Climate and Health Symposium
May 6, 2022

Heat Stress and Acute Cardiovascular Effects

William W. Aitken, M.D.
Cardiology PGY-5
Disclosures

None
Pollution, Climate and the Heart

- 9 million deaths worldwide in 2019
- 62% cardiovascular disease
- Largely omitted from cardiovascular disease prevention guidelines


Heat Stress and CVD

High temperatures increase:
• ground-level ozone
• risk of wildfires and dust storms (PM2.5)
• Demand for electricity (fossil-fuel combustion and pollution)
• mortality from CVD

Climate, Heat, and the Heart

Global Warming → Extreme Heat Events → Cardiovascular Disease

Climate, Heat, and the Heart

Climate, Heat, and the Heart

Heat Stress

- Increased Cardiac Workload
- Hemoconcentration
- Inflammatory response (IL-1, 6)
- Autonomic Dysfunction

Climate, Heat, and the Heart

Among older adults in summer after controlling for PM2.5 concentration, relative humidity, and barometric pressure:

Extremely hot days (>95\textsuperscript{th}% of monthly mean)
- CVD-related ED visits at lag day 5
  - OR: 1.02 (95% CI: 1.01–1.04)
  - 6% increase risk of cardiac dysrhythmias
  - 4% increased risks of hypertension
- 7% increased risk of ischemic heart disease on the day of extreme heat
Climate, Heat, and the Heart

ICD-9 principal diagnoses:
- hypertension (401–405)
- ischemic heart diseases (410–414)
- cardiac dysrhythmias (427)
- heart failure (428)
- cerebrovascular diseases (430–434, 436–438)

Climate, Heat, and the Heart

Time-series analysis in 184 cities in China between 2014 and 2017

At the national-average level, a 1°C increase in temperature variability was associated with increase in hospital admissions for:

- cardiovascular disease 0.44% (0.32%-0.55%)
- ischemic heart disease 0.31% (0.20%-0.43%)
- heart failure 0.48% (0.01%-0.96%)
- heart rhythm disturbances 0.34% (0.01%-0.67%)
- and ischemic stroke 0.82% (0.59%-1.05%)
Climate, Heat, and the Heart

Climate, Heat, and the Heart

Interventions

- Hydration
- Air Conditioning
- Light, Loose Clothing

Thank you!

Contact: @williamaitken