

Cardiovascular Mortality — The Hidden Peril of Heat Waves

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Abbreviations:

ACME = automatic classification of medical entities
CI = 95% confidence interval
ICD-9 = International Classification of Diseases
RR = mortality rate ratio
SE = standard error

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Abstract

Objective — Define the mortality associated with extremely hot weather during the 04 July through 14 July, 1993 heat wave that struck the northeastern United States.

Methods: Design — A rapid field assessment was used to compare mortality occurring during the heat wave to mortality occurring during a period in which there was no heat wave using copies of death certificates. The findings of the rapid field assessment were validated, and it was determined whether increases in mortality occurred in other metropolitan east-coast counties also affected by the heat wave, by reviewing computerized mortality files.

Setting — Information was collected on all deaths occurring in Baltimore City, Maryland; Baltimore County, Maryland; Essex County, New Jersey; Newcastle County, Delaware; and Philadelphia County, Pennsylvania; during these specified study periods: 08–18 June (comparison period) and 06–16 July (heat wave study period), 1993.

Main Outcome Measures — Ratios for total mortality, cause-specific mortality, and variables such as age, sex, race, residence, and day and place of death, that were available from death certificates were calculated.

Results: From the rapid field assessment, the following were observed: a 26% increase in total mortality and a 98% increase in cardiovascular mortality associated with the heat wave in Philadelphia. Data from the computerized mortality files showed an increase in total mortality in four of five counties examined and an increase in cardiovascular mortality in all five counties. The risk for death for those dying from cardiovascular disease increased significantly for people older than 64 years, for both sexes, and all races.

Conclusion: As initially indicated by the Philadelphia Medical Examiner, there was excess mortality associated with a heat wave in Philadelphia. All other nearby

counties examined also experienced excess mortality associated with the heat wave, although this excess was not recognized by the local health officials. The true impact of a heat wave that causes excess preventable mortality must be appropriately and rapidly ascertained. Using a national standard to certify a death as heat-related will provide the needed information rapidly so that public health resources can be more effectively allocated and mobilized to prevent further heat-related illnesses and death.

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Introduction

The number of deaths occurring in a region can increase by more than 50% during a heat wave.^{1–3} Although heatstroke is the most obvious cause of death, and although in 1980, a year in which a severe heat wave occurred, heatstroke accounted for 1,700 deaths, it accounted for only a portion of the excess mortality.^{4,5} Deaths due to cardiovascular, cerebrovascular, and respiratory diseases may increase as much as 100% during heat waves^{1,6,7} Yet, these deaths often are not reported as heat-related. An accurate classification and reporting of a death as heat-related during a heat wave is essential for understanding what risk factors are involved, and for allocating resources effectively in order to prevent heat-wave-related mortality.

A severe heat wave occurred in Philadelphia, Pennsylvania, from 04–14 July, 1993. The Philadelphia Medical Examiner, who is responsible for investigating sudden or unexplained deaths, initially reported that 118 deaths were related to this heat wave.⁸ However, several other east-coast counties also affected by the heat wave, did not report many