LET’S GET STARTED! BUT FIRST – HOUSE-KEEPING NOTES

- This webinar is being recorded and will be sent out shortly after the webinar
- Have audio or visual issues? Try closing and reopening GoToWebinar
- Have a question? Use the chat box and we will get to the question at the end of the session
- Want to learn more? We have additional sessions scheduled.
- You can also provide feedback, suggest a topic or ask a question by emailing us at info@earthnetworks.com
SAM ZHAO

Attending Physician
Division of Emergency Medicine
Children’s National Hospital, Washington, DC
POLL QUESTION

Do you already have a policy to prevent weather-related injuries?
REPORTED CASES AS OF MARCH 18

Reported Cases
(last updated March 18, 2020)

- 11 to 50
- 6 to 10
- None
- 1 to 5
- 51 to 100
- 101 to 200
- 201 to 500
- 501 to 1000
AGE DISTRIBUTION

![Bar Chart]

- **General ward**
- **Intensive care unit**

Number of cases across different age groups:
- <18
- 18-24
- 25-49
- 50-64
- ≥65
OBJECTIVES

• Recognize health risks associated with heat stress and lightning strikes

• Describe long term health impacts related to heat stress and lightning strikes

• Identify prevention tips and first aid recommendations in the event of an incident
WHAT IS NORMAL?

- Carl Wunderlich (1815-1877)
- 37°C or 98.6°F
BUT IS THIS CORRECT?

- Philip A. Mackowiak: 36.8° C or 98.2° F
- Jonathan S. Hausmann: 36.5° C or 97.7° F
PEDIATRIC DATA

James M. Chamberlain:

- 3 days to 10 years: 36.8°C or 98.2°F
- 11 years and older: 37.5°C or 97.7°F
WHAT HAPPENS WHEN IT’S TOO HOT?

HEAT CRAMPS
Involuntary muscle contractions

HEAT EXHAUSTION

HEAT SYNCOPE
Loss of consciousness or collapse

HEAT STROKE
AVERAGE 90+ DEGREE DAYS IN MAJOR CITIES IN THE REGION

<table>
<thead>
<tr>
<th>City</th>
<th>Number of 90+ Degree Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix, AZ</td>
<td>168</td>
</tr>
<tr>
<td>San Antonio, TX</td>
<td>113</td>
</tr>
<tr>
<td>Orlando, FL</td>
<td>106</td>
</tr>
<tr>
<td>Jackson, MS</td>
<td>93</td>
</tr>
<tr>
<td>Montgomery, AL</td>
<td>78</td>
</tr>
<tr>
<td>Columbus, GA</td>
<td>76</td>
</tr>
<tr>
<td>Little Rock, AR</td>
<td>73</td>
</tr>
<tr>
<td>New Orleans, LA</td>
<td>72</td>
</tr>
<tr>
<td>Oklahoma City, OK</td>
<td>68</td>
</tr>
<tr>
<td>Memphis, TN</td>
<td>67</td>
</tr>
<tr>
<td>Albuquerque, NM</td>
<td>62</td>
</tr>
<tr>
<td>Denver, CO</td>
<td>34</td>
</tr>
<tr>
<td>Location</td>
<td>Event Details</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Blue Eye, MO</td>
<td>Right Angle Foundations: Construction worker outdoors feels ill and later dies</td>
</tr>
<tr>
<td>West Point, KY</td>
<td>Walter Ross &amp; Shawn Morrison: Roofer on construction site feels ill and later dies</td>
</tr>
<tr>
<td>Delair, NJ</td>
<td>Aluminum Shapes, LLC.: Metalworker near an oven feels ill and later dies</td>
</tr>
<tr>
<td>Hondo, TX</td>
<td>Hellas Construction: Construction worker at outdoor field feels ill and later dies</td>
</tr>
<tr>
<td>Tampa, FL</td>
<td>Middleton High School: 14-y.o. freshman collapses during football conditioning and later dies</td>
</tr>
<tr>
<td>College Park, MD</td>
<td>University of Maryland, College Park: Offensive lineman hospitalized and died due to heatstroke</td>
</tr>
<tr>
<td>Austin, TX</td>
<td>University of Texas: Offensive lineman hospitalized due to heat-related illness</td>
</tr>
<tr>
<td>Bowling Green, OH</td>
<td>Bowling Green State University: Football player hospitalized at away game due to heat stress</td>
</tr>
</tbody>
</table>
HEAT EXHAUSTION

**Observe in a cool environment**
- Remove as much clothing as possible
- Active cooling (e.g., Mist-and-fan)

**Oral hydration**
- Reestablishes circulating volume
- Promotes sweating

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**Heat Exhaustion**
- Faint or dizzy
- Excessive sweating
- Rapid, weak pulse
- Nausea or vomiting
- Cool, pale, clammy skin
- Muscle cramps

**Heat Stroke**
- Throbbing headache
- May lose consciousness
- Rapid, strong pulse
- Nausea or vomiting
- Body temperature above 103°
- Red, hot, dry skin
- No sweating

Help the person get to a cooler, air conditioned place. Encourage them to drink water if they're fully conscious.

Call 911
Take immediate action to help cool the person until help arrives.
HEAT STROKE

Begin cooling as soon as possible
• *Cold water immersion for 15 to 20 minutes*
• Mist-and-fan
• Application of cold material to body
• Stop cooling before normal core body temperature achieved

Give fluids orally if patient is not confused, weak, or vomiting

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WHAT ARE RISK FACTORS FOR HEAT-RELATED INJURIES?

- Young or old age
- Certain medications
- Occupational or recreational activities requiring strenuous exercise in hot or humid environments
  - Athletes
  - Firefighters
  - Military personnel
HOW CAN YOU PREVENT HEAT-RELATED INJURIES?

- Do not leave children in vehicles, even for short periods of time
- Wear loose, light clothing
- Take in more fluids and electrolytes than usual
- Avoid strenuous activity during extreme heat
WHAT ARE COMPLICATIONS OF HEAT STROKE?

• Good prognosis if recognized and treated early

• Heart injury (bradycardia, hypotension, dysrhythmias)

• Muscle injury (rhabdomyolysis)

• Kidney injury (acute kidney injury)

• Brain injury (delirium, seizures)
5 TYPES OF LIGHTNING INJURY

A. Direct strike

B. Contact voltage

C. Side flash

D1. Step voltage

D2. Ground current

D3. Upward streamer

E. Upward streamer
WHO IS MOST AFFECTED?

• Highest risk of injury in males 15 to 44 years old

• 300 injuries and 100 deaths per year in the United States

• Up to 74% of survivors have permanent disabilities
WHAT HAPPENS AFTER A LIGHTNING STRIKE?

• Sudden death is caused by cardiac or respiratory arrest
4 TYPES OF SKIN LESIONS
WHAT ARE OTHER LIGHTNING-ASSOCIATED INJURIES?

• Eye injuries
• Eardrum rupture
• Kidney injury
• Burns to the bones and deep tissue
• Temporary to permanent neurological disability
WHAT DO YOU DO AFTER A LIGHTNING-ASSOCIATED INJURY?

• Check for breathing and a pulse

• Start CPR immediately if either is missing

• Move the injured person into a protected area until EMS arrives
EARTH NETWORKS AUTOMATED ALERTING: HOW IT WORKS

1. System detects lightning within a pre-determined radius around the facility

2. Horn sounds for 15 seconds and strobe light activates (strobe stays on during the entire alert period)

3. Everyone must immediately seek shelter. Activities suspended until all-clear signal is received

4. When system no longer detects a threat beyond the pre-configured time frame, three 5-second blasts from horn will sound and the strobe light will stop

5. This is the signal that it is safe to return outdoors
## LIGHTNING DETECTION & ALERTING INTEGRATION

### OUTER – 25 Miles

<table>
<thead>
<tr>
<th>ALERT</th>
<th>Email warning sent to key admin: Public Safety Director / Facilities Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTION</td>
<td>Monitor the situation (Take note of potential severe weather movement)</td>
</tr>
</tbody>
</table>

### MIDDLE – 15 Miles

<table>
<thead>
<tr>
<th>ALERT</th>
<th>Text &amp; email alerts are sent to key stakeholders: Safety team, ADs, Key Admins</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTION</td>
<td>Monitor direction of storm</td>
</tr>
<tr>
<td>ACTION</td>
<td>Prepare to halt outdoor activities if required</td>
</tr>
</tbody>
</table>

### INNER – 10 Miles

<table>
<thead>
<tr>
<th>ALERT</th>
<th>Outdoor horn, system notification and strobes are activated</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTION</td>
<td>All outdoor activities are halted</td>
</tr>
<tr>
<td>ACTION</td>
<td>General public head to designated indoor area for safety until all clear is given</td>
</tr>
</tbody>
</table>
WET BULB GLOBE TEMPERATURE (WBGT) & HYPERLOCAL CONDITIONS (OPTIONAL)

PROFESSIONALLY MONITORED WEATHER STATION

- Campus-wide WBGT monitoring
- Mobile Alerting
- Automated & Accurate
- Online Weather Center with historic data and local forecast
TOTAL PROTECTION FOR SEVERE WEATHER

- Real-time storm tracking
- Customized mobile alerts
- Automated high-decibel audible/visual alerts
- Forecasting
- Daily weather outlooks
- Dangerous thunderstorm alerts
- 24/7 access to meteorologists
- Managed weather equipment
PROTECTING THOUSANDS OF CUSTOMERS WITH MILLIONS OF ALERTS
Are you interested in learning more about automated lightning and WBGT alerting?