MCoE and the Heat Center Presents

4th Annual Heat Forum

McGinnis Wickham
11-12 Feb 2020
### TUE, 11 FEB

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>0800</td>
<td>TRADOC VIDEO – MCoE Safety</td>
<td>Marshall Auditorium</td>
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<tr>
<td>0830</td>
<td>OPENING REMARKS – COL VINCENT</td>
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<td>0930</td>
<td>KEY NOTE ADDRESS – Mr Ari Cowen Assistant Athletic Trainer for the Atlanta Falcons</td>
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<td>HEAT CENTER STAKEHOLDERS</td>
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<td>MEDICS/68W/BN CMD Teams</td>
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<td>First Responders (Medics, 68W, CLS)</td>
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<td>1445</td>
<td>BDE/BN CMD Teams</td>
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### WED, 12 FEB

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<tbody>
<tr>
<td>0800</td>
<td>Clinicians &amp; Researchers Welcome – MAJ DeGroot</td>
<td>Marshall Auditorium</td>
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<tr>
<td>0920</td>
<td>Exertional Collapse Associated with Sickle Cell Trait (ECAST) – COL Meyering</td>
<td>Marshall Auditorium</td>
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<tr>
<td>1015</td>
<td>Killer Heat in the USA – Dr Shana Udvardy (Union of Concerned Scientists)</td>
<td>Marshall Auditorium</td>
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<tr>
<td>1055</td>
<td>Advances in Exertional Heat Stroke Treatment – CPT Konfe</td>
<td>Marshall Auditorium</td>
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<tr>
<td>1120</td>
<td>Care of Acute Hyponatremia Patients – LTC Will</td>
<td>Marshall Auditorium</td>
</tr>
<tr>
<td>1150</td>
<td>Within Season Distribution of Exertional Heat Illness – MAJ DeGroot</td>
<td>Marshall Auditorium</td>
</tr>
<tr>
<td>1220</td>
<td>Update: Non-invasive Markers of Heat Related Illness During Rigorous Military Training – Ms Driver/Dr Buller</td>
<td>Marshall Auditorium</td>
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<tr>
<td>1245</td>
<td>Eliminating As Much Of The Unknown Exertional Heat Illness Prevention – Fernando Montes, CSCS</td>
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<tr>
<td>1330</td>
<td>End 2020 Heat Forum</td>
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</table>
Commanders initiating mitigation strategies in the field (ice sheets, arm immersion cooling) has decreased elevated core temperatures on arrival to the hospital.

Hyponatremia cases are slightly decreased.

Hospitalization for Soldiers has decreased with new protocols (exhaustion – 24 hour quarters; stroke – 3 days quarters to 2 week profile based on the severity).

Main Post units are transporting heat victims by tactical or GSA vehicle causing delays in treatment and violating policy.
The Ft Benning Heat Center

David DeGroot
MAJ(P), MS
Director, FOA Heat Center
4th Annual Heat Forum

Why have a Heat Forum?

Heat-Related Deaths at Ft Benning

1998 EHS
2005 EHS x2
2007 EHS
2009 EHS
2012 EHS
2014 Hyponatremia
2016 Hyponatremia
4th Annual Heat Forum

Why have a Heat Forum?

608 heat casualties at Ft Benning
140 hospital admissions
78 exertional heat stroke casualties

TRADOC-wide
1059 heat casualties (DRSi)
185 exertional heat stroke casualties
4th Annual Heat Forum

The ‘Tragedy Loop’

- Heat-related death
- Institutional Memory Fades
- Improved Performance
- Renewed Interest
4th Annual Heat Forum

Why have another Heat Forum?

<table>
<thead>
<tr>
<th></th>
<th>Heat Casualties</th>
<th>Hospitalization</th>
<th>Core Temperature</th>
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<tr>
<td></td>
<td>EHS</td>
<td>All others</td>
<td>Average</td>
</tr>
<tr>
<td>2017</td>
<td>55</td>
<td>276</td>
<td>5.5</td>
</tr>
<tr>
<td>2018</td>
<td>86</td>
<td>278</td>
<td>3.0</td>
</tr>
<tr>
<td>2019</td>
<td>78</td>
<td>530</td>
<td>3.5</td>
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</table>

You are making a difference!
Why have another Heat Forum?

Because we can still do better!

97 non-trainees were heat casualties

60+ heat casualties evacuated by POV or tactical vehicle, not EMS
EHI – A Year-Round Problem

The daily average high (red line) and low (blue line) temperature, with 25th to 75th and 10th to 90th percentile bands. The thin dotted lines are the corresponding average perceived temperatures.

weatherspark.com

APHC Public Health Report WS.0022479-15
EHI – A Year-Round Problem

31 year old trainee
From Kansas
15-20°F colder
Collapse, LOC
Core temp 108.1°F
14 Jan transferred to Piedmont
Kidneys

Arrive FBGA

Reception Battalion

Day 1 OSUT
Warrior Heat Illness Collaborative

FOA Heat Center

External Advisory Board

Warrior Heat Illness Collaborative (WHIC)

Field Operating Agency Pilot Program, Fort Benning
What is it?

An organization for
- Leaders
- Clinicians
- Researchers

To advance the science for
- Prevention
- Risk mitigation
- Casualty Management
Who is the Warrior Heat Illness Collaborative?
WHIC

Initiatives
• Develop clinical practice guidelines
• Synchronize Joint Service EHI policies and doctrine
• Provide forum for information sharing
• Provide oversight of Heat Center(s)
• Website – ‘Ask the Expert’, resource center

Multi-disciplinary case review committee
• Advanced evaluations
• Heat tolerance testing
• Muscle biopsy (malignant hyperthermia testing)
• Neuromuscular evaluations
• Sports Medicine evaluations
The Heat Center

Prevention - Management - Research

The Heat Center at Fort Benning
The Heat Center

Lines of Effort

1. Prevention – education and training

2. Medical Management

3. Research
The Heat Center

Prevention – Education and Training

1. The Heat Forum!
2. Leadership briefs
3. Cluster analysis
4. Event analysis

2019 EVENTS

- Unspecified Outdoor Physical/Instructional Training: 23
- Training (indoor): 23
- Run (unspecified distance): 8
- Run (11 to 15 miles): 1
- Run (5 to 10 miles): 37
- Run (< 1 to 4 miles): 34
- PT/PRT: 30
- Misc. (other non-training activities): 73
- March (with load): 123
- March (no load): 36
- Land Navigation: 39
- Formation (standing): 18
- Formation (after physical event): 14
- Field Training & Courses: 105
- Exercise & Drills: 36
- APFT: 3
Medical Management

1. Cadre
2. Medics
3. EMS
4. Emergency Dept
Research

1. Risk Factors
2. Return to duty
3. Illness severity
4. Early ID of EHS
5. Long-term follow-up
The Heat Center

Director – 71B Research Physiologist

Medical Director – 62A Emergency Medicine Physician

Clinical Administrator – 66S Critical Care Nurse

Program Assistant – civilian contractor

Physician Assistant – pending hire

Study Coordinator – pending hire
The Heat Center

Prevention - Management - Research

The Heat Center at Fort Benning
HEAT ILLNESS IN THE NFL

ARI COWAN, MS, ATC
Atlanta Falcons
About me
PREVALENCE OF HEAT ILLNESS
Heat illness exposures by state

Rates of exertional heat illness per 100,000 athlete exposures
Heat illness exposures by sex/age
# Heat illness exposures by activity

## Table 2

Unweighted number and percentage of persons treated for nonfatal sports and recreation heat illness in hospital emergency departments, by sex, age group, and specific activity — National Electronic Injury Surveillance System – All Injury Program, United States, 2001–2009

<table>
<thead>
<tr>
<th>Sex/Rank</th>
<th>Activity</th>
<th>Age group (yrs)</th>
<th>No. (%)</th>
<th>Activity</th>
<th>Age group (yrs)</th>
<th>No. (%)</th>
<th>Activity</th>
<th>Age group (yrs)</th>
<th>No. (%)</th>
<th>Activity</th>
<th>Age group (yrs)</th>
<th>No. (%)</th>
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<tbody>
<tr>
<td>Males</td>
<td></td>
<td>≤14</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Football</td>
<td>75 (46)</td>
<td></td>
<td>Football</td>
<td>140 (57)</td>
<td></td>
<td>Exercise</td>
<td>77 (39)</td>
<td></td>
<td>Golf</td>
<td>27 (29)</td>
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<tr>
<td></td>
<td>Baseball/Softball</td>
<td>19 (12)</td>
<td></td>
<td>Basketball</td>
<td>22 (9)</td>
<td></td>
<td>Baseball/Softball</td>
<td>21 (11)</td>
<td></td>
<td>Exercise</td>
<td>21 (23)</td>
<td></td>
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<tr>
<td></td>
<td>Basketball</td>
<td>12 (7)</td>
<td></td>
<td>Exercise</td>
<td>15 (6)</td>
<td></td>
<td>Track/Field</td>
<td>19 (10)</td>
<td></td>
<td>Bicycle</td>
<td>16 (17)</td>
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<tr>
<td></td>
<td>Exercise</td>
<td>12 (7)</td>
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<td>Baseball/Softball</td>
<td>14 (6)</td>
<td></td>
<td>Bicycle</td>
<td>15 (8)</td>
<td></td>
<td>Track/Field</td>
<td>6 (7)</td>
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<tr>
<td></td>
<td>Track/Field</td>
<td>8 (5)</td>
<td></td>
<td>Racquet sports</td>
<td>10 (4)</td>
<td></td>
<td>Basketball</td>
<td>14 (7)</td>
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<td>Racquet sports</td>
<td>4 (4)</td>
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<tr>
<td></td>
<td>Other</td>
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<td>45 (18)</td>
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<td>54 (27)</td>
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<td>18 (20)</td>
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<tr>
<td>Total</td>
<td></td>
<td>163 (100)</td>
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<td></td>
<td>246 (100)</td>
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<td></td>
<td>200 (100)</td>
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<td>92 (100)</td>
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<td>Females</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Baseball/Softball</td>
<td>22 (25)</td>
<td></td>
<td>Track/Field</td>
<td>21 (27)</td>
<td></td>
<td>Exercise</td>
<td>26 (32)</td>
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<td>16 (44)</td>
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<td>Baseball/Softball</td>
<td>5 (6)</td>
<td></td>
<td>Golf</td>
<td>5 (14)</td>
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<tr>
<td></td>
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<td>Soccer</td>
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<td>Bicycle</td>
<td>4 (5)</td>
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<td>Racquet sports</td>
<td>3 (8)</td>
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<td>Swimming</td>
<td>6 (7)</td>
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<td>Gymnastics</td>
<td>4 (5)</td>
<td></td>
<td>Soccer</td>
<td>4 (5)</td>
<td></td>
<td>Baseball/Softball</td>
<td>2 (6)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>32 (36)</td>
<td></td>
<td></td>
<td>20 (26)</td>
<td></td>
<td></td>
<td>17 (21)</td>
<td></td>
<td></td>
<td>5 (14)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>88 (100)</td>
<td></td>
<td></td>
<td>77 (100)</td>
<td></td>
<td></td>
<td>81 (100)</td>
<td></td>
<td></td>
<td>36 (100)</td>
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# Risk factors for heat illness

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<th>Risk Factor</th>
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<tr>
<td>Prepubescent age</td>
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<tr>
<td>Obesity</td>
</tr>
<tr>
<td>Lack of fitness</td>
</tr>
<tr>
<td>Dehydration</td>
</tr>
<tr>
<td>Lack of acclimatisation</td>
</tr>
<tr>
<td>Prior history of heat illness</td>
</tr>
<tr>
<td>Sleep deprivation</td>
</tr>
<tr>
<td>Medications (antidepressants, diuretics, antihypertensives, antihistamines)</td>
</tr>
<tr>
<td>Stimulants (caffeine, Ma Huang, ephedra, pseudoephedrine)</td>
</tr>
<tr>
<td>Alcohol consumption</td>
</tr>
<tr>
<td>Sweat gland dysfunction</td>
</tr>
<tr>
<td>Sunburn</td>
</tr>
<tr>
<td>Upper respiratory illness, acute gastroenteritis within 1 week of strenuous exercise</td>
</tr>
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</table>
HEAT ILLNESSES
Exercise induced muscle cramps

- Most common of the 4 heat illnesses that we see in the NFL
- Usually able to be treated quickly with salt/calcium supplements and stretching
- Athlete not disqualified from play
- Most common with prolonged activity

Source: Korey Stringer Institute
Heat syncope

• Peripheral vasodilation due to the body’s attempt to cool down
• Leads to a decrease in blood flow to the brain
• Can lead to a loss of consciousness
• Other potential symptoms:
  • Dizziness
  • Weakness
  • Tunnel Vision
  • Decreased or weak pulse

Source: Korey Stringer Institute
Heat exhaustion

- Diagnosed by heat related symptoms with a core temperature LESS THAN 105 degrees
- Symptoms may include nausea, vomiting, chills, fainting, weakness, fatigue, increased breathing rate, decreased blood pressure
- Athlete is immediately removed from activity and taken inside for evaluation
- Athlete will receive IV treatment, salt supplement replacement, cooled down with ice bags in armpits, pelvic area and posterior neck

Source: Koney Stringer Institute
Exertional heat stroke

- Diagnosed by heat related symptoms with a core temperature GREATER THAN 105 degrees
- Considered a medical emergency and immediately placed in cold tub to begin cooling
- Symptoms may be more severe and include CNS dysfunction
  - Altered consciousness
  - Confusion
  - Profuse sweating
  - Collapse

Source: Korey Stringer Institute
TREATMENT OF HEAT ILLNESSES
**Nata position statement**

![Flowchart diagram](image-url)

Figure 3. Algorithm for treatment of exertional heat stroke.

**Source:** NATA Position Statement on Heat Illness
Falcons preventative measures

- WBGT
- AED
- Rectal Thermometer
- IV Tech Available
- EMS On-Site
- Cold Tub
- 20+ Staff Members Pushing Hydration
- Urine Specific Gravity
- Weigh-In Weigh-Out
HALFTIME

COLD TOWELS — ICE TOWELS
DRY TOWELS — DRY OFF SKIN
GATORADE/GATORLYTES
SNACKS — CLIFBARS, GATORADE CHEWS
NACL+ TABLETS
POWER BREEZER FANS
SHADDED AREA
TAKE OFF HELMETS
NEW TECHNOLOGY*
# Hydration Education

**Falcons Performance**

**Hydrate**

**Before**
- Drink 2 bottles during meetings
- Take a sip between each rep
- Drink 1 bottle at Halftime

**During**
- Drink 1 bottle for every pound of sweat lost

**After**

Thirst doesn't kick in until you are already 2% dehydrated. At 2% dehydration, performance decreases in the heat. **Drink before you are thirsty!**

## Urine Color Chart

<table>
<thead>
<tr>
<th>Color</th>
<th>Hydration Level</th>
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<tbody>
<tr>
<td>Clear</td>
<td>Appropriate Hydration</td>
</tr>
<tr>
<td>Light yellow</td>
<td>At risk for Dehydration</td>
</tr>
<tr>
<td>Dark yellow</td>
<td>Dehydrated</td>
</tr>
</tbody>
</table>

**Recommendations**

**Pre-Activity**
- Drink 2 bottles of Gatorade 2 hours before practice, activity or game

**During Activity**
- Drink about 1/2 a bottle of Gatorade every 15 minutes of practice in addition to water
- On hotter, more humid days, drink more Gatorade Endurance Formula and supplement with Gatorlytes

**Post-Activity**
- Drink 1 bottle of Gatorade for every 1 lb. of weight lost during activity

**Evening**
- Continue to drink Gatorade to prepare for the next day. There are Gatorade and...
QUESTIONS
<table>
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<th>Time</th>
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<th>Breakout #2</th>
<th>Breakout #3</th>
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<td>W139</td>
<td>W120</td>
</tr>
<tr>
<td>1000-1300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1300-1400</td>
<td>LUNCH</td>
<td>MEDICS/68W/CADRE</td>
<td>HEAT CENTER STAKEHOLDERS</td>
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<td>1400-1600</td>
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<td>W139</td>
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<td>1600-1800</td>
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<td>1800-1830</td>
<td>GM TO DINNER</td>
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<tr>
<td>1830-2100</td>
<td>HEAT, MEET, GREET, EAT!</td>
<td></td>
<td>BARE ROOTS FARMACY</td>
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