Consensus Statement on the Pre-Hospital Management of Exertional Heat Illness
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Contents:

Introduction

Heat Illness can be subdivided into two related, but distinct, conditions: Exertional Heat Illness (EHI) and non-EHI (N-EHI), or 'classic' heat illness as it is commonly known.

EHI describes a syndrome related to a rise in core body temperature (T_c) and disordered thermoregulation during, or immediately after, exercise or physical activity and can range in severity from mild to severe.

Climate change is increasing the frequency, severity, and duration of extreme heat events globally. The incidence of heat illness is therefore likely to increase.

This consensus statement provides evidence-based guidance and expert recommendations on the recognition, diagnosis, and immediate management of EHI in the pre-hospital environment.

This guidance supports all levels of competency within pre-hospital emergency care providers, from first aiders to specialist pre-hospital emergency medicine (PHEM) practitioners and critical care teams. It is also intended to provide guidance to organisations including (but not limited to) the NHS, Fire and Rescue Service, mass participation event organisers, elite and community sports organisations and associations, voluntary aid charities and Government departments including the Ministry of Defence (MOD).

Background

EHI can occur during exercise or physical activity when an individual's heat production exceeds their ability to dissipate heat, leading to a rise in core body temperature and thermoregulation becomes overwhelmed. EHI describes a syndrome with a spectrum of conditions ranging from mild to severe. The most severe manifestation of EHI is often referred to as Exertional Heat Stroke(1).

Core body temperature in EHI may range from 38.5°C to over 40°C and is influenced by a variety of factors including aerobic fitness, acclimatisation status, body mass, and body composition(2–4).

Although more common in warm and humid environments, EHI also occurs in temperate climates such as the UK(5). Severe EHI is a leading cause of critical illness and death in those undertaking prolonged exertion and is particularly common in endurance sporting events and arduous military training (6–8).

Acute complications of severe EHI may include rhabdomyolysis, acute neurological impairment, acute kidney injury, and acute liver failure. These acute complications may progress to fulminant multiorgan failure and death(9,10).

Requirement for Future Research

The Heat Illness Advisory Group (HIAG) identified a significant lack of high-quality level evidence within the literature for EHI.

Further studies are required to address this issue, including those incorporating prospective research and registry data and detailed retrospective case record review.

Tools and methods to define EHI severity more accurately and quickly must be developed.

Improved understanding of the pathophysiology of EHI, at every level of severity, is required to define new targets for therapeutic intervention and assist the stratification of casualties into optimal pathways of care and safe return to physical activity.

There is a lack of valid studies investigating the comparative performance and tolerability of cooling modalities of EHI patients within the clinical environment. The interpretation of data from published case series is hampered by selection and information bias. This may result in misclassification of heat illness casualties in the literature, according to severity and outcomes. This could conceivably lead to erroneous conclusions being drawn as to minimum standards of care in the pre-hospital environment, and definitive care.

Consensus Recommendations

The HIAG graded the quality of evidence (described in Appendix B). for the consensus recommendations.

Defining Exertional Heat Illness

1. Exertional heat illness is a syndrome associated with a raised core temperature and disordered thermoregulation which occurs on a spectrum of severity, ranging from mild to life threatening during or immediately after physical activity. (Grade: D)

Hyperthermia may be caused by many different aetiologies, including fever, neuroleptic malignant syndrome and sympathomimetic toxicity. It may also occur as a normal physiological response to intense exercise or physical activity (11).

It is not uncommon to observe core temperatures approaching and occasionally above 40˚C during intense or prolonged physical activity, particularly in warm conditions or whilst wearing restrictive clothing and equipment. In the absence of signs or symptoms of heat illness, this raised temperature alone does not necessarily reflect a pathophysiological process (12,13).

Conversely, signs or symptoms of heat illness in the presence of a raised core body temperature during or immediately after physical activity suggests disordered thermoregulation and is described as Exertional Heat Illness (EHI).

Return to Contents

EHI occurs on a spectrum of severity from mild to severe which can be life-threatening.

Mild EHI is defined as: '***a core body temperature typically ranging from 38.5°C to 40°C associated with signs or symptoms of heat illness other than CNS (central nervous system) dysfunction during or immediately after physical activity***'.

Patients with mild EHI usually recover rapidly and are unlikely to experience long-lasting effects (14).

There continues to be discussion on the definition of moderate EHI, variously describing it with or without relatively mild CNS dysfunction and evidence of persistent systemic upset despite appropriate initial management. A recent expert consensus statement suggested that the diagnosis of moderate EHI may be made retrospectively, when post-incident blood tests provide biochemical evidence of end organ damage such as acute kidney injury (AKI) or raised serum liver transaminases (14).

After careful consideration the HIAG acknowledge this issue, and to avoid confusion, recommends that patients with a raised core body temperature and signs or symptoms of CNS dysfunction in the pre-hospital environment should be considered as severe EHI.

2. Severe exertional heat illness is 'a life-threatening condition of disordered thermoregulation with central nervous system dysfunction, associated with a core body temperature above 40°C during or immediately after physical activity'. (Grade: D)

Severe EHI is commonly referred to as Exertional Heat Stroke (EHS), but the term is slightly misleading as the associated CNS dysfunction observed in EHS is more encephalopathic in nature. However, the HIAG understands that EHS is the current recognised term for severe EHI in academic and clinical medicine internationally.

The precise T_c at which severe EHI occurs is a matter of debate. Several organisations define the threshold for severe EHI as a T_c >40.5˚C(15,16). However, a lower threshold of 40˚C is also commonly reported (17) and there is a risk of significant harm if the diagnosis of severe EHI is overlooked when T_c is below 40.5˚C (15).

As the threshold for developing symptoms is likely to differ between individuals, the key diagnostic criterion for severe EHI is the presence of CNS dysfunction(6).

3. Exertional heat illness can present with a range of signs and symptoms ranging from mild and transient, to life-threatening. (Grade: D)

EHI may present with a variety of signs and symptoms(18,19). Detailed assessment is required to differentiate between mild and severe EHI.

Signs and Symptoms of Mild Exertional Heat Illness		
Feeling uncomfortably hot	Dizziness	Nausea
Headache	Excessive fatigue	Profuse sweating
Tunnel vision	Tachypnoea & tachycardia	Unable to continue exercise
Able to stand unaided	Generalised weakness	Core temperature usually 38.5 - 40˚C

Table 1: Signs and Symptoms of Mild Exertional Heat Illness

Signs and Symptoms of Severe Exertional Heat Illness (NB: Patients may also have concurrent mild EHI signs and symptoms)			
Core temperature usually >40˚C and Central nervous system dysfunction (less than “Alert” on ACVPU scale)			
Confusion	Agitation, or aggression	Behavioural changes	Seizures
Stumbling gait (Ataxia)	Vomiting	Loss of consciousness & coma	Urinary or faecal Incontinence
Flushed or pale skin	Collapse	Hypotension	Cardiac arrhythmias

Table 2: Signs and Symptoms of Severe Exertional Heat Illness

EHI is a syndrome which can present with a wide spectrum of conditions and therefore patients with severe EHI may present with concurrent signs and symptoms of mild EHI.

CNS dysfunction is the key feature differentiating severe EHI from mild EHI(6). CNS dysfunction may initially manifest with relatively mild symptoms, such as confusion or subtle behavioural changes therefore a careful cognitive assessment is essential to ensure these signs and symptoms are not missed.

Patients with severe EHI may be pale and appear to be shivering or occasionally not sweating, however the presence of CNS dysfunction during or after physical activity should suggest the possibility of EHI despite these paradoxical signs (18,19).

Patients with severe EHI can rapidly develop multiorgan dysfunction, including metabolic dysfunction, distributive shock, cardiac arrhythmias, seizures, coma and cardiac arrest (20).

Assessing Exertional Heat Illness

4. Exertional heat illness should be considered in all individuals who become unwell during or immediately after physical activity. (Grade: D)

EHI must be considered in individuals who become acutely unwell during or shortly after exercise or other strenuous activity. This also includes occupational activity, especially whilst wearing restrictive clothing or personal protective equipment (PPE), as seen in construction, mining, manual labour, the fire and rescue service and military.

It is important to note that EHI can occur in relatively cool temperate climates including the UK throughout the year and is not restricted to warm and humid environments (5,21).

5. Core body temperature assessment should not be delayed during the initial primary survey if exertional heat illness is suspected. (Grade: D)

Core Temperature (T_c) measurement is essential to confirm a diagnosis of EHI(22) , and hence early assessment will support early commencement of appropriate treatment.

Once severe EHI is suspected, active treatment should occur in parallel with the primary survey and resuscitation.

6. Rectal temperature is the preferred method of assessing temperature in suspected exertional heat illness patients. (Grade: B)

Rectal temperature assessment provides a more accurate measurement of T_c than peripheral temperature assessments (23–26) and is easily measured via a flexible probe in the rectum (27).

Rigid anal and rectal thermometers have the potential to cause local tissue damage, and their use is therefore not routinely recommended by the HIAG.

Rectal temperature monitoring is relatively simple and should be performed with the insertion of a flexible thermistor probe to a depth of 15cm.(26) Insertion to a depth less than 15cm may lead to an inaccurate T_c measurement (28).

In patients who have been intubated, oesophageal temperature measurement may be appropriate and has been shown to provide T_c measurements with a similar accuracy to rectal temperature measurements (26).

7. Tympanic, oral and non-contact infrared skin thermometers are not recommended for assessing temperature in patients with suspected exertional heat illness. (Grade B)

Tympanic thermometers are commonly used in clinical practice but are inaccurate in measuring T_c in patients with EHI. (29)

Oral and infrared non-contact thermometers demonstrate poor sensitivity for temperatures above 38.0 ˚C (30–33) and demonstrate variable results in differing ambient temperatures as well as in direct sunlight. This further limit their utility in a pre-hospital setting. (34) In line with agreed national guidelines in the US, the HIAG do not recommend their use to assess temperature in EHI patients.

The HIAG acknowledge that many pre-hospital care providers do not have the ability to measure T_c. However, it is important to emphasise that peripheral temperature measurements are unreliable indicators of T_c(33) and risk providing inaccurate readings and false reassurance in EHI.

8. Cooling must not be delayed in a patient with a suspected exertional heat illness if a core temperature is not available. (Grade: C)

If EHI is suspected and T_c is not available, active cooling and supportive treatment should commence until clinical improvement and preferably confirmation of a normal T_c .

Treating Exertional Heat Illness

9. Severe exertional heat illness is a time critical illness and the priority is rapid and effective cooling prior to transfer (grade D).

The consequences of EHI are greatly worsened by the amount of time the patient is hyperthermic. EHI is therefore one of the few conditions where transport to hospital should be delayed to prioritise rapid on-site cooling. Early recognition and diagnosis of EHI in the pre-hospital environment is critical and will allow initiation of rapid on-site cooling (62).

Rapidly reducing the patient's T_c is vital to minimise tissue and organ damage and will substantially reduce the risk of morbidity and mortality (35–37). In contrast, delayed cooling is a common risk factor in many cases of fatal EHI (10,38,39).

Data from animal models show that survival outcomes from EHI are inversely proportional to cumulative time spent with an elevated T_c. (40).

Although the optimal cooling rate in humans has not yet been established, animal studies have shown limited evidence that a cooling rate of >0.15˚C per minute is associated with less morbidity and mortality in severe EHI(38).

Rapid and effective cooling is difficult to perform during transport and hence should be performed on site and not be delayed by patient transfer.

10. Cold water immersion is the preferred and recommended method of cooling patients with severe exertional heat illness. (Grade: C)

Cold Water Immersion (CWI) is recognised internationally as the most effective and hence preferred cooling modality for treating severe EHI (14,41,42), demonstrating consistently good outcomes for patients (43,44).

CWI should be conducted with patients immersed up to the neck where possible.

Continuous T_c monitoring should be used when CWI is performed.

Cardiac arrythmias and cardiogenic shock are the main relative contraindications to CWI.

Shade, strip, spray and fan (S3F) is recommended in severe EHI patients where CWI is contraindicated or not possible (45), and this should be delivered with continuous core temperature monitoring if available.

The HIAG note other cooling methods suggested in the literature such as application of ice sheets / towels which are rotated from a tub of ice slurry every 30-180 seconds. However, they are not as effective as CWI (38,46)and hence not routinely recommended in patients with severe EHI.

11. Active cooling via cold water immersion should cease when core body temperature reaches 38.5-39˚C. (Grade: C)

In general, the literature supports stopping CWI at least one degree above normothermia to reduce the likelihood of developing overshoot hypothermia(47–49). Therefore, in line with other consensus statement recommendations (14–16,50) a target T_c of 38.5-39˚C balances the aim of minimising organ damage from EHI with the risk of hypothermia related to the treatment of EHI.

The T_c of patients who have received CWI should be continuously monitored for at least 30 mins following termination of CWI due to the risk of rebound hyperthermia or overshoot hypothermia (51–53).

Early recognition of rebound hyperthermia can usually be managed via S3F, however recommencing CWI should be considered for refractory hyperthermia.

Following CWI, a further reduction in T_c can be reduced by removing wet clothing, drying thoroughly, and wrapping the patient in blankets.

In line with other consensus statement recommendations,(14–16,50) gentle re-warming using active external warming devices to achieve normothermia may be required after CWI but should be used with caution and requires continuous T_c monitoring.

12. Patients with severe exertional heat illness should be transferred to hospital for further assessment after cooling. (Grade: D)

Immediate cooling is critical to remove the underlying pathological process in severe EHI. However, it is recognised that some end organ damage may occur prior to the onset of symptoms and before active cooling has commenced. (54) Post EHI monitoring to assess for biochemical evidence of end organ damage (55) through sequential blood tests is important.

Patients who exhibit persistent CNS dysfunction or systemic upset despite effective cooling and treatment should be transferred directly to hospital for further assessment and management.

Patients with mild EHI and complete resolution of symptoms after initial treatment may be considered for discharge from scene. However, all patients must be provided with robust safety-netting advice and recommended appropriate medical follow-up.

13. In mild exertional heat illness, a "shade, strip, spray and fan" method of cooling is recommended. (Grade: D)

In patients with mild EHI, cooling via a S3F method is recommended by the HIAG.

S3F is logistically simple and can be performed easily with minimal resources and training to enable effective cooling in EHI patients.

Spraying or dousing the entire exposed body surface with water is essential and therefore recommended.

Fanning must be continual, rigorous and may be performed by several people simultaneously. Fanning may utilise rigid or semi-rigid hand-held items or powered electric fans. Small hand-held fans, and clothing do not produce sufficient air flow for effective cooling.

Although preferred, continuous T_c monitoring is not essential during S3F.

Due to the low risk of overshoot hypothermia, S3F should be terminated at a T_c of 37.5 °C or following resolution of symptoms.

It is recommended that patients with mild EHI who have been cooled with S3F should be monitored for at least 30 mins following cessation of cooling, prior to a decision whether discharge from scene is appropriate.

14. In the pre-hospital environment, anti-pyretics, dantrolene, steroids, antibiotics and depolarising neuromuscular blocking drugs are not recommended in the management of exertional heat illness. (Grade: D)

Anti-pyretic use in EHI has not been investigated and there is potential that anti-pyretic drugs such as paracetamol and non-steroidal anti-inflammatory drugs may contribute to EHI-related end organ damage (56,57).

Some studies have reported improved cooling rates with dantrolene, but none identified a clear benefit in morbidity or mortality (58).

There is limited animal study evidence that may indicate some benefit from the administration of antibiotics and steroids in heat illness (59,60). However, a lack of evidence specific to EHI means these medications are not recommended at present.

Core temperatures may be elevated in anaesthetised patients who have received suxamethonium (61) and its use is therefore not recommended.

15. Cold IV fluids are not recommended as an initial method of cooling in the pre-hospital environment. (Grade D)

Current evidence does not support the routine use of IV fluids, cold or otherwise, to reduce T_c in EHI patients in a pre-hospital setting (62).

The HIAG recommend that securing venous access to commence IV fluid administration during initial resuscitation of severe EHI should not be a priority unless clinically indicated, as this risks delaying initiation of effective cooling.

In the pre-hospital setting where exercise associated hyponatraemia may not be easily excluded, IV fluids should be administered with extreme caution(63–65).

Preparing to Manage Exertional Heat Illness

16. Pre-hospital healthcare organisations should ensure staff are provided with the training and equipment to diagnose and treat exertional heat illness. (Grade: D)

Due to the significant morbidity and mortality associated in EHI, organisations responsible for pre-hospital care provision must ensure clinical staff are able to recognise and effectively manage patients who present with EHI (15).

Where there is a recognised risk of patients presenting with severe EHI, pre-hospital healthcare organisations and medical service providers should provide:

- Education and training in the recognition, diagnosis, and safe and effective management of EHI.
- Equipment to effectively and safely diagnose and monitor patients with EHI(66).
- A capability for rapid and effective cooling at the scene(41,45,67).

17. Event Organisers of mass participation sporting events should ensure on-site treatment is available for exertional heat illness. (Grade: D)

The HIAG note there is the potential for significant numbers of EHI cases at mass participation sporting events (36).

Communication before and during the event should aim to educate participants on measures to reduce the risks of EHI (66).

Event organisers and medical directors should implement strategies for risk mitigation and management of EHI cases within their pre-event risk assessment and medical plans. (41) Resources for transfer to definitive care needs to be available (15).

If the pre-event or dynamic risk assessment identifies a risk of severe EHI amongst event participants, the medical plan should the capability to provide safe and effective on-site cooling. This should include the provision of equipment, resources and trained medical personnel with the competency to manage severe EHI, including effective delivery of CWI (6,41).

Conclusion

EHI is an increasingly common and dangerous syndrome seen in a wide variety of environmental conditions, sporting events, and occupational groups in the UK.

Early recognition of EHI through increased education and the capability to measure core temperature, provides an opportunity to initiate immediate pre-hospital treatment.

The consequences of EHI are greatly worsened by the amount of time the patient is hyperthermic. EHI is therefore one of the few conditions where transport to hospital should be delayed to prioritise rapid on-site cooling.

'Shade Strip, Spray and Fan' (S3F) is effective for the treatment of mild EHI and when cold water immersion is not available for severe EHI. However, rapid cooling with cold water immersion is the preferred and most effective method of cooling in severe EHI. This should be considered in the same way as other immediate lifesaving medical interventions such as early defibrillation in cardiac arrest.

Those responsible for the provision of medical services at events where EHI is a potential risk, should include provision for management of EHI in their medical plans during the pre-event risk assessment process. Provision of appropriate resources, equipment, logistical support and trained personnel to ensure a rapid and effective treatment capability for EHI casualties must be included.

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Appendix B - Methods

EW conducted a comprehensive search of electronic databases, including Medline, Embase, Cochrane Central, and Google Scholar. The search focused on identifying full-text publications of randomized controlled trials, observational studies, and systematic reviews related to exertional heat illness (EHI). The detailed search strategy for Medline can be found in Appendix D. Searches were limited to human studies and restricted to English-language publications, unless specified otherwise. Additionally, relevant primary data sources were identified through manual reference screening of the included studies.

The recommendations, along with their corresponding grades (see Appendix D), are grounded in the available evidence while considering the logistical challenges faced by pre-hospital care providers. The levels of evidence are outlined in the main body of the text, illustrating the relative merits that support each recommendation and specifying the grade assigned by the consensus panel.

Subsequently RH and MS were invited by the FPHC clinical standards Chair to produce a consensus statement. RH convened the consensus statement development group (CSDG), now known as the Heat Illness Advisory Group (www.hiag.org.uk)). The group included members from a wide variety of medical specialities across the NHS, UK Universities and the Military who had significant clinical experience of managing EHI patients and an interest in EHI research.

A Nominal Group Technique (NGT) was utilised to attain consensus on definition, diagnosis and treatment of EHI.

The HIAG formally convened for an initial meeting in January 2024 moderated by (RH), with (FS) documenting the session minutes for reference. The primary objective of the group, as outlined, was to create a consensus statement offering practical guidance for pre-hospital care providers—both healthcare professionals and non-healthcare professionals—on the recognition, diagnosis, and safe, effective management of exertional heat illness (EHI).

Stage 1: Idea Generation

In the first phase, each participant was asked by the moderator to individually generate provisional ideas concerning the key information that should be included in the consensus statement. This encouraged independent thinking and helped bring forward a wide range of perspectives on EHI management. The topics produced ranged from recognition and diagnosis of EHI, perspectives on different treatments for EHI and follow up of EHI.

Stage 2: Round-Robin Discussion

The group then entered a structured round-robin session where every member shared their ideas one by one, ensuring that all viewpoints were heard. Each contribution was formally recorded and made available for the group to review, promoting inclusivity and ensuring no idea was overlooked.

Stage 3: Clarification and Debate

Once all ideas were presented, the group engaged in detailed discussions to clarify the meaning, relevance, and importance of each idea. This stage also helped resolve any ambiguities, allowing the group to refine and consolidate ideas, while focusing on the essential aspects of EHI management. A focus of this stage was on nomenclature and agreeing terms that were useful to health care professionals but that also provided some use to differentiate different types of EHI. A key point of agreement was the importance of recognising central nervous system dysfunction in individuals with suspected EHI.

In addition, there was discussion of different management techniques and diagnosis methods depending on which pre-hospital setting a patient may be in. This caried from remote military exercises to large mass participation sports events and individuals. Through this process, understanding was achieved on most points.

Stage 4: Provisional Consensus Development

Following the initial meeting the provisional list of consensus statements was produced by RH, reflecting the key points agreed upon. A notable decision during this stage was to focus the statement exclusively on exertional heat illness (EHI), recognizing its distinct aetiology and treatment when compared to non-exertional (classic) heat illness. The group also agreed that future guidelines or a separate consensus statement would be needed for non-exertional heat illness.

Stage 5: Drafting the Initial Consensus Statement

FS, TL, and RH then drafted the first version of the consensus statement, incorporating the key statements and supporting e on the evidence. The draft was based on the evidence and papers provided and formed the basis for further review and refinement by the entire group.

Stage 6: Review and Voting for Consensus

The initial draft was presented to the CSDG group in preparation for a series of scheduled virtual meetings. During these meetings, the group worked systematically through each recommendation, voting to indicate agreement or disagreement with each numbered item. This structured voting process was essential for ensuring that each recommendation had majority support before being included in the final consensus statement.

Stage 7: Resolving Disagreements

Disagreements, particularly regarding the terminology and definitions of different grades of EHI, were addressed in subsequent meetings. Through focused discussion and further revisions, consensus was reached on a unified approach that emphasized prognostic outcomes and appropriate treatment strategies for EHI. In addition, there was discussion around the recommendation to use rectal temperature where possible. There was recognition that not all health care professionals, in all settings would currently be able to perform this and so consideration was given as to the strength of recommendation. It was agreed by all that this is the gold standard method and so should be recommended based on evidence demonstrating its superiority over other methods.

Following this meeting, the statement was revised by the HIAG, and the final draft prepared by RH for submission to the FPHC Executive Committee.

Return to Contents

Appendix C - Authors

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Declarations:

RH is a Director of Nereus Medical and Thermo Elite Health Ltd.

TL is a Director of Thermo Elite Health Ltd.

The HIAG would like to take this opportunity to thank the following persons for assisting with the development of this CS:

- Mr Ruben Muhayiteto MA, PhD candidate - Leeds Beckett University. (Design and production of the infographics.)
- Dr Charlotte Haldane – FPHC RCSEd, Chair Clinical Standards Committee.
- Professor David Lockey – FPHC RCSEd Gibson Chair.

Appendix D - Hierarchy of evidence & grading of recommendations

Hierarchy of Evidence

Level of evidence	Type of evidence
Ia	Evidence from systematic reviews or meta-analysis of randomised controlled trials
Ib	Evidence from at least one randomised controlled trial
IIa	Evidence from at least one controlled study without randomisation
IIb	Evidence from at least one other type of quasi experimental study
III	Evidence from non-experimental descriptive studies such as comparative studies, correlation studies and case-control studies
IV	Evidence from expert committee reports or opinions and/or clinical experience of respected authorities

Grade of recommendation	Type of evidence
A	Based on hierarchy I evidence
B	Based on hierarchy II evidence or extrapolated from hierarchy I evidence
C	Based on hierarchy III evidence or extrapolated from hierarchy I or II evidence
D	Directly based on hierarchy IV evidence or extrapolated from hierarchy I, II or III evidence

Literature Review and Search Term (MeSH) Details:

1. Definitions of heat-related terms

[Heat illness OR hyperthermia OR heatstroke OR fever] AND [definition OR criteria OR diagnosis]

2. Presentation and clinical signs

[Heat illness OR hyperthermia OR heatstroke OR fever] AND [clinical OR signs OR features OR presentation]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [temperature OR thermometer]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [neurological OR sedation]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [cardiovascular OR shock OR heart]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [respiratory OR oxygen OR ventilation OR intubation]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [coagulation OR clotting OR bleeding]

3. Temperature measurement

[Heat illness OR hyperthermia OR heatstroke OR fever] AND [temperature OR measurement OR thermometry OR core]

4. Recommended cooling methods and rates

[Heat illness OR hyperthermia OR heatstroke OR fever] AND [cooling OR treatment]

5 General supportive treatment

[Heat illness OR hyperthermia OR heatstroke OR fever] AND [intubation OR malignant hyperthermia OR suxamethonium]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [oxygen OR ventilation OR respiratory]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [cardiovascular OR heart OR shock]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [neurological OR sedation]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [dantrolene OR muscle]

[Heat illness OR hyperthermia OR heatstroke OR fever] AND [aspirin OR paracetamol OR anti-inflammatory]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [antibiotics OR steroids]

6. The need to cool before transport

[Heat illness OR hyperthermia OR heatstroke OR fever] AND [hospital OR cooling OR transport]

7. The need for hospital assessment

[Heat illness OR hyperthermia OR heatstroke OR fever] AND [mortality]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [biochemistry OR coagulation OR laboratory]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [cardiac OR heart OR ECG]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [respiratory OR intubation OR ventilation]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [renal OR kidney]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [liver OR hepatic]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [neurologic OR cognition]
[Heat illness OR hyperthermia OR heatstroke OR fever] AND [recurrence OR intolerance]

Quick Reference Guide

Defining Exertional Heat Illness

1. Exertional heat illness is a syndrome associated with a raised core temperature and disordered thermoregulation which occurs on a spectrum of severity ranging from mild to life threatening during or immediately after physical activity. (Grade D)

2. Severe exertional heat illness is '*a life-threatening condition of disordered thermoregulation with central nervous system dysfunction, associated with a core body temperature above 40°C during or immediately after physical activity*'. (Grade D)

3. Exertional heat illness can present with a range of signs and symptoms ranging from mild and transient, to life-threatening . (Grade: D)

Assessing Exertional Heat Illness

4. Exertional heat illness should be considered in all individuals who become unwell during or immediately after physical activity. (Grade: D)

5. Core body temperature assessment should not be delayed during the initial primary survey if exertional heat illness is suspected. (Grade: D)

6. Rectal temperature is the preferred method of assessing temperature in suspected exertional heat illness patients. (Grade: B)

7. Tympanic, oral and non-contact infrared skin thermometers are not recommended for assessing temperature in patients with suspected exertional heat illness. (Grade B)

8. Cooling must not be delayed in a patient with a suspected exertional heat illness if a core temperature is not available. (Grade C)

Treating Exertional Heat Illness

9. Severe exertional heat illness is a time critical illness, and the priority is rapid and effective cooling prior to transfer. (Grade D)

10. Cold water immersion is the preferred and recommended method of cooling patients with severe exertional heat illness. (Grade: C)

11. Active cooling via cold water immersion should cease when core body temperature reaches 38.5-39˚C. (Grade: C)

12. Patients with severe exertional heat illness should be transferred to hospital for further assessment after cooling. (Grade: D)

13. In mild exertional heat illness, a 'shade, strip, fan and spray' method of cooling is recommended. (Grade: D)

14. In the pre-hospital environment, anti-pyretics, dantrolene, steroids, antibiotics and depolarising neuromuscular blocking drugs are not recommended in the management of exertional heat illness. (Grade: D)

15. Cold IV fluids are not recommended as an initial method of cooling in the pre-hospital environment. (Grade D).

Preparing to Manage EHI

16. Pre-hospital healthcare organisations should ensure staff are provided with the training and equipment to diagnose and treat exertional heat illness. (Grade: D)

17. Event Organisers of mass participation sporting events should ensure on-site treatment is available for exertional heat illness. (Grade: D)

Figure 1. Exertional Heat Illness Pre-Hospital Diagnosis

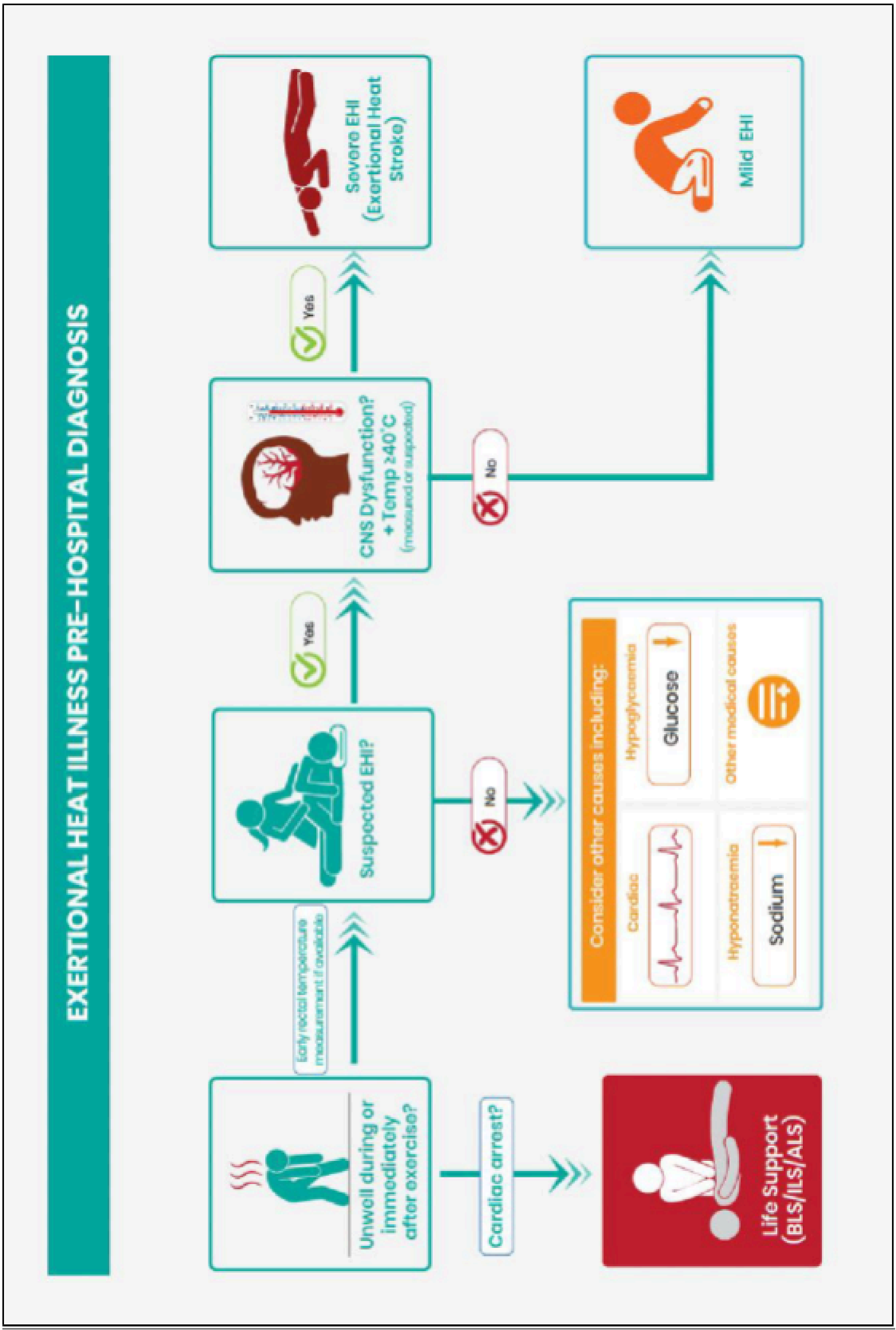

Figure 2. Exertional Heat Illness Pre-Hospital Treatment

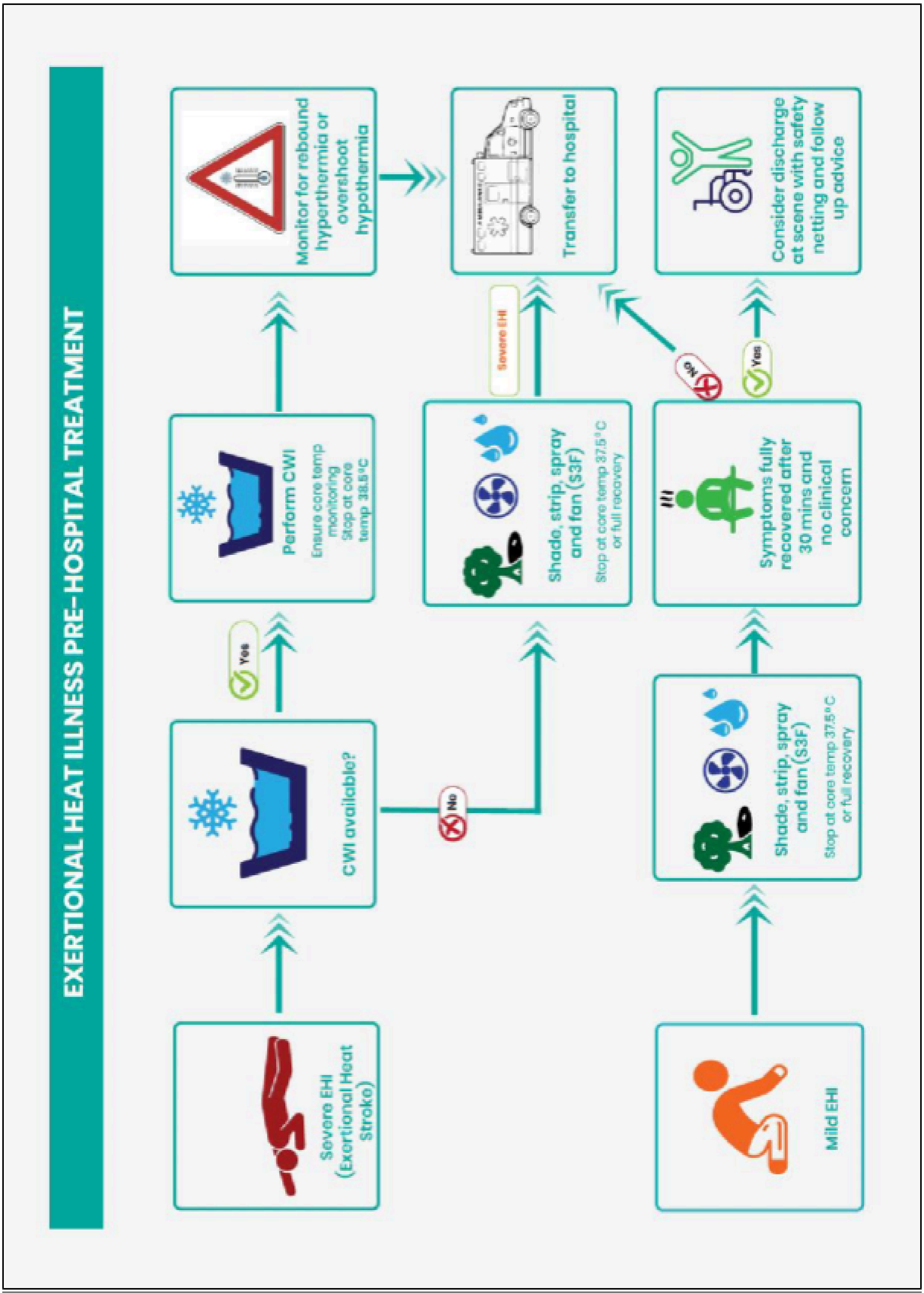

Figure 3. Recommended Methods of Cooling

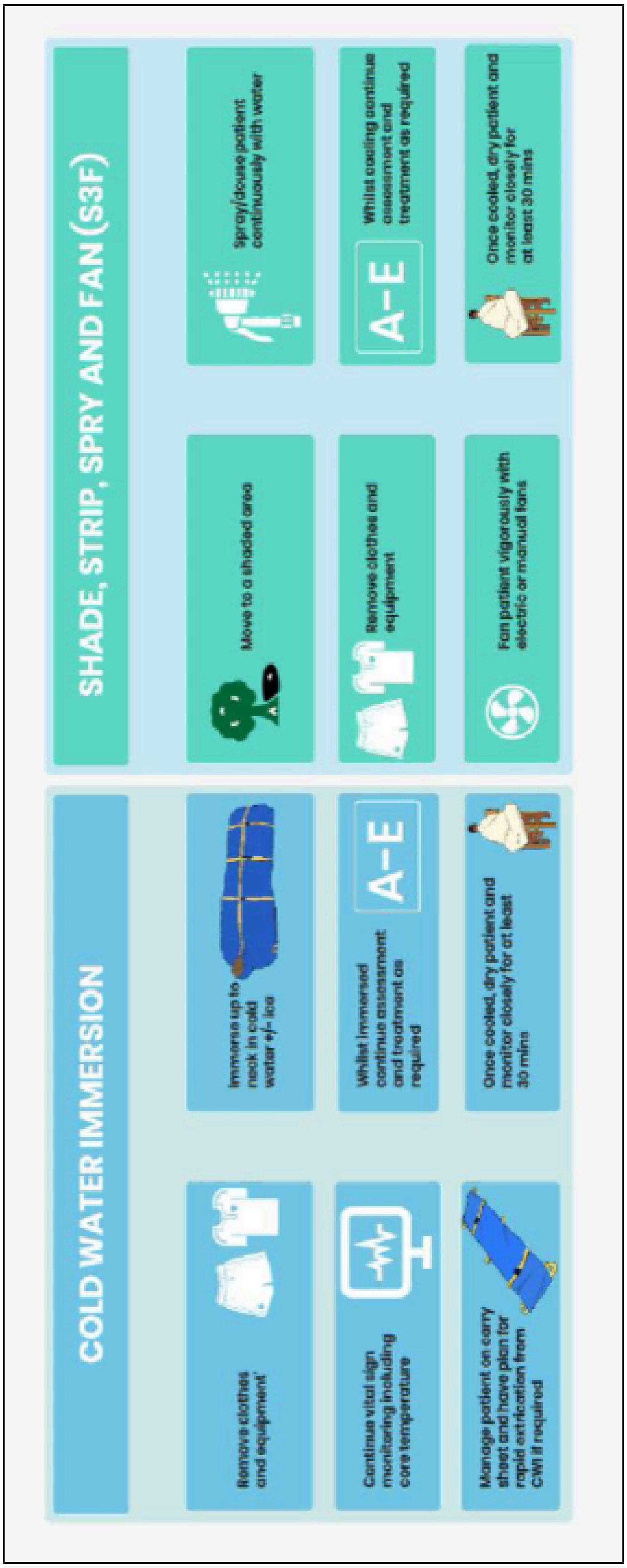

Figure 4. Principles of Management for Severe Exertional Heat Illness (Exertional Heat Stroke)