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Heat-Related Mortality — United States, 1997

Environmental heat exposure can cause illness, injury, and death. This report describes four heat-related deaths that occurred in the United States during 1997 and summarizes risk factors for and reviews measures to prevent heat-related illness, injury, and death.

Case 1. On June 18, in New York City, a previously healthy 61-year-old woman was found dead in a sauna of an apartment building. The sauna room temperature was 90 F (32.2 C). The sauna did not have a timer. Her blood alcohol level was 0.21% (New York State's legal limit is 0.10%). The cause of death was heat exposure associated with acute alcohol intoxication.

Case 2. On July 4, in Oakland County, Michigan, a previously healthy but overweight 14-year-old male was found dead in his home. He had been lifting weights and wearing only shorts. The outdoor air temperature was 74 F (23.3 C), but the heat was on in the home with the temperature set at 85 F (29.4 C). He had begun a program of lifting weights 2 week before his death. The toxicology report from the autopsy detected no drugs in his serum or urine. The cause of death was acute congestive heart failure caused by strenuous weight lifting and heat exhaustion.

Case 3. On July 18, in New York City, a 37-year-old man was found dead at a transition house for homeless persons with mental illness. During July 17–18, a power failure had occurred in the house, and the ambient temperature was >90 F (>32.2 C). Two days before the power outage, he had complained of influenza-like symptoms. He was taking several medications, including amantadine, lithium, and lorazepam. He died from hyperthermia complicated by lithium therapy for bipolar disorder.

Case 4. On August 5, in Los Angeles, a 47-year-old woman collapsed in her residence, which was not air-conditioned. Paramedics transported her to the hospital, where she was pronounced dead. She had a history of hypertension and weighed approximately 300 lbs; the medical report noted no obvious trauma. The outdoor temperature was at least 100 F (37.8 C). The cause of death was listed as hyperthermia.

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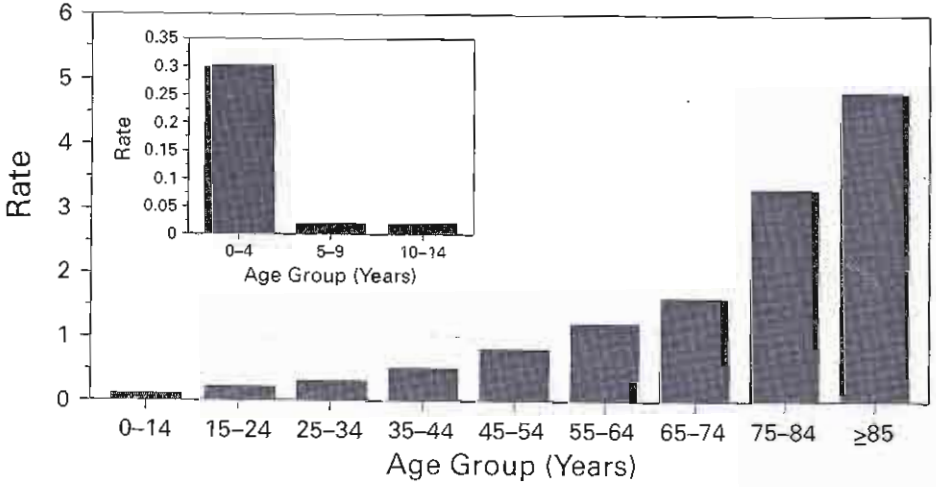
Heat-Related Mortality — Continued

Editorial Note: During 1979–1995, a total of 6615 deaths in the United States were attributed to excessive heat exposure*; of these, 2792 (42%) were "due to weather conditions"; 327 (5%) were "of man-made origin"; and 3496 (53%) were "of unspecified origin." Of the 2744 persons for whom age data were available, persons aged ≥55 years accounted for 1692 (62%), and children aged ≤14 years accounted for 109 (4%) heat-related deaths "due to weather conditions." Except for children aged ≤14 years, the average annual rate of heat-related deaths increased with each age group, particularly for persons aged ≥55 years (Figure 1). Because other causes of death (e.g., cardiovascular and respiratory diseases) also increase during heat waves (*1,2*), heat-related deaths "due to weather conditions" represent only a portion of heat-related excess mortality. The criteria to define a heat-related death differ by state and among individual medical examiners and coroners (*3–5*). The National Association of Medical Examiners defines heat-related death as exposure to high ambient temperature either causing the death or substantially contributing to the death (*3*).

The cases described in this report highlight risk factors for heat-related death: alcohol consumption, overweight, use of some medications (e.g., neuroleptics and tricyclic antidepressants), and physical activity (e.g., exertion in unusually hot environments) (*1,4,6*). Other factors associated with increased risk for heat-related

*Underlying cause of death attributed to excessive heat exposure, classified according to the *International Classification of Diseases, Ninth Revision* (ICD-9), as E900.0, "due to weather conditions"; E900.1, "of man-made origin"; or E900.9, "of unspecified origin." These data were obtained from the Compressed Mortality File, provided by CDC's National Center for Health Statistics. It contains information from death certificates filed in the 50 states and the District of Columbia through the National Vital Statistics System. Cause of death has been coded in accordance with the provisions of ICD-9.

FIGURE 1. Average annual rate* of heat-related deaths,† by age group — United States, 1979–1995



†Per 1 million population.
Underlying cause of death attributed to excess heat exposure classified according to *International Classification of Diseases, Ninth Revision*, as code E900.0, "due to weather

Heat-Related Mortality — Continued

ss and death include age (e.g., the very young and the elderly), history of pre heatstroke, chronic conditions (e.g., cardiovascular or respiratory diseases), soci cumstance (e.g., living alone), and physical or mental impairment or bed confine that interferes with ability to care for oneself or to avoid hot environments (*1*, However, all persons can be at risk if exposed to excessive heat (*4*).

Adverse health conditions associated with high environmental temperatur clude heatstroke, heat exhaustion, heat syncope, and heat cramps (*4*). Heatstrok medical emergency characterized by rapid onset and progression (within minut the core body temperature to ≥105 F (≥40.6 C) and lethargy, disorientation, deli and coma (*4*). Heatstroke is often fatal despite expert medical care directed at ra lowering the body temperature (e.g., ice baths) (*4*). Heat exhaustion is characte by dizziness, weakness, or fatigue often following several days of sustained exp to hot temperatures and results from dehydration or electrolyte imbalance (*4*); ment for heat exhaustion is directed at replacing fluids and electrolytes and ma quire hospitalization (*4*). Hot weather and standing or mild exercise may increas likelihood of heat syncope and heat cramps caused by peripheral vasodilation. ment of persons with loss of consciousness as a result of heat syncope should in placement in a recumbent position with feet elevated and electrolyte replacemen

Persons working in high temperatures—either indoors or outdoors—should special precautions, including allowing 10–14 days to acclimate to an environme high ambient temperature. Adequate salt intake with meals is important; howeve tablets are not recommended and may be hazardous (*4*). Although using fans increase comfort at temperatures <90 F (<32.2 C), fans are not protective against ed illness when temperatures are ≥90 F (≥32.2 C) and humidity >35% (*1,7*).

Strategies for preventing heat-related illness during exercise or because of hu causes (e.g., saunas) include acclimating to the climate and consulting a health professional to develop an exercise regimen (*8,9*). Other strategies include increa time in air-conditioned environments, increasing nonalcoholic fluid intake, exerc only during cooler parts of the day, and taking cool-water baths (*1*). Persons w fluid consumption is restricted for medical reasons should consult their physicia fore altering their fluid intake (*4*). Elderly persons should be encouraged to tak vantage of air-conditioned environments (e.g., shopping malls and public libra even if only for part of the day (*1,4,6*). Public health information about exceptio high temperatures should be directed toward susceptible populations. For exan parents should be educated about the higher sensitivity to heat of children <5 years (*4*). When a heat wave is predicted, prevention messages about avoi heat-related illness should be disseminated to the public as early as possible to vent heat-related illness, injury, and death (*5*).

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Statewide Surveillance for Ehrlichiosis — Connecticut and New York, 1994–1997

In the United States, human monocytic ehrlichiosis (HME) and human granulocytic ehrlichiosis (HGE) represent two clinically indistinguishable yet epidemiologically and etiologically distinct diseases caused by *Ehrlichia chaffeensis* and a bacterium similar or identical to *E. equi*, respectively. Infection with these emerging tickborne pathogens results in acute, influenza-like illnesses with fever, headache, malaise, and frequently leukopenia and/or thrombocytopenia. Connecticut and New York have initiated statewide laboratory-based surveillance to determine the magnitude and geographic extent of ehrlichiosis. This report summarizes results from the first 3 years of surveillance, which showed that rates of ehrlichiosis were similar in counties in both states where the disease occurs, and highest age-specific rates occurred among persons aged >40 years.

In New York, since 1994, physicians have been encouraged to submit serum specimens and clinical data from patients with signs and symptoms consistent with ehrlichiosis. Ehrlichiosis became reportable in Connecticut in January 1995 and in New York in March 1996; public health laboratories in both states have provided confirmatory serologic testing for ehrlichiosis since 1995. State laboratories tested serum specimens by indirect fluorescent antibody (IFA) assays to detect antibodies against *E. chaffeensis* and *E. equi*, and tested whole blood or serum using polymerase chain reaction (PCR) assays to detect *Ehrlichia* spp. DNA. A probable case was defined in New York as the presence of a single antibody titer ≥1:80 to either *Ehrlichia* sp., and in Connecticut as a titer ≥1:64 to *E. chaffeensis* or ≥1:80 to *E. equi*. A confirmed case was defined in both states as a fourfold or greater increase in antibody titer between acute-phase and convalescent-phase serum specimens, visualization of intracytoplasmic ehrlichiae (i.e., morulae) in peripheral blood leukocytes (plus, in New York, at least one antibody titer ≥1:80), or identification of DNA sequences of *E. chaffeensis* or the agent of HGE by PCR assay.

Connecticut

From 1995 through 1997, a total of 173 ehrlichiosis cases were reported in Connecticut; 131 (76%) were confirmed, and 42 (24%) were probable. Of the 173 confirmed and probable cases, 155 (90%) were HGE and nine (5%) were HME; nine (5%) persons had antibodies reactive with both *E. chaffeensis* and *E. equi*. Cases were identified by IFA (83), PCR (69), both assays (19), and visualization of morulae (two).

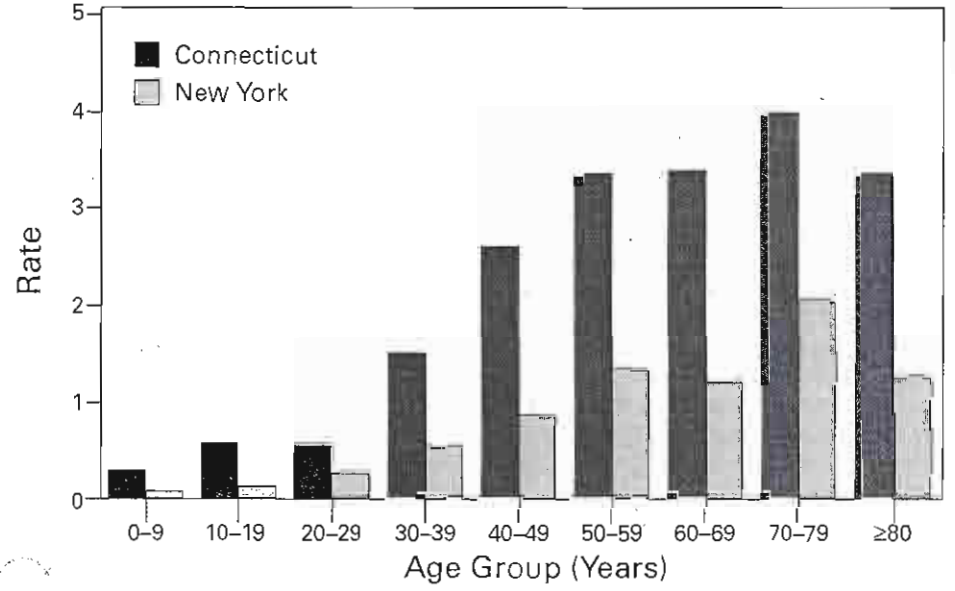
Ehrlichiosis — Continued

Frequencies of specific signs and symptoms were similar to frequencies identified in previous case series (*1–3*). Information about fever (defined as ≥100.4 F [≥38.0 C] was known for 162 patients; of the 138 (85%) with fever, the median temperature was 102.4 F (39.1 C). Information about leukopenia (defined as a white blood cell count [WBC] <5.0 X 10^9/L) was known for 130 patients; of the 79 (61%) with leukopenia, the median WBC was 3.2 X 10^9/L. Information about thrombocytopenia (defined as a platelet count of <150 X 10^9/L) was known for 130 patients; of the 92 (68%) patients with thrombocytopenia, the median platelet count was 87 X 10^9/L.

Ehrlichiosis cases occurred in all months except January; 133 (77%) of the 173 cases occurred during May–September. Illnesses occurred equally in males and females. The mean patient age was 53 years (range: 3 days–90 years). The 19 (11% patients who were hospitalized were substantially older (mean age: 61.9 years) than patients who were not hospitalized (mean age: 44.7 years). One patient died with cancer as the primary diagnosis at the time of death. Treatment information was available for 66 cases. Reported antibiotic therapy began at a median of 4.5 days from symptom onset; 59 of the 66 patients received doxycycline.

The statewide average annual reporting rate for 1995–1997 was 1.8 cases per 100,000 population (range: 1.1 in 1995 to 2.9 in 1997). In 1997, a total of 96 cases were reported, an increase from 40 in 1996 and 37 in 1995. Ehrlichiosis cases were reported in all eight Connecticut counties; the highest average annual reporting rate was in Middlesex and New London counties (9.3 and 4.8, respectively). Age-specific rates were higher among persons aged >40 years; the highest rate (3.9) was among those aged 70–79 years (Figure 1).

FIGURE 1. Average annual reported ehrlichiosis rate*, by age group — Connecticut, 1995–1997, and 19 counties in New York†, 1996–1997



*Per 100,000 population.
†Albany, Bronx, Chemung, Dutchess, Essex, Kings, Lewis, Nassau, New York, Onondaga