

An NRL player died at training due to exertional heat stroke. What is it and what should coaches and athletes know?

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The tragic death of Manly rugby league player Keith Titmuss in 2020 due to exertional heat stroke is a reminder of the life-threatening nature

of the condition.

[Titmuss died](#) after a pre-season training session which was "more likely than not inappropriate," according to the magistrate who oversaw a recent inquest.

Deputy NSW coroner Derek Lee made [several recommendations](#) in reviewing Titmuss' death in the hope of reducing the chance of it happening again.

So, what is exertional heat stroke, and what should athletes and coaches know about it?

What is exertional heat stroke?

Exertional heat stroke is the most severe form of a [spectrum of conditions classified as exertional heat illness](#).

During sport and exercise, the body is challenged to maintain an ideal core temperature of about 36°C–38°C.

This is because exercise produces a massive amount of internal heat, which needs to be released from the body to avoid overheating. Hot and humid conditions stress the ability of an person to release this internal heat, as well as potentially adding to the heat load.

If someone's body is unable to control the rise in core temperature during physical activity, it may ultimately display [central nervous system dysfunction](#). Signs of this include loss of muscle control in the arms and legs, combativeness, seizures, or loss of consciousness.

A [highly elevated core temperature](#) (typically, but not always, above 40°C) and [multi-organ damage and failure](#) are also characteristics of

exertional heat stroke.

In one study, [27% of people suffering severe exertional heat illness died](#). But even those who survive often face long-term negative health consequences, such as an [increased risk of cardiovascular disease](#) later in life.

How often does exertional heat stroke occur?

Less severe forms of exertional heat illness (termed as [heat exhaustion](#) and heat injury) are [more common](#) during sport and exercise than exertional heat stroke. However, the life-threatening nature of the condition means precautions must be considered, especially for summer sports.

The condition strikes "weekend warriors" through to [elite athletes](#) and military personnel. A recent paper published in the [Journal of Science and Medicine in Sport](#) reported there were 38 deaths in Australia from exertional heat stroke from sport and exercise between 2001 to 2018.

However, exertional heat illness cases are thought to be broadly [underreported](#).

In an effort to reduce the risk of future cases of exertional heat stroke in rugby league, Coroner Lee made recommendations following the inquest into the death of Titmuss.

1. Mandatory 14-day heat acclimatization training

The human body can [adapt quickly](#) (in one to two weeks) to repeated gradual exposure to hot and humid environments, which ultimately reduces the risk of heat illness.

[Research](#) shows that pre-season heat acclimatization protocols reduce the risk of heat illness in team sport athletes.

2. Consider screening and classifying players for exertional heat stroke risk

The United States [National Athletic Trainer's Association](#) recommends players be screened for heat illness when competing in hot and humid conditions.

This process seems intuitive, but we lack a standardized and validated questionnaire.

Other [important risk factors](#) include hydration status, prior history of heat illness and/or recent viral illness or infection, body composition (high body fat percentage), and age (older people).

3. Identify cooling strategies that are relevant and effective

Cooling interventions that serve both as a prevention (during play) and treatment (for a victim) should be considered in hot and [humid conditions](#).

In terms of cooling interventions, the evidence suggests [cold water immersion](#), [cold water or ice ingestion](#), [cooling garments](#) (such as ice vests or ice towels), [portable fans](#) (with or without additional wetting of the skin), or [additional breaks in play](#) can help.

The type of sport will influence the decision about which cooling intervention/s are possible.

Other considerations include the level of resourcing (amount of finances and support staff), type of sport (the number of athletes who need an intervention will differ between team vs. individual sports) and game demands (continuous exercise vs. sports that have regular breaks).

Is there anything else that athletes and coaches can consider?

Many elite sport organizations in Australia and abroad are working with researchers to develop modernized heat policies that look to reduce the risk of heat [illness](#) for elite competition.

An example is the revamped Australian Open tennis heat policy.

At the community level, coaches and athletes can consult [Sports Medicine Australia](#)'s online tool. This provides an estimation of risk according to the type of sport and current geographical location.

Sporting and educational organizations should also consider better education for administrators, staff, and athletes to reduce the risk of exertional heat [stroke](#) in players.

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