Exertional Heat Stroke: Best Practices

UPMC | SPORTS MEDICINE

Emergency Action Planning at West Allegheny

- Review current policy and procedures
- Review new research or recommendations (consensus statements)
- Apply best fit for West Allegheny Community
- Consult with administration and team physician
- Review and practice as a medical team
- Review and practice as an athletic department (Coaches, administrators, support staff)

Why is this Important?

Hezekiah Walters, 14 years old, June 11, 2019

Zachary Martin, 16, June 29, 2017

Korey Stringer, Minnesota Vikings
August 2001

"If you throw him in an ice tub, Korey is alive today, "It's that simple"

Jordan McNair, May 29, 2018, Maryland

Remy Hidalgo, September 18th, 2020

Korey Stringer Institute
University of Connecticut
Preventing sudden death in sport

Our Experiences

Steps for Survival

Consensus Statement- Prehospital Care of Exertional Heat Stroke

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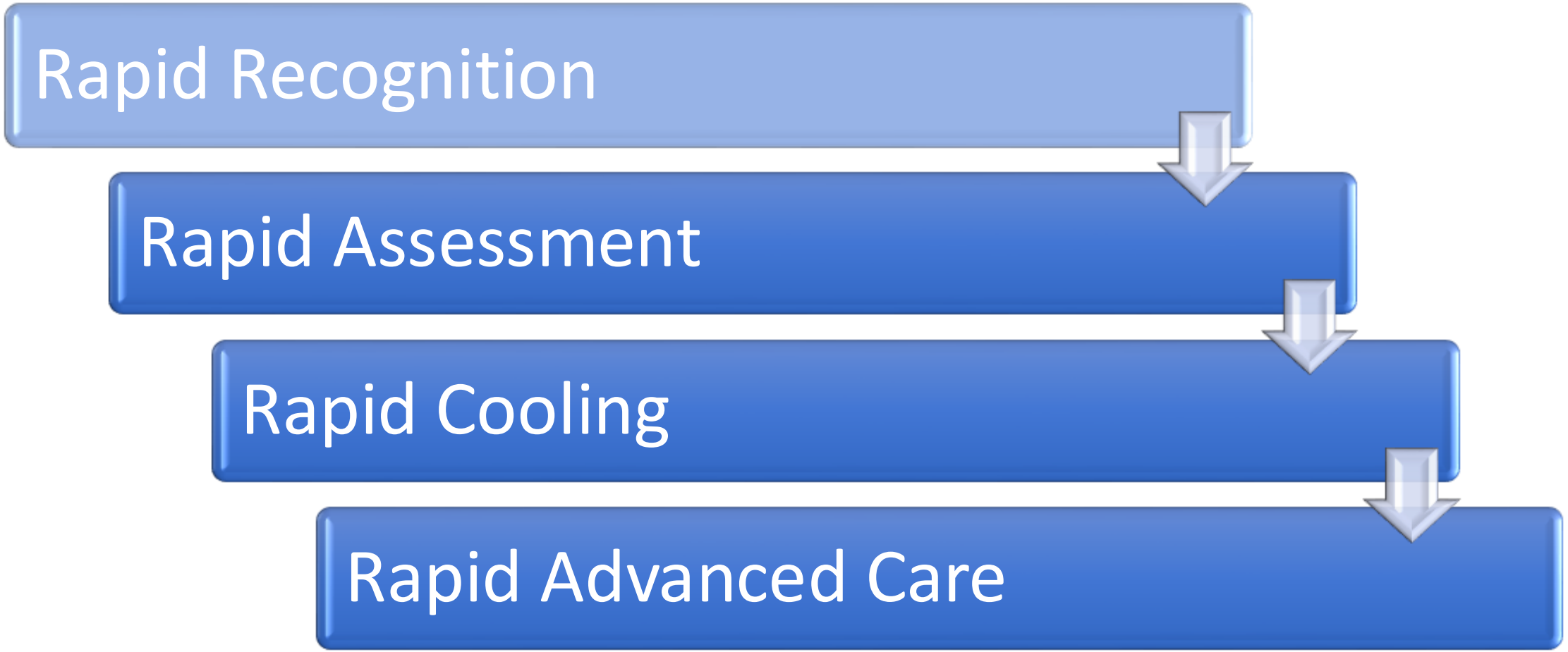

Rapid Recognition: Something is Wrong

Risk Factors of EHS[1-3]

- Extrinsic
  - High ambient temperature, humidity
  - Athletic gear
  - Minimal access to fluids
  - Lack of awareness/education
  - No EAP to identify and treat
  - Delay in recognition and care – not in alignment with best practices
- Intrinsic
  - High intensity of exercise, unmatched to physical conditioning
  - Sleep loss
  - Dehydration
  - Inadequate heat acclimatization
  - Use of diuretics, antihistamines, ADHD medications
  - Reluctance to report illness

Steps for Survival

- Rapid Recognition
- Rapid Assessment

- Rapid Cooling
- Rapid Advanced Care

Rapid Assessment:
Two basic rule in considerations

- Core temperature >40-40.5℃ or **104-105℉**
- CNS Dysfunction
  - Dizziness
  - Collapse
  - Confusion
  - Irrational behavior
  - Hysteria
  - Aggressiveness
  - Disorientation
  - Seizures
  - Coma

Other signs/symptoms
Hot, wet skin
Dehydration
Tachycardia
Hyperventilation
Hypotension
Vomiting
Diarrhea

Rectal Temperature Review

- Gold standard for core temperature: best practice, standard in a court of law
- Korey Stringer Institute:
  - *If rectal temperature is not available, DO **NOT** USE AN ALTERNATE METHOD (oral, tympanic, axillary, forehead sticker, etc.). These devices are not accurate and should never be used to assess an athlete exercising in the heat.*[6] Only rectal temperature has been validated for EHS victims.

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original research

Validity of Devices That Assess Body Temperature During Outdoor Exercise in the Heat

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original research

Validity and Reliability of Devices That Assess Body Temperature During Indoor Exercise in the Heat

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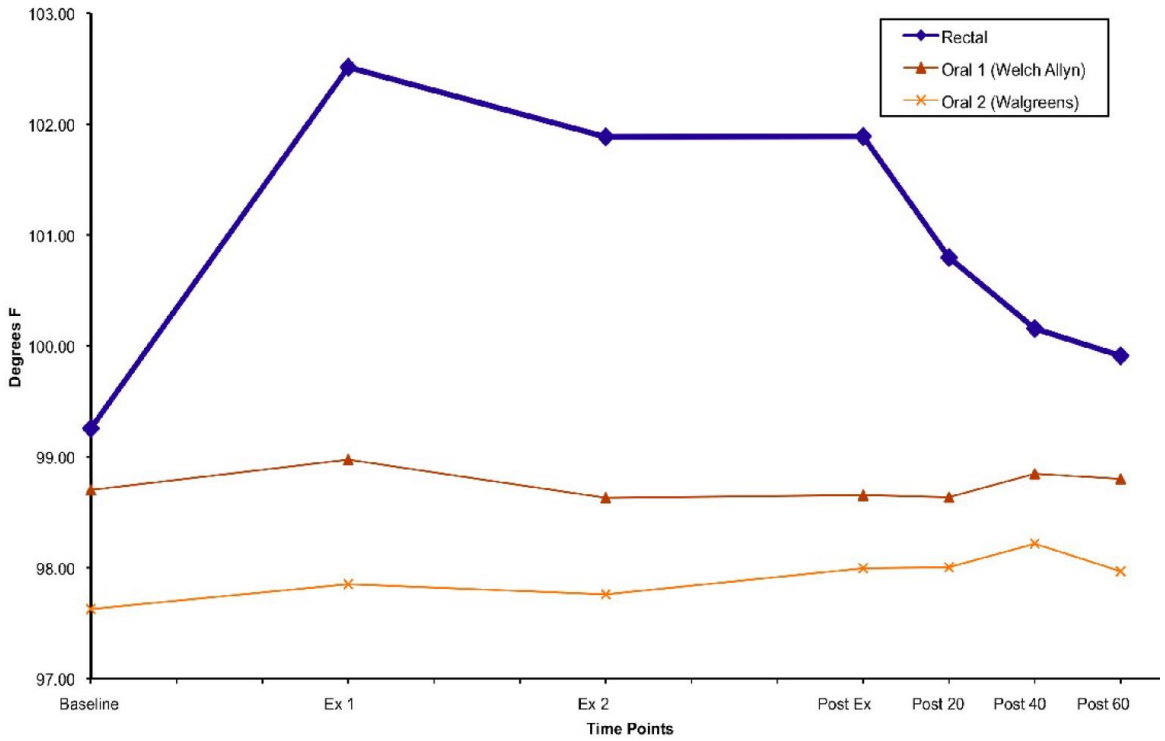
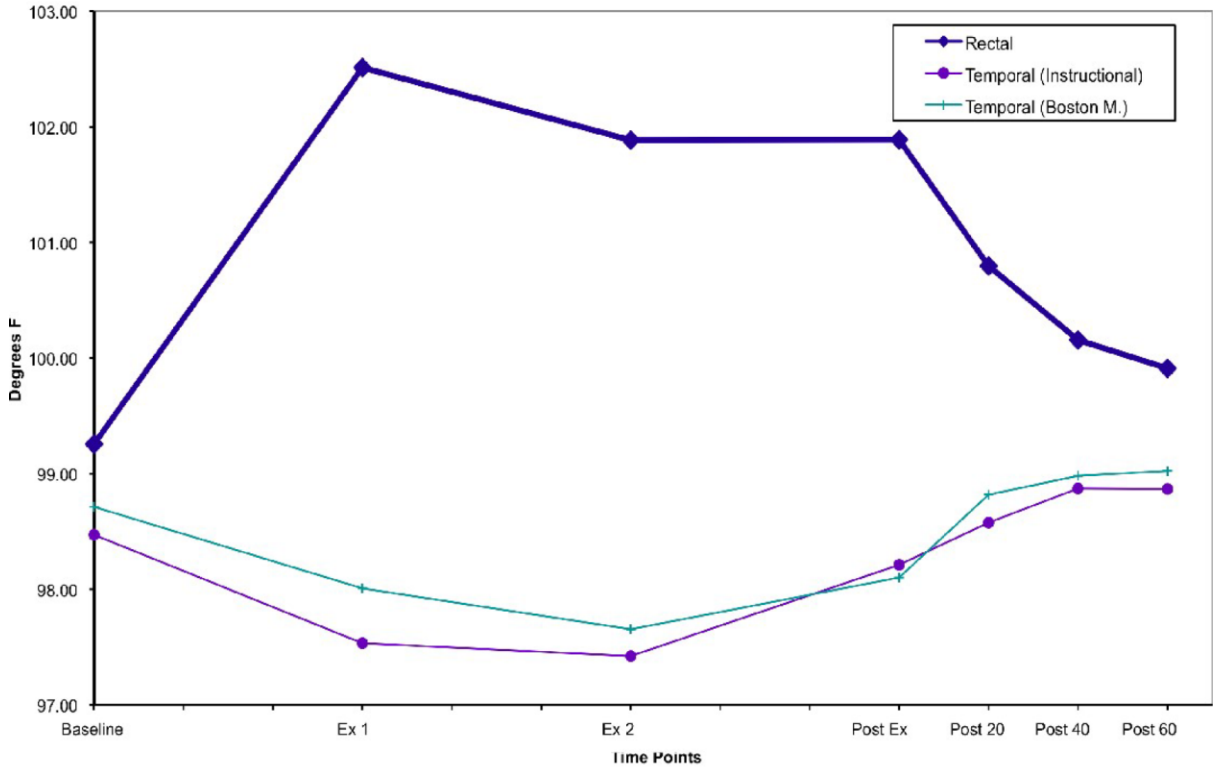
Rectal/Oral

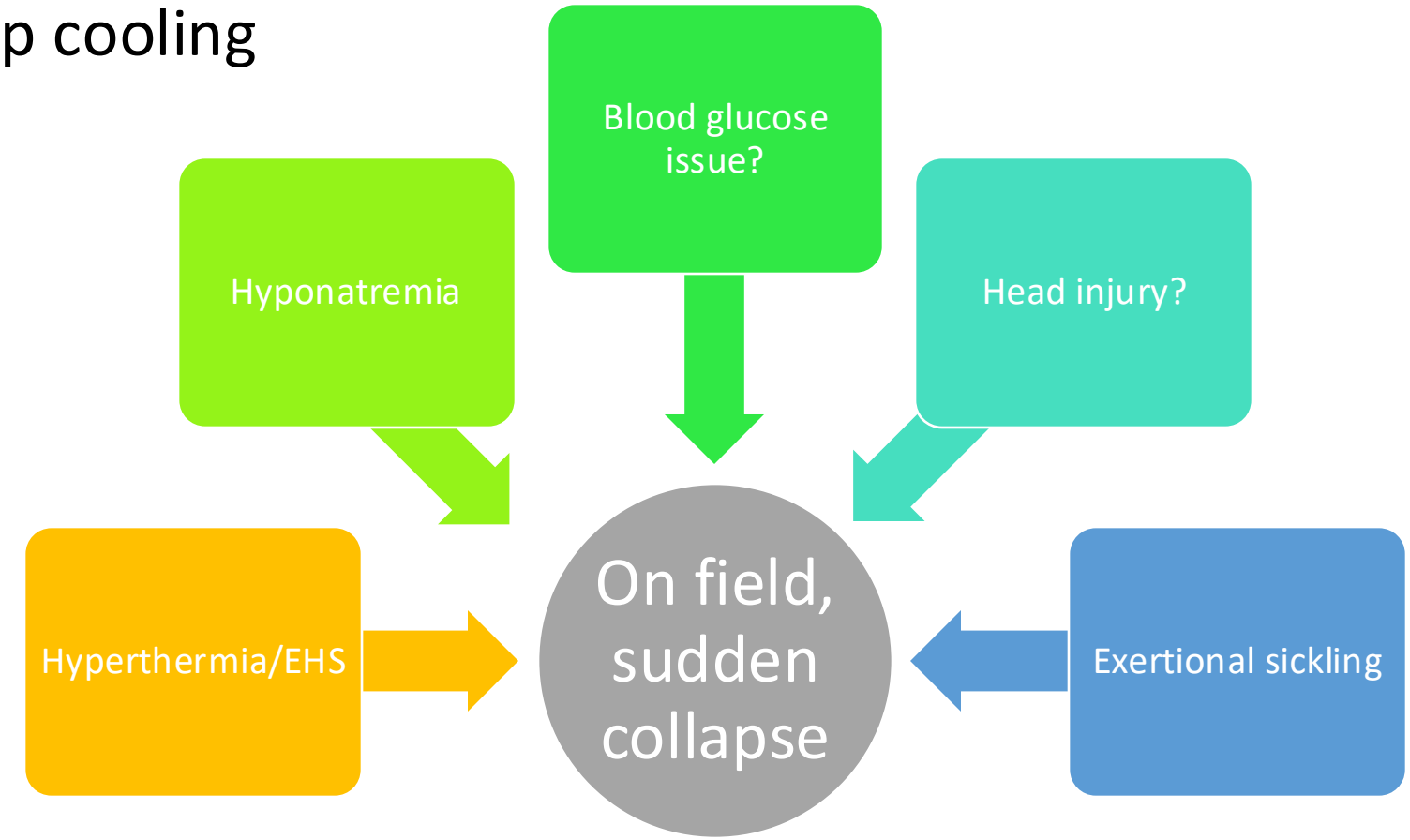


Rectal/Temporal



Why do we need an accurate temperature?

- Determine if it is or is not EHS
- Determine when to stop cooling

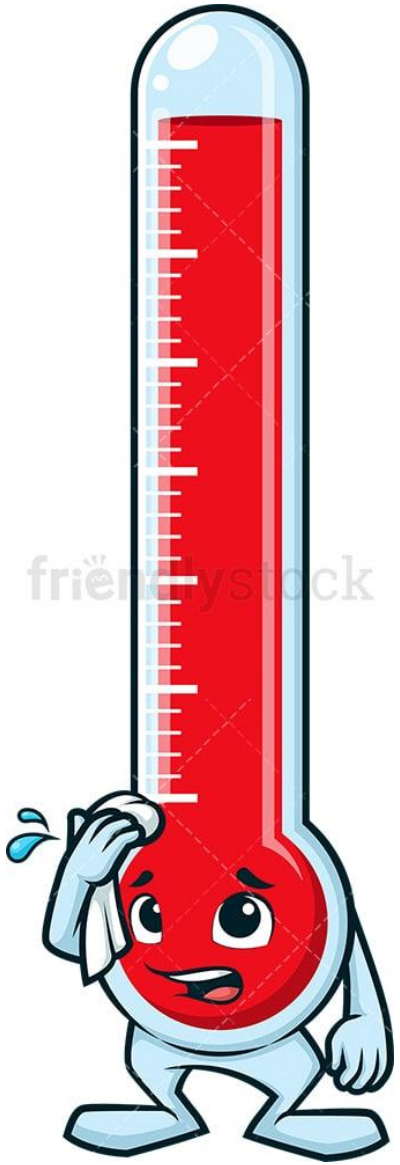


Steps for Survival

- Rapid Recognition
- Rapid Assessment
- Rapid Cooling
- Rapid Advanced Care

Cold Water Immersion: Down to 102

- *An example of cold-water immersion set up and treatment, including the use of a rectal thermometer, towels for the head and to hold the athlete above water*



Rapid, On-Site Cooling: 100% Survivability Rate

- **CWI has provided 100% survival for more than 800 documented EHS victims**

- "The key determinant for an exertional heat stroke outcome is the time above a critical temperature, not the maximum temperature obtained."
  - ***Minimize the length of time a person's temperature is above 104°F***
    - *Multisystem tissue injury, morbidity, death*

Rapid, on-site cooling – COOL FIRST, TRANSPORT SECOND

Cooled within 30 minutes of collapse/onset

Why it still matters

Management Strategies for Patients With Suspected Exertional Heat Stroke (EHS) That Were or Would Have Been Used by Athletic Trainers (ATs) During the 2017 High School American Football Preseason

EHS Management Strategy	Treated Patients With Suspected EHS? No. (%)		*z* Score[a]	*P* Value[b]
	Yes (n = 124)	No (n = 892)		
Standard-of-care practices				
Removed athlete's football equipment	121 (97.6)	879 (98.5)	−0.75	.45
Immersed athlete in ice water	64 (51.6)	804 (90.1)	**−11.38**	**<.001**
Took rectal temperature[c]	4 (3.2)	175 (19.6)	**−4.49**	**<.001**
Additional steps to cool athlete's temperature				
Moved athlete to shaded area	109 (87.9)	841 (94.3)	**−2.71**	**.007**
Used wet ice towels	109 (87.9)	770 (86.3)	0.49	.62
Moved athlete indoors into air conditioning	89 (71.8)	714 (80.0)	**−2.10**	**.04**
Removed athlete's clothing	69 (55.6)	692 (77.6)	**−5.29**	**<.001**
Cooled athlete with fan	38 (30.6)	362 (40.6)	**−2.14**	**.03**
Used portable air conditioning unit	6 (4.8)	90 (10.1)	−1.89	.06
Obtained additional medical care resources				
Called for emergency medical services	19 (15.3)	848 (95.1)	**−23.55**	**<.001**
Called for clinical backup (ie, physician)	7 (5.6)	175 (19.6)	**−3.81**	**<.001**

[a] Reflects *z* scores for proportions evaluating use or intended use of management strategies by ATs who treated patients with suspected cases of EHS and those who did not, respectively. Bolded values were significant at the $\alpha = .05$ level.

[b] *P* values reported from z test for proportions evaluating use or intended use of management strategies by ATs who treated patients with suspected cases of EHS and those who did not. Bolded values were significant at the $\alpha = .05$ level.

[c] An additional 46.7% of ATs who treated patients with suspected EHS reported taking temperature by other means or via alternative sites, such as other external body sites (eg, armpit, forehead) or using internal heat sensors (eg, gastrointestinal temperature via ingestible thermometer). Bolded *z* score and *P* value indicate differences in the use and intended use of the various management strategies.

Nedimyer AK, Chandran A, Hirschhorn RM, et al. J Athl Train. 2020

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