

Findings on Mortality and Climate Change

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MORTALITY DATA

- Daily deaths (Source: National Center for Health Statistics)
- All causes (total mortality)
- County of death aggregated into Metropolitan Statistical Areas (MSAs)

METEOROLOGICAL DATA

- 4 p.m. Apparent Temperature (combination of temperature and humidity, used by the National Weather Service as the basis of the “Heat Index”)

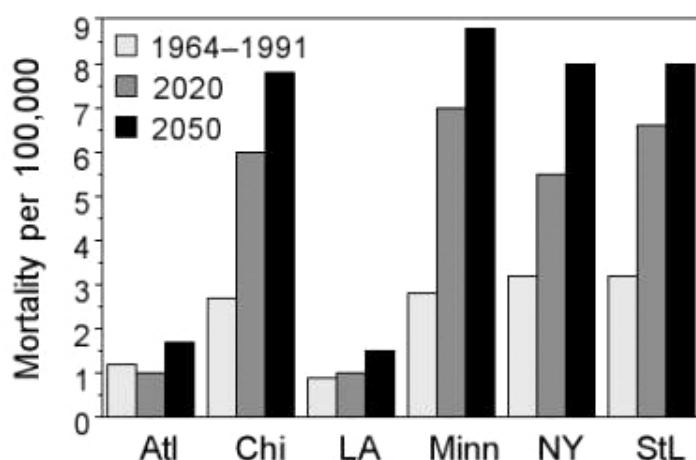
LOCATIONS

- 28 Major U.S. Cities

TIME PERIOD

- 29 non-consecutive years;
- Organized into three “decades”
- 1964–1966, 1973–1979 (60s+70s); 1980–1989 (80s); 1990–1998 (90s)

FUTURE MORTALITY PROJECTIONS (Climate component from Max Planck Institute model)



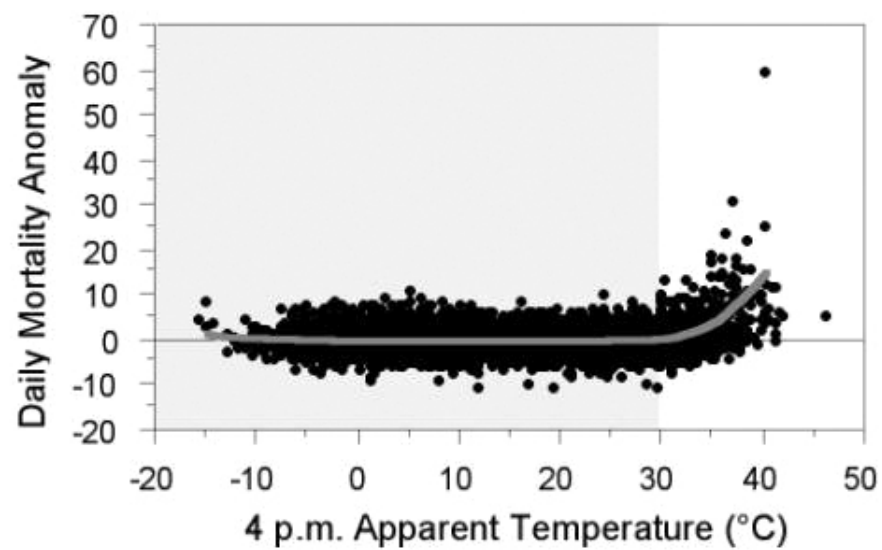
“Statistical relationships between heat waves and increased deaths are constructed for each city based on historical experience. Deaths under a city’s future climate are then projected by applying that city’s projected incidence of extreme heat waves to the statistical relationship that was estimated for the city whose present climate is most similar to the projected future climate for the city in question.”

(Source: Climate Change Impacts on the United States. Report of the National Assessment Synthesis Team.)

HYPOTHESIS

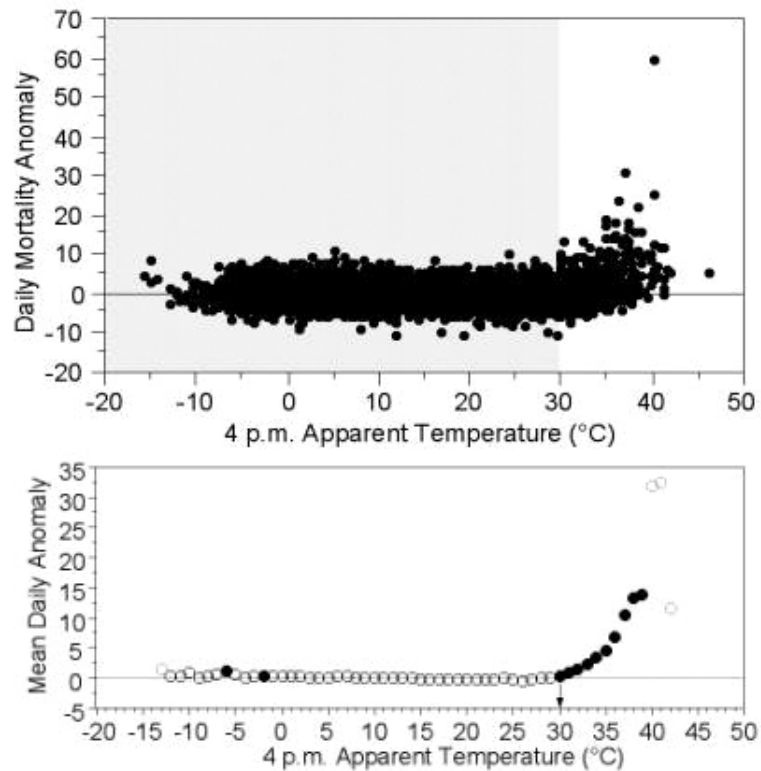
Human mortality during days with extremely high apparent temperatures will decline over time as a result of sociological and physiological “adaptations”

NEW YORK CITY DAILY MORTALITY 1964-66; 1973-79



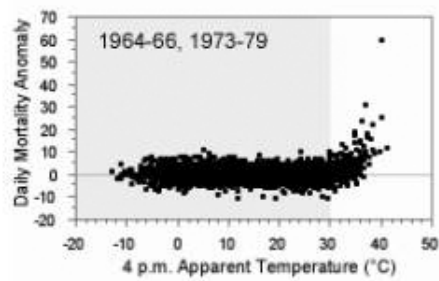
Source: Davis et al., International Journal of Biometeorology, 2003

NEW YORK CITY DAILY MORTALITY 1964-66; 1973-79

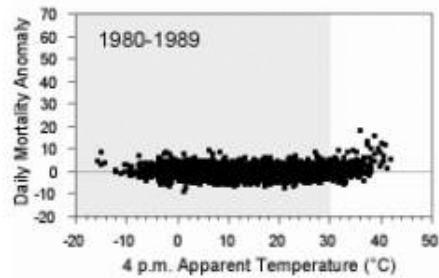


Source: Davis et al., International Journal of Biometeorology, 2003

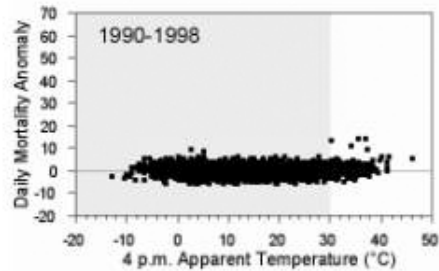
NEW YORK CITY — DAILY MORTALITY BY “DECADE”



1960s-70s



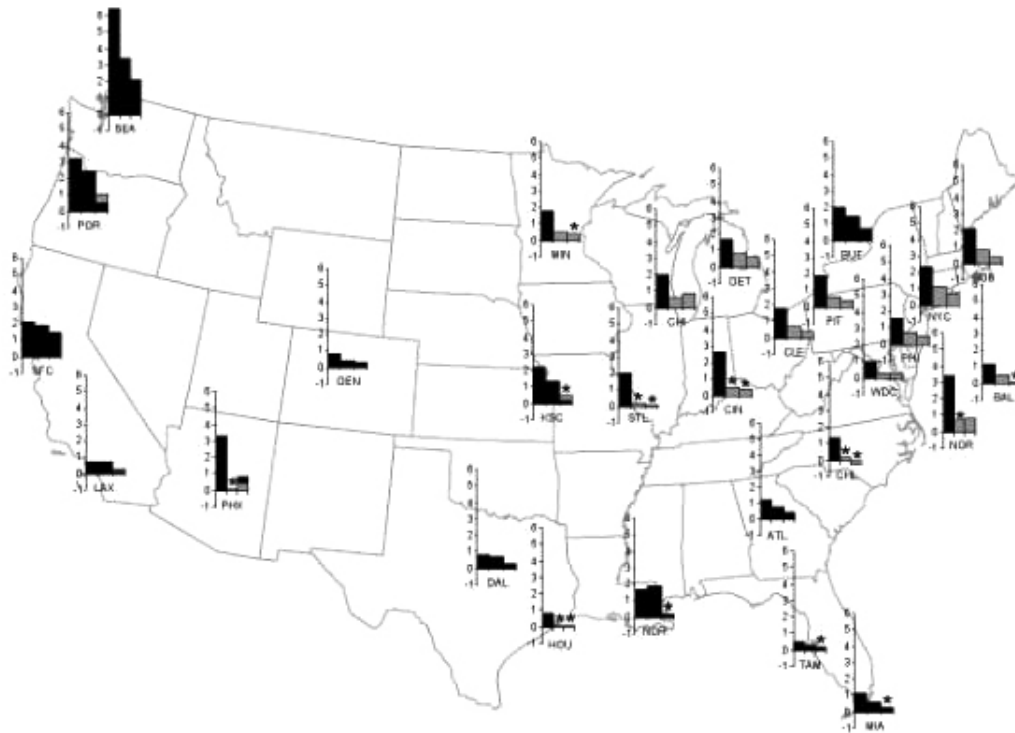
1980s



1990s

Source: Davis et al., International Journal of Biometeorology, 2003

“HEAT-RELATED” EXCESS MORTALITY ANOMALIES



Source: Davis et al., International Journal of Biometeorology, 2003

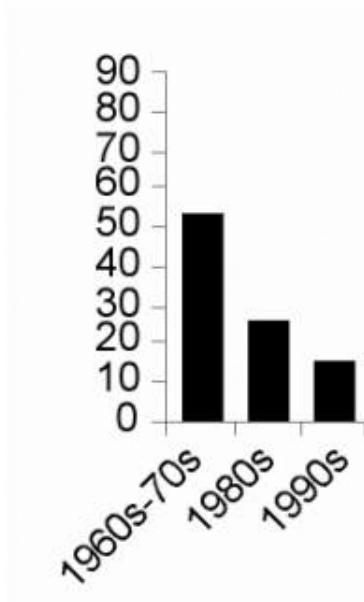
“HEAT-RELATED” EXCESS MORTALITY



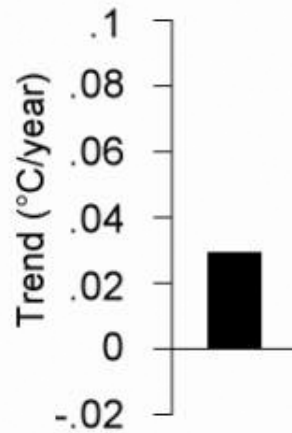
Source: Davis et al., International Journal of Biometeorology, 2003

28-CITY AVERAGE NATIONAL AVERAGE

**ANNUAL
EXCESS MORTALITY**



**APPARENT TEMPERATURE
CHANGE**



POSSIBLE CONTRIBUTING FACTORS

- Increased Access to Air Conditioning in Homes, Cars, and Offices
- Advances in Medical Care
- Proactive Community Response Measures
- Human Biophysical Adaptations
- Infrastructural and Architectural Adaptations
- National Weather Service Heat Watch/Warning Systems