Heat-Related Deaths

This indicator reviews trends in heat-related deaths in the United States.

Background

When people are exposed to extreme heat, they can suffer from potentially deadly heat-related illnesses such as hyperthermia, heat cramps, heat exhaustion, and heat stroke. Heat is the leading weather-related killer in the United States even though many heat-related deaths are largely preventable through outreach and intervention (see EPA's Excessive Heat Events Guidebook at: www.epa.gov/heatisland/about/pdf/EHEguide_final.pdf).

Heat waves have become more frequent in most of North America in recent decades (see the Heat Waves indicator on p. 24), and these events can be associated with increases in heat-related deaths.

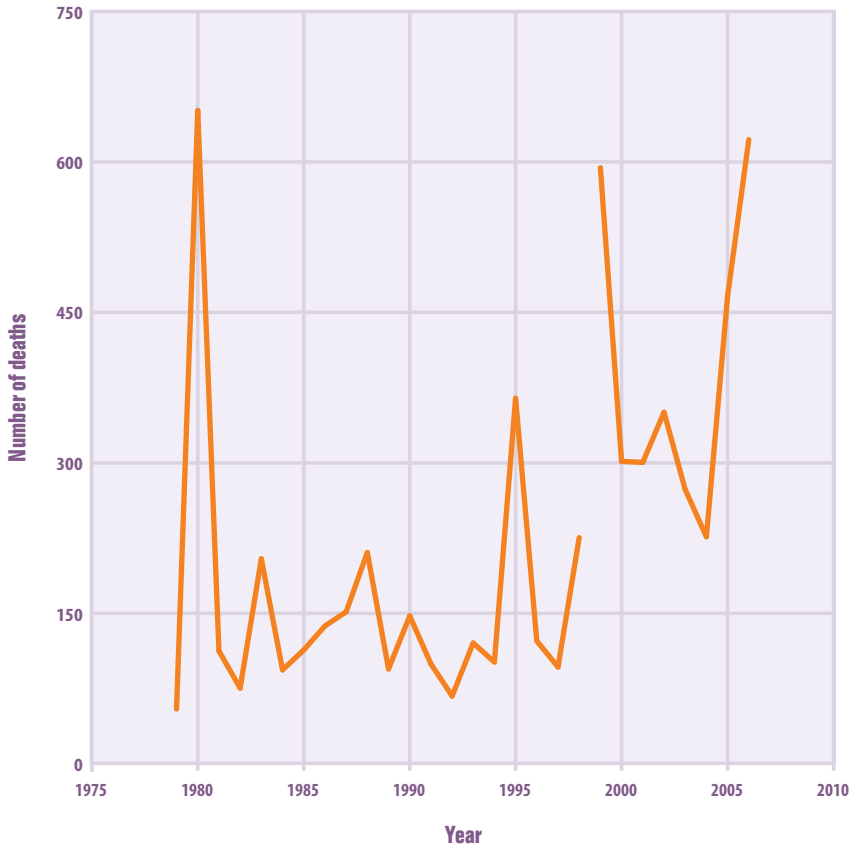
Older adults carry the highest risk of heat-related death. Across North America, the population over the age of 65 is expected to increase slowly until 2010, and then grow dramatically as the baby boom generation ages. People with certain diseases, such as cardiovascular and respiratory illnesses, are especially sensitive to heat.

About the Indicator

This indicator shows the number of heat-related deaths each year in the United States from 1979 to 2006, the years for which national data are available. The indicator is based on data from the U.S. Centers for Disease Control and Prevention, which maintains a database that tracks all deaths nationwide. Data in this indicator include only those deaths for which excessive natural heat was stated as the underlying cause of death on the death certificate. Other studies might consider a broader definition of "heat-related" by also including deaths for which heat has been listed as a contributing factor. For example, even in a case where cardiovascular disease is determined to be the underlying cause of death, heat could have contributed by making the individual more susceptible to the effects of the disease.

Figure 1. Heat-Related Deaths in the United States, 1979–2006

*This figure shows the annual number of heat-related deaths occurring in the 50 states and the District of Columbia from 1979 to 2006.**



* Between 1998 and 1999, the World Health Organization revised the international codes used to classify causes of death. As a result, data from before 1999 cannot easily be compared with data from 1999 and later.

Data source: CDC, 2009[1]

Key Points

- Overall, during the 28 years of data collection (1979–2006), 6,367 deaths were classified as heat-related (see Figure 1).
- Considerable year-to-year variability in the number of heat-related deaths makes it difficult to determine whether the United States has experienced a meaningful increase or decrease in heat-related deaths over time.
- Dramatic increases in cases of heat-related mortality are closely associated with the occurrence of heat waves, especially those of 1980 (St. Louis and Kansas City, Missouri), 1995 (Chicago, Illinois), and 1999 (Cincinnati, Ohio, and Chicago).

Indicator Limitations

Just because a death is classified as "heat-related" does not mean that high temperatures were the only factor that caused the death. Pre-existing medical conditions can significantly increase an individual's vulnerability to heat. This indicator does not include deaths for which heat was listed as a contributing cause but not the official underlying cause of death. Including deaths for which heat was a contributing cause would substantially increase the number of deaths shown in Figure 1. For example, the U.S. Centers for Disease Control and Prevention reported 54 percent more deaths resulting from exposure to extreme heat between 1999 and 2003 (totaling 3,442) when they included deaths for which heat was a contributing cause.[2]

Heat waves are not the only factor that can affect trends in "heat-related" deaths. Other factors include the vulnerability of the population, the extent to which people have adapted to higher temperatures, the local climate and topography, and the steps people have taken to manage heat emergencies effectively.

Heat response measures can make a big difference in death rates. These measures can include early warning and surveillance systems, air conditioning, health care, public education, infrastructure standards, and air quality management. For example, after a 1995 heat wave, the City of Milwaukee developed a plan for responding to extreme heat conditions in the future. During the 1999 heat wave, this plan cut heat-related deaths nearly in half compared with what was expected.[3]

Data Sources

Data for this indicator were provided by the U.S. Centers for Disease Control and Prevention (CDC) and are available in the CDC WONDER database in the Compressed Mortality File at: http://wonder.cdc.gov/mortSQL.html. In the CDC WONDER database for the period from 1979 to 1998, heat-related mortalities were classified as International Classification of Disease, Ninth Revision (ICD-9) codes E900 "excessive heat—hyperthermia" and E900.0 "due to weather conditions." For the period from 1999 to 2006, deaths were classified as ICD-10 code X30 "exposure to excessive natural heat—hyperthermia."