Sport in the Era of a Changing Climate

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The Olympic Committee of Israel views sport not only as a vehicle for excellence and high performance, but also as a leading force for social impact. In this context, we are committed to leading the Israeli sporting community toward national responsibility in an era of climate change, while safeguarding the health, safety, and well-being of elite athletes, along with enhancing performance.
Our vision is to create a sustainable sporting environment that is professionally and technologically equipped to meet the challenges of the future.

Sport and the Climate Crisis: A Reciprocal Relationship

The climate and environmental crisis that is evident in recent decades is reflected in the increasing frequency and severity of environmental changes that are widely recognized as major threats to ecosystems and human living conditions. This crisis exacerbates existing health, economic, and social challenges while also creating new ones.

In recent years, the reciprocal and complex relationship between sport and the ecological crisis has become increasingly evident:

Sport as a Contributing Factor

Sporting events, particularly large-scale international competitions, together with the activities that accompany them, consume significant resources, contribute to pollutant and greenhouse gas emissions, and generate significant ecological and carbon footprints.

Sport as a Sector Affected by Climate Change

Climate change, particularly the increasing frequency and intensity of extreme heat events and environmental pollution, directly affects the ability to conduct sporting activities safely and compromises athletes' capacity to achieve optimal performance.

The climatic window suitable for hosting international sporting events is becoming increasingly restricted, requiring careful consideration in the selection of competition venues, adjustments to competition formats, and implementation of precautionary measures to protect athletes' health and safety.

Recognizing the effect of climate on athletic performance, and to safeguard the future of sport, we have a responsibility to act simultaneously on two fronts:

- **Mitigation** – reducing sport's environmental impact.
- **Adaptation** – preparing for and adjusting to diverse climatic conditions.

The Legacy of the Climate Forum

The Olympic Committee of Israel began addressing climate-related challenges in preparation for the Tokyo 2020 Olympic Games through the establishment of a dedicated Climate Forum. Its mission was to coordinate the professional, medical, and logistical aspects associated with athlete performance under conditions of extreme heat stress.

The Forum established scientific and operational evidence-based foundations that continue to support Israeli Olympic sport during major international competitions. The knowledge and experience accumulated through its work form the backbone of this guidance document.

The Olympic Committee of Israel remains committed to a data-driven and science-based approach to excellence, including the study and implementation of best practices for physical activity in hot environments across all sports and for all individuals engaged in sport and recreational physical activity.

The Role of the Sustainability Committee

The Sustainability Committee of the Olympic Committee serves as a bridge between scientific knowledge in environmental disciplines and practical implementation in the field.

Its role is to transform environmental challenges into opportunities. Not only by improving athletes' resilience and capacity to perform in hot environments, but also by promoting environmentally responsible and climate-conscious practices in facility planning, event management, and resource utilization.

An athlete who trains in an environment guided by scientific, evidence-based knowledge and environmental awareness will be stronger, better protected, and more competitive.

Purpose of This Guidance Document

This document has been developed as a practical working tool for sports federations, clubs, coaches, medical personnel, and facility managers.

Its purpose is to provide an evidence-based toolbox for addressing the challenges associated with rising temperatures and the broader impacts of climate change through:

- **Protecting Health** – Early identification of exertional heat illness (EHI) and implementing appropriate preventive measures.
- **Optimizing Performance** – Implementation of evidence-based protocols and performance strategies for training and competition in challenging environmental conditions.
- **Environmental Responsibility** – Embedding a culture of event organization and facility management that reduce carbon footprint (Mitigation) while strengthening preparedness and resilience to climate change (Adaptation) as an integral component of professional sport.

This document serves as a professional compass. We call upon all participants across every level of the sporting community – athletes, coaches, managers, sport event organizers, to adopt the guidelines presented herein, adapt them to the specific needs of their sport, and establish athlete welfare and environmental responsibility as the new standard of excellence.

Administrative and Operational Preparedness for Heat Waves

Prof. Adi Wolfson
Chair, Sustainability Committee, Olympic Committee of Israel

The Challenge
To prepare, from both an administrative and operational perspective, for the safe conduct of training sessions and sporting competitions under conditions of heat stress in general, and during heat waves in particular.

A heat wave is defined as a period of unusually high ambient temperatures, relative to the seasonal average, that persists for several consecutive days.
Preparedness should include adaptation of activities, schedules, infrastructure, and support services, together with education and communication for professional staff, athletes, and spectators before and during heat-wave events.

Guidelines
1. Appoint a designated coordinator responsible for planning, coordination, and implementing heat-wave preparedness measures.
2. Identify and assess potential risks as comprehensively as possible in advance.
3. Develop dedicated response plans to address identified risks and coordinate all required actions before and during heat-wave conditions.
4. Establish a “traffic-light” decision framework defining thresholds for activating specific operational measures.
5. Identify all relevant external administrators and authorities with whom coordination is required, including the Israel Meteorological Service, the National Emergency Management Authority, Home Front Command, emergency medical services, and other relevant agencies.
6. Develop training and communication programs for staff, athletes, and spectators.

Practical Protocol
Heat stress place substantial demands on human physiology. In addition to its effects on health and performance, heat can significantly affect related infrastructure, and essential services. These impacts may be direct or indirect, local or national, and may occur over short and long term periods.

Organizations should identify and evaluate all relevant risks and prepare appropriate response plans for both routine operations and heat-wave conditions.

From an operational perspective, heat-waves may result in melting, cracking, or deformation of surfaces such as running tracks and playing fields, damage to electrical power systems and water infrastructure, failure of cooling systems, and other infrastructure-related disruptions.

Pre-Event Preparedness
- Monitoring weather forecasts and environmental conditions.
- Establishing heat-stress action thresholds (a "traffic-light" system) that determine whether activities can be proceed as planned, be modified, postponed, or should be suspended.
- Preparing and adapting infrastructure and support services.
- Assessing the characteristics and needs of participating populations.

Training and competition schedules - including dates, times, and locations, should be planned in accordance with local climatic conditions while maintaining sufficient flexibility to accommodate changing environmental circumstances.

Educational and training programs should be developed for coaches, medical personnel, and professional staff, alongside communication programs for athletes and spectators.

Wherever possible, facilities should incorporate shaded and covered resting areas. Preference should be given to materials that absorb less heat. Electrical and water systems should be protected, and contingency plans should be established to address potential interruptions in power or water supply.

Real-Time Operational Response

Organizations should continuously monitor weather forecasts and conduct on-site measurements of environmental conditions, including air temperature and humidity, to assess heat stress in order to determine whether operational thresholds have been exceeded.

Actions should be guided by real-time monitoring data:

- Communicating updated guidance and instructions to all participants.
- Modifying activities as required by prevailing conditions.
- Increasing vigilance for signs of infrastructure failure or heat-related health concerns among athletes, staff, and spectators.
- Maintaining close coordination with professional teams and relevant external agencies.
- Ensuring that all individuals present at the venue are informed of operational directives and that necessary measures are implemented without delay.

Physiology and Heat Acclimation –
Protocols for Preparing the Body for Exercise in the Heat

Prof. Yoram Epstein
Climate Forum, Olympic Committee of Israel

The Challenge
To enable athletes to achieve peak performance during training and competition under conditions of significant heat stress while maintaining their health and safety.

Key Concepts

Heat Balance
Body temperature is determined by the balance between heat absorbed from the environment and heat generated by physical activity (metabolic heat load), and the ability to dissipate that heat.

Most of the heat accumulated during exercise originates from metabolic heat production.
When ambient temperature exceeds approximately 35°C, heat is absorbed from the environment. Then, the amount of heat absorbed is proportional to the environmental temperature rise.

Heat dissipation depends on the cardiovascular system, which transports heat from the body's core (primarily the working muscles) to the body's periphery, and on the evaporation of sweat.

Sweat secretion is stimulated by elevated body temperature. However, sweat evaporation, the mechanism by which heat is dissipated, depends on environmental conditions, specifically the combination of ambient temperature and humidity, commonly expressed as heat stress.

Heat Stress
Heat stress is an index derived from the combination of ambient temperature and humidity and reflects the body's ability to dissipate excess heat and thereby reduce the risk of exertional heat illness.

Heat Stress Classification

Heat Stress Category	**None**	**Mild**	**Moderate**	**Moderate/High**	**High**	**Extreme**
Discomfort Index (DI)	<22	22.1–24	24.1–26	26.1–28	30–28.1	>30.1

Temperature (C°)

42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	Relative Humidity (%)
30.7	30.0	29.2	28.5	27.7	27.0	26.2	25.6	24.8	24.0	23.3	22.6	21.8	21.0	20.3	19.5	18.7	17.9	17.2	16.4	15.6	5%
31.6	30.9	30.1	29.3	28.5	27.8	27.0	26.2	25.4	24.6	23.9	23.2	22.4	21.6	20.7	20.0	19.2	18.4	17.6	16.8	16.0	10%
32.5	31.7	30.9	30.1	29.2	28.8	27.7	26.9	26.1	25.3	24.5	23.7	22.9	22.2	21.3	20.5	19.7	18.9	18.1	17.3	16.5	15%
33.3	32.4	31.6	30.8	30.0	29.2	28.3	27.5	26.8	25.9	25.1	24.2	23.5	22.6	21.7	21.0	20.1	19.4	18.5	17.6	16.9	20%
34.1	33.1	32.4	31.4	30.7	29.8	29.0	28.2	27.3	26.5	25.7	24.8	23.9	23.2	22.3	21.4	20.6	19.7	18.9	18.1	17.2	25%
34.7	33.9	33.0	32.2	31.2	30.4	29.6	28.7	27.9	27.0	26.1	25.3	24.5	23.6	22.8	21.9	21.0	20.2	19.3	18.4	17.6	30%
35.4	34.5	33.7	32.7	31.9	31.1	30.1	29.3	28.4	27.5	26.7	25.8	24.9	24.1	23.2	22.3	21.5	20.5	19.7	18.8	18.0	35%
36.1	35.1	34.3	33.3	32.5	31.6	30.7	29.9	28.9	28.1	27.2	26.3	25.4	24.5	23.6	22.7	21.9	21.0	20.1	19.2	18.3	40%
36.7	35.7	34.9	33.9	33.1	32.1	31.3	30.4	29.4	28.6	27.6	26.7	25.9	24.9	24.0	23.2	22.2	21.3	20.4	19.6	18.6	45%
37.3	36.3	35.4	34.5	33.6	32.6	31.8	30.9	29.9	29.0	28.1	27.2	26.3	25.3	24.4	23.6	22.7	21.7	20.8	19.9	19.0	50%
	36.9	36.0	35.0	34.1	33.2	32.2	31.3	30.4	29.0	28.6	27.6	26.7	25.8	24.8	23.9	23.0	22.1	21.2	20.2	19.3	55%
		36.5	35.6	34.6	33.7	32.8	31.8	30.8	29.9	29.0	28.0	27.1	26.2	25.2	24.3	23.4	22.4	21.5	20.6	19.7	60%
			36.0	35.1	34.1	33.1	32.2	31.3	30.3	29.4	28.5	27.5	26.6	25.6	24.7	23.7	22.8	21.8	20.9	20.0	65%
				35.5	34.6	33.6	32.6	31.7	30.8	29.8	28.8	27.9	26.9	26.0	25.1	24.1	23.1	22.2	21.2	20.3	70%
					35.0	34.1	33.1	32.1	31.2	30.2	29.2	28.2	27.3	26.3	25.3	24.4	23.4	22.5	21.5	20.6	75%
								32.5	31.5	30.5	29.6	28.6	27.7	26.7	25.7	24.7	23.8	22.8	21.9	20.9	80%
										30.9	29.9	29.0	28.0	27.1	26.1	25.1	24.1	23.1	22.1	21.2	85%
											30.3	29.3	28.3	27.4	26.4	25.4	24.4	23.4	22.5	21.5	90%
											30.7	29.7	28.7	27.7	26.7	25.7	24.7	23.7	22.7	21.7	95%
												30.0	29.0	28.0	27.0	26.0	25.0	24.0	23.0	22.0	100%

Heat Illness
Heat illness encompasses a spectrum of clinical conditions ranging from mild to severe, resulting from the accumulation of excess body heat that cannot be adequately dissipated because of environmental limitations such as climate conditions or clothing.

Heat illness initially manifests as impaired physical and cognitive function and may progress to life-threatening multi-organ failure if not recognized and treated promptly.

Factors contributing to the development of heat illness include:
- Physical activity under conditions of high to extreme heat stress.
- Negative fluid balance (dehydration).
- Exercise intensity exceeding the individual's physiological capacity.
- Prolonged exertion without adequate recovery.
- Sleep deprivation
- Poor heat acclimation.
- Concurrent illness, including gastrointestinal illness accompanied by vomiting or diarrhea.

Dehydration
Dehydration is a disruption of the body's fluid balance.
When fluid loss through sweating exceeds fluid intake, dehydration develops. As the severity of dehydration increases, so does the associated health risk.

A prominent sign of dehydration is reduced urine output accompanied by dark yellow urine.

Classification of Dehydration

Severity	Mild	Moderate	Severe
Fluid Loss (% Body Mass)	2–5%	>5–7%	>7%
Fluid Loss for a 70 kg Individual	1.5–3.5 kg	>3.5–5 kg	>5 kg
Clinical Signs	• Thirst • Headache • Rapid pulse • Dry mouth • Reduced urine output • Yellow urine	• Dizziness • Dark yellow urine • Reduced skin turgor • Vomiting • Mild confusion	• Altered consciousness • Loss of consciousness • Labored breathing • Dark urine • Absence of urine output • Death

Heat Acclimation
Heat acclimation is the physiological adaptation of the body's systems to exercise under conditions of heat stress.

Heat acclimation is a gradual process that normally requires several weeks. However, it can be accelerated (10–14 days) through repeated daily exposure, while exercising, to a controlled environmental condition.

Practical Guidelines

Activity
Exercise intensity should be adjusted according to the prevailing heat stress level. Physical activity should be avoided under conditions of high and extreme heat stress. Activity level (work intensity) should match the athlete's physiological capacity.

Rest Periods
Scheduled rest periods should be incorporated during exercise. As exercise intensity and heat stress increase, rest periods should be extended. Rest should preferably take place in shaded areas and, where possible, in air-conditioned environments.

Hydration
Free access to drinking water should be provided. Fluid intake should neither be restricted nor excessively encouraged. Proper hydration does not necessarily mean drinking large quantities but rather drinking according to need. Water should be cool but not excessively cold, non-carbonated, and consumed in small amounts (approximately 200 mL at a time) rather than in large volumes at once.

Heat Acclimation
Heat acclimation requires time. Exercise intensity should be adjusted according to the athlete's level of heat acclimation.

Cooling
During rest periods, cooling methods such as cold-water immersion, ice-soaked towels, forearm immersion in cold water, and cooling vests may be used. These methods are safe and effective when applied appropriately.

Work/Rest Ratios and Fluid Intake Recommendations

The following table summarizes recommended work/rest cycles and hourly fluid intake according to heat stress level and exercise intensity. (Values are based on a 70 kg individual).

Rest periods may be extended but should not be shortened. Fluid intake may exceed the recommended amounts but should not fall below them. Individual fluid requirements should be calculated according to actual sweat losses.

Heat Stress Category	Moderate Work		Heavy Work	
	Work/Rest (min)	Fluid Intake (mL/h)	Work/Rest (min)	Fluid Intake (mL/h)
None	60/15	300	40/20	500
Mild	60/15	500	40/20	500
Moderate	40/20	750	30/30	1000
High	30/30	1000		
Extreme	Activity should be discontinued due to risk of heat stroke			

Equipment

Heat stress should be measured using a dedicated heat-stress monitor (for example, devices manufactured by Kestrel).

These instruments simultaneously measure ambient temperature and humidity and calculate a heat-stress index.

Note

Most commercially available devices display heat stress using the **Wet Bulb Globe Temperature (WBGT)** scale. To convert WBGT readings to the scale commonly used in Israel and presented in this document, **subtract two units from the displayed WBGT value.**

Nutrition and Hydration in Extreme Heat

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The Challenge
During physical exertion in general, and exercising under conditions of extreme heat stress, in particular, body temperature elevates to levels that challenge the body's thermoregulatory systems.

Sweating is the primary mechanism for dissipating heat and regulating body temperature. When fluid intake does not adequately replace sweat losses, **dehydration** ensues.

Sweating also results in significant sodium loss. Additionally, consuming fluid volumes that exceed physiological requirements without adequate sodium replacement may dilute blood sodium concentration and lead to **hyponatremia**.

Both dehydration and hyponatremia can impair athletic performance and compromise athlete health. Therefore, to mitigate the risk of these conditions adopting appropriate strategies of fluid intake and nutrition are essential.

Practical Guidelines for Athletes
The emphasis of proper hydration is shifting from a simple "drink according to thirst" approach toward "planned fluid intake" that accounts for environmental conditions, exercise intensity, and exercise duration.

Individualized hydration recommendations should be prioritized over generalized guidelines **(Personalized Hydration Strategy)**.

Attention should be paid to sodium and carbohydrate intake during prolonged physical activity. Appropriate replacement of these nutrients not only compensates for losses incurred during exercise but also influences blood osmolality, improves intestinal fluid absorption, and helps to maintain optimal fluid balance compared with water consumption alone.

Recommended Practices ("Do's")
- Choose meals and snacks throughout the day that are easy to digest and rich in fluids and sodium.
- Follow a planned hydration schedule throughout the day – before, during, and after exercise.
- Begin training or competition in an optimal hydration state. Clear or pale-yellow urine before exercise is a useful indicator of adequate hydration.
- During training, estimate sweat losses by measuring body weight before and after exercise sessions (see below).
- During exercise lasting longer than 90 minutes, or during activity performed under conditions of significant heat stress, include sodium and moderate amounts of carbohydrate in beverages (see Table 1).
- Consult a sports dietitian regarding individualized recommendations for fluid, sodium, and carbohydrate intake.

Practices to Avoid ("Don'ts")
- Do not rely on thirst as a guide for hydration before and after exercise.
- Do not avoid drinking before or during exercise because of concerns regarding feelings of "heaviness" or "discomfort".
- Do not consume large volumes of water within a short period of time. Fluids are absorbed more effectively when consumed gradually in smaller amounts..
- Do not drink excessive quantities of water during exercise (more than 1.5 liters per hour), as this may increase the risk of hyponatremia.
- Do not consume highly concentrated beverages (such as fruit juices) during exercise. High sugar concentrations slow fluid absorption and may cause gastrointestinal discomfort.
- Do not consume carbonated beverages during physical activity.
- Do not ignore warning signs such as dizziness, headache, or confusion.

Table 1. Recommendations for Fluid, Sodium, and Carbohydrate Replacement

	2–4 Hours Before Training/Competition	During Training/Competition	Up to 2 Hours After Training/Competition
Fluids	5–7 mL/kg body mass. If necessary, an additional 3–5 mL/kg may be consumed approximately 1 hour before exercise.	400–800 mL/hour, depending on weather conditions, exercise intensity, and duration	Replace 125–150% of body mass lost through sweating
Sodium	Consume a sodium-rich meal.	300–700 mg sodium per liter of beverage. In most cases, sodium tablets are not required.	Consume sodium-rich foods (e.g., tuna, cheese, bread, and appropriately salted meals).
Carbohydrates	Light meal rich in readily available carbohydrates; low in fat and dietary fiber; moderate protein intake.	30–60 g/hour.	1.0–1.2 g carbohydrate/kg body mass/hour together with 20–30 g protein.
Objective	Achieve optimal hydration status, indicated by clear to pale-yellow urine, and ensure adequate sodium and carbohydrate availability before exercise.	Maintain fluid balance, replace sweat losses, and reduce the risk of hyponatremia during exercise.	Restore fluid, electrolyte, and energy deficits and support recovery.

Calculating Sweat Loss During Exercise
Total Fluid Loss
Total Fluid Loss = (Body Weight Before Exercise + Fluid Consumed) – (Body Weight After Exercise + Urine Output)
Hourly Sweat Rate
Hourly Sweat Rate = Total Fluid Loss ÷ Duration of Exercise (hours)

Cooling Technologies and Strategies – Before, During, and After Exercise

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The Challenge
An increase in body temperature impairs physical performance and may pose a significant health risk. The challenge is to limit the rise in core body temperature and help athletes cope with heat stress during training and competition. To achieve this, a variety of body-cooling strategies can be implemented before, during, and after exercise.

Key Concepts
- During periods without physical activity, athletes should remain in a comfort air-conditioned environment.
- Between exercise bouts, athletes should remain in shaded areas. Shade alone reduces environmental heat stress. When possible, an air-conditioned space is preferable.
- A substantial reduction in core body temperature can only be achieved through aggressive cooling methods, such as cold-water immersion or wrapping the body with ice-soaked sheets.
- All other methods that are described below primarily improve thermal comfort, with only a modest effect on core body temperature.
- The use of cooling strategies on a competition day (before, during, or after exercise) does not replace a structured heat acclimation process based on training in a hot environment.

Evidence-Based Strategies for Reducing Heat Strain and Thermal Discomfort
- **Combining "Cooling" Methods:** For optimal results, it is recommended to combine several methods, including internal cooling (ice slurries or cold beverages) and external cooling (cooling vests, wet towels, water spraying, and ice baths).
- **Targeting Key Body Regions:** Cooling the neck, face, arms and hands, and torso has been shown to effectively reduce physiological strain and thermal discomfort and may improve performance.
- **Individualization and Prior Practice:** Cooling strategies should be practiced during training sessions and competition simulations, to identify the method best suited to each athlete at each stage. As a general rule, new methods should not be introduced for the first time in the competition day.
- **Use of Cold Beverages:** Excessively cold beverages may cause discomfort. Therefore, beverage temperature and volume should be individualized.
- **Ice Baths:** When cold-water immersion is used for performance or recovery purposes rather than for the treatment of heat illness, the water temperature should be tested in advance to ensure athlete comfort.
- **Pre-Cooling:** Recommended for endurance and aerobic sports. Conversely, cooling immediately before activities requiring explosive power is generally not recommended. In these situations, particularly when cold-water immersion is used, reduced muscle temperature may significantly impair force production.

Practical Protocol and Recommendations

Preliminary Assessment and Decision-Making
Selection of an appropriate cooling strategy should be based on:

Internal Factors (Athlete Characteristics)
- Sport-specific requirements, including the dominant physical fitness components and the effect of cold exposure on performance.
- Individual tolerance to cold.
- Body composition and body size.

External Factors (Environmental Conditions)
- Expected weather conditions on the day of competition.
- Nature and duration of the exercise.
- Use of protective equipment that limits access to cooling sites.
- Availability of resources such as ice, water, and electricity.

Cooling Phase	Objective and Timing	Recommendations
Pre-Exercise	To increase the body's heat-storage capacity and reduce core and skin temperature. Begin approximately 15–60 minutes before activity, typically during the warm-up period.	- External cooling using a properly fitted cooling vest, or cold towels. These should generally be removed a few minutes before exercise begins. - Internal cooling through consumption of an ice slurry or a cold isotonic/hypotonic beverage, with volume and temperature individualized. - Remain in an air-conditioned environment if the waiting period before activity is prolonged.
During Exercise	To slow the rate of increase in core and skin temperature and improve tolerance to heat and exercise. Implement whenever possible during activity in the heat, during breaks between exercise sessions, or at refreshment stations.	- Depending on the sport and its characteristics, apply ice packs or cold wet towels to the neck, spray water on the body, and consume cold beverages. - Mouth rinsing with a menthol solution (or very cold water) may be used. This strategy helps create a sensation of cooling and has been shown to improve performance. The flavor and tolerance of menthol should be tested during training.
Recovery	To rapidly reduce core body temperature and accelerate muscular recovery.	- Whole body cold-water immersion (10–20°C, individualized according to athlete preference) for approximately 10–15 minutes. Immersion of the lower body alone has also been shown to be effective. Controlled fluid replacement should be combined with the cooling intervention.

Equipment and Advance Preparation
To implement the protocol effectively, professional staff should prepare the following equipment in advance:

- Cooling vests in a range of sizes (athletes should be fitted in advance to ensure proper sizing).
- An ice-slurry machine or blender for preparing beverages.
- Insulated bottles and thermal beverage containers.
- Coolers stocked with ice and cooling towels.
- Portable pools or inflatable tubs for cold-water immersion.
- Shaded areas and access to air-conditioned spaces for prolonged stays, when required.
- Ice-soaked towels, cooling vests, cold showers, or water that can be sprayed or poured over the athlete's body.
- Recovery in an air-conditioned environment.

Medicine and Safety – Prevention, Recognition, and Treatment of Heat Emergencies in Extreme Heat

Prof. Dan Nemet
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The Challenge
Combined exposure to extreme heat stress and physical activity increases the risk of significant medical conditions, including dehydration, heat exhaustion, and Exertional Heat Stroke (EHS).

Exertional Heat Stroke (EHS) is a medical emergency that requires early recognition, immediate treatment by aggressive cooling, and a structured medical response.

The combination of preventive strategies, heat acclimation, heat-stress monitoring, effective cooling, and coordinated medical preparedness is essential for safeguarding athlete health and reducing heat-related morbidity and mortality associated with physical activity in hot environments.

Do's
- Monitor temperature and humidity (combined into a measure of heat stress) before and during activity.
- Exercise intensity should be adjusted according to the prevailing heat stress conditions.
- Ensure a gradual heat acclimation period of 7–14 days before competitions or training camps.
- Ensure the availability of cold water, ice, shade, and cooling equipment at every training session and competition.
- Recognize warning signs such as confusion, aggression, instability, headache, altered mental status, or collapse.
- In any suspected case of heat stroke, immediately initiate a cooling protocol using cold-water immersion (see below).

Don'ts
- Do not evacuate or transport a heat casualty before initiating active cooling treatment ("Cool First, Transport Second").
- Do not rely solely on the athlete's subjective symptoms. Do not ignore clinical signs (dizziness, neurological dysfunction, stupor)
- Do not rely on oral, skin, or ear temperature measurements. In these situations, accurate assessment of body temperature requires rectal temperature measurement.
- Do not leave a symptomatic athlete unattended.
- Do not allow an athlete suspected of heat illness to return to activity without a complete medical evaluation.
- Do not conduct high-intensity training during periods of extreme heat stress without appropriate modifications.

Main Elements of the Heat Casualty Management Protocol

Stage	Action	Key Considerations
1. Recognition	Collapse or altered mental	Exclude a primary cardiac cause and immediately transfer the athlete to the designated heat-treatment area.
2. Assessment	Rectal temperature	The only method that enables accurate diagnosis and continuous monitoring of core body temperature (typically, although not always, above 40°C).
3. Cooling	Cold-water immersion.	Whole-body immersion is preferred, using water at 5–10°C. Ice-soaked sheets may be used and should be replaced every 3 minutes.
4. Monitoring	Continuous monitoring.	Continuously stir the water in the bath. At least four staff members are required for safe management of an EHS patient. Monitor core
5. Evacuation	Core body temperature below 39°C.	Remove the athlete from the water, dry the athlete, and continue monitoring core body temperature for several additional minutes before evacuation. Core body temperature should demonstrate a continuing downward trend.

Key Points

1. **Stop activity immediately,** move the athlete to a shaded area, and summon medical assistance. Any suspicion of heat stroke requires immediate cessation of exercise and urgent treatment.
2. **Conduct an initial assessment** of consciousness, breathing, pulse, and neurological signs such as apathy, aggression, involuntary movements, or loss of sphincter control.
3. **Measure core body temperature.** Rectal temperature measurement is the preferred method for diagnosing EHS.
4. **Initiate immediate cooling** by immersion in ice cold-water (5–10°C) until core body temperature falls below 39°C.
5. **Activate advanced medical support and evacuation procedures** while cooling is ongoing.
6. **Maintain continuous monitoring** of consciousness, breathing, and body temperature.
7. **After removal from the water**, dry the athlete and continue monitoring for several minutes before evacuation.
8. **Return to activity** only after medical evaluation and a graduated return-to-play process.

Required Equipment

- Heat-stress monitoring equipment (see Epstein section above).
- A dedicated shaded treatment area or cooling zone ("Heat Deck"), including privacy screens where appropriate.
- A tub or container suitable for cold-water immersion.
- Ice, cooling towels, cold water, and drying towels.
- A medical-grade thermometer designed for core body temperature measurement.
- Fans or portable ventilation devices.
- A hydration station with water and electrolyte beverages.
- Transport equipment, including a stretcher and basic evacuation supplies.
- An automated external defibrillator (AED) and basic resuscitation equipment.
- Heat-incident reporting and documentation forms.

Central Message

Exertional Heat Stroke is a medical emergency that can be prevented and successfully treated through early recognition, immediate cooling, and a coordinated medical response.

Rapid cooling within the first 30 minutes saves lives and significantly reduces complications and mortality.

Scientific editing: Prof. Yoram Epstein