Effects of heat stress on human health outcomes

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Adverse health outcomes during heat waves

- Non-accidental mortality (NAD) and ED visits increase during heat waves.
- Previously identified important covariates include SES, age, chronic disease status, minority status, and geography (greater risk in northern ‘less hot’ cities).
- Numerous studies have reported a positive association between preterm birth (PTB) and heat waves.

Data gaps:

- A variety of heat wave definitions exist. Which one is the most predictive of adverse health outcomes?
- Does ambient temperature predict personal heat exposure across urban/rural areas and occupations?
Assessment of extreme heat and hospitalizations

FROM: Vaidyanathan et al. PNAS March 19, 2019 116 (12) 5420-5427
Exposure-response relationships between daily maximum heat index and hospitalizations across U.S. Regions
Heatwaves in urban heat islands are detected with incorporation of satellite-derived data

Downscaled data (1km)

NLDAS data (12.5km)

Wu et al. (2018) Annals of Amer Assoc Geog
Association between heat waves and non-accidental deaths are greater in urban areas

Kent et al. 2014 Environ Health Persp. 122 (2)
The iButton temperature sensor clipped to shoe
More hours in most protective work-rest schedule when using personal vs. weather station temperatures

Wang, S et al. (2019) Jour Occup Envir Med
Attributable fractions of hospitalizations to heat exposure
Actionable Solutions

- Remind patients in the late Spring about signs of heat stress, allow at least a 2 week period for physiological acclimation to hot weather.

- Hospital preparedness for more cases of diabetes complications and renal failure during hot periods of summer.

- Work with local employers of outdoor workers to implement appropriate monitoring and work-rest schedules.

- Remind obstetric patients to identify an air conditioned location that is available to them and be particularly aware of signs of heat stress, dehydration, and preterm labor during hot periods.
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