Heat and Health: Knowns and Unknowns

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Workshop on the Development of Climate Information Systems for Heat Health Early Warning, Chicago 2015
Roadmap

- Salient findings from the literature on health impacts from extreme heat
- Information sharing between the public health and meteorological agencies
- Future collaborations for discussion during the meeting
Relation between Elevated Ambient Temperature and Mortality: A Review of the Epidemiologic Evidence
Rupa Basu and Jonathan M. Samet

*Epidemiologic Reviews, 2002*

Ambient Temperature and Morbidity: A Review of Epidemiological Evidence
Xiaofang Ye, Roddy Wolff, Weiwei Yu, Pavla Vaneckova, Xiaoqian Pan, and Shilu Tong

*Environmental Health Perspective, 2012*

Projecting Future Heat-Related Mortality under Climate Change Scenarios: A Systematic Review
Cunrui Huang, Adrian Gerard Barnett, Xiaoming Wang, Pavla Vaneckova, Gerard FitzGerald, and Shilu Tong

*Environmental Health Perspective, 2011*

Impact of diurnal temperature range on human health: a systematic review
Jian Cheng, Zhiwei Xu, Rui Zhu, Xu Wang, Liu Jin, Jian Song, Hong Su

*International Journal of Biometeorology, 2014*

The SSC: a decade of climate–health research and future directions
D. M. Hondula, J. K. Vanos, S. N. Gosling

*International Journal of Biometeorology, 2013*
Mortality risk from heat waves

Andersen and Bell, EHP 2011
Temperature profile on ED visit days change by place

Sahe et al., 2015
Environmental Health
Relevant findings from the literature review

- Absolute or relative thresholds
- Duration of heat waves
- Lagged exposure effects
- Temperature metric – daily maximum, diurnal difference, heat index, synoptic classification
### Comparing ‘hot day’ classification using Maximum Temperature and Spatial Synoptic Classification

<table>
<thead>
<tr>
<th>Maximum temperature</th>
<th>May-Sep</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sep</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;80F</td>
<td>5</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>80-90F</td>
<td>45</td>
<td>53</td>
<td>35</td>
<td>41</td>
<td>48</td>
<td>51</td>
</tr>
<tr>
<td>90-95F</td>
<td>67</td>
<td>33</td>
<td>62</td>
<td>65</td>
<td>73</td>
<td>82</td>
</tr>
<tr>
<td>95-100F</td>
<td>73</td>
<td>_</td>
<td>68</td>
<td>63</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>&gt;100F</td>
<td>73</td>
<td>_</td>
<td>100</td>
<td>67</td>
<td>70</td>
<td>_</td>
</tr>
</tbody>
</table>

Spatial synoptic classification – [http://sheridan.geog.kent.edu/ssc.html](http://sheridan.geog.kent.edu/ssc.html)

Maximum temperature – GHCN Daily Summary, National Climatic Data Center
The definition of a ‘hot’ day

Environmental Public Health Tracking:  http://www.cdc.gov/nceh/tracking/
Projections of extreme heat, National Climate Assessment 2014

Projected number of extreme heat days above the 98th percentile based on a high emissions scenario (A2)

- 2030
- 2050
- 2080

- 14-17
- >17-24
- >24-30
- >30-48
- >48-157
- No Data

CDC logo
Changing health risk with temperature increase

Reducing and meta-analysing estimates from distributed lag non-linear models

Antonio Gasparrini and Ben Armstrong
Future work

- The search for the right temperature metric
- Heat warnings – the missing link?
- Different temperature thresholds for different health outcomes – the precautionary principle
- Regional vs local analyses – statistical power or spatial resolution
Thank you

"The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official view of Centers for Disease Control and Prevention

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