National Institute of Environmental Health Sciences

Heat and mortality in New York City since the beginning of the 20th century

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Year: 2014
Journal: Epidemiology. 25 (4): 554-560

Abstract:

BACKGROUND: Heat is recognized as one of the deadliest weather-related phenomena. Although the impact of high temperatures on mortality has been a subject of extensive research, few previous studies have assessed the impact of population adaptation to heat. METHODS: We examined adaptation patterns by analyzing daily temperature and mortality data spanning more than a century in New York City. Using a distributed-lag nonlinear model, we analyzed the heat-mortality relation in adults age 15 years or older in New York City during 2 periods: 1900-1948 and 1973-2006, to quantify population adaptation to high temperatures over time. RESULTS: During the first half of the century, the decade-specific relative risk of mortality at 29°C vs. 22°C ranged from 1.30 (95% confidence interval [CI]Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 1.25-1.36) in the 1910s to 1.43 (1.37-1.49) in the 1900s. Since the 1970s, however, there was a gradual and substantial decline in the relative risk, from 1.26 (1.22-1.29) in the 1970s to 1.09 (1.05-1.12) in the 2000s. Age-specific analyses indicated a greater risk for people age 65 years and older in the first part of the century, but there was less evidence for enhanced risk among this older age group in more recent decades. CONCLUSION: The excess mortality with high temperatures observed between 1900 and 1948 was substantially reduced between 1973 and 2006, indicating population adaption to heat in recent decades. These findings may have implications for projecting future impacts of climate change on mortality.

Source: http://dx.doi.org/10.1097/ede.0000000000000123

Resource Description

Early Warning System:

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Heat, Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☒

resource focuses on specific location

United States

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Injury, Morbidity/Mortality, Other Health Impact

Other Health Impact: Hospitalizations; Emergency room visits

Mitigation/Adaptation: ☒

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☒

type of model used or methodology development is a focus of resource

Methodology, Outcome Change Prediction, Other Projection Model/Methodology

Other Projection Model/Methodology: Adaptation to extreme heat

Population of Concern: A focus of content

Population of Concern: ☒

populations at particular risk or vulnerability to climate change impacts

Children, Elderly, Low Socioeconomic Status

Other Vulnerable Population: Social isolation; Pre-existing medical conditions

Resource Type: ☒

format or standard characteristic of resource

Research Article

Resilience: ☒

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale: ☒

time period studied

Time Scale Unspecified