hour prior to race start the race directors and technical officials are to discuss the options of reducing the event distance or postponing the event.
- In addition all athletes should have at least one 750 ml biddon of water on their bike. Failure to do so will prohibit the participant from competing.
- RD and TO should aim to limit the combined event duration for the bike and run legs to less than 60 minutes for all participants.
- Training should be shortened or modified to allow; more rest, lower intensity workloads, more fluid to be consumed or moved to a cooler start and finish time.
- On training rides all athletes are required to carry two biddons of fluid when commencing the ride. Ride leader/coach must ensure fluid replacement occurs every 90 minutes.
- On club training runs all athletes are to carry water or have access to it such that at least 200 ml can be consumed every 1.5 km
- Shade with adequate air flow should be made available to cater for all competitors spectators and volunteers
- All volunteers should have a broad brimmed or legionnaires type hat, applied sunscreen to all exposed skin, be wearing light coloured, loose fitting clothing (preferably long sleeves), access to shade and access to at least 750 ml of fluid per hour fluid

Additional points

Swimming

- Triathlon Australia rules prohibit the use of wetsuits in water above 24 degrees. Water temperature should be measured by an accredited technical official.
- Wetsuit thickness is to be minimized to less than 5 mm.

Cycling

- In events over 40 km in duration, aid stations to provide additional water should be provided. One aid station per 30 km is required should WBGT exceed 26 one hour prior to the event commencing

Running

- Ensure aid stations are available every 2.5 km as per Triathlon Australia guidelines.
- Should WBGT exceed 28 additional aid stations, every 1.5 km is to be provided, or the run leg reduced.
- Water jets can be used to increase evaporative heat losses.

Post event

- Ensure shade is available so that everyone can be comfortably seated out of the sun
- Ensure adequate air flow is available in shaded areas

WBGT 21-25 &/or ambient temperature 26-30

- All athletes should have at least one biddon of water on their bike. Failure to do so will prohibit the participant from competing.
- Training should be modified to allow more fluid to be consumed or moved to a cooler start and finish time.
- On training rides all athletes are required to carry two biddons of fluid when commencing the ride.
- On training runs all athletes are to carry water or have access to it such that at least 200 ml can be consumed every 2.5 km
- Shade with adequate air flow should be made available to cater for all competitors spectators and volunteers
- All volunteers should have a broad brimmed or legionnaires type hat, applied sunscreen to all exposed skin, be wearing light coloured, loose fitting clothing (preferably long sleeves), access to shade and access to at least 750 ml of fluid per hour fluid
- When WBGT 21-25 one hour prior to the event additional water should be made available on the run course

When ambient temperature is between 15-25 or WBGT less than 20

Heat illness can occur in distance running, caution over motivation.

Please note although temperature ranges are given, there are not clear demarcations in risk between ranges.

3- Treat ill athletes immediately

Clubs, coaches and EO should have clear emergency plans to deal with heat related emergencies. These should include

- Ensure trained personnel are available to treat the affected person, and designated recovery areas for patients are identified. In situations where heat problems may be expected an experienced medical practitioner should be present.
- Treat athletes immediately should they exhibit signs of a heat exhaustion
- Remove distressed athletes from the course /event
- Rest in a shaded area with some passing or artificial breeze
- Raise legs and pelvis to improve blood pressure
- Misting or spraying water can help
- Provide them with extra hydration if conscious

- Should the athlete also exhibit dry skin and have or likely to collapse call an ambulance immediately. Heat stroke is a potentially fatal condition, the best first aid measures are strip/soak/fan
- Strip the athlete of excess clothing
- Soak the athlete in water
- Fan the athlete, do not cool to where they start to shiver
- Place ice in the athlete's groin and armpit regions for heat stroke patients

Table 1 Source Australian Bureau of Meteorology website

		Wet Bulb Globe Temperature (WBGT) from Temperature and Relative Humidity																														
		Temperature (°C)																														
Relative Humidity (%)	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
	0	15	16	16	17	18	18	19	19	20	20	21	22	22	23	23	24	24	25	25	26	27	27	28	28	29	29	30	31	31	32	32
	5	16	16	17	18	18	19	19	20	21	21	22	22	23	24	24	25	26	26	27	27	28	29	29	30	31	31	32	33	33	34	35
	10	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29	30	30	31	32	32	33	34	35	36	36	37
	15	17	17	18	19	19	20	21	21	22	23	23	24	25	26	26	27	28	29	29	30	31	32	33	33	34	35	36	37	38	39	
	20	17	18	18	19	20	21	21	22	23	24	24	25	26	27	27	28	29	30	31	32	32	33	34	35	36	37	38	39			
	25	18	18	19	20	20	21	22	23	24	24	25	26	27	28	28	29	30	31	32	33	34	35	36	37	38	39					
	30	18	19	20	20	21	22	23	23	24	25	26	27	28	29	29	30	31	32	33	34	35	36	37	39							
	35	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39								
	40	19	20	21	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39									
	45	19	20	21	22	23	24	25	26	27	27	28	29	30	32	33	34	35	36	37	38											
	50	20	21	22	23	23	24	25	26	27	28	29	30	31	33	34	35	36	37	39												
	55	20	21	22	23	24	25	26	27	28	29	30	31	32	34	35	36	37	38													
	60	21	22	23	24	25	26	27	28	29	30	31	32	33	35	36	37	38														
	65	21	22	23	24	25	26	27	28	29	31	32	33	34	36	37	38															
	70	22	23	24	25	26	27	28	29	30	31	33	34	35	36	38	39															
75	22	23	24	25	26	27	29	30	31	32	33	35	36	37	39																	
80	23	24	25	26	27	28	29	30	32	33	34	36	37	38																		
85	23	24	25	26	28	29	30	31	32	34	35	37	38	39																		
90	24	25	26	27	28	29	31	32	33	35	36	37	39																			
95	24	25	26	27	29	30	31	33	34	35	37	38																				
100	24	26	27	28	29	31	32	33	35	36	38	39																				

Note: This table is compiled from an approximate formula which only depends on temperature and humidity. The formula is valid for full sunshine and a light winds