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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 was 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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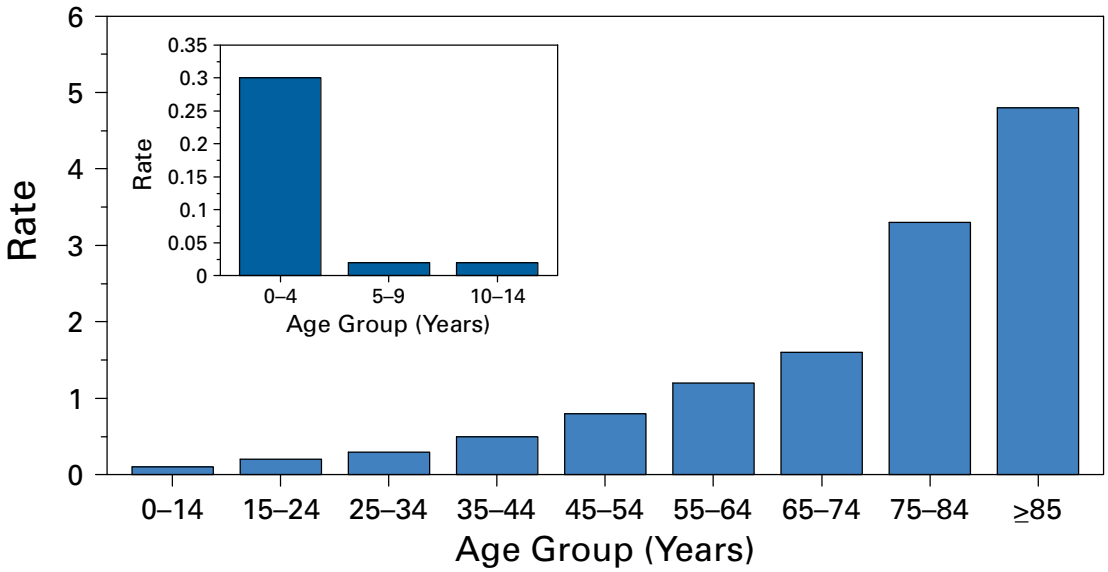
Heat-Related Mortality — Continued

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 the *International Classification of Diseases, Ninth Revision*, as code E900.0, "due to weather conditions."

Heat-Related Mortality — Continued

illness and death include age (e.g., the very young and the elderly), history of previous heatstroke, chronic conditions (e.g., cardiovascular or respiratory diseases), social circumstance (e.g., living alone), and physical or mental impairment or bed confinement that interferes with ability to care for oneself or to avoid hot environments (*1,4,6*). However, all persons can be at risk if exposed to excessive heat (*4*).

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

Persons working in high temperatures—either indoors or outdoors—should take special precautions, including allowing 10–14 days to acclimate to an environment of high ambient temperature. Adequate salt intake with meals is important; however, salt tablets are not recommended and may be hazardous (*4*). Although using fans can increase comfort at temperatures <90 F (<32.2 C), fans are not protective against heat-related 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 human causes (e.g., saunas) include acclimating to the climate and consulting a health-care professional to develop an exercise regimen (*8,9*). Other strategies include increasing time in air-conditioned environments, increasing nonalcoholic fluid intake, exercising only during cooler parts of the day, and taking cool-water baths (*1*). Persons whose fluid consumption is restricted for medical reasons should consult their physician before altering their fluid intake (*4*). Elderly persons should be encouraged to take advantage of air-conditioned environments (e.g., shopping malls and public libraries), even if only for part of the day (*1,4,6*). Public health information about exceptionally high temperatures should be directed toward susceptible populations. For example, parents should be educated about the higher sensitivity to heat of children aged <5 years (*4*). When a heat wave is predicted, prevention messages about avoiding heat-related illness should be disseminated to the public as early as possible to prevent 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).

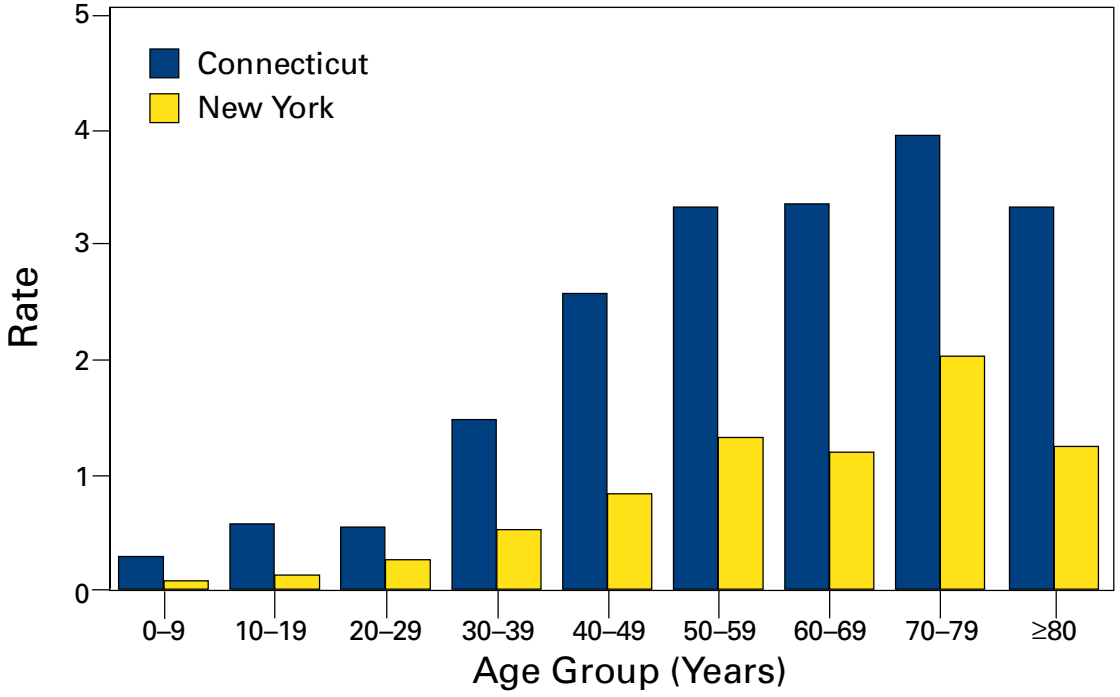
Ehrlichiosis — Continued

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, Orange, Putnam, Rockland, Suffolk, Tompkins, Ulster, Washington, Wayne, and Westchester.

Ehrlichiosis — Continued

New York

From 1994 through 1997, a total of 225 ehrlichiosis cases were reported in New York; 135 (60%) were confirmed, and 90 (40%) were probable. Of the 225 confirmed and probable cases, 197 (88%) were HGE, and 28 (12%) were HME. Cases were identified by IFA (138), PCR (57), and both assays (30); nine with a positive IFA titer also had visualization of morulae.

Frequencies of specific signs and symptoms were similar to those reported for Connecticut patients. All 218 patients for whom fever information was available had fever (median temperature: 102.5 F [39.2 C]). Information about leukopenia was known for 177 patients; of the 110 (62%) with leukopenia, the median WBC was 4.0 X 10^9/L. Information about thrombocytopenia was known for 171 patients; of the 122 (71%) with thrombocytopenia, the median platelet count was 114 X 10^9/L. Ehrlichiosis cases occurred during all months; 182 (81%) of the 225 cases occurred during May–September. Most (123 [55%] of 225) cases occurred in males. The mean patient age was 50.1 years (range: 5–90 years). Ninety-three patients were hospitalized; one person with a probable case died from multiple organ failure.

The statewide average annual reporting rate for 1994–1997 was 0.4 cases. In 1997, a total of 67 cases were reported, a decrease from 69 in 1996 but an increase from 51 in 1995 and 14 in 1994. Ehrlichiosis cases were reported in 19 of the 62 counties in New York. Most cases occurred in the lower Hudson River Valley and eastern Long Island; the highest yearly reported rates were in Westchester and Putnum counties (5.5 and 3.6, respectively). As in Connecticut, age-specific rates were higher among persons aged >40 years; the highest rates were among those aged 70–79 years (Figure 1).

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Editorial Note: Since 1985, approximately 500 ehrlichiosis cases have been confirmed by CDC. The occurrence of these diseases reflects the seasonal activities and geographic distributions of the tick vectors. The preponderance of ehrlichiosis cases are observed between mid-spring and mid-summer. *E. chaffeensis* infections occur most frequently in southeastern and midwestern states with abundant lone star ticks (*Amblyomma americanum*). The black-legged tick (*Ixodes scapularis*) is the principal vector of the HGE agent in the northeast and upper midwestern United States. This tick also transmits *Borrelia burgdorferi*, which causes Lyme disease, and most recognized HGE cases have originated from states with high rates of Lyme disease, particularly Connecticut, Minnesota, New York, and Wisconsin.

The findings in this report are subject to an important limitation. Surveillance case definitions developed for new or emerging infections such as ehrlichiosis are usually highly specific. Accordingly, case definitions used in the surveillance studies described in this report captured only those patients with recognized clinical findings;

Ehrlichiosis — Continued

patients with less severe disease were excluded from confirmatory testing. The reported rates of disease therefore underestimate the true incidence of disease. When the clinical spectrum of ehrlichiosis is better defined and improved diagnostic tests for ehrlichial infections are available, the surveillance case definition can be expanded.

Passive surveillance data for ehrlichial infections are sparse, collected from a few small geographic regions in a limited number of states where *Ehrlichia* spp. are endemic. Although ehrlichiosis is reportable in 21 states, few statewide summaries of ehrlichiosis cases are large enough for meaningful analysis. Surveillance for the ehrlichioses in Connecticut and New York is part of the CDC's Emerging Infections Program, and CDC's Tick-Borne Diseases Initiative is supporting active, population-based surveillance for these diseases in Connecticut, Missouri, and Wisconsin.

The findings in Connecticut and New York underscore the expanding recognition of these diseases and unresolved issues concerning the ehrlichioses. In these two states combined, <30% of persons with ehrlichiosis required hospitalization. Previous patient series in which 55%–60% of ehrlichiosis patients were hospitalized (*1,2*) possibly overrepresented seriously ill patients. The decline in hospitalizations also might represent increasing physician awareness of these diseases and broader use of appropriate therapy. The finding that reported rates of ehrlichiosis increase with age is consistent with previous studies (*1–3*) and contrasts with age-specific incidences for Lyme disease and Rocky Mountain spotted fever, tickborne diseases that frequently occur in children. Age-associated host factors may account for severity of disease; however, fatal ehrlichial infections have occurred in otherwise healthy young adults and children.

Serologic cross-reactivity between *E. chaffeensis* and *E. equi* is well recognized (*3*) and can hinder epidemiologic distinction between HME and HGE. There are 10 recognized species of *Ehrlichia,* and substantial serologic cross-reactivity exists among individual species within subgroups of this genus. Some "serologically confirmed" cases of HME and HGE may represent infections with the alternate agent or infections with other, antigenically-related ehrlichial species. Although IFA is the principal diagnostic tool for detecting ehrlichial infection, neither this assay nor PCR-based diagnostics are standardized. New techniques, including enzyme immunoassays using recombinant ehrlichial antigens and multiplex fluorescence-detection PCR, are under investigation.

Doxycycline is the drug of choice for persons infected with ehrlichiosis. The optimal duration of therapy has not been established, but current regimens recommend continuation of treatment for at least 3 days following defervescence, for a minimum total course of 5 to 7 days. Severe or complicated disease can require longer treatment courses. Because tetracyclines are contraindicated in pregnancy, rifampin has been used successfully in a limited number of pregnant women with documented HGE (*4*).

Limiting exposure to ticks reduces the likelihood of ehrlichial infection. In persons exposed to tick-infested habitats, prompt careful inspection for and removal of crawling or attached ticks remains an important method of preventing disease because *Ehrlichia*-infected ticks appear to require 24–48 hours of attachment to the host before the agent can be transmitted (*5*). As with Lyme disease, peridomestic activities account for many of the tick exposures responsible for HGE in the northeastern United States (*3*), and strategies to reduce vector tick densities through area-wide application of acaricides and control of tick habitats (e.g., leaf litter and brush) have been effective

Ehrlichiosis — Continued

in small-scale trials. New methods being developed include applying acaricides to rodents and deer and using baited tubes, boxes, and deer feeding stations in areas where these pathogens are endemic. Community-based integrated tick management strategies may be an effective public health response to reduce the incidence of tick-borne infections.

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Sun-Protection Behaviors Used by Adults for Their Children — United States, 1997

In the United States, the high incidence of skin cancer—including basal cell carcinoma, squamous cell carcinoma, and melanoma—has been attributed primarily to sun exposure (*1,2*). To reduce exposures to the sun's harmful ultraviolet (UV) rays, the American Academy of Dermatology (AAD), the American Cancer Society, and other organizations have recommended sun-protection practices such as wearing protective clothing, avoiding sun exposure during the midday hours (when the sun's rays are the strongest), and using sunscreen (*3,4*). Such practices are especially important for infants and children because sun exposure during the early years of life appears to increase the risk for melanoma, the most serious form of skin cancer (*1*). To characterize sun-protection practices among children, AAD conducted a survey of parents with children aged ≤12 years during June–July 1997. This report summarizes the results of the survey, which indicate that three fourths of adults had their children use one or more measures to reduce exposure to UV rays.

Random-digit–dialing was used to compile a sample of households with children aged ≤12 years. Of 1872 households screened, 587 included a child aged ≤12 years. Of these households, 84 refused to participate in the survey, resulting in a sample size of 503 households. One adult per household was interviewed. Demographic characteristics were ascertained, and respondents were asked how often (always, usually, sometimes, or never) they had their child use specific measures to protect themselves from the sun. For households with more than one child aged ≤12 years, one child was randomly selected for reporting in the survey. For the analyses, "always" and "usually" were coded as positive responses and "sometimes" and "never" as negative responses. The statistical differences between the sun-protection behaviors and demographic variables were determined using Chi-square analyses.

Overall, 363 (74%) of 491 adults reported using one or more sun-protection behaviors for their children (Table 1). The sun-protection behavior most frequently reported was using a sunscreen with a sun-protection factor of ≥15 (257 [53%] of 486), followed

Sun-Protection Behaviors — Continued

TABLE 1. Sun-protection behaviors reported by adults for their children, by selected characteristics — United States, 1997

Characteristic	Children who use sunscreen			Children who use sunscreen, clothing, hats, or shade		
	No.*	(%)	(95% CI†)	No.	(%)	(95% CI)
Child's age (yrs)						
≤ 2	51	(56)	(±10)	77	(83)	(± 8)
3– 4	53	(60)	(±10)	69	(78)	(± 9)
5– 7	55	(50)	(± 9)	80	(72)	(± 8)
8–10	52	(49)	(± 9)	75	(69)	(± 9)
11–12	46	(51)	(±10)	62	(69)	(±10)
Child's sex						
Boy	130	(52)	(± 6)	191	(76)	(± 5)
Girl	127	(54)	(± 6)	172	(71)	(± 6)
Child's skin type						
Dark	30	(39)	(±11)	49	(64)	(±11)
Olive	68	(55)	(± 9)	91	(73)	(± 8)
Fair	111	(53)	(± 7)	157	(75)	(± 6)
Very fair	48	(62)	(±11)	64	(83)	(± 8)
Sex of adult respondent						
Man	62	(39)	(± 8)	110	(69)	(± 7)
Woman	195	(59)	(± 5)	253	(76)	(± 5)
Race of adult respondent§						
White, non-Hispanic	215	(59)	(± 5)	279	(76)	(± 4)
Black, non-Hispanic	10	(18)	—	29	(52)	—
Other	29	(47)	—	51	(80)	—
Skin cancer in family						
Yes	39	(75)	(±12)	40	(77)	(±11)
No	216	(50)	(± 5)	321	(73)	(± 4)
Total	**257**	**(53)**	**(± 5)**	**363**	**(74)**	**(± 4)**

*Numbers may not add to total because of nonresponse to some questions.
†Confidence interval.
§Numbers for racial/ethnic groups other than white and black were too small for meaningful analysis.

by seeking shade (150 [30%] of 499), wearing hats (133 [27%] of 502), and wearing shirts (42 [8%] of 501). Sun-protection behaviors overall were more frequently reported for fair-skinned children and for children of adults who were white than for darker-skinned children and for children of adults who were black. Sunscreen use in particular was more frequently reported for those same subgroups of children and for children with a family history of skin cancer. Women were more likely than men to report sunscreen use for their children. Although sunscreen use did not significantly

Sun-Protection Behaviors — Continued

change with the age of the child, the proportion of children using one or more sun-protection behaviors decreased with age.

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Editorial Note: The findings in this report indicate that a high proportion of parents, particularly parents of children at increased risk for skin cancer (e.g., those who are white, have fair skin, and who have a family history of skin cancer), use sun-protection measures for their children. The most frequently reported sun-protection behavior was sunscreen use. Other means of protection may be more difficult to promote among children, who may not want to wear hats or may be too hot to wear long sleeves.

The findings in this report are subject to at least two limitations. First, many households refused to be screened or had no adult respondent available; therefore, the results may not be representative of all U.S. children. Second, respondents' reporting of sun-protection behaviors may have been influenced by the desire to report in what was perceived to be a socially acceptable manner.

Several organizations, including AAD, the Skin Cancer Foundation, the American Cancer Society, the Food and Drug Administration, and CDC, have initiated educational efforts about sun protection. A recent study found an increased awareness among adults that sun exposure is dangerous, a decline in the belief that having a tan is healthy, and an increase in the reported use of sunscreen. However, study results also suggested an increase in adult UV ray exposure, as measured by increased reports of sunburning and regular use of tanning booths (*5*). Targeting health-education messages to children, young adults, and parents may result in further attitudinal and behavioral change in those who engage in high-risk behaviors. The desire to influence a child's behavior may further motivate adults to protect themselves while in the sun and to avoid sunburning. Sun-protection behaviors among children also may be enhanced by including educational components in school health curricula and by environmental measures, such as providing shade structures and scheduling outdoor activities before 10 a.m. or after 4 p.m.

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Multistate Outbreak of Hemolysis in Hemodialysis Patients — Nebraska and Maryland, 1998

From May 13 through May 23, 1998, a total of 30 patients in three states* developed hemolysis with or without chest pains, shortness of breath, nausea, or abdominal pain while undergoing hemodialysis (HD). Two patients died. This report summarizes the preliminary findings of investigations in Nebraska and Maryland and implicated lot number 04015309 of Cobe Centrysystem 3 Blood Tubing sets (Gambro Healthcare, Lakewood, Colorado)† as the cause of these reactions.

Nebraska

A case was defined as hypertension (an increase of ≥30 mm Hg from the baseline systolic blood pressure) and evidence of hemolysis (i.e., positive "pink test" [pink-appearing serum]) in a patient within 12 hours of initiating hemodialysis during May 13–20. A total of 13 (11%) of 118 patients at two HD centers in Lincoln, Nebraska, had illnesses that met the case definition. In addition, case-patients reported chest pain (five), shortness of breath (four), nausea (four), abdominal pain (four), vomiting (three), back pain (two), cyanosis (two), or diarrhea (one). Onset of symptoms occurred a median of 120 minutes (range: 20–272 minutes) into the dialysis session.

Case-patients ranged in age from 46 to 84 years (median: 70 years); seven were men. They had received hemodialysis for a median of 3 years (range: <1 to 8 years); 11 (85%) used reprocessed dialyzers. Of the 13 patients, 11 (85%) required hospitalization; four (31%), admission to an intensive-care unit (ICU); and three (23%), blood transfusion. The 13 case-patients were dialyzed on 12 different machines but all may have been dialyzed using a Cobe Centrysystem 3 Blood Tubing Set (lot number 04D15309) that was present at the clinic during the dialysis period. During hemodialysis, lot numbers of blood tubing are not routinely recorded. However, for six case-patients, the blood tubing lot number was 04D15309.

Examination of the implicated blood tubing revealed narrowing of the aperture through which blood was pumped during the dialysis treatment. Analyses of the water supply at one of the HD centers was within normal limits for chlorine, chloramine, endotoxin, bacteria, and trace element levels as set by the American Association for the Advancement of Medical Instrumentation.

Maryland

During May 18–23, a total of 12 (4%) of 298 patients at four HD centers in Baltimore developed abdominal pain (eight), nausea (seven), and/or erythroderma (four); all had evidence of hemolysis on admission to the hospital. Onset of symptoms occurred a median of 114 minutes (range: 22–227 minutes) into the dialysis session.

Case-patients ranged in age from 48 to 85 years (median: 67 years); seven were men. Case-patients had received hemodialysis for a median of 3 years (range: 1 to >5 years); none used reprocessed dialyzers. All case-patients required hospitalization; four, admission to ICU; and six, blood transfusion. The 12 case-patients were dialyzed on 12 different machines, but all may have been dialyzed using a Cobe Centrysystem 3 Blood Tubing Set (lot number 04D15309) that was present at the clinic during the dialysis period.

*No data were available for five patients in Massachusetts.

†Use of trade names and commercial sources is for identification only and does not imply endorsement by CDC or the U.S. Department of Health and Human Services.

Hemolysis Outbreak — Continued

On May 25, the manufacturer issued a voluntary nationwide recall of specific lots of catalog number 003210-500 (including lot number 04D15309) of Cobe Centrysystem 3 Blood Tubing sets. On June 10, following additional reports (including two additional deaths) in Alabama and New Jersey, the manufacturer expanded the recall to all lots of Cobe Centrysystem 3 Blood Tubing sets and Cobe Hemodialysis kits containing blood tubing sets for dialysis with catalog numbers 003109-400, 003109-410, 003110-500, 003111-500, 003112-500, 003113-500, 003114-500, 003210-500, 003212-500, 003101-000, and 003212-515.

Reported by: L Spry, MD, A Stivers, Dialysis Center of Lincoln, Lincoln; R Morin, MD, Bryan Memorial Hospital, Lincoln; T Timmons, S Weaver, C Douglas, Lincoln-Lancaster County Health Dept, Lincoln; T Safranek, MD, State Epidemiologist, Nebraska Health and Human Svcs System. J Roche, MD, C Groves, MS, D Portesi, MPH, M Hawkins, MD, D Dwyer, MD, State Epidemiologist, Maryland Dept of Health and Mental Hygiene. Center for Devices and Radiologic Health, and Office of Regulatory Affairs, Food and Drug Administration. Div of Chronic Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; International Emergency and Refugee Health Program, National Center for Environmental Health; Hospital Infections Program, National Center for Infectious Diseases; and EIS officers, CDC.

Editorial Note: In the United States, approximately 225,000 persons with end stage renal disease undergo long-term hemodialysis each year (*1*). Hemolysis (i.e., premature breakdown of red blood cells [RBCs]) associated with hemodialysis is rare (*2,3*). The most frequent causes of hemodialysis-associated hemolysis are increased chloramine in the water used for dialysis; nitrate contamination of the dialysate, formaldehyde residue left after dialyzer reprocessing or water treatment system disinfection, use of hypotonic dialysate or dialysate exceeding 108 F (42 C), or mechanical injury of RBCs from occluded or kinked hemodialysis blood lines (2–4).

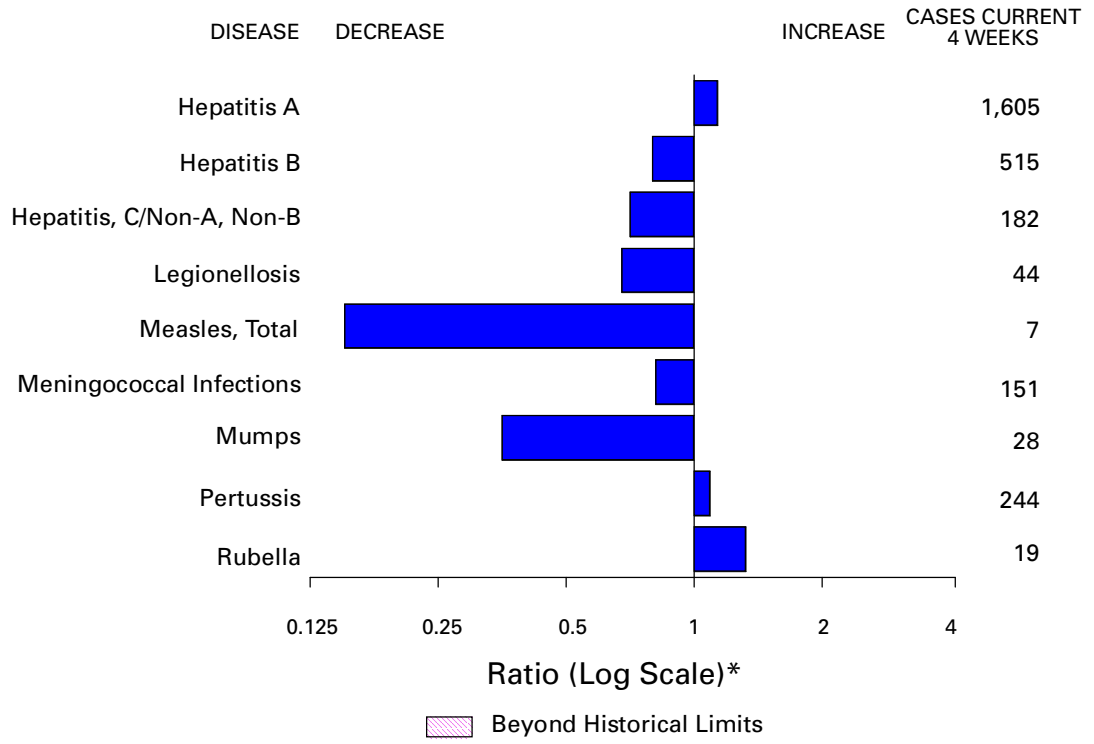
In this outbreak, all episodes of hemolysis have been associated with blood tubing produced by a single manufacturer. Preliminary findings suggest that the narrowed aperture of the blood tubing sets caused mechanical lysis of the RBCs.

To ascertain the extent of this problem, all episodes of hemolysis in dialysis patients using a Cobe Centrysystem 3 Blood Tubing Set or Cobe Hemodialysis Kit should be reported through state health departments to CDC's Hospital Infections Program, National Center for Infectious Diseases, telephone (404) 639-6413, and to the Food and Drug Administration's MedWatch program, telephone (800) 332-1088.

References

1. Health Care Financing Administration. ESRD facility survey data, 1995. Washington, DC: US Department of Health and Human Services, 1995.
2. Sweet SJ, McCarthy S, Steingart R, Callahan T. Hemolytic reactions mechanically induced by linked hemodialysis lines. Am J Kidney Dis 1996;27:262–6.
3. Corea AL, Ohanian N, Anderson M, Holloway M. Hemodialysis procedure. In: Nissenson AR, Fine RN, Gentile DE, eds. Clinical dialysis. Norwalk, Connecticut, and San Mateo, California: Appleton and Lange, 1990:147–160.
4. Fried W. Hematologic aspects of uremia. In: Nissenson AR, Fine RN, Gentile DE, eds. Clinical dialysis. Norwalk, Connecticut, and San Mateo, California: Appleton and Lange, 1990:391–408.

FIGURE I. Selected notifiable disease reports, comparison of provisional 4-week totals ending June 13, 1998, with historical data — United States



*Ratio of current 4-week total to mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — provisional cases of selected notifiable diseases, United States, cumulative, week ending June 13, 1998 (23rd Week)

	Cum. 1998		Cum. 1998
Anthrax	-	Plague	1
Brucellosis	11	Poliomyelitis, paralytic¶	-
Cholera	3	Psittacosis	20
Congenital rubella syndrome	2	Rabies, human	-
Cryptosporidiosis*	778	Rocky Mountain spotted fever (RMSF)	52
Diphtheria	1	Streptococcal disease, invasive Group A	999
Encephalitis: California*	2	Streptococcal toxic-shock syndrome*	32
eastern equine*	-	Syphilis, congenital**	128
St. Louis*	-	Tetanus	10
western equine*	-	Toxic-shock syndrome	59
Hansen Disease	47	Trichinosis	5
Hantavirus pulmonary syndrome*†	4	Typhoid fever	125
Hemolytic uremic syndrome, post-diarrheal*	14	Yellow fever	-
HIV infection, pediatric*§	106		

-:no reported cases
*Not notifiable in all states.
† Updated weekly from reports to the Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases (NCID).
§ Updated monthly to the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention (NCHSTP), last update May 24, 1998.
¶ One suspected case of polio with onset in 1998 has been reported to date.
**Updated from reports to the Division of STD Prevention, NCHSTP.

TABLE II. Provisional cases of selected notifiable diseases, United States, weeks ending June 13, 1998, and June 7, 1997 (23rd Week)

Reporting Area	AIDS		Chlamydia		*Escherichia coli* O157:H7		Gonorrhea		Hepatitis C/NA,NB	
					NETSS†	PHLIS§				
	Cum. 1998*	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997
UNITED STATES	20,034	25,974	227,200	212,415	533	278	133,823	122,134	1,721	1,531
NEW ENGLAND	640	897	8,359	7,661	75	52	2,208	2,575	19	29
Maine	13	25	405	427	4	-	22	25	-	-
N.H.	21	14	401	341	11	11	41	56	-	-
Vt.	10	18	168	178	1	-	13	24	-	1
Mass.	275	416	3,732	3,160	40	30	892	977	18	25
R.I.	58	70	1,109	917	3	1	166	213	1	3
Conn.	263	354	2,544	2,638	16	10	1,074	1,280	-	-
MID. ATLANTIC	5,695	8,265	28,013	25,256	44	10	15,546	15,368	184	151
Upstate N.Y.	710	1,336	N	N	36	-	2,667	2,661	138	117
N.Y. City	3,153	4,136	15,010	13,319	2	5	6,428	5,867	-	-
N.J.	993	1,783	4,412	4,575	6	4	2,600	3,214	-	-
Pa.	839	1,010	8,591	7,362	N	1	3,851	3,626	46	34
E.N. CENTRAL	1,518	1,809	38,765	32,368	93	49	25,982	19,204	217	292
Ohio	281	394	10,972	9,750	22	6	6,527	5,971	6	7
Ind.	293	328	3,288	3,846	25	20	2,083	2,613	3	9
Ill.	610	602	11,133	5,792	26	-	8,762	2,837	10	48
Mich.	252	394	9,739	8,235	20	7	7,185	5,816	198	212
Wis.	82	91	3,633	4,745	N	16	1,425	1,967	-	16
W.N. CENTRAL	351	520	13,194	13,907	69	32	6,496	6,148	109	32
Minn.	56	83	1,923	2,890	28	17	679	1,012	5	2
Iowa	20	66	1,878	2,061	13	-	570	552	12	15
Mo.	176	254	5,120	5,142	10	12	3,821	3,299	88	4
N. Dak.	4	4	290	375	1	1	29	24	-	2
S. Dak.	9	2	711	535	1	1	119	54	-	-
Nebr.	36	48	989	871	7	-	343	322	2	2
Kans.	50	63	2,283	2,033	9	1	935	885	2	7
S. ATLANTIC	5,037	6,477	47,546	38,072	39	16	38,513	36,400	86	96
Del.	57	111	1,126	612	-	1	605	477	-	-
Md.	571	742	3,661	3,206	11	4	4,108	5,163	5	3
D.C.	413	469	N	N	1	-	1,539	1,840	-	-
Va.	368	552	4,314	5,010	N	7	2,694	3,449	4	9
W. Va.	47	38	1,298	1,364	N	1	370	429	3	7
N.C.	335	363	10,078	7,410	9	3	8,430	7,191	12	27
S.C.	318	295	8,307	5,377	1	-	5,407	4,938	1	20
Ga.	608	856	10,669	4,031	4	-	8,984	5,305	8	-
Fla.	2,320	3,051	8,093	11,062	12	-	6,376	7,608	53	30
E.S. CENTRAL	788	807	16,236	14,329	39	11	15,431	14,334	67	151
Ky.	101	112	2,716	2,877	10	-	1,526	1,846	11	7
Tenn.	272	354	5,590	5,493	20	10	4,741	4,505	53	91
Ala.	233	196	4,270	3,389	9	-	5,476	4,799	3	5
Miss.	182	145	3,660	2,570	U	1	3,688	3,184	U	48
W.S. CENTRAL	2,473	2,590	34,384	21,535	29	5	19,562	14,615	474	178
Ark.	81	96	1,319	1,145	1	1	1,120	1,920	2	5
La.	415	493	5,471	3,468	-	1	4,531	3,279	9	95
Okla.	134	138	4,496	3,181	4	3	2,443	1,994	5	4
Tex.	1,843	1,863	23,098	13,741	24	-	11,468	7,422	458	74
MOUNTAIN	725	751	7,663	12,115	51	39	2,814	3,348	205	161
Mont.	13	18	556	450	3	-	23	18	4	7
Idaho	14	22	846	617	6	-	74	45	82	22
Wyo.	2	13	292	235	1	-	15	25	35	58
Colo.	127	194	-	2,018	14	10	1,020	791	13	19
N. Mex.	111	66	1,684	1,723	9	6	311	391	40	28
Ariz.	286	188	3,315	5,035	N	9	1,213	1,611	2	17
Utah	57	60	717	734	11	8	66	96	16	3
Nev.	115	190	253	1,303	7	6	92	371	13	7
PACIFIC	2,807	3,858	33,040	47,172	94	64	7,271	10,142	360	441
Wash.	203	287	4,723	4,062	22	22	796	867	10	12
Oreg.	88	144	2,455	2,101	26	21	329	320	2	2
Calif.	2,463	3,377	24,204	39,646	45	18	5,836	8,549	294	347
Alaska	12	22	835	614	1	-	145	183	1	-
Hawaii	41	28	823	749	N	3	165	223	53	80
Guam	-	2	8	193	N	-	2	27	-	-
P.R.	834	760	U	U	-	U	184	288	-	57
V.I.	17	35	N	N	N	U	U	U	U	U
Amer. Samoa	-	-	U	U	N	U	U	U	U	U
C.N.M.I.	-	1	N	N	N	U	7	16	-	2

N: Not notifiable U: Unavailable -: no reported cases C.N.M.I.: Commonwealth of Northern Mariana Islands

*Updated monthly to the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention, last update May 24, 1998.

†National Electronic Telecommunications System for Surveillance.

§Public Health Laboratory Information System.

TABLE II. (Cont'd.) Provisional cases of selected notifiable diseases, United States, weeks ending June 13, 1998, and June 7, 1997 (23rd Week)

Reporting Area	Legionellosis		Lyme Disease		Malaria		Syphilis (Primary & Secondary)		Tuberculosis		Rabies, Animal
	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998*	Cum. 1997	Cum. 1998
UNITED STATES	440	362	1,933	1,501	455	596	2,925	3,823	3,295	8,596	3,046
NEW ENGLAND	22	25	558	343	18	23	33	72	138	177	600
Maine	1	1	1	3	2	1	1	-	U	15	97
N.H.	2	4	12	7	3	2	1	-	2	6	33
Vt.	1	4	3	3	-	2	2	-	-	3	30
Mass.	8	8	119	50	11	16	21	39	114	90	193
R.I.	4	4	31	37	2	2	-	1	22	13	35
Conn.	6	4	392	243	-	-	8	32	U	50	212
MID. ATLANTIC	96	61	1,067	890	117	170	96	182	244	1,328	665
Upstate N.Y.	28	13	579	116	32	25	13	19	U	186	465
N.Y. City	15	3	3	73	54	100	22	34	U	692	U
N.J.	4	9	124	247	17	33	18	83	244	267	86
Pa.	49	36	361	454	14	12	43	46	U	183	114
E.N. CENTRAL	141	138	33	26	41	66	405	345	225	771	41
Ohio	62	62	31	11	2	6	72	107	5	139	32
Ind.	19	23	2	9	3	6	66	74	U	66	-
Ill.	14	5	-	2	15	29	155	35	220	406	2
Mich.	28	31	-	4	20	17	89	59	U	112	6
Wis.	18	17	U	U	1	8	23	70	U	48	1
W.N. CENTRAL	30	26	21	14	28	16	68	76	104	199	316
Minn.	3	1	9	9	13	5	3	13	U	49	62
Iowa	3	7	9	-	2	6	-	3	U	20	68
Mo.	11	2	-	4	10	3	52	39	75	85	17
N. Dak.	-	2	-	-	1	-	-	-	U	4	60
S. Dak.	-	1	-	-	-	-	1	-	9	4	54
Nebr.	10	10	1	1	-	1	4	1	5	4	2
Kans.	3	3	2	-	2	1	8	20	15	33	53
S. ATLANTIC	54	47	176	139	114	106	1,231	1,538	620	1,344	952
Del.	7	5	3	27	1	2	15	14	-	14	17
Md.	10	10	124	87	40	39	293	430	121	127	241
D.C.	3	3	4	6	7	7	36	57	49	43	-
Va.	5	9	13	2	18	26	76	128	118	140	295
W. Va.	N	N	4	-	-	-	2	3	24	24	40
N.C.	6	6	5	7	8	6	344	320	180	166	136
S.C.	5	2	1	1	3	7	139	178	128	110	68
Ga.	-	-	2	1	14	12	228	277	U	247	63
Fla.	17	12	20	8	23	7	98	131	U	473	92
E.S. CENTRAL	18	16	21	32	11	14	500	829	160	523	120
Ky.	11	4	5	4	1	3	53	70	U	73	18
Tenn.	4	6	8	10	7	4	254	345	U	187	70
Ala.	3	1	8	4	3	4	114	214	160	173	32
Miss.	U	5	U	14	U	3	79	200	U	90	U
W.S. CENTRAL	13	5	6	10	12	7	368	514	53	1,097	100
Ark.	-	-	3	3	1	1	48	86	53	87	21
La.	1	1	-	1	4	4	117	176	-	85	-
Okla.	6	1	-	2	2	2	24	54	U	84	79
Tex.	6	3	3	4	5	-	179	198	U	841	-
MOUNTAIN	27	24	2	4	23	34	85	84	193	237	72
Mont.	1	1	-	-	-	2	-	-	12	7	25
Idaho	-	2	-	-	3	-	-	-	4	5	-
Wyo.	1	1	-	1	-	1	1	-	2	2	39
Colo.	5	5	1	1	7	16	6	2	U	48	1
N. Mex.	2	1	-	-	8	5	12	4	27	17	-
Ariz.	4	7	-	1	4	4	61	69	91	102	7
Utah	13	4	-	-	1	2	3	3	28	10	-
Nev.	1	3	1	1	-	4	2	6	29	46	-
PACIFIC	39	20	49	43	91	160	139	183	1,558	2,920	180
Wash.	4	5	1	1	7	8	9	6	7	124	-
Oreg.	-	-	7	9	9	10	2	3	U	68	-
Calif.	35	14	41	33	74	136	128	172	1,467	2,600	163
Alaska	-	-	-	-	-	3	-	1	19	40	17
Hawaii	-	1	-	-	1	3	-	1	65	88	-
Guam	-	-	-	-	-	-	-	3	-	13	-
P.R.	-	-	-	-	-	3	108	97	46	88	27
V.I.	U	U	U	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U	U	U	U
C.N.M.I.	-	-	-	-	-	-	1	6	8	-	-

N: Not notifiable U: Unavailable -: no reported cases

*Additional information about areas displaying "U" for cumulative 1998 Tuberculosis cases can be found in Notice to Readers, *MMWR* Vol. 47, No. 2, p. 39.

TABLE III. Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending June 13, 1998, and June 7, 1997 (23rd Week)

Reporting Area	*H. influenzae*, invasive		Hepatitis (Viral), by type				Measles (Rubeola)					
			A		B		Indigenous		Imported†		Total	
	Cum. 1998*	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	1998	Cum. 1998	1998	Cum. 1998	Cum. 1998	Cum. 1997
UNITED STATES	501	532	9,412	12,383	3,318	4,089	1	17	-	11	28	65
NEW ENGLAND	26	31	123	290	48	75	-	-	-	1	1	9
Maine	2	3	12	37	-	4	-	-	-	-	-	-
N.H.	1	4	7	17	7	5	-	-	-	-	-	-
Vt.	2	2	10	6	1	2	-	-	-	-	-	-
Mass.	19	19	34	147	15	35	-	-	-	1	1	8
R.I.	2	2	9	24	25	8	-	-	-	-	-	-
Conn.	-	1	51	59	-	21	-	-	-	-	-	1
MID. ATLANTIC	72	64	590	1,087	505	610	-	3	-	1	4	12
Upstate N.Y.	28	4	151	126	139	110	-	2	-	-	2	4
N.Y. City	12	21	156	483	130	245	-	-	-	-	-	5
N.J.	28	25	113	157	90	116	-	1	-	-	1	2
Pa.	4	14	170	321	146	139	-	-	-	1	1	1
E.N. CENTRAL	81	83	1,188	1,351	327	699	-	9	-	2	11	7
Ohio	33	41	151	189	31	41	-	-	-	-	-	-
Ind.	24	8	73	137	26	48	-	2	-	1	3	-
Ill.	23	24	213	329	62	139	-	-	-	-	-	5
Mich.	-	10	666	600	193	218	-	7	-	1	8	2
Wis.	1	-	85	96	15	253	-	-	-	-	-	-
W.N. CENTRAL	31	23	802	866	150	243	-	-	-	-	-	11
Minn.	17	14	60	71	16	18	-	-	-	-	-	2
Iowa	1	3	353	125	23	17	-	-	-	-	-	-
Mo.	8	3	315	478	85	183	-	-	-	-	-	1
N. Dak.	-	-	2	9	4	1	-	-	-	-	-	-
S. Dak.	-	2	8	12	1	-	U	-	U	-	-	8
Nebr.	-	1	15	35	7	8	-	-	-	-	-	-
Kans.	5	-	49	136	14	16	U	-	U	-	-	-
S. ATLANTIC	105	92	780	620	469	476	1	2	-	5	7	3
Del.	-	-	2	11	-	3	-	-	-	1	1	-
Md.	33	38	155	104	75	72	-	-	-	1	1	1
D.C.	-	-	28	14	6	21	-	-	-	-	-	1
Va.	12	6	121	79	48	56	-	-	-	2	2	-
W. Va.	4	3	1	6	3	8	-	-	-	-	-	-
N.C.	12	15	41	95	82	108	-	-	-	-	-	1
S.C.	3	3	16	59	1	48	-	-	-	-	-	-
Ga.	20	18	156	117	66	47	-	-	-	1	1	-
Fla.	21	9	260	135	188	113	1	2	-	-	2	-
E.S. CENTRAL	31	35	170	310	181	300	-	-	-	-	-	-
Ky.	4	4	10	37	22	18	-	-	-	-	-	-
Tenn.	20	21	116	186	131	191	-	-	-	-	-	-
Ala.	7	8	44	48	28	32	-	-	-	-	-	-
Miss.	U	2	U	39	U	59	U	U	U	U	U	-
W.S. CENTRAL	27	25	1,716	2,502	524	481	-	-	-	-	-	4
Ark.	-	1	37	117	30	32	-	-	-	-	-	-
La.	12	6	37	99	45	53	-	-	-	-	-	-
Okla.	13	16	259	759	32	15	-	-	-	-	-	-
Tex.	2	2	1,383	1,527	417	381	-	-	-	-	-	4
MOUNTAIN	64	56	1,543	1,854	368	399	-	-	-	-	-	7
Mont.	-	-	50	50	3	5	-	-	-	-	-	-
Idaho	-	1	119	74	16	14	-	-	-	-	-	-
Wyo.	-	1	22	18	2	12	-	-	-	-	-	-
Colo.	14	9	119	208	44	78	-	-	-	-	-	-
N. Mex.	4	5	80	138	148	134	-	-	-	-	-	-
Ariz.	36	16	986	862	102	87	-	-	-	-	-	5
Utah	4	3	99	328	30	46	U	-	U	-	-	-
Nev.	6	21	68	176	23	23	-	-	-	-	-	2
PACIFIC	64	123	2,500	3,503	746	806	-	3	-	2	5	12
Wash.	3	2	538	238	61	31	-	-	-	1	1	-
Oreg.	28	21	186	177	53	52	-	-	-	-	-	-
Calif.	27	96	1,742	3,001	621	707	-	3	-	1	4	9
Alaska	1	1	11	22	6	10	-	-	-	-	-	-
Hawaii	5	3	23	65	5	6	U	-	U	-	-	3
Guam	-	-	-	-	-	3	U	-	U	-	-	-
P.R.	2	-	19	165	221	644	-	-	-	-	-	-
V.I.	U	U	U	U	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U	U	U	U	U
C.N.M.I.	-	5	-	1	7	24	U	-	U	-	-	1

N: Not notifiable U: Unavailable -: no reported cases

*Of 118 cases among children aged <5 years, serotype was reported for 62 and of those, 28 were type b.

†For imported measles, cases include only those resulting from importation from other countries.

TABLE III. (Cont'd.) Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending June 13, 1998, and June 7, 1997 (23rd Week)

Reporting Area	Meningococcal Disease		Mumps			Pertussis			Rubella		
	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997
UNITED STATES	1,346	1,828	10	218	309	78	1,855	2,357	2	226	56
NEW ENGLAND	66	113	-	-	7	8	307	514	-	32	-
Maine	4	11	-	-	-	-	5	6	-	-	-
N.H.	4	11	-	-	-	-	23	61	-	-	-
Vt.	1	2	-	-	-	-	30	164	-	-	-
Mass.	31	61	-	-	2	8	240	261	-	6	-
R.I.	3	7	-	-	4	-	3	12	-	-	-
Conn.	23	21	-	-	1	-	6	10	-	26	-
MID. ATLANTIC	136	182	3	14	34	10	246	185	2	108	13
Upstate N.Y.	34	43	-	3	5	3	117	63	2	103	2
N.Y. City	15	32	-	4	1	-	4	45	-	2	11
N.J.	36	35	-	-	6	-	5	11	-	2	-
Pa.	51	72	3	7	22	7	120	66	-	1	-
E.N. CENTRAL	197	265	3	39	36	9	174	225	-	-	3
Ohio	79	100	2	19	13	3	66	65	-	-	-
Ind.	25	31	-	3	4	1	48	27	-	-	-
Ill.	47	82	-	1	8	4	14	28	-	-	-
Mich.	25	27	1	16	10	1	29	30	-	-	-
Wis.	21	25	-	-	1	-	17	75	-	-	3
W.N. CENTRAL	106	128	-	19	8	1	141	133	-	3	-
Minn.	16	17	-	10	3	-	79	84	-	-	-
Iowa	15	25	-	5	4	1	35	7	-	-	-
Mo.	46	63	-	3	-	-	12	21	-	2	-
N. Dak.	-	1	-	1	-	-	-	2	-	-	-
S. Dak.	6	4	U	-	-	U	4	1	U	-	-
Nebr.	4	5	-	-	1	-	5	3	-	-	-
Kans.	19	13	U	-	-	U	6	15	U	1	-
S. ATLANTIC	237	309	1	31	35	5	117	194	-	5	17
Del.	1	4	-	-	-	-	1	-	-	-	-
Md.	22	31	-	-	1	3	25	73	-	-	-
D.C.	-	5	-	-	-	-	1	2	-	-	-
Va.	21	30	-	4	4	-	6	19	-	-	1
W. Va.	7	12	-	-	-	-	1	4	-	-	-
N.C.	31	55	-	7	7	-	42	46	-	3	10
S.C.	36	37	-	4	9	-	13	9	-	-	6
Ga.	50	58	-	1	5	1	3	6	-	-	-
Fla.	69	77	1	15	9	1	25	35	-	2	-
E.S. CENTRAL	101	130	-	-	18	3	48	42	-	-	-
Ky.	16	34	-	-	2	-	18	11	-	-	-
Tenn.	39	41	-	-	3	3	17	13	-	-	-
Ala.	46	38	-	-	6	-	13	12	-	-	-
Miss.	U	17	U	U	7	U	U	6	U	U	-
W.S. CENTRAL	149	186	1	31	35	8	122	70	-	60	3
Ark.	22	25	-	-	-	-	15	4	-	-	-
La.	35	33	-	2	7	1	1	11	-	-	-
Okla.	26	22	-	-	-	-	13	8	-	-	-
Tex.	66	106	1	29	28	7	93	47	-	60	3
MOUNTAIN	78	110	1	21	41	26	415	618	-	5	4
Mont.	2	8	-	-	-	-	1	7	-	-	-
Idaho	3	7	-	3	2	13	178	408	-	-	1
Wyo.	3	-	-	1	1	-	7	4	-	-	-
Colo.	18	31	1	4	3	7	77	144	-	-	-
N. Mex.	13	19	N	N	N	-	61	32	-	1	-
Ariz.	28	23	-	4	25	2	61	11	-	1	3
Utah	8	11	U	3	5	U	19	4	U	2	-
Nev.	3	11	-	6	5	4	11	8	-	1	-
PACIFIC	276	405	1	63	95	8	285	376	-	13	16
Wash.	35	50	-	5	12	1	131	163	-	9	3
Oreg.	51	84	N	N	N	1	17	23	-	-	-
Calif.	185	268	1	43	67	6	132	179	-	2	7
Alaska	1	1	-	2	5	-	-	2	-	-	-
Hawaii	4	2	U	13	11	U	5	9	U	2	6
Guam	-	1	U	-	1	U	-	-	U	-	-
P.R.	4	9	-	1	4	-	2	-	-	-	-
V.I.	U	U	U	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U	U	U	U
C.N.M.I.	-	-	U	-	4	U	-	-	U	-	-

N: Not notifiable U: Unavailable -: no reported cases

TABLE IV. Deaths in 122 U.S. cities,* week ending June 13, 1998 (23rd Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	>65	45-64	25-44	1-24	<1	
NEW ENGLAND	582	403	106	43	17	13	32
Boston, Mass.	122	70	31	9	8	4	6
Bridgeport, Conn.	44	33	9	2	-	-	3
Cambridge, Mass.	19	17	1	1	-	-	1
Fall River, Mass.	24	17	4	3	-	-	2
Hartford, Conn.	74	49	8	10	2	5	2
Lowell, Mass.	26	20	3	3	-	-	2
Lynn, Mass.	12	7	5	-	-	-	2
New Bedford, Mass.	14	12	-	2	-	-	2
New Haven, Conn.	42	29	6	3	3	1	1
Providence, R.I.	65	47	14	2	2	-	-
Somerville, Mass.	5	3	2	-	-	-	-
Springfield, Mass.	46	34	7	2	1	2	3
Waterbury, Conn.	28	20	6	1	-	1	1
Worcester, Mass.	61	45	10	5	1	-	7
MID. ATLANTIC	2,215	1,505	430	164	58	58	93
Albany, N.Y.	51	36	11	1	1	2	2
Allentown, Pa.	29	24	3	-	2	-	2
Buffalo, N.Y.	99	75	16	6	1	1	9
Camden, N.J.	31	19	8	1	2	1	2
Elizabeth, N.J.	15	10	2	1	1	1	-
Erie, Pa.	30	23	2	2	1	2	1
Jersey City, N.J.	U	U	U	U	U	U	U
New York City, N.Y.	1,185	800	235	94	27	29	42
Newark, N.J.	59	24	17	13	2	3	1
Paterson, N.J.	27	17	5	3	-	2	-
Philadelphia, Pa.	300	190	58	27	15	10	13
Pittsburgh, Pa.§	45	28	12	1	1	3	2
Reading, Pa.	27	24	3	-	-	-	2
Rochester, N.Y.	122	83	25	10	2	2	8
Schenectady, N.Y.	23	19	3	-	1	-	1
Scranton, Pa.	28	25	3	-	-	-	-
Syracuse, N.Y.	82	59	18	2	1	2	7
Trenton, N.J.	24	19	3	2	-	-	-
Utica, N.Y.	17	12	4	-	1	-	-
Yonkers, N.Y.	21	18	2	1	-	-	1
E.N. CENTRAL	2,041	1,363	408	160	61	48	111
Akron, Ohio	56	35	13	4	-	4	-
Canton, Ohio	30	26	2	2	-	-	3
Chicago, Ill.	416	243	92	51	17	12	25
Cincinnati, Ohio	113	76	19	11	2	5	9
Cleveland, Ohio	131	86	31	4	4	6	1
Columbus, Ohio	207	145	40	15	4	3	24
Dayton, Ohio	129	93	29	5	1	1	12
Detroit, Mich.	184	96	47	31	6	4	5
Evansville, Ind.	36	27	7	1	1	-	1
Fort Wayne, Ind.	64	45	10	6	1	2	2
Gary, Ind.	14	8	4	2	-	-	-
Grand Rapids, Mich.	50	36	6	5	1	2	1
Indianapolis, Ind.	145	88	32	9	14	2	-
Lansing, Mich.	26	20	5	1	-	-	2
Milwaukee, Wis.	117	90	22	2	2	1	10
Peoria, Ill.	38	28	7	1	1	1	3
Rockford, Ill.	61	44	11	4	2	-	4
South Bend, Ind.	56	45	8	1	-	2	1
Toledo, Ohio	104	79	20	1	4	-	6
Youngstown, Ohio	64	53	3	4	1	3	2
W.N. CENTRAL	883	608	152	57	21	27	40
Des Moines, Iowa	93	76	10	5	1	1	14
Duluth, Minn.	28	22	1	2	-	3	1
Kansas City, Kans.	51	27	19	2	1	2	2
Kansas City, Mo.	124	73	24	3	5	1	5
Lincoln, Nebr.	30	21	6	3	-	-	2
Minneapolis, Minn.	186	137	30	10	4	5	11
Omaha, Nebr.	75	51	11	5	3	5	1
St. Louis, Mo.	116	79	19	10	2	6	-
St. Paul, Minn.	98	77	16	2	3	-	1
Wichita, Kans.	82	45	16	15	2	4	3
S. ATLANTIC	1,494	959	327	132	33	42	73
Atlanta, Ga.	424	267	109	34	6	8	4
Baltimore, Md.	173	94	47	21	7	4	12
Charlotte, N.C.	82	50	15	6	4	7	6
Jacksonville, Fla.	120	72	25	15	2	6	4
Miami, Fla.	103	55	29	12	3	3	-
Norfolk, Va.	49	32	11	1	1	4	5
Richmond, Va.	61	41	8	7	2	3	3
Savannah, Ga.	30	26	4	-	-	-	3
St. Petersburg, Fla.	73	55	11	4	2	1	8
Tampa, Fla.	165	127	24	12	-	2	19
Washington, D.C.	214	140	44	20	6	4	9
Wilmington, Del.	U	U	U	U	U	U	U
E.S. CENTRAL	838	544	176	60	37	20	53
Birmingham, Ala.	190	115	42	16	10	6	15
Chattanooga, Tenn.	76	53	18	4	1	-	2
Knoxville, Tenn.	73	54	14	3	2	-	8
Lexington, Ky.	69	38	15	9	2	5	7
Memphis, Tenn.	160	99	39	13	7	2	12
Mobile, Ala.	51	35	10	4	1	1	-
Montgomery, Ala.	55	41	10	2	1	1	5
Nashville, Tenn.	164	109	28	9	13	5	4
W.S. CENTRAL	1,451	952	295	119	53	31	92
Austin, Tex.	76	49	13	8	4	2	3
Baton Rouge, La.	42	30	9	2	-	1	1
Corpus Christi, Tex.	60	41	10	7	2	-	4
Dallas, Tex.	176	105	39	16	10	6	5
El Paso, Tex.	114	77	26	6	1	3	2
Ft. Worth, Tex.	89	59	21	7	1	1	13
Houston, Tex.	350	231	68	29	14	8	26
Little Rock, Ark.	82	62	13	1	4	2	10
New Orleans, La.	119	67	26	17	6	3	-
San Antonio, Tex.	206	146	34	15	8	3	19
Shreveport, La.	U	U	U	U	U	U	U
Tulsa, Okla.	137	85	36	11	3	2	9
MOUNTAIN	864	535	154	109	39	27	58
Albuquerque, N.M.	92	67	14	4	5	2	3
Boise, Idaho	34	26	4	4	-	-	1
Colo. Springs, Colo.	43	28	6	5	2	2	3
Denver, Colo.	117	82	16	9	2	8	10
Las Vegas, Nev.	153	57	32	45	14	5	11
Ogden, Utah	28	25	2	1	-	-	-
Phoenix, Ariz.	175	106	35	21	8	5	13
Pueblo, Colo.	19	12	4	2	1	-	2
Salt Lake City, Utah	85	54	17	8	4	2	8
Tucson, Ariz.	118	78	24	10	3	3	7
PACIFIC	1,816	1,280	333	119	47	36	131
Berkeley, Calif.	19	16	1	-	-	2	1
Fresno, Calif.	129	88	23	8	6	4	-
Glendale, Calif.	40	34	5	1	-	-	5
Honolulu, Hawaii	62	44	16	2	-	-	4
Long Beach, Calif.	73	46	22	4	-	1	11
Los Angeles, Calif.	653	450	135	33	20	15	46
Pasadena, Calif.	U	U	U	U	U	U	U
Portland, Oreg.	U	U	U	U	U	U	U
Sacramento, Calif.	U	U	U	U	U	U	U
San Diego, Calif.	134	92	23	9	6	3	8
San Francisco, Calif.	117	79	21	15	-	2	13
San Jose, Calif.	216	164	31	13	3	5	14
Santa Cruz, Calif.	39	29	7	3	-	-	4
Seattle, Wash.	148	99	25	20	3	1	7
Spokane, Wash.	76	57	8	5	4	2	5
Tacoma, Wash.	110	82	16	6	5	1	13
TOTAL	12,184¶	8,149	2,381	963	366	302	683

U: Unavailable -: no reported cases

*Mortality data in this table are voluntarily reported from 122 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

†Pneumonia and influenza.

§Because of changes in reporting methods in this Pennsylvania city, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

¶Total includes unknown ages.

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