



TRIATHLON
AUSTRALIA

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MEDICAL & SAFETY GUIDELINES

for EVENT COVERAGE

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The safety and the care of the Athlete is the most important consideration

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Introduction

This document serves as a guide for prospective Medical Directors and provides information to Race Directors and other race officials about the nature of comprehensive triathlon medical coverage. The paper is not a detailed account of medical conditions, but outlines the scope of triathlon medical coverage and potential problems.

Background

Triathlon consists of three separate disciplines: swimming, cycling, and running. Triathletes come from various sporting backgrounds, and many have particular preference for certain legs.

Athletes participate over various distances, from a sprint distance to the ultimate test of endurance, the Ironman.

Table of common triathlon competition distances (km):

| | Sprint | Olympic Distance | Half Ironman | Ironman |
|-------|--------|------------------|--------------|---------|
| Swim | 0.75 | 1.5 | 1.9 | 3.8 |
| Cycle | 20 | 40 | 80 | 180 |
| Run | 5 | 10 | 21.1 | 42.2 |

Athletes can be classified as “elite” who hold International Triathlon Union (ITU) world rankings <125, and “age group” competitors who compete against each other in 5-year age categories. “Junior” triathletes are in the 16-19 year age group.

Medical support for triathlon races

Races that involve elite athletes and races that are open to the general public should have a dedicated medical team to deal with problems that may arise.

The Race Director (RD) or Organising Committee (OC) appoints a Medical Director (MD) who assumes responsibility for overall medical care for the triathlon. This includes appointing other medical staff, organising medical and other supplies, and liaising with the RD and/or OC. The timing of the appointment depends on the size of the Triathlon, for example appointment of staff for an Ironman triathlon should be about 10-12 months in advance due to the complex organising involved.

Medical Staff

Medical Director

The MD should be a medical practitioner who has had experience in medical management of triathlons. In Australia a Sports Physician or Emergency Physician are the ideal qualifications to cover endurance events. There are a number of other medical practitioners who have acquired experience covering endurance events and their previous experience determines suitability for the position.

The MD may choose to have a committee involved with planning, depending on the size of the event. Other duties may include:

- Working with race officials to co-ordinate medical services with the running of the event
- Advice on number and placement of staff to ensure competitor safety on the course
- Liaise with the ambulance service
- Advise race officials about safety and health matters
- Advise unwell or injured athletes on whether they can safely compete

Other staff may include:

Medical Practitioners who are suitably qualified. The MD usually appoints additional medical practitioners. For Olympic Distance, the ITU recommends one doctor for every 200 athletes. Sprint distance triathlons may require one doctor per 500-1000 athletes, and the Hawaii Ironman has two physicians per 100 athletes.

Nurses with training and skill that allows intravenous cannulation, and care of injured people. Intensive care nurses will have additional skills, and the ability to intubate is invaluable. There should be one nurse per 100-250 athletes for Olympic Distance events.

First Aiders should have recognised qualifications such as St Johns training, and their level of training and experience determines the complexity of emergency that they can manage. The number of first aiders depends also on the number of athletes, and the expected weather conditions. This varies from one on-course first aider for every 100-250 athletes.

Physiotherapists should have the ability to manage acute musculoskeletal injuries such as sprained ankles, muscle tears etc. They are generally not trained to deal with medical emergencies.

Ambulance paramedics in an ambulance are required for elite races and where a large number of competitors are anticipated. This service provides the highest standard of medical care that is mobile and can respond to emergencies on the cycle and run courses. This service provides the safest transport to hospitals of injured and unwell athletes.

Ideally there should be an ambulance at the finish and one on the course. In smaller races one ambulance may suffice, and a designated medical/emergency vehicle may be able to access athletes on the course. Races longer than Olympic Distance may require more ambulances, depending on the course layout.

Chiropractors, in the context of triathlons are able to manage back complaints mainly. Generally they do not have training to manage acute trauma nor medical emergencies, and conventionally do not manage peripheral joint injuries.

Massage therapists are often invited to triathlons, marathons and cycle races because their services are popular.

The medical staff may be required to assist the MD and other medical practitioners as required during the course of the triathlon.

Physiotherapists, chiropractors and massage therapists should be in a tent/room separate to that of the emergency services.

The MD can vary the number of staff according to the number of competitors and expected weather conditions. However it is prudent to have more staff than less to deal with unforeseen circumstances. There should also be a disaster plan in case of major problems.

Identification

The medical staff must have identification/accreditation badges and/or clothing that make them highly visible. The medical tent and massage tent must be signposted so that they are easily found.

Information

Athletes can be informed prior to the race via the race website, newsletter, or the race manual regarding particular factors such as expected race conditions, training requirements, nutrition, hydration, heat illness, hypothermia, and recent medical illnesses (depending on the quality of the athletes, number of entrants, and anticipated weather).

The entry form should include a paragraph that alerts entrants to seek medical advice if:

- You may be pregnant;
- You recently had a fever, cold or respiratory problem like asthma;
- You had an injury that may hamper performance.

Athletes should be informed of the level of medical assistance they can receive without disqualification.

Documentation

Where there is higher risk of medical problems, it is very useful to have athletes' personal and medical information at the back of the race numbers. This should be considered in Olympic Distance Triathlons where there is a high proportion of novices, and should definitely be implemented for races longer than Olympic Distance (Half-Ironman and Ironman).

Information should be printed or written in indelible ink, and include:

- Name
- Date of birth
- Next of kin and contact phone number
- Existing medical conditions, medication, and allergies.

Weight of athletes prior to the start will assist with estimation of dehydration if the athlete requires medical attention during or after the race.

The same information should be kept in the medical tent as race numbers may be lost during the race.

Comprehensive medical records should be kept by medical personnel. The MD should provide a written report to the RD after the triathlon.

Insurance

It is mandatory that all medical personnel have professional indemnity which covers them for the situation of event coverage.

Medical and paramedical personnel must be included in waivers to be signed by the athletes. The categories of health professionals should be listed separately in the waiver.

Planning

Ideally the MD should be involved with the planning of the race, and an experienced RD should minimize medical problems by having a safe course. The MD should be aware of safety issues, the course layout, event personnel etc. The RD should liaise with the MD prior to the event. The number of competitors, weather conditions, layout of the course and format of the race will determine the complexity of medical coverage.

It is the RD's and MD's responsibility to determine the degree of medical coverage required for the triathlon. Factors such as number of competitors, anticipated weather conditions, and course layout contribute to this decision.

Budget

Larger races will require a budget for items such as:

- Medical Tent (usually RD's responsibility);
- Ambulance(s) (RD);
- Fans, cooling baths if hot weather anticipated;
- Heaters, warm baths if cold weather anticipated;
- Ice;
- Water and drinks for competitors and staff;
- Patient beds/stretchers;
- Medical supplies such as IV fluids, blood analysers (to measure sodium levels), etc

Weather Conditions

Generally triathlons are held in water temperatures from 14⁰C – 28⁰C. For comfortable cycling and running, temperatures should be 10-20⁰C. In ambient temperatures >25⁰C there is a risk of heat related illnesses. In shorter races this may not pose a problem but in long races such as the Ironman, the slowest competitors have up to 17hrs to complete the event. In the Hawaii Ironman for example, athletes may be running in hot, humid conditions where the temperature may be over 30⁰C.

The Swim

Water Safety is usually provided by a Surf Club where active members have a current Bronze Medallion qualification. Depending on water conditions, water craft such as Inflatable Rubber Boats, rescue boards, or kayaks may be used. In shorter races, water safety may be done by surf lifesavers on rescue boards, or in kayaks. The RD appoints a water safety co-ordinator, who is responsible for water safety staff. The MD should liaise with the Lifeguards prior to the triathlon about care of a rescued swimmer.

Factors that determine the safety of a swim course include:

- Start method. This may be from the shore where athletes run into the water, dive from a dock or pontoon or a deep water start;

- Number of athletes in a mass start. ITU rules specify that there should be no more than 75 in an elite swim wave, and no more than 150 in an age group wave;
- Course layout (point to point, lap course);
- Ground surface and obstacles at the swim exit;
- Water conditions- temperature, tides, currents, waves;
- Visibility.

The swim section is potentially the most dangerous, with risk from unexpected problems. Ocean swims pose the risks associated with marine creatures (e.g. blue bottles), currents, and waves. There are also potential biological hazards where water is contaminated by bacteria such as E. Coli, and Shigella (causing diarrhoea or dysentery), or viruses such as Hepatitis A. Contamination can occur after heavy rains where sewage flows into public waterways.

Mass starts pose the risk of physical injury when swimmers compete for space. Injuries such as bruises and abrasions, eye injuries, and dislocated shoulders may occur. Swim safety marshals should be on the lookout for such problems and be ready to rescue someone in difficulty.

Specific to triathlon swimming is the use of wetsuits. In Australia, for age-group triathletes the threshold temperature above which a wetsuit is disallowed is 24°C. Wetsuit thickness should not be >5mm. The rationale for limiting wetsuit use above 24°C is the risk of hyperthermia although this has not been demonstrated in laboratory settings.

The ITU has rulings (2003) regarding wetsuit use:

For elite competitors:

| Swim length | Forbidden above: | Mandatory below: | Maximum stay in water |
|-------------|------------------|------------------|-----------------------|
| 1500m | 20°C | 14°C | 30min |

For age group competitors:

| Swim length | Forbidden above: | Mandatory below: | Maximum stay in water |
|-------------|------------------|------------------|-----------------------|
| 1500m | 22°C | 14°C | 1hr 10min |
| 1501-3000m | 23°C | 15°C | 1hr 40min |
| | 24°C | 16°C | 2hr 15min |

The MD should arrange with water safety personnel a means by which rescued athletes are assessed. First aiders may be positioned at the swim/cycle transition to assist athletes in trouble.

The Cycle

The RD may appoint someone to specifically manage the cycle course where safety is paramount. Factors that contribute to a safe course include:

- Vehicular traffic (except for ambulances) should be excluded from the course;
- Intersections should be staffed to control traffic;

- Tight corners should be staffed and first aiders may need to be present. Hay bales may be needed at certain sections;
- Road surfaces should be swept and kept clean during the race;
- There should be a protocol whereby an ambulance or other designated emergency vehicle can access a rider on the course. The MD will need to communicate with the emergency vehicle personnel to determine whether the injured rider needs to go to hospital or to the medical tent at the finish.

It is easier to observe cyclists on a circuit than on a point-to-point race. Expect to deal with riders colliding and falling in draft-legal races.

The Run

Runners are easier to observe on a lap course than on a point-to-point course. This is the part of the triathlon when most problems arise as triathletes are fatigued and this is usually the hottest time of the day.

The number and positioning of drink stations depends on the course layout and expected weather conditions. In practice the stations may be between 1.5 – 4km apart.

The MD should be in radio contact with aid-stations, and have a plan to attend to runners who collapse on the course, and have a means of evacuating unwell runners.

Medical Problems

The medical team should be prepared to treat the following conditions:

- Hypothermia
- Hyperthermia
- Exhaustion
- Collapse
- Exercise-induced bronchospasm
- Cardiac problems such as chest pain and arrhythmias, including cardiac arrest
- Anaphylaxis
- Drowning/ near-drowning
- Head injury
- (Cervical) Spinal injury
- Abrasions
- Lacerations
- Musculoskeletal problems such as ankle sprains, muscle tears, cramps etc
- Blisters

Especially in longer races such as the Half Ironman and Ironman, be prepared to treat the following:

- Collapse
- Dehydration
- Hyponatremia

Percentage of Participants requiring medical assistance

In sprint distance races there may be no participants requiring medical treatment. In the extreme case up to 17% of competitors have been treated in the Hawaii Ironman. In the 2002 Cancun World Championships (Olympic/Standard Distance), conditions were extremely hot and humid (Temperature on the day 28-31⁰C, average humidity for the day 84%). Twenty four out of 162 (15%) Aussies required treatment in medical tent at the end of the race. Ten (42%) required intravenous fluids.

Problems like collapse and dehydration is more commonly seen in athletes who extend themselves beyond their level of training (exercise at an unsustainably high intensity level). Athletes who have had an infectious illness within a week of competition are also at increased risk of problems such as collapse, dehydration, and cardiac arrhythmias.

Drug Testing

Drug testing may be carried out by the Australian Sports Anti Doping Authority (ASADA) using guidelines which are in keeping with the World Anti Doping Agency (WADA). It is the responsibility of the race director to provide an adequate facility where urine or blood specimens can be collected.

Drug testing is routinely a part of elite and professional triathletes' lives and the athletes should be prepared to be tested. It is less common for amateurs to be tested but this is possible, and the athletes should be aware of prohibited substances.

Each athlete that is selected for drug testing is approached by a chaperone from ASADA on conclusion of his/her race. That athlete is allowed a personal representative/support person. The athlete will be ushered to the designated drug testing area within an hour of concluding the race. Access to this area is strictly limited.

The Medical Tent

- *MUST BE WITHIN 25M OF THE FINISH LINE;*
- Have clear access from the finish line;
- Must be clearly identified by signs;
- Large enough to contain beds for 5-10% of the field depending on the conditions;
- Must have good ventilation;
- Must have opaque walls for privacy;
- Must have easy access to toilets;
- Must have easy access for Ambulances and emergency vehicles;
- May require fans if hot weather, or heaters in colder conditions;
- Ideally have running water available.

The Medical area can be divided into sections:

- A shaded area for the walking wounded who have minor problems (eg blisters). First aiders can attend to athletes here;
- Beds for those feeling faint or dizzy, and with more sever injuries or problems;
- An intensive care area for those with serious injuries or medical problems.

In races where there is more than one transition area there will be an additional medical facility at each transition area.

The MD should be free to triage athletes, organise staff and handle communications. The physiotherapy/massage tent should be adjacent the medical tent.

ACCESS to the Medical Tent

Should be restricted to athletes requiring treatment. An athlete may be visited for a short period by ONE support person once the patient is stabilised and if space and circumstance permit. Media personnel (TV reporters, photographers) are not allowed in the medical tent.

Mobile Medical Vehicles

These are essential in races which are point-to-point, or where there is one large circuit for either or both the run and cycle leg.

The vans are ideally a station wagon or people mover vehicles that can accommodate a reclining (athlete) and a medical person. An ambulance may be appropriate in some races.

The vehicle should be equipped with fluids (oral and intravenous), thermometers, emergency drugs, resuscitation equipment if possible, ice, blankets, towels, asthma treatment, dressings, tapes and bandages and a communications radio.

The vehicle should patrol a previously specified area identified by checkpoints along the course watching for compromised athletes. It can then respond to emergency calls from aid stations or safety check points which are relayed through a central communications centre. After an initial assessment of the patient when responding to a call, the doctor may choose to transport the patient back to the medical tent or call for an ambulance to transport the patient to hospital. If a mobile vehicle leaves the course to return to the medical tent, the remaining vehicles/ambulances should be aware of its absence and increase its/their patrol area. The medical director must be kept informed of all action taken at all times.

Alternatively a doctor or first aider can be taken to an injured athlete on the course by motorbike.

Designated Hospitals

The closest hospitals (with Emergency Departments) near the race venue will be notified of the event. (Depending on the number of competitors) The Emergency Room staff should be notified and notified about the types of problems likely to arise and the required treatment. The Admitting Officer should be notified prior to the arrival of each case. Follow-up should be obtained on each competitor admitted to hospital.

Contingency Plans for Adverse Conditions

This is a difficult area to be precise on as there are a multitude of different factors at each race that contribute to its relative safety.

1. Water Conditions. Water temperature, waves, currents, marine/biological hazards may require modification of the swim course. The course may be shortened or even cancelled.

2. Hot/ humid conditions

Hyperthermia is a life threatening illness that can be avoided. It is more likely to occur in hot and humid conditions. Humidity is seven times more important than actual environmental temperature when considering the relative risks. Races should be held in the early morning and certainly temperatures over 35 degrees Celsius are extremely dangerous for vigorous exercise. The decision for cancellation should be left in the hands of the MD and the RD.

MDs who are expecting hot and humid conditions should rely on a **wet bulb globe temperature** which takes into account the temperature, radiant heat, and humidity. Note this is not wet bulb temperature. This has been a standardised method to determine heat stress, but does not take into account individual response, heat acclimation (or the lack thereof), and evaporation while cycling and running.

A WBG temperature;

- 26.5 - 29 degrees - caution should be taken and athletes should be advised of the danger and to increase their normal fluid intake by taking frequent drink breaks and to avoid trying to do personal best times. If poorly conditioned or recently sick they should think twice about competing.
- 29.1 - 31.0 degrees - Suspend race
- > 31.1 - Athletes advised to perform no exercise activity

The wet bulb globe thermometer can be purchased as a unit quite cheaply from a surgical supply company. Alternatively one can check readings from the Bureau of Meteorology website <http://www.bom.gov.au/products/IDS65004.shtml>

3. Cold conditions can result in *Hypothermia*. Athletes can lose body heat on the cycle and run legs despite wearing a wetsuit in the swim. Participants should be warned about this risk, and the medical staff and officials should be on the lookout for competitors in trouble.

4. Hailstorms/ Electrical storms pose hazards and the race may need to be postponed or cancelled

5. Poor Visibility due to mist, fog or smoke may require modification or cancellation of the race.

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APPENDICES

STAFFING GUIDELINES

Sprint Distance

- one doctor per 500 athletes
- one sports trainer, nurse or first aider per 200 athletes
- expect to treat about 1-2% of athletes
- local ambulance services should be informed of the event and should be able to respond if required
- the local hospital emergency department to be notified of the event

Olympic Distance

- one doctor per 200 athletes
- one nurse per 100-250 athletes
- one first aider per 100-250 athletes
- expect to treat up to 10% athletes

Long Distance/Ironman length

- one doctor per 100 athletes
- one nurse per 50 athletes
- one first aider at each aid station and
- 1 spotter per 100 athletes present at the finish line to identify affected athletes and assist them to the medical tent
- expect to treat 15-25% of the competitors
- up to 15% of competitors will require IV treatment in Ironman triathlons

Distribution of (para)medical staff

Consider having:

- 60% at finish line medical tent
- 10% at finish line itself
- 20% at aid stations
- 10% patrolling in mobile vehicles/ambulance/bicycles/motorbikes

In all events there should be an experienced medical practitioner at the finish line to triage patients (determine who needs medical attention, and what type of attention) and direct them to the relevant medical area.

MOBILE MEDICAL VEHICLES

- There should be designated vehicles that are able to respond to emergencies
- Ideally there should be an ambulance at the finish line
- In a point-to point race another ambulance should be stationed on the course or patrolling the course. Two per 500 competitors are recommended
- Alternative vehicles may be a station wagon/ people mover with a doctor and nurse/ first aider and emergency equipment
- Ambulances should have direct access to the finish line medical tent
- Ambulances should have cardiopulmonary resuscitation equipment and personnel trained to use it
- Ambulances should be in direct communication with medical tent.
- Police should be aware that there is a medical director and the manner in which they should direct medical problems.

MEDICAL SUPPLIES

The amount of supplies depends on the length of the triathlon, and expected conditions. These are minimum guidelines for National and State Title Standard Distance Races or longer.

In particular, the following supplies are needed:

- Intravenous fluids: hartmanns, normal saline, dextrose saline for Olympic Distance. There should be fluid for 5% of competitors;
- 5% dextrose & normal saline, and 4% dextrose and 0.18% normal saline for Ironman, and sufficient for 15% competitors;
- The amount for fluids can be varied according to weather and course conditions;
- Giving Sets, intravenous cannulae.

Wound care

- adhesive dressings, various sizes (e.g. bandaids, tegaderm, opsite)
- adhesive tape, various including rigid
- antiseptic e.g. betadine, chlorhexidine
- crepe bandages, various (e.g. 5cm, 7.5cm, 10cm)
- collar and cuff/ slings
- dressing packs, disposable
- eye pads
- gauze squares: sterile and non-sterile
- gloves: sterile and non-sterile
- local anaesthetic (e.g. 1% lignocaine)
- non-adhesive dressings
- scrubbing brush (sterile)
- steristrips.

Sterile Instruments

- forceps
- needle holders
- scissors
- scalpel & blades
- syringes and needles.

Diagnostic equipment

- Auroscope
- Blood pressure cuff
- Ophthalmoscope
- Reflex hammer
- Stethoscope
- Syringes, needles, and blood collection tubes
- Thermometers, including rectal thermometers
- Torch
- Tongue depressors.

For long distance and Ironman triathlons:

- glucometers - minimum of 2
- blood chemistry analysers (e.g. Abbott iStat machines) that analyse blood glucose, sodium, and urea.

Emergency equipment

- airways, various sizes
- blankets and towels for 15% of the field
- cervical collars- rigid
- defibrillator
- ECG monitor
- Laryngoscope and endotracheal tubes
- nebulisers (for salbutamol)
- oxygen, tubing and masks
- suction device.

General equipment and supplies

- beds, stretchers for 5% - 10% competitors
- blankets
- crutches
- drinks- water and sports drink; warm drinks (e.g. tea, coffee)
- fans
- Head Injury Cards
- Heaters.

General equipment and supplies continued...

- ice (1kg/ 4 competitors) and plastic bags
- means of documenting: pens, permanent marker, and paper/ computer and printer
- prescription pads
- sign for medical tent
- stretchers and wheelchairs to transport athletes from the finish line to medical tent
- tables, chairs
- towels
- Sharps bins
- vomit bowls.

Doctor's Bag Medications

Injectable:

- adrenaline 1:1000 and/or anaphylactic kit (e.g. EpiPen)
- atropine
- frusemide
- diazepam
- glucose for injection
- glucagons
- hydrocortisone
- lignocaine - cardiac and local anaesthetic
- morphine
- naloxone
- metoclopramide
- phenergan
- prochlorperazine.

Oral

- analgesics e.g. paracetamol, paracetamol and codeine
- antibiotics - starter packs
- anti-inflammatories
- anti-emetics
- glycerol trinitrate sublingual spray
- proton pump inhibitors.

Inhaled

- salbutamol solution for nebulising
- salbutamol or terbutaline aerosol/ turbuhaler.

Topical

- normal saline for eye irrigation
- amethocaine/fluorescein
- chloromycetin eye ointment
- xylocaine.