Submission Id: 5027

Title

Extreme Heat Threatens Health, Health Care, and the Economy: Combining Health and Claims Data to Understand Climate Change

Priority 1 (Research Category)

Economic or policy analysis

Presenters

Alex Krist, MD, MPH, Derek Chapman, PhD, Joseph Morina, PhD, Roy Sabo, PhD, Stephen Fong, Steven Woolf, MD, MPH, Adam Funk

Abstract

Context: Climate change is causing prolonged periods of extreme heat and the incidence of heat-related illness is rising. Heat-related illness is not equitably distributed. Some people and communities are at greater health risk. Nationally, this increase in healthcare utilization has significant costs.

Objective: To calculate the excess number of emergency department (ED) visits and hospital admissions caused by heat event days in Virginia, identify communities with higher adverse health events, and extrapolate Virginia's findings nationally to estimate the annual cost of care.

Study Design: Retrospective observational analysis.

Dataset: We used data from 15 Virginia (or near) and 298 national weather stations to identify heat event days, Virginia All-Payer Claims Data to identify healthcare utilization, American Community Survey to compare community characteristics, and the Healthcare Cost & Utilization Project to estimate cost of care.

Population studied: Census tract level evaluation of Virginia with national extrapolation.

Analysis: Between 2016 and 2020, we calculated the per capita rate of ED visits and hospitalizations for heat-related and heat-adjacent illness. From daily climate data, we determined the number of heat event days experienced by each ZCTA and the size of the exposed population. We compared health care

utilization by ZCTA on heat event days to non-heat event days. We applied Virginia's health event rates to national measures of heat events to calculate a national cost.

Results: There were 80 heat-event days per year in Virginia between 2016 and 2020. During heat event days, ED visits for heat related and adjacent illness increased 179% and hospital admissions increased 217% for an additional 6967 ED visits and 1667 hospital admissions each year. Rates appeared to be higher in more vulnerable communities. Extrapolating Virginia's findings nationally and assuming average ED visits and hospital admission costs of $800 and $15,000, respectively, heat event days resulted nationwide in 234,188 ED visits, 56,037 hospital admissions, and $1.03 billion in costs every summer.

Conclusions: These findings highlight the stark impact of climate change on health and demonstrate the value of integrating health, community, and environmental data. Action is needed to slow rising temperatures, raise public awareness about the risks of extreme heat, increase community resilience, and strengthen health care services.