CENTERS FOR DISEASE CONTROL

October 26, 1990 / Vol. 39 / No. 42

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

Epidemiologic Notes and Reports

Typhoid Fever – Skagit County, Washington

In June and July 1990, an outbreak of typhoid fever occurred in Skagit County, Washington, following a family gathering of 293 people from five states. This report provides a preliminary summary of the investigation of this outbreak by the Skagit County and Washington State departments of health.

Based on interviews of 257 attendees, 17 (6.6%) of these persons developed an illness that met the case definition for probable or confirmed typhoid fever*. Blood cultures were obtained from seven case-patients and from three other symptomatic persons; four of these yielded *Salmonella typhi*. Stool specimens from nine case-patients and six asymptomatic persons yielded *S. typhi*. The 17 case-patients ranged in age from 1 to 50 years; eight were male. Fourteen were from Washington, and three, from California. The mean incubation period was 16.1 days (range: 7–27 days); mean duration of illness was 19.7 days (range: 7–35 days). Two case-patients were hospitalized and treated with systemic antibiotics.

The investigation indicated that consumption of three food items served during the gathering was associated with risk for illness. A foodhandler who prepared one of the implicated food items had an *S. typhi*-positive stool culture and an elevated antibody titer (1:80) to the Vi antigen, suggesting chronic carriage of *S. typhi*. No other suspected carriers were identified.

To prevent secondary transmission of *S. typhi* associated with this outbreak, the county and state health departments implemented several measures from July 30 to August 17, including 1) widely disseminating information about typhoid fever and its prevention; 2) recruiting local family members to assist with case finding and disease-control efforts by asking them to contact family members and friends who had attended the gathering; 3) culturing stool samples from household contacts of infected persons, foodhandlers who had worked at the gathering, and other attendees who had jobs as foodhandlers; 4) excluding selected persons (foodhandlers who worked at the gathering, attended the gathering, or cultured positive for *S. typhi*) from foodhandling until three consecutive negative stool cultures were obtained; and

*Probable case: illness of ≥7 days in a person present at the family gathering who had subjective or objective fever, beginning 1–4 weeks after June 23, 1990, with three other symptoms characteristic of typhoid fever. Confirmed case: illness in a person that met the above definition and a culture of blood or stool positive for *Salmonella typhi*.

Typhoid Fever — Continued

5) instructing all other infected persons in proper handwashing and advising these persons to refrain from handling food until three consecutive negative stool cultures are obtained. No new cases of typhoid fever related to this outbreak have occurred since August 4.

Reported by: J Thayer, C Milat, B Meier, J Hadman, S Paciotti, R Palmer, C Story, D Larson, L Bjerkness, H Parker, V Jensen, R Rognstad, P Anderson, J Lynne, Skagit County Health Dept; N Therien, B Bartleson, L Kentala, J Lewis, JM Kobayashi, MD, State Epidemiologist, Washington State Dept of Health. Enteric Diseases Br, Div of Bacterial Diseases, Center for Infectious Diseases; Div of Field Svcs, Epidemiology Program Office, CDC.

Editorial Note: Although the incidence of typhoid fever has declined in developed nations, sporadic cases and outbreaks continue to occur. About 400 cases are reported annually in the United States, and the case-fatality rate ranges from 1.3% to 8.4% (*1*). In addition to the outbreak in this report, in 1990, state health departments have reported five other outbreaks of typhoid fever to CDC, including two outbreaks associated with restaurants, one with home-prepared food, one with imported shellfish, and one with unknown source. In comparison, from 1980 to 1989, only six outbreaks were reported to CDC.

Because complications of typhoid fever can be life-threatening, outbreaks require immediate and thorough epidemiologic investigation. However, these investigations are often constrained by three factors: 1) identification of outbreaks is often delayed because of the long incubation period (typically 10–14 days); 2) case-finding may be hampered because the symptoms of typhoid fever are similar to those of other illnesses, such as urinary tract or respiratory tract infections (*2*); and 3) cultures of stool alone often fail to detect the organism (*1,3*). The probability of recovering the organism can be increased by culturing whole stool samples (rather than rectal swabs), blood, and bone marrow (*1,3*). Cultures of urine usually are not necessary.

Because outbreaks of typhoid fever are often traced to foodhandlers who are asymptomatic carriers, stool samples from all foodhandlers associated with an outbreak should be cultured, even when the foodhandlers are asymptomatic. However, isolation of *S. typhi* from the stool of a foodhandler does not necessarily identify that person as the source of the outbreak or as a carrier because the foodhandler may have consumed the contaminated food or drink. To be considered a carrier, a person must excrete the organism for at least 3 months (*1*). During that time, the potential carrier should be excluded from foodhandling.

As demonstrated in this report, testing a possible carrier's serum for antibody to the purified Vi antigen may be helpful because carriers often have a high serum antibody titer (*4,5*). Therefore, serum specimens should be obtained from all potential or suspected carriers at the time of the investigation and, if possible, repeated several weeks later. The Vi antibody also serves as a useful marker during treatment of chronic carriers because they usually revert to seronegative after successful antimicrobial therapy (*6*).

A 6-week course of ampicillin with probenecid has been successful for treating chronic carriers with normal gallbladders and without evidence of cholelithiasis (*7*). A prolonged course of amoxicillin has been reported to be effective even in patients with gallstones or nonfunctioning gallbladders (*8*). Other effective treatments include trimethoprim-sulfamethoxazole (*9*) and oral quinolones (*10,11*). Cholecystectomy is also useful in eradicating the carrier state and may be necessary for patients whose illnesses relapse after therapy or who cannot tolerate antimicrobial therapy (*12*).

Typhoid Fever — Continued

References

1. Christie AB. Infectious diseases: epidemiologic and clinical practice. 4th ed. Vol 1. New York: Churchill Livingstone, 1987:101–64.
2. Klotz SA, Jorgensen JH, Buckwold FJ, Craven PC. Typhoid fever: an epidemic with remarkably few clinical signs and symptoms. Arch Intern Med 1984;144:533–7.
3. Gilman RH, Terminel M, Levine MM, Hernandez-Mendoza P, Hornick RB. Relative efficacy of blood, urine, rectal swab, bone-marrow, and rose-spot cultures for recovery of *Salmonella typhi* in typhoid fever. Lancet 1975;1:1211–4.
4. Engleberg NC, Barrett TJ, Fisher H, Porter B, Hurtado E, Hughes JM. Identification of a carrier by using Vi enzyme-linked immunosorbent assay serology in an outbreak of typhoid fever on an indian reservation. J Clin Microbiol 1983;18:1320–2.
5. Lin FY, Becke JM, Groves C, et al. Restaurant-associated outbreak of typhoid fever in Maryland: identification of carrier facilitated by measurement of serum Vi antibodies. J Clin Microbiol 1988;26:1194–7.
6. Nolan CM, Feeley JC, White PC, Hambie EA, Brown SL, Wong KH. Evaluation of a new assay for Vi antibody in chronic carriers of *Salmonella typhi*. J Clin Microbiol 1980;12:22–6.
7. Phillips WE. Treatment of chronic typhoid carriers with ampicillin. JAMA 1971;217:913–5.
8. Nolan CM, White PC. Treatment of typhoid carriers with amoxicillin. JAMA 1978;239: 2352–4.
9. Pichler H, Knothe H, Spitzy KH, Vielkind G. Treatment of chronic carriers of *Salmonella typhi* and *Salmonella paratyphi* B with trimethoprim-sulfamethoxazole. J Infect Dis 1973;128 (suppl):S743–4.
10. Rodriguez-Noriega E, Andrade-Villanueva J, Amaya-Tapia G. Quinolones in the treatment of *Salmonella* carriers. Rev Infect Dis 1989;11(suppl 5):S1179–85.
11. Gotuzzo E, Guerra JG, Benavente L, et al. Use of norfloxacin to treat chronic typhoid carriers. J Infect Dis 1988;157:1221–5.
12. Mandell GL, Douglas RG, Bennett JE. Principles and practice of infectious diseases. 3rd ed. New York: Churchill Livingstone, 1990:1707–9.

Exertional Rhabdomyolysis and Acute Renal Impairment — New York City and Massachusetts, 1988

During the summer and fall of 1988, outbreaks of exertional rhabdomyolysis (the breakdown of muscle fiber) with renal impairment occurred in New York and Massachusetts among candidates or trainees for public safety positions. In each of the outbreaks, risk for illness was lower in persons who were accustomed to vigorous exercise; however, incidence rates, the relation to dehydration, and settings differed.

New York

On June 14, 1988, the New York City (NYC) Department of Health was notified of one death and three hospitalizations among candidates for the NYC Fire Department (NYCFD) who had taken the NYCFD competitive physical fitness test within the previous 2 weeks. The fatality occurred in a young man with sickle cell trait who died because of uncontrollable hyperkalemia secondary to rhabdomyolysis within 6 hours of taking the fitness test; the three other hospitalized candidates had rhabdomyolysis and renal insufficiency.

The firefighter physical fitness test is usually administered during a 2- to 3-month period every 4 years to approximately 25,000–30,000 men and women who are aged 19–29 years and who have passed the NYCFD written employment examination. The test, which was given indoors in a temperature-controlled environment, required the

Exertional Rhabdomyolysis — Continued

candidates to wear a 20-lb vest and a 20-lb oxygen tank while consecutively performing 11 activities that simulate typical firefighter tasks. Completion of the test in ≤7 minutes earned a passing score, and completion in ≤4 minutes earned a 100% score.

Following the hospitalizations, the test was suspended on June 15 and resumed on June 27 with modified pre- and post-testing procedures. However, additional hospitalizations occurred, and on July 13, the test was again suspended. In late July, an epidemiologic investigation was initiated; the investigation included an environmental evaluation for carbon monoxide, which did not reveal elevated levels inside the building. Testing was temporarily suspended four times during the 19 months (May 31, 1988–December 21, 1989) after it was initiated. Each suspension was followed by an evaluation of the test by medical experts and exercise physiologists.

On June 27, a series of interventions was implemented to prevent exertional rhabdomyolysis by minimizing the effect of the ambient temperature, screening out candidates with current or prior medical problems, and assuring adequate hydration. Specific interventions included cancelling the test during the summer, requiring medical clearance from a physician, instructing candidates to reschedule the test if they were ill, urging candidates to avoid all medication and alcohol for 24 hours before and after the test, and providing fluids before the test. Despite these interventions, cases of rhabdomyolysis and/or renal impairment requiring hospitalization occurred during each of the five testing periods (Table 1).

During the 19-month period, 32 (0.2%) of 16,506 candidates were hospitalized for rhabdomyolysis and/or acute renal impairment after taking the fitness test; 41 other candidates were treated in emergency rooms but not admitted to hospitals. Of those hospitalized, four had rhabdomyolysis (defined as a serum creatinine phosphokinase [CPK] ≥600 U/L [normal: 60–200 U/L]), and 16 had renal impairment (defined as serum creatinine ≥3.0 mg/dL [normal: 0.6–1.3 mg/dL]); 12 had both rhabdomyolysis and renal impairment.

Thirty (94%) of the 32 hospitalized candidates presented with back pain, 26 (81%) with nausea and vomiting, 20 (63%) with abdominal pain, 18 (56%) with muscle pain, and 18 (56%) with decreased urine output; four required hemodialysis. The mean hospital stay was 6 days (range: 1–20 days). All hospitalized candidates were men. None of the 84 women candidates reported illness. The mean age of the patients was 25 years; 29 were white, two were black, and one was Hispanic.

TABLE 1. Hospitalizations for rhabdomyolysis and/or acute renal impairment among firefighter candidates — New York City, 1988–89

Period	Candidates tested	Hospitalizations	Hospitalization rate*
May 31–Jun 15, 1988	5,818	7	1.2
Jun 27–Jul 13, 1988	6,690	9	1.3
Oct 17–27, 1988	1,859	6	3.2
May 31–Jun 2, 1989	754	4	5.3
Dec 5–7 and Dec 21, 1989	1,385	6	4.3
Total	**16,506**	**32**	**1.9**

*Per 1000 candidates tested.

Exertional Rhabdomyolysis — Continued

After the second testing period, the NYC Department of Health and CDC conducted a case-control study using patients from the first two testing periods to assess potential risk factors. Thirteen of the 18 patients whose illnesses occurred in the first two periods agreed to be interviewed. Of the candidates who took the test during the same period and were not affected, 161 were selected randomly to serve as controls; 108 (67%) agreed to a telephone interview.

The risk for rhabdomyolysis and/or acute renal impairment after taking the test was increased in candidates with an underlying medical condition (e.g., pneumonia or renal vein thrombosis) (odds ratio [OR] = 10.3; 95% confidence interval [CI] = 2.5–43.6). The risk was lower for men who engaged in physical activity (work plus leisure activity ≥50 hours per week; OR = 0.2; 95% CI = 0.1–0.9). Risk for illness was not associated with the test score.

Based on the epidemiologic and clinical data and the failure of the implemented interventions, the NYC Department of Health recommended that the test be modified before it is given again and a comprehensive survey be done of alternative methods of selecting firefighter candidates in other cities.

Massachusetts

On September 19, 1988, 50 police trainees from local police departments began a 14-week "mental stress" and physical training program at a state-sponsored academy in western Massachusetts. On the evening of September 21, the Massachusetts Department of Public Health was notified that five trainees had been hospitalized. The program was suspended, and an epidemiologic investigation initiated September 22 determined that some trainees had experienced severe dehydration, rhabdomyolysis, and/or acute renal insufficiency. An environmental investigation did not identify any biological agents in the air or water.

All trainees were white; most were young adults (mean age: 25 years) and male (94%). The first 3 days of the training program were physically strenuous and included push-ups, squat-thrusts, and running. Daytime temperatures were 75–80 F (24–27 C), with a relative humidity of 50% (apparent temperature [heat index]: 75–80 F [24–27 C]). During the training program, drinking water was available only during three or four short breaks each day; trainees obtained water from a 19-L (5-gal) water cooler using 90-mL (3-oz) fold-out cups and from faucets in the restrooms by hand scooping. The amount of water drunk by each trainee could not be quantified; however, based on the known limited availability of water, as well as reports of severe thirst and the large volumes of fluids drunk at the end of each day (compensatory hydration), water intake was considered to be grossly inadequate.

All 50 trainees had evidence of rhabdomyolysis (serum CPK ≥10 times normal) and 33 (66%) had severe rhabdomyolysis (serum CPK ≥200 times normal). Thirteen (26%) of the trainees were hospitalized with complaints of nausea, back and abdominal pain, and dark urine; each of those hospitalized had serum CPK levels ≥32,000 U/L (normal: 10–300 U/L) and an abnormal urinalysis. Nine (69%) of those hospitalized had evidence of renal insufficiency (serum creatinine ≥2.0 mg/dL); six (46%) required hemodialysis. One trainee died 44 days after onset from complications of heat stroke, rhabdomyolysis, and renal and hepatic failure.

One month before the program, 49 of the trainees were tested for cardiovascular fitness (2.4-km [1.5-mile] run) and muscular strength (sit-ups). Compared with trainees who passed both tests, those who failed either test were at increased risk for

Exertional Rhabdomyolysis — Continued

severe rhabdomyolysis (relative risk [RR] = 2.5; 95% CI = 1.3–4.9) or renal insufficiency (RR = 2.0; 95% CI = 0.5–8.8).

As a result of this investigation, the Massachusetts Criminal Justice Training Council extensively revised its police training program. "Mental stress" training, including the use of physical exercise as a punishment for infractions, was immediately abolished. An exercise physiologist who was appointed to develop a physical fitness regimen recommended requirements for 1) meeting specific physical fitness and medical standards before and during the training program; 2) adequate hydration during activity, based on the intensity and duration of the activity and prevailing environmental conditions; and 3) a clear administrative chain of responsibility and protocol for responding to injury or illness.

Reported by: A Goodman, MD, S Klitzman, DrPH, S Lau, MPH, IW Surick, MD, S Schultz, MD, W Myers, MD, New York City Dept of Health. J Dawson, MD, Div of Critical Care, Bay State Medical Center, Springfield; JE Smith, Jr, Massachusetts Criminal Justice Training Council, RJ Timperi, MPH, GF Grady, MD, State Epidemiologist, Massachusetts Dept of Public Health. Div of Surveillance, Hazard Evaluation, and Field Studies, National Institute for Occupational Safety and Health; Div of Field Svcs, Epidemiology Program Office; Div of Chronic Disease Control and Community Intervention, Center for Chronic Disease Prevention and Health Promotion, CDC.

Editorial Note: Rhabdomyolysis is a natural consequence of vigorous physical activity. In persons unaccustomed to regular physical activity, rhabdomyolysis may be extensive, and renal impairment may occur, especially when dehydration or acidosis are also present (*1*). Dehydration alone can also cause impaired renal function by decreasing renal perfusion. These problems have been recognized among military personnel, long-distance runners, and other athletes (*2–6*). However, exercise-related rhabdomyolysis and renal impairment have not been previously described in the groups involved in this report.

The circumstances in Massachusetts resemble those in military recruit training programs (i.e., young men of varying levels of physical fitness who begin sustained strenuous exercise in moderately warm outdoor conditions). In contrast, the outbreak in the NYC firefighter candidates was associated with an indoor temperature-controlled environment, and the exercise was brief (≤7 minutes) in duration. Only one other outbreak of exertional rhabdomyolysis has been reported following a short exercise period (<10 minutes) in an indoor setting (*4*).

In Massachusetts, neither the ambient temperature nor humidity were markedly elevated (apparent temperature: 75–80 F [24–27 C]). Thus, the outbreak underscores the need to assure adequate hydration during exercise regardless of the temperature. Exercise physiologists recommend that, in addition to normal water replacement, an additional 250 mL of fluids is needed for every 15–20 minutes of exercise (*7*). Based on ambient dry bulb temperatures and relative humidity (Figure 1), nomograms have been developed to aid participants and persons responsible for groups involved in exercise during warm weather. Special efforts to assure hydration may be necessary when the apparent temperature approaches 80 F (27 C).

The substantial difference in the hospitalization rates in NYC (0.2%) and Massachusetts (26%) probably reflects a variety of factors, including environmental conditions and types of exercise. In both outbreaks, however, level of physical fitness appeared to influence the risk for illness. High levels of physical fitness may be protective through increased muscle conditioning, accelerated heat acclimatization, and reduction of postexertional myoglobinemia (*2,8–10*). Thus, findings from both outbreaks support the general recommendation that persons who plan to engage in

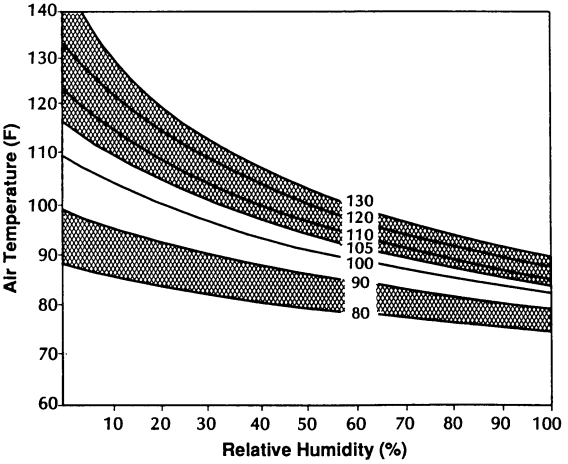
Exertional Rhabdomyolysis — Continued

extreme muscle exertion should first participate in a preconditioning program to improve their physical fitness.

Although the NYC investigation suggested that having an acute and/or chronic medical condition placed candidates at a higher risk for rhabdomyolysis and/or renal impairment, these findings should be interpreted with caution because case-patients may have been more likely than controls to report illness; consequently, their underlying conditions were more likely to be detected through medical record review. Certain conditions (e.g., viral illnesses, cocaine and aspirin abuse, and prior history of heat exhaustion) increase the risk for rhabdomyolysis and/or renal impairment (*1,11*). Sickle cell trait has been associated with an increased risk for sudden death during exertion (*12*). However, the absolute risk for sudden death is low, and persons with sickle cell trait should not be excluded, on that basis alone, from employment requiring maximal physical exertion (*13*). Based on this investigation and others (*1,11*), persons with infectious diseases should be advised to postpone testing until their illness has resolved; those with metabolic abnormalities should participate only with medical supervision; those with substance-abuse problems should be referred for appropriate treatment.

In NYC, the increasing risk for illness despite successive implementation of preventive measures suggests that the effectiveness of case-finding improved and that severe rhabdomyolysis and renal impairment among participants in similar programs might occur more frequently than previously suspected. The increasing risk also suggests that the preventive measures could have been inadequate. Prior studies suggested that the measures were appropriate; however, those studies (*1–7*) were of

FIGURE 1. Apparent temperature (F) (heat index)* as a function of ambient air temperature and relative humidity



Source: National Weather Service Bureau, New York, New York.

*With prolonged exposure and physical activity, heat syndromes for each apparent temperature range may occur as follows: 80–89 F (27–32 C)—fatigue possible; 90–104 F (32–40 C)—sunstroke, heat cramps, and heat exhaustion possible; 105–129 F (41–54 C)—heat cramps or heat exhaustion likely, heatstroke possible; ≥130 F (>54 C)—heatstroke or sunstroke imminent.

Exertional Rhabdomyolysis — Continued

persons engaged in exertion of much longer duration than the NYCFD candidates. The effect of measures to reduce or prevent exertional phenomena after short-duration activities needs to be clarified.

In the United States, there are an estimated 800,000 police officers (*14*) and 203,000 paid and 500,000 volunteer firefighters (Federal Emergency Management Agency, National Fire Academy, unpublished data, 1989). Among these workers, fitness testing is used increasingly as a criterion for job entry and for job retention (International Association of Fire-Fighters, personal communication, 1989). The need for physical performance testing must be balanced carefully with the safety of persons participating in the testing; the National Fire Protection Association (NFPA) is developing new standards for fitness testing of firefighters. Physicians and other providers who monitor the health of these persons or who serve as occupational health consultants to fire and police departments, their unions, training academies, or advisory groups (e.g., the NFPA) should be aware of these potential problems.

References

1. Gabow PA, Kaeny SP. The spectrum of rhabdomyolysis. Medicine 1982;61:141–52.
2. Demos MA, Gitin EL. Exertional myoglobinemia and acute rhabdomyolysis. Arch Intern Med 1974;134:669–73.
3. Schrier RW, Henderson HS, Tisher CC. Nephropathy associated with heat stress and exercise. Ann Intern Med 1967;317:356–76.
4. Hamilton RW, Gardner LB, Penn AS. Acute tubular necrosis caused by exercise-induced myoglobinuria. Ann Intern Med 1972;77:77–82.
5. Howenstine JA. Exertion-induced myoglobinuria and hemoglobinuria. JAMA 1960;173: 493–9.
6. Demos MA, Gitin DL. The incidence of myoglobinuria and exertional rhabdomyolysis in marine recruits. Camp Lejeune, North Carolina: The Naval Medical Field Research Laboratory, 1973;23:1–5.
7. Costill DL. Gastric emptying of fluids during exercise. In: Gisolfi CV, Lamb DR, eds. Perspectives in exercise science and sports medicine. Vol 3. Fluid homeostasis during exercise. Carmel, Indiana: Benchmark Press, 1990:97–121.
8. Olerud JE, Homer LD, Carroll HW. Incidence of acute exertional rhabdomyolysis. Arch Intern Med 1976;136:692–7.
9. Gisolfi C, Robinson S. Relations between physical training, acclimatization, and heat tolerance. J Appl Physiol 1969;26:530–4.
10. Gavhed DC, Holmer I. Thermoregulatory responses of firemen to exercise in the heat. Eur J Appl Physiol 1989;59:115–22.
11. Roth D, Alarcon FJ, Fernandez JA, et al. Acute rhabdomyolysis associated with cocaine intoxication. N Engl J Med 1988;319:673–7.
12. Kark JA, Posey DM, Schumacher HR, Ruehle CJ. Sickle cell trait as a risk factor for sudden death in physical training. N Engl J Med 1987;317:781–7.
13. Sullivan LW. The risks of sickle cell trait: caution and common sense. N Engl J Med 1987;317:830–1.
14. Bureau of Justice Statistics. Profile of state and local law enforcement agencies, 1987. Washington, DC: US Department of Justice, Bureau of Justice Statistics, 1989; publication no. NCJ-113949.

Current Trends

Update: St. Louis Encephalitis — Florida and Texas, 1990

In July 1990, active surveillance of national arboviral transmission patterns indicated that outbreaks of St. Louis encephalitis (SLE) might occur in Florida and in Houston and Harris County, Texas (*1*). Subsequently, a cluster of cases was reported

St. Louis Encephalitis — Continued

from central Florida, and sporadic cases were recognized in Harris County (*1,2*). This report updates surveillance for SLE in these locations.

Florida

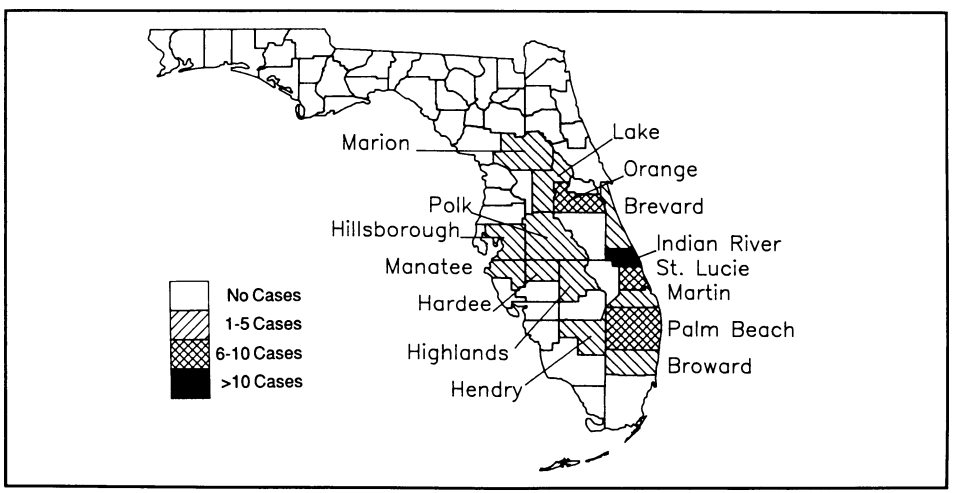
As of October 17, 1990, 38 confirmed and 26 presumptive cases* of SLE had been reported to the Florida Department of Health and Rehabilitative Services. Onset of illness occurred from July 28 to October 3, 1990. Two patients have died, one with confirmed and one with presumptive SLE. All persons with confirmed and presumptive cases resided in 15 central and south Florida counties (Figure 1); Indian River County reported 17 confirmed and presumptive cases (27% of all reported cases). Patients ranged in age from 14 to 91 years (mean: 53 years); of the 61 patients for whom sex was known, 33 (54%) were male. The affected counties have maintained programs of larviciding and aerial and ground-based adulticiding for control of *Culex nigripalpus*, the principal mosquito vector of SLE in Florida. Residents of and visitors to affected counties have been cautioned to continue use of personal protective measures against mosquitoes. In some affected counties, evening recreational activities have been rescheduled to daylight hours.

Texas

In 1990, mosquitoes infected with SLE virus were detected in Houston and surrounding Harris County on June 19, almost 1 month earlier than in previous epidemic years and at higher levels than usual (*1*). In nonepidemic years, surveillance of mosquito vectors and intermediate avian hosts has shown that viral transmission occurs at lower levels or is absent. Active surveillance for possible SLE cases was initiated through weekly contacts with infection-control personnel at all county hospitals. Surveillance was also facilitated by increasing public awareness through

*Confirmed case: fourfold rise in SLE viral hemagglutination-inhibition (HI) antibody titer in paired serum specimens obtained 2 weeks apart, or presence of IgM antibody in serum or cerebrospinal fluid. Presumptive case: viral HI antibody titer of >1:40 in a single serum specimen.

FIGURE 1. Confirmed and presumptive cases of St. Louis encephalitis, by county — Florida, as of October 17, 1990



St. Louis Encephalitis — Continued

mailings and announcements to the local medical community and through the mass media. On September 7, two cases of SLE were reported; since then, 10 additional cases have been confirmed serologically (*1*). The onset dates of illness of confirmed or presumptive cases ranged from July 20 through September 10.

All 12 patients were residents of Harris County: six cases occurred in residents of Houston; five cases, Baytown; and one, Humble. Patients ranged in age from 17 to 86 years (median: 39 years); 11 patients were hospitalized. Two infected patients died, but the causes of death have not been established.

Mosquito surveillance and control activities have been intensified throughout Harris County, especially in areas reporting human cases and in areas where infected mosquitoes were found. No infected mosquitoes have been detected since September 26.

Reported by: KL Hudson, DL Wells, AL Lewis, E Buff, RA Calder, MD, State Epidemiologist, Florida Dept of Health and Rehabilitative Svcs. RE Barnett, DA Sprenger, PhD, Houston-Harris County Mosquito Control District; J Pappas, VF Flannery, MS, KH Sullivan, PhD, JE Arrandondo, MD, City of Houston Dept of Health and Human Svcs; LJ Kilborn, MPH, MA Canfield, MS, T Hyslop, MD, Harris County Health Dept; KA Hendricks, MD, JP Taylor, MPH, DM Simpson, MD, State Epidemiologist, Texas Dept of Health. Div of Field Svcs, Epidemiology Program Office; Div of Vector-Borne Infectious Diseases, Center for Infectious Diseases, CDC.

Editorial Note: The possibility that SLE outbreaks might occur in central Florida and in Harris County, Texas, was predicted in July (*1*) when rising seroconversion rates were detected in sentinel chickens in Florida and elevated SLE viral infection rates were detected in vector mosquitoes in Harris County. Although the sensitivity and specificity of these approaches to predicting outbreaks have not been proven rigorously, observations in 1990 and previous experience suggest that measures of viral activity in nature can be used to indicate risk for human disease (*1*).

In Florida, arboviral surveillance has relied chiefly on monitoring of viral transmission to sentinel chickens (*3,4*). Seroconversions in chickens in central Florida in June and July 1990 were unprecedented in their early appearance and their proportions, approaching 100% at some sites (*1*). In previous years, seroconversions in chickens in central Florida did not peak until September and October, and the proportion of infected sentinels never exceeded 25% (*3,4*).

SLE is transmitted in Florida principally by *Cx. nigripalpus*, a predominantly exophilic (outdoor biting) mosquito found throughout central and south Florida. Feeding activity is most intense at night, especially at dusk and at dawn. Although vector control is an important means of decreasing transmission of SLE to humans, personal protective measures are also important. These practices include avoiding nighttime outdoor activity in affected counties, especially at dusk and dawn; for persons who cannot avoid outdoor activity during these periods, wearing long-sleeved shirts and long pants of tightly woven material and applying mosquito repellents are recommended.

In Harris County, where a program of mosquito surveillance has been maintained for 24 years, elevated SLE viral infection rates in *Cx. quinquefasciatus* have been associated geographically and temporally with the occurrence of human cases. In 1986, when 24 cases were reported from Baytown and four cases were reported from Houston, increased mosquito infection rates were observed in both areas in the 2-week period preceding the onset of the first case in the respective areas. Cases occurred only in areas where infected mosquitoes were captured (*5*; D. Sprenger, Houston-Harris County Mosquito Control District, personal communication, 1990).

St. Louis Encephalitis — Continued

The geographic specificity of vector surveillance was shown again in 1989 when infected mosquitoes were detected within 1 mile of the residences of each of the four patients (D. Sprenger, personal communication, 1990). In systematic collections elsewhere in the county in both 1986 and 1989, infection rates were either lower or zero (D. Sprenger, personal communication, 1990). Through October 17, 1990, the widespread distribution of infected mosquitoes has correlated with the distribution of human cases in extended areas of the city and county.

In Harris County and throughout the southeastern United States, *Cx. quinquefasciatus*, the southern house mosquito, is the prinicpal vector of SLE. In contrast to *Cx. nigripalpus*, which feeds in various outdoor locations, *Cx. quinquefasciatus* is a highly domesticated species and may feed indoors or outdoors. Risk for acquiring the disease has been epidemiologically associated with inadequately screened residences; conversely, air-conditioned residences, especially residences with central air-conditioning units, were protective in two studies (*2,6*).

In both central Florida and in Harris County, the risk for further epidemic transmission should decline as the activity of vector mosquitoes diminishes with cooling temperatures.

References

1. CDC. Arboviral surveillance—United States, 1990. MMWR 1990;39:593–8.
2. CDC. Update: arboviral surveillance—Florida, 1990. MMWR 1990;39:650–1.
3. Day JF. The use of sentinel chickens for arbovirus surveillance in Florida. Journal of the Florida Anti-Mosquito Association 1989;60:56–61.
4. Monath TP, Tsai TF. St. Louis encephalitis: lessons from the past decade. Am J Trop Med Hyg 1987;37:S40–59.
5. Tsai TF, Canfield MA, Reed CM, et al. Epidemiologic aspects of a St. Louis encephalitis outbreak in Harris County, Texas, 1986. J Infect Dis 1988;157:351–6.
6. Henderson BE, Pigford CA, Work T, Wende RD. Serologic survey for St. Louis encephalitis and other group B arbovirus antibodies in residents of Houston, Texas. Am J Epidemiol 1970; 91:87–98.

International Notes

Rabies Postexposure Immunization Regimens — Thailand

In Thailand, >100,000 persons receive rabies postexposure prophylaxis and >200 persons die from rabies annually. For persons who have been bitten by rabid animals, immune globulin (IG) (passive immunization) and rabies vaccination (active immunization) are essential components of postexposure immunization. Although tissue culture (TC) rabies vaccines (e.g., human diploid cell rabies vaccine [HDCV]) are more immunogenic and less likely to cause adverse effects than neural tissue rabies vaccine (NTV), the routine use of TC vaccine is cost-prohibitive in many developing countries. To assess the efficacy of abbreviated, cost-reducing regimens of TC vaccines, in 1987–1989, investigators at the Queen Saovabha Memorial Institute, Bangkok, Thailand, conducted separate concurrent studies of modified postexposure TC vaccine regimens: one study used an abbreviated intramuscular (IM) schedule and the other substituted multisite intradermal (ID) injections for IM injections. This report summarizes results of the two studies.

In each study, 100 Thai patients severely exposed (*1*) to rabies were treated and followed for 1 year. Patients were selected based on seven criteria: 1) the patient had

Rabies Immunization — Continued

been bitten by an animal that had been proven rabid by fluorescent antibody testing; 2) the injury was transdermal and resulted in active bleeding; 3) postexposure treatment could be initiated within 5 days of the exposure; 4) the patient or a close family member lived and worked in metropolitan Bangkok; 5) the patient was not receiving corticosteroids or immunosuppressive drugs, using alcohol or drugs, or known to have chronic liver disease; 6) the patient had no prior history of rabies vaccination; and 7) the patient (or parent) agreed to participate.

For each study, patients received both IG and vaccine (purified Vero cell rabies vaccine* [PVRV; Pasteur-Mérieux Serum and Vaccine, Lyon, France] [lot number AO254] with an antigen content of 3.17 IU per 0.5 mL ampule). In the first study, the 100 patients who were treated with the abbreviated IM regimen (2-1-1 IM) received 0.5 mL (a full dose of this vaccine) IM in the deltoid region of each arm on day 0, one dose on day 7, and one dose on day 21 (*2*). In the second study, the 100 patients treated with the Thai Red Cross ID (TRC-ID) regimen received two ID injections of 0.1 mL each at different deltoid area sites on days 0, 3, and 7 and one 0.1 mL ID injection on days 30 and 90 (*3*).

In each group, 96 patients received Equine Rabies Immune Globulin (ERIG) (Pasteur-Mérieux, France). ERIG was given at 40 IU/kg of body weight as recommended by the World Health Organization (WHO) (*1*). The maximum volume possible of ERIG was injected around bite wounds; the remainder was administered IM into the gluteal region. Because four patients in each group had a positive skin test to ERIG, they each received human rabies immune globulin (20 IU/kg) by infiltration around the bite site. In each study group, blood samples were obtained from 10 randomly selected patients on days 14, 90, and 360; all serum was frozen and analyzed concurrently in 1989 for rabies neutralizing antibody by the rapid fluorescent focus inhibition test (*4*).

At the end of the study period, all members of each cohort were alive. On the basis of exposure severity and control data from published reports, 12% and 14% of the recipients of the 2-1-1 IM regimen and the TRC-ID regimen, respectively, would have been expected to die from rabies. The efficacy of each regimen was 100% (for the 2-1-1 IM regimen, 95% confidence interval [CI] = 77%–100%, $p<0.0001$, exact binomial distribution, and for the TRC-ID regimen, 95% CI = 81%–100%). Both of these regimens were well tolerated: in each group, 4% of patients experienced mild side effects (e.g., malaise, pain at injection sites, low-grade fever, or headache).

Of the 20 patients from whom serum samples were collected on day 14, neutralizing antibody titers were higher in patients who received the TRC-ID regimen than those who received the 2-1-1 IM regimen; however, in all patients in both groups, titers were >0.5 IU/mL† (Table 1). On day 90, all patients in the TRC-ID group had titers >0.5 IU/mL, compared with 80% of those who received the 2-1-1 IM regimen. On day 360, all patients who received the TRC-ID regimen had titers >0.5 IU/mL; 50% of persons in the 2-1-1 IM group had titers <0.5 IU/mL.

Reported by: S Chutivongse, H Wilde, C Supich, Queen Saovabha Memorial Institute, Thai Red Cross Society and Faculty of Medicine, Chulalongkorn Univ, Bangkok, Thailand. Program for Appropriate Technology in Health, Seattle, Washington. Div of Viral and Rickettsial Diseases, Center for Infectious Diseases, CDC.

*Use of trade names is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

†This is the minimum titer recommended by the WHO Expert Committee on Rabies.

Rabies Immunization — Continued

Editorial Note: Each year, an estimated 25,000 persons die from rabies and approximately 4 million persons worldwide receive rabies postexposure prophylaxis; >90% of these persons live in developing countries in Asia, Africa, and South America. The least expensive TC vaccine generally is more than 10-fold the cost of locally produced NTV. Because NTVs are often provided free and a course of TC vaccine can cost several months' income, most patients receive NTVs, although NTVs are associated with a higher rate of serious adverse reactions and lower immunogenicity than TC vaccines. By using ID injections of either HDCV (*5*) or newer TC-derived rabies vaccines (*3*), investigators have attempted to lower the cost of rabies postexposure prophylaxis by reducing 1) the amount of TC vaccine used and 2) the number of clinic visits required. Although the 2-1-1 IM regimen can be accomplished in fewer visits, this regimen requires 4 ampules (2.0 mL) of vaccine: the TRC-ID schedule requires only 1.6 ampules (0.8 mL).

None of the persons vaccinated with either of the schedules in this study developed rabies, suggesting that the regimens are efficacious. Postexposure vaccine failures have been reported in 18 patients who received other postexposure regimens with TC vaccines in developing countries (*6,7*). However, in these cases, substantial departures occurred from standard postexposure practices, including failure to wash the bite wound, failure to administer passive immunization (i.e., to inject the wounds with IG), or administration of the rabies vaccine in the gluteal area rather than deltoid area.

In the United States, the only rabies postexposure prophylaxis regimen recommended by the Immunization Practices Advisory Committee (ACIP) is the combination of human rabies immune globulin (20 IU/kg, with up to one half infiltrated around the bite site and the rest administered IM in the gluteal area) and five 1-mL doses IM of HDCV or Rabies Vaccine Adsorbed (one dose each on days 0, 3, 7, 14, and 28 administered IM in the deltoid area). PVRV (the vaccine used in the studies) has not yet been licensed for use in the United States but is licensed and widely used in many European and Asian countries.

In Thailand, geometric mean titers (GMTs) for the study patients who received the 2-1-1 IM regimen appeared to be lower than those achieved by the ACIP-recommended regimen on days 14, 90, and 360. On day 90, GMTs were also low in

TABLE 1. Antibody titers in severely exposed Thai patients 14, 90, and 360 days after initiation of postexposure prophylaxis with the Thai Red Cross intradermal (TRC-ID) or the 2-1-1 intramuscular (2-1-1 IM) schedule using purified Vero cell rabies vaccine* — Thailand, 1987–1989

Regimen	No. patients	Day 14		Day 90		Day 360	
		GMT†	Range	GMT	Range	GMT	Range
TRC-ID	10	3.5§	(1.0–6.9)	0.9	(0.6–3.1)	0.7¶	(0.6–3.0)
2-1-1 IM	10	1.5	(0.5–6.9)	1.1	(0.1–6.9)	0.4	(0.1–0.6)

*Use of trade names is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.
†Geometric mean titer.
§TRC-ID titer statistically higher ($p<0.05$, Wilcoxon rank sum test) than 2-1-1 IM regimen during same period.
¶TRC-ID titer statistically higher ($p<0.005$, Wilcoxon rank sum test) than 2-1-1 IM regimen during same period.

Rabies Immunization — Continued

patients receiving the TRC-ID regimen. Several factors could account for these lower neutralizing antibody titers. Unrecognized differences in the two study groups may have influenced their antibody responses. Only 10 patients in each group were followed serologically. On day 14, titers in the 2-1-1 IM group were lower even though this group received more than twice as much vaccine as the TRC-ID group during the first 7 days of treatment. Forty IU/kg of Human Rabies Immune Globulin (HRIG) (twice the recommended dose) can suppress the antibody response to a standard five-dose IM postexposure schedule of HDCV; the administration of 40 IU/kg of ERIG may suppress the early antibody response to vaccine administered IM more than vaccine administered ID. Suppression has been observed with the 2-1-1 IM schedule when PVRV or other TC-derived vaccines, including Purified Chick Embryo Cell and Purified Duck Embryo Cell, were administered with 20 IU/kg of HRIG (*8*).

Ideally, ID regimens should be administered by staff skilled in this technique; therefore, these regimens are probably most appropriate for clinics that treat many exposed patients. However, an acceptable titer of neutralizing antibody can be achieved following subcutaneous injection or inadvertent administration of less than a full ID dose (*9,10*). The serologic response of the 2-1-1 IM regimen in patients who are also treated with ERIG requires further evaluation. In 1991, the WHO Expert Committee on Rabies is expected to make official recommendations about these alternative regimens.

References

1. Anonymous. WHO expert committee on rabies. WHO Tech Rep Ser 1984;709:1–104.
2. Vodopija I, Sureau P, Lafon M, et al. An evaluation of second generation tissue culture rabies vaccines for use in man: a four-vaccine comparative immunogenicity study using a pre-exposure vaccination schedule and an abbreviated 2-1-1 postexposure schedule. Vaccine 1986;4:245–8.
3. Chutivongse S, Wilde H, Supich C, Baer GM, Fishbein DB. Postexposure prophylaxis for rabies with antiserum and intradermal vaccination. Lancet 1990;335:896–8.
4. Smith JS, Yager PA, Baer GM. A rapid reproducible test for determining rabies neutralizing antibody. Bull WHO 1973;48:535–41.
5. Warrell MJ, Nicholson KG, Warrell DA, et al. Economical multiple-site intradermal immunisation with human diploid-cell-strain vaccine is effective for post-exposure rabies prophylaxis. Lancet 1985;1:1059–62.
6. Bernard KW, Fishbein DB, Miller KD, et al. Pre-exposure rabies immunization with human diploid cell vaccine: decreased antibody responses in persons immunized in developing countries. Am J Trop Med Hyg 1985;34:633–47.
7. Wilde H, Choomkasien P, Hemachudha T, Supich C, Chutivongse S. Failure of rabies postexposure treatment in Thailand. Vaccine 1989;7:49–52.
8. Vodopija I, Sureau P, Smerdel S, et al. Interaction of rabies vaccine with human rabies immunoglobulin and reliability of a 2-1-1 schedule application for postexposure treatment. Vaccine 1988;6:283–6.
9. Fishbein DB, Pacer RE, Holmes DF, Ley AB, Yager P, Tong TC. Rabies pre-exposure prophylaxis with human diploid cell rabies vaccine: a dose-response study. J Infect Dis 1987;156:50–5.
10. Phanuphak P, Khaoplod P, Benjavongkulchai M, Chutivongse S, Wilde H. What happens if intradermal injections of rabies vaccine are partially or entirely injected subcutaneously? Bull WHO 1990;68:83–5.

Notice to Readers

Availability of Meningococcal Vaccine in Single-Dose Vials for Travelers and High-Risk Persons

The Food and Drug Administration has approved a single-dose vial of quadrivalent polysaccharide vaccine against *Neisseria meningitidis* serogroups A, C, Y, and W135. The single-dose vial replaces the previously available 10-dose vial, which, once reconstituted, has a 5-day shelf life. This limitation is obviated by the single-dose vial and should facilitate administration to persons at high risk.

Immunization is recommended for persons with anatomic or functional asplenia and deficiencies of the terminal components of the complement system. Additionally, travelers to areas with hyperendemic or epidemic meningococcal disease should be immunized (*1*). Updated travel advisories can be obtained from travelers' clinics, county and state health departments, and CDC.

The vaccine is not recommended for routine use in the United States for three reasons: 1) meningococcal disease is infrequent (approximately 3000 cases per year); 2) no vaccine exists for serogroup B, which accounts for about 50% of cases in the United States; and 3) vaccine is not efficacious against group C disease in children <2 years of age (*2*). This age group accounts for 28% of the group C cases in the United States (CDC, unpublished data).

In adults, the protective efficacy of the vaccine is 85%–95% for disease caused by serogroups A or C (*3,4*). Efficacy data are not available for serogroups Y and W135, but the vaccine is immunogenic for both of these serogroups (*5–7*). Side effects of the vaccine are mild and infrequent, consisting primarily of erythema and induration at the site of injection and low-grade fever. Protective immunity is achieved 10–14 days after vaccination.

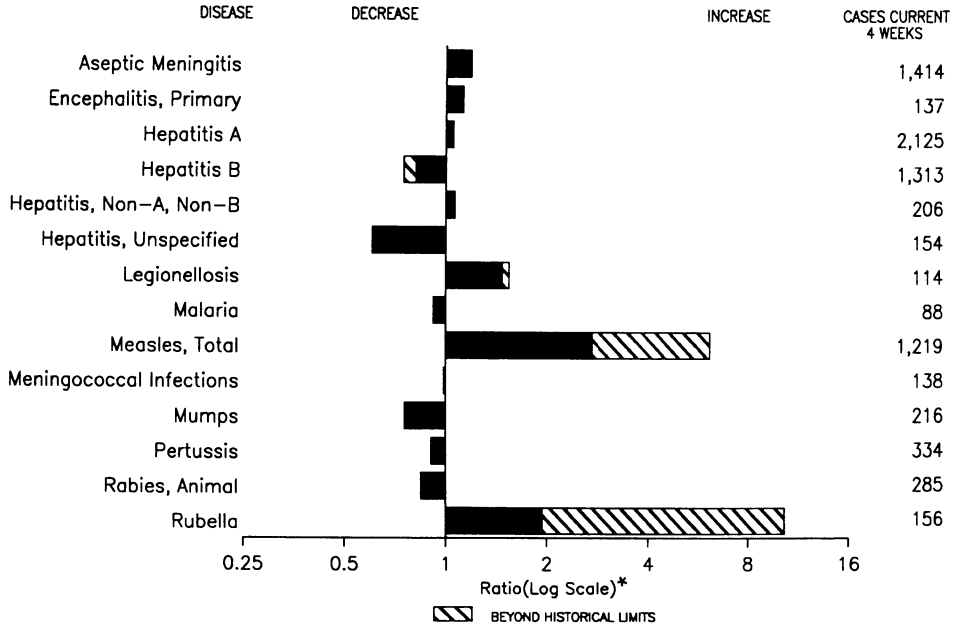
The new single-dose tetravalent vaccine is available from local distributors or Connaught Laboratories, Inc., A Pasteur Mérieux Company (telephone [800] 822-2463). Physicians are encouraged to report all cases of meningococcal disease to their local and state health departments.

Reported by: Meningitis and Special Pathogens Br, Div of Bacterial Diseases, Center for Infectious Diseases, CDC.

References

1. ACIP. Meningococcal vaccines. MMWR 1985;34:255–9.
2. Taunay A de E, Galvao PA, de Morais JS, Gotschlich EC, Feldman RA. Disease prevention by meningococcal serogroup C polysaccharide vaccine in preschool children: results after eleven months in Sao Paulo, Brazil [Abstract]. Pediatr Res 1974;8:429.
3. Makela PH, Kayhty H, Weckstrom P, Sivonen A, Renkonen OV. Effect of group A meningococcal vaccine in army recruits in Finland. Lancet 1975;2:883–6.
4. Artenstein MS, Gold R, Zimmerly JG, Wyle FA, Schneider H, Harkins C. Prevention of meningococcal disease by group C polysaccharide vaccine. N Engl J Med 1970;282:417–20.
5. Hankins WA, Gwaltney JM, Hendley JO, Farquhar JD, Samuelson JS. Clinical and serological evaluation of a meningococcal polysaccharide vaccine groups A, C, Y, W135 (41306). Proc Soc Exp Biol Med 1982;169:54–7.
6. Armand J, Arminjon F, Mynard MC, Lafaix C. Tetravalent meningococcal polysaccharide vaccine groups A, C, Y, W135: clinical and serological evaluation. J Biol Stand 1982;10:335–9.
7. Griffiss M, Brandt BL, Altieri PL, Pier GB, Berman S. Safety and immunogenicity of group Y and group W135 meningococcal capsular polysaccharide vaccines in adults. Infect Immun 1981;34:725–32.

FIGURE I. Notifiable disease reports, comparison of 4-week totals ending October 20, 1990, with historical data — United States



*Ratio of current 4-week total to mean of 15 4-week totals (from comparable, previous, and subsequent 4-week periods for past 5 years).

TABLE I. Summary — cases of specified notifiable diseases, United States, cumulative, week ending October 20, 1990 (42nd Week)

	Cum. 1990		Cum. 1990
AIDS	33,953	Plague	2
Anthrax	-	Poliomyelitis, Paralytic*	-
Botulism: Foodborne	16	Psittacosis	91
Infant	47	Rabies, human	1
Other	5	Syphilis: civilian	38,399
Brucellosis	68	military	196
Cholera	4	Syphilis, congenital, age < 1 year	685
Congenital rubella syndrome	3	Tetanus	47
Diphtheria	3	Toxic shock syndrome	243
Encephalitis, post-infectious	79	Trichinosis	22
Gonorrhea: civilian	534,788	Tuberculosis	18,566
military	7,109	Tularemia	118
Leprosy	166	Typhoid fever	406
Leptospirosis	45	Typhus fever, tickborne (RMSF)	563
Measles: imported	1,068		
indigenous	22,515		

*Three cases of suspected poliomyelitis have been reported in 1990; five of 13 suspected cases in 1989 were confirmed and all were vaccine-associated.

TABLE II. Cases of specified notifiable diseases, United States, weeks ending October 20, 1990, and October 21, 1989 (42nd Week)

Reporting Area	AIDS	Aseptic Menin-gitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionel-losis	Leprosy
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1989	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990
UNITED STATES	33,953	8,314	790	79	534,788	566,894	23,274	16,183	1,937	1,389	1,033	166
NEW ENGLAND	1,199	309	22	-	14,920	16,404	508	862	58	59	54	10
Maine	48	12	3	-	158	219	7	24	4	1	4	-
N.H.	52	35	-	-	138	142	7	38	5	3	4	-
Vt.	13	30	2	-	45	57	5	41	4	-	6	-
Mass.	681	101	11	-	6,317	6,324	332	536	35	53	32	9
R.I.	74	96	1	-	969	1,165	47	38	-	2	8	1
Conn.	331	35	5	-	7,293	8,497	110	185	10	-	-	-
MID. ATLANTIC	9,742	800	43	7	71,671	83,515	3,183	2,070	188	85	323	20
Upstate N.Y.	1,229	427	35	1	11,739	13,455	950	572	64	23	122	1
N.Y. City	5,589	132	3	3	29,454	34,399	487	553	25	43	83	14
N.J.	1,982	-	1	-	12,126	12,468	366	451	37	-	44	4
Pa.	942	241	4	3	18,352	23,193	1,380	494	62	19	74	1
E.N. CENTRAL	2,402	2,340	207	13	101,364	104,888	1,875	1,927	255	81	259	2
Ohio	550	449	68	4	30,351	27,535	177	337	72	12	82	-
Ind.	228	282	4	7	9,311	8,010	136	343	17	15	45	-
Ill.	974	383	58	2	32,482	34,394	917	365	39	17	15	1
Mich.	459	884	63	-	23,037	26,261	321	525	31	37	74	1
Wis.	191	342	14	-	6,183	8,688	324	357	96	-	43	-
W.N. CENTRAL	881	443	90	2	27,753	26,303	1,402	740	115	31	58	1
Minn.	151	83	54	1	3,459	2,849	201	91	24	1	5	-
Iowa	43	82	5	-	1,958	2,225	243	49	10	4	4	-
Mo.	511	175	7	1	16,913	16,155	414	467	54	20	28	-
N. Dak.	2	18	3	-	76	116	17	5	2	1	1	-
S. Dak.	3	9	3	-	224	231	244	7	4	-	2	-
Nebr.	50	35	7	-	1,317	1,198	84	30	4	-	10	1
Kans.	121	41	11	-	3,806	3,529	199	91	17	5	8	-
S. ATLANTIC	7,385	1,482	205	25	153,173	151,314	2,708	3,201	273	204	152	6
Del.	82	40	5	-	2,577	2,641	98	80	9	2	11	-
Md.	840	216	20	1	19,229	17,720	889	454	47	13	54	3
D.C.	589	9	-	-	11,112	9,063	15	39	4	-	2	-
Va.	585	263	46	1	14,605	13,127	259	209	35	140	13	-
W. Va.	58	51	55	-	1,018	1,149	18	71	4	8	4	-
N.C.	462	157	34	-	22,915	22,718	584	885	101	-	22	1
S.C.	288	20	1	-	12,094	13,823	38	501	15	9	18	-
Ga.	985	253	4	1	32,732	29,002	312	392	11	7	19	-
Fla.	3,496	473	40	22	36,891	42,071	495	570	47	25	9	2
E.S. CENTRAL	862	579	52	2	46,188	45,103	309	1,251	161	8	49	-
Ky.	146	156	23	-	4,792	4,382	74	442	54	6	20	-
Tenn.	286	111	21	2	14,305	15,091	142	661	88	-	16	-
Ala.	192	222	8	-	15,470	14,416	92	144	17	1	13	-
Miss.	238	90	-	-	11,621	11,214	1	4	2	1	-	-
W.S. CENTRAL	3,680	660	44	7	57,772	59,191	2,605	1,678	82	251	42	33
Ark.	168	22	5	-	7,039	6,794	435	70	9	23	9	-
La.	587	82	7	-	10,055	12,636	163	256	4	7	13	-
Okla.	170	67	3	6	4,961	5,192	480	128	23	24	13	-
Tex.	2,755	489	29	1	35,717	34,569	1,527	1,224	46	197	7	33
MOUNTAIN	915	331	21	2	10,478	11,945	3,731	1,195	181	107	40	2
Mont.	11	5	-	-	162	155	147	59	7	4	3	-
Idaho	20	7	-	-	109	147	79	66	8	-	3	-
Wyo.	2	6	1	-	128	85	53	15	5	1	2	-
Colo.	281	81	4	-	2,457	2,508	243	142	43	35	8	-
N. Mex.	86	19	1	-	1,004	1,087	772	161	11	10	3	-
Ariz.	273	153	8	-	4,272	4,921	1,691	414	66	40	11	2
Utah	88	27	3	-	317	382	480	87	24	7	3	-
Nev.	154	33	4	2	2,029	2,660	266	251	17	10	7	-
PACIFIC	6,887	1,370	106	21	51,469	68,231	6,953	3,259	624	563	56	92
Wash.	523	-	6	1	4,180	5,346	1,146	495	107	29	12	6
Oreg.	243	-	-	-	2,047	2,516	711	335	49	8	-	-
Calif.	5,968	1,183	92	19	43,996	59,156	4,853	2,319	452	516	42	70
Alaska	24	103	7	-	850	771	175	51	6	5	-	-
Hawaii	129	84	1	1	396	442	68	59	10	5	2	16
Guam	2	2	-	-	192	135	12	2	-	11	-	1
P.R.	1,378	62	6	-	611	890	125	271	9	24	-	6
V.I.	10	-	-	-	357	545	1	11	-	-	-	-
Amer. Samoa	-	1	-	-	51	51	26	-	-	-	-	10
C.N.M.I.	-	-	-	-	153	78	10	9	-	15	-	4

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of the Northern Mariana Islands

TABLE II. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending October 20, 1990, and October 21, 1989 (42nd Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1990	1990	Cum. 1990	1990	Cum. 1990	Cum. 1989	Cum. 1990	1990	Cum. 1990	1990	Cum. 1990	Cum. 1989	1990	Cum. 1990	Cum. 1989
UNITED STATES	963	279	22,515	4	1,068	13,642	1,983	64	4,302	109	3,099	3,011	5	1,015	336
NEW ENGLAND	82	-	264	-	25	336	153	-	38	9	354	311	-	8	6
Maine	1	-	28	-	2	1	12	-	-	-	16	20	-	1	-
N.H.	4	-	-	-	8	15	11	-	9	1	49	6	-	1	4
Vt.	7	-	-	-	1	3	12	-	2	-	7	6	-	-	1
Mass.	45	-	22	-	7	63	70	-	11	5	252	250	-	2	1
R.I.	8	-	27	-	3	41	12	-	5	2	6	11	-	1	-
Conn.	17	-	187	-	4	213	36	-	11	1	24	18	-	3	-
MID. ATLANTIC	216	15	1,265	-	156	973	318	6	290	8	464	245	-	11	35
Upstate N.Y.	43	-	203	-	111	152	117	5	124	5	304	107	-	10	14
N.Y. City	80	15	417	-	21	112	46	-	-	-	-	9	-	-	15
N.J.	70	-	270	-	15	445	66	-	77	-	21	32	-	-	6
Pa.	23	-	375	-	9	264	89	1	89	3	139	97	-	1	-
E.N. CENTRAL	57	-	3,353	-	143	4,762	261	2	457	-	606	415	-	161	28
Ohio	7	-	549	-	3	1,396	80	-	89	-	154	45	-	131	3
Ind.	3	-	417	-	1	78	27	-	19	-	117	19	-	-	-
Ill.	22	-	1,296	-	10	2,659	69	-	162	-	135	148	-	18	21
Mich.	16	-	348	-	125	325	63	2	139	-	75	42	-	9	1
Wis.	9	-	743	-	4	304	22	-	48	-	125	161	-	3	3
W.N. CENTRAL	17	2	884	-	14	686	64	2	138	3	178	199	-	22	6
Minn.	4	-	419	-	4	23	12	-	14	-	31	53	-	17	-
Iowa	2	-	25	-	1	12	1	-	20	-	18	15	-	4	1
Mo.	10	-	98	-	-	398	27	-	55	3	98	118	-	-	4
N. Dak.	-	-	-	-	-	-	2	-	-	-	2	3	-	1	-
S. Dak.	-	-	15	-	8	-	2	-	-	-	1	1	-	-	-
Nebr.	-	-	97	-	1	113	5	1	6	-	7	6	-	-	-
Kans.	1	2	230	-	-	140	15	1	43	-	21	3	-	-	1
S. ATLANTIC	189	4	913	-	376	644	352	34	1,789	11	281	314	-	20	10
Del.	3	-	8	-	3	40	3	-	4	-	5	1	-	-	-
Md.	52	-	194	-	18	98	41	22	1,009	-	60	65	-	2	2
D.C.	10	-	15	-	7	40	11	1	34	-	14	2	-	1	-
Va.	48	-	84	-	2	22	46	-	99	-	18	33	-	1	-
W. Va.	2	-	6	-	-	53	15	1	43	4	28	30	-	-	-
N.C.	14	-	9	-	15	188	50	-	294	-	71	66	-	-	1
S.C.	3	-	4	-	-	15	24	6	60	-	5	-	-	-	-
Ga.	15	-	99	-	259	2	61	1	86	-	32	41	-	1	-
Fla.	42	4	494	-	72	186	101	3	160	7	48	76	-	15	7
E.S. CENTRAL	20	-	183	-	3	235	118	2	93	1	146	194	-	15	3
Ky.	2	-	41	-	1	44	35	-	-	-	-	1	-	1	-
Tenn.	9	-	93	-	-	141	51	-	51	-	70	112	-	14	2
Ala.	9	-	23	-	2	50	30	2	16	1	68	70	-	-	1
Miss.	-	-	26	-	-	-	2	-	26	-	8	11	-	-	-
W.S. CENTRAL	57	3	4,181	3	94	3,193	133	7	626	29	181	326	-	66	50
Ark.	4	3	18	3§	31	22	17	2	136	2	19	27	-	3	-
La.	6	-	10	-	-	11	30	-	107	-	30	19	-	-	5
Okla.	9	-	174	-	-	110	17	-	100	6	52	52	-	1	1
Tex.	38	-	3,979	-	63	3,050	69	5	283	21	80	228	-	62	44
MOUNTAIN	23	-	828	-	100	415	66	3	320	6	249	582	-	109	36
Mont.	1	-	-	-	1	13	10	-	1	-	32	35	-	14	1
Idaho	5	-	16	-	10	7	6	-	143	3	41	67	-	49	32
Wyo.	1	-	-	-	15	-	-	-	2	-	-	-	-	-	2
Colo.	2	-	91	-	47	97	19	1	24	-	74	61	-	4	-
N. Mex.	4	-	81	-	12	31	12	N	N	1	18	30	-	-	-
Ariz.	9	-	291	-	12	145	5	2	125	-	49	368	-	32	-
Utah	-	-	127	-	-	114	7	-	9	2	31	20	-	2	-
Nev.	1	-	222	-	3	8	7	-	16	-	4	1	-	8	1
PACIFIC	302	255	10,644	1	157	2,398	518	8	551	42	640	425	5	603	162
Wash.	25	-	202	-	69	54	63	-	47	3	165	175	-	-	-
Oreg.	12	-	168	-	44	61	57	N	N	12	86	15	1	74	4
Calif.	259	249	10,166	1†	38	2,253	384	8	475	3	305	213	2	514	136
Alaska	2	-	78	-	2	1	9	-	4	2	7	1	-	-	-
Hawaii	4	6	30	-	4	32	5	-	25	22	77	21	2	15	22
Guam	3	U	-	U	1	4	-	U	4	U	1	1	U	-	-
P.R.	3	-	1,656	-	-	546	12	-	8	1	11	4	-	-	8
V.I.	-	-	21	-	3	4	-	1	12	-	-	-	-	-	-
Amer. Samoa	35	U	190	U	-	-	-	U	19	U	-	-	U	-	-
C.N.M.I.	-	U	-	U	-	-	-	U	8	U	4	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable †International §Out-of-state

TABLE II. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending October 20, 1990, and October 21, 1989 (42nd Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1990	Cum. 1989	Cum. 1990	Cum. 1990	Cum. 1989	Cum. 1990	Cum. 1990	Cum. 1990	Cum. 1990
UNITED STATES	38,399	35,157	243	18,566	17,094	118	406	563	3,493
NEW ENGLAND	1,376	1,379	21	449	505	3	24	18	6
Maine	7	11	7	16	25	-	-	-	-
N.H.	40	11	1	3	23	-	-	1	3
Vt.	1	1	1	8	8	-	-	-	-
Mass.	561	408	10	227	270	3	23	15	-
R.I.	18	26	1	61	53	-	-	-	-
Conn.	749	922	1	134	126	-	1	2	3
MID. ATLANTIC	7,625	7,433	25	4,467	3,462	1	92	29	823
Upstate N.Y.	727	732	9	315	274	-	17	15	150
N.Y. City	3,610	3,476	5	2,793	1,970	-	54	2	-
N.J.	1,214	1,152	-	764	649	1	18	7	280
Pa.	2,074	2,073	11	595	569	-	3	5	393
E.N. CENTRAL	2,778	1,487	54	1,806	1,738	2	29	45	151
Ohio	431	121	19	321	295	1	6	33	9
Ind.	78	52	1	167	168	1	1	2	14
Ill.	1,170	668	8	906	802	-	13	2	26
Mich.	824	511	26	342	372	-	8	8	48
Wis.	275	135	-	70	101	-	1	-	54
W.N. CENTRAL	414	267	26	486	435	41	5	51	544
Minn.	76	47	2	92	86	-	-	-	209
Iowa	63	29	7	48	44	-	1	1	17
Mo.	222	138	8	253	197	31	3	34	23
N. Dak.	1	3	-	16	13	-	-	-	75
S. Dak.	1	1	-	11	25	4	-	2	177
Nebr.	9	21	3	15	18	3	-	1	4
Kans.	42	28	6	51	52	3	1	13	39
S. ATLANTIC	12,715	12,535	21	3,463	3,602	4	66	235	958
Del.	150	168	1	32	35	-	-	1	24
Md.	970	645	1	269	315	-	31	17	357
D.C.	926	649	1	130	148	-	-	2	-
Va.	726	465	2	298	292	1	7	21	163
W. Va.	64	14	-	57	60	-	1	1	34
N.C.	1,415	880	10	467	446	2	2	135	8
S.C.	851	696	2	390	409	1	1	38	115
Ga.	3,205	3,126	1	575	565	-	3	18	177
Fla.	4,408	5,892	3	1,245	1,332	-	21	2	80
E.S. CENTRAL	3,655	2,385	13	1,326	1,335	7	4	70	155
Ky.	79	47	2	302	320	1	1	10	44
Tenn.	1,516	1,032	8	372	420	6	1	50	27
Ala.	1,110	731	3	410	377	-	2	10	81
Miss.	950	575	-	242	218	-	-	-	3
W.S. CENTRAL	5,748	4,793	11	2,189	2,058	40	15	92	388
Ark.	443	309	-	281	209	31	-	20	30
La.	1,178	1,188	1	185	269	-	1	2	28
Okla.	200	93	7	162	179	8	2	64	111
Tex.	3,927	3,203	3	1,561	1,401	1	12	6	219
MOUNTAIN	721	533	27	433	414	16	20	12	197
Mont.	-	1	-	22	11	-	-	4	42
Idaho	6	1	2	11	22	-	-	1	6
Wyo.	2	6	2	5	-	5	-	1	47
Colo.	39	58	7	27	39	4	-	1	23
N. Mex.	35	25	3	88	72	4	-	1	12
Ariz.	522	256	8	194	196	-	18	1	33
Utah	16	14	5	35	36	3	-	3	16
Nev.	101	172	-	51	38	-	2	-	18
PACIFIC	3,367	4,345	45	3,947	3,545	4	151	11	271
Wash.	282	377	4	218	191	1	21	2	-
Oreg.	114	189	2	99	109	-	4	1	1
Calif.	2,947	3,766	38	3,443	3,048	-	118	3	248
Alaska	15	3	-	32	50	3	-	-	22
Hawaii	9	10	1	155	147	-	8	5	-
Guam	2	4	-	36	71	-	-	-	-
P.R.	268	438	-	95	229	-	1	-	33
V.I.	12	8	-	4	4	-	-	-	-
Amer. Samoa	-	-	-	12	7	-	1	-	-
C.N.M.I.	3	8	-	43	23	-	4	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending October 20, 1990 (42nd Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	580	408	102	43	13	14	33
Boston, Mass.	151	99	27	13	5	7	9
Bridgeport, Conn.	38	30	5	-	2	1	3
Cambridge, Mass.	33	26	4	3	-	-	3
Fall River, Mass.	29	24	3	2	-	-	-
Hartford, Conn.	50	28	10	5	3	4	-
Lowell, Mass.	28	18	7	3	-	-	2
Lynn, Mass.	9	8	1	-	-	-	1
New Bedford, Mass.	19	16	2	-	1	-	-
New Haven, Conn.	41	24	9	6	1	1	2
Providence, R.I.	52	36	10	4	1	1	3
Somerville, Mass.	4	2	2	-	-	-	-
Springfield, Mass.	35	23	6	6	-	-	1
Waterbury, Conn.	44	37	6	1	-	-	2
Worcester, Mass.	47	37	10	-	-	-	7
MID. ATLANTIC	2,656	1,693	527	295	82	59	152
Albany, N.Y.	46	33	8	3	1	1	2
Allentown, Pa.	23	20	2	1	-	-	1
Buffalo, N.Y.	100	66	22	5	4	3	5
Camden, N.J.	40	21	14	4	1	-	-
Elizabeth, N.J.	17	12	2	2	-	1	3
Erie, Pa.†	37	24	8	5	-	-	3
Jersey City, N.J.	46	33	8	4	-	1	-
N.Y. City, N.Y.	1,390	852	273	196	38	31	62
Newark, N.J.	73	26	23	16	4	4	8
Paterson, N.J.	26	17	4	5	-	-	2
Philadelphia, Pa.	390	240	93	30	22	5	29
Pittsburgh, Pa.†	110	71	21	10	2	6	11
Reading, Pa.	42	36	5	-	1	-	4
Rochester, N.Y.	120	96	13	5	3	3	13
Schenectady, N.Y.	28	23	3	1	1	-	1
Scranton, Pa.†	26	19	6	-	1	-	1
Syracuse, N.Y.	52	38	9	2	-	3	1
Trenton, N.J.	44	31	4	4	4	1	4
Utica, N.Y.	17	13	3	1	-	-	1
Yonkers, N.Y.	29	22	6	1	-	-	1
E.N. CENTRAL	2,415	1,612	503	175	54	71	113
Akron, Ohio	46	36	8	-	2	-	-
Canton, Ohio	23	15	7	1	-	-	1
Chicago, Ill.§	564	362	125	45	10	22	16
Cincinnati, Ohio	136	94	23	12	3	4	17
Cleveland, Ohio	189	106	47	21	6	9	4
Columbus, Ohio	184	122	39	11	4	8	3
Dayton, Ohio	118	82	29	5	2	-	5
Detroit, Mich.	234	135	56	27	10	6	7
Evansville, Ind.	55	45	8	1	-	1	6
Fort Wayne, Ind.	87	66	13	8	-	-	12
Gary, Ind.	18	8	6	2	-	2	-
Grand Rapids, Mich.	44	31	9	2	-	2	6
Indianapolis, Ind.	192	129	34	19	6	4	14
Madison, Wis.	43	25	12	3	-	3	2
Milwaukee, Wis.	142	100	31	4	5	2	6
Peoria, Ill.	53	39	9	3	-	2	3
Rockford, Ill.	46	37	5	2	1	1	3
South Bend, Ind.	42	31	9	1	1	-	-
Toledo, Ohio	110	78	22	5	1	4	5
Youngstown, Ohio	89	71	11	3	3	1	3
W.N. CENTRAL	767	523	139	42	35	28	40
Des Moines, Iowa	79	56	13	-	9	1	3
Duluth, Minn.	20	18	2	-	-	-	3
Kansas City, Kans.	35	26	5	-	1	3	-
Kansas City, Mo.	113	83	15	8	3	4	4
Lincoln, Nebr.	37	28	6	2	-	1	2
Minneapolis, Minn.	177	117	36	14	7	3	13
Omaha, Nebr.	78	51	21	2	3	1	1
St. Louis, Mo.	115	78	21	2	8	6	10
St. Paul, Minn.	53	31	9	8	1	4	4
Wichita, Kans.	60	35	11	6	3	5	-
S. ATLANTIC	1,342	769	284	172	38	70	48
Atlanta, Ga.	182	95	48	25	6	8	6
Baltimore, Md.	102	57	22	17	4	2	6
Charlotte, N.C.	66	30	21	11	2	2	4
Jacksonville, Fla.	132	78	26	8	12	7	7
Miami, Fla.	133	68	22	29	1	13	-
Norfolk, Va.	63	38	12	7	-	6	3
Richmond, Va.	94	51	22	9	2	9	2
Savannah, Ga.	40	28	8	3	-	1	4
St. Petersburg, Fla.	73	57	10	2	2	2	5
Tampa, Fla.	162	102	37	17	-	5	6
Washington, D.C.	278	152	53	43	9	15	5
Wilmington, Del.	17	13	3	1	-	-	-
E.S. CENTRAL	781	504	159	62	28	28	59
Birmingham, Ala.	96	57	18	12	6	3	1
Chattanooga, Tenn.	49	34	8	2	2	3	5
Knoxville, Tenn.	95	58	25	7	1	4	7
Louisville, Ky.	100	72	17	6	3	2	6
Memphis, Tenn.	162	97	34	14	8	9	13
Mobile, Ala.	121	83	21	10	5	2	12
Montgomery, Ala.	39	29	6	3	1	-	9
Nashville, Tenn.	119	74	30	8	2	5	6
W.S. CENTRAL	1,693	1,021	353	194	71	54	45
Austin, Tex.	60	39	9	7	4	1	4
Baton Rouge, La.	16	7	2	5	2	-	-
Corpus Christi, Tex.	51	32	12	5	-	2	-
Dallas, Tex.	161	95	25	29	7	5	1
El Paso, Tex.	50	34	12	1	3	-	2
Fort Worth, Tex	90	62	11	10	-	7	3
Houston, Tex.§	734	436	169	89	24	16	18
Little Rock, Ark.	75	41	22	6	3	3	2
New Orleans, La.	104	52	22	14	10	6	-
San Antonio, Tex.	171	107	37	10	8	9	6
Shreveport, La.	65	38	11	8	6	2	4
Tulsa, Okla.	116	78	21	10	4	3	5
MOUNTAIN	660	441	112	65	22	19	45
Albuquerque, N. Mex.	83	54	12	6	8	2	3
Colo. Springs, Colo.	46	35	4	5	1	1	10
Denver, Colo.	90	67	15	7	1	-	8
Las Vegas, Nev.	117	69	27	12	5	4	4
Ogden, Utah	15	13	-	2	-	-	4
Phoenix, Ariz.	129	88	14	18	3	6	3
Pueblo, Colo.	23	19	3	1	-	-	2
Salt Lake City, Utah	53	28	17	4	1	3	5
Tucson, Ariz.	104	68	20	10	3	3	6
PACIFIC	1,972	1,256	369	232	64	45	135
Berkeley, Calif.	11	8	2	1	-	-	2
Fresno, Calif.	73	47	12	7	5	2	4
Glendale, Calif.	24	21	2	1	-	-	4
Honolulu, Hawaii	84	52	18	8	2	4	5
Long Beach, Calif.	100	57	15	18	4	6	17
Los Angeles Calif.	548	334	103	69	25	11	25
Oakland, Calif.§	62	39	11	8	2	2	4
Pasadena, Calif.	25	17	5	3	-	-	1
Portland, Oreg.	148	109	22	9	5	3	4
Sacramento, Calif.	164	99	41	18	3	3	17
San Diego, Calif.	133	82	26	16	8	1	10
San Francisco, Calif.	153	82	34	31	3	3	9
San Jose, Calif.	164	110	38	10	3	3	9
Seattle, Wash.	160	107	26	21	3	3	6
Spokane, Wash.	76	58	8	7	-	3	10
Tacoma, Wash.	47	34	6	5	1	1	8
TOTAL	12,866††	8,227	2,548	1,280	407	388	670

*Mortality data in this table are voluntarily reported from 121 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.

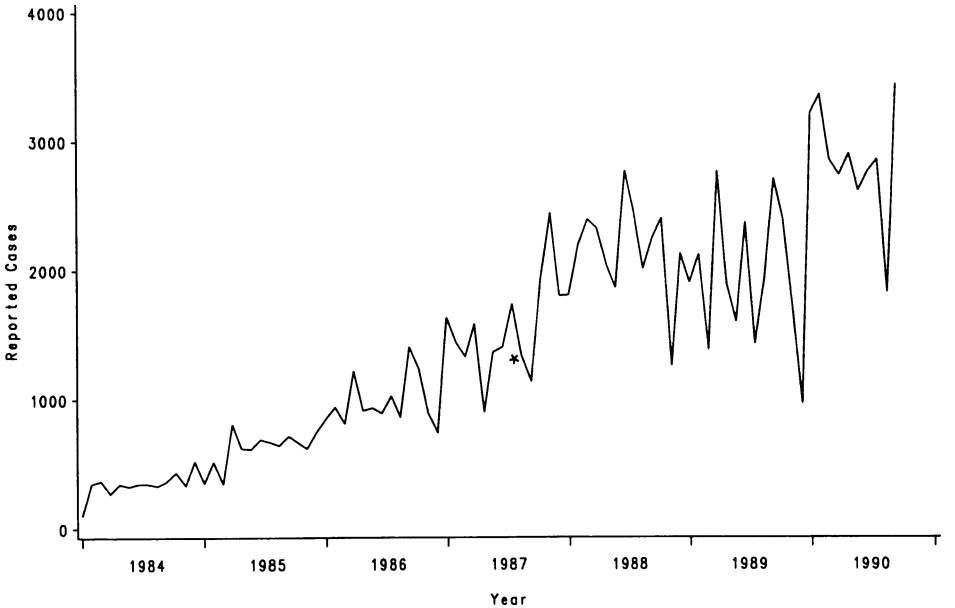
**Pneumonia and influenza.

†Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

††Total includes unknown ages.

§Data not available. Figures are estimates based on average of past available 4 weeks.

FIGURE II. Acquired immunodeficiency syndrome cases, by 4-week period of report – United States, 1984–1990



*Change in case definition.

FIGURE III. Tuberculosis cases, by 4-week period of report – United States, 1984–1990

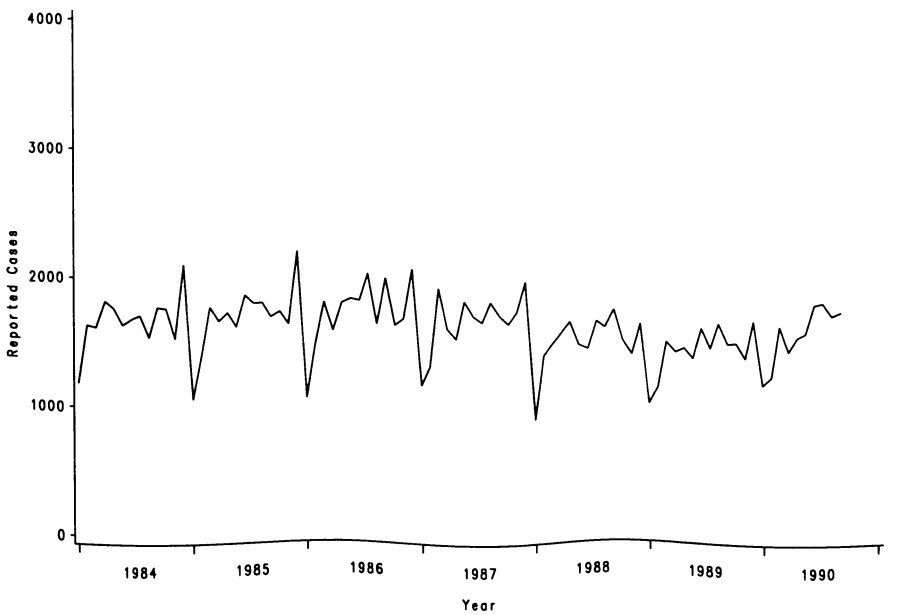


FIGURE IV. Gonorrhea cases, by 4-week period of report — United States, 1984–1990

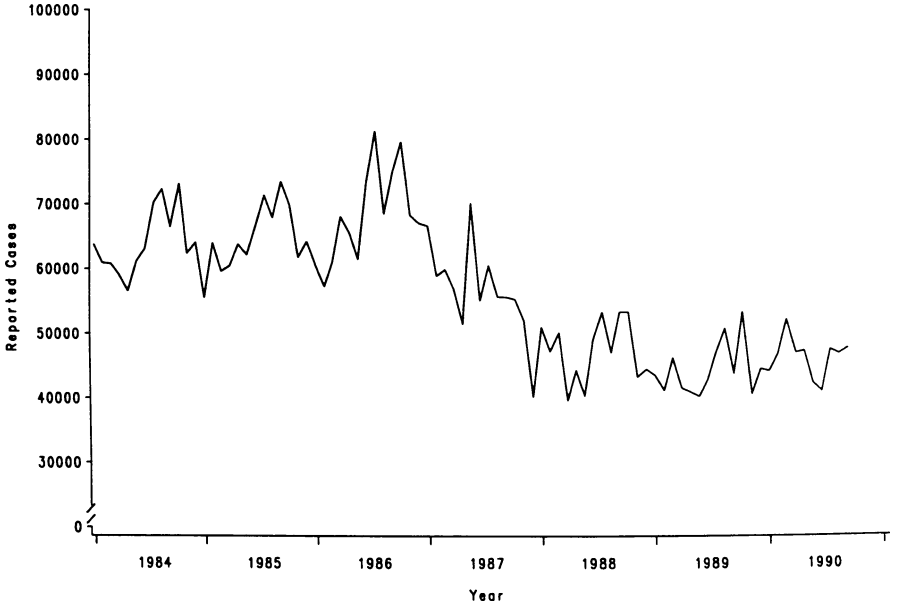
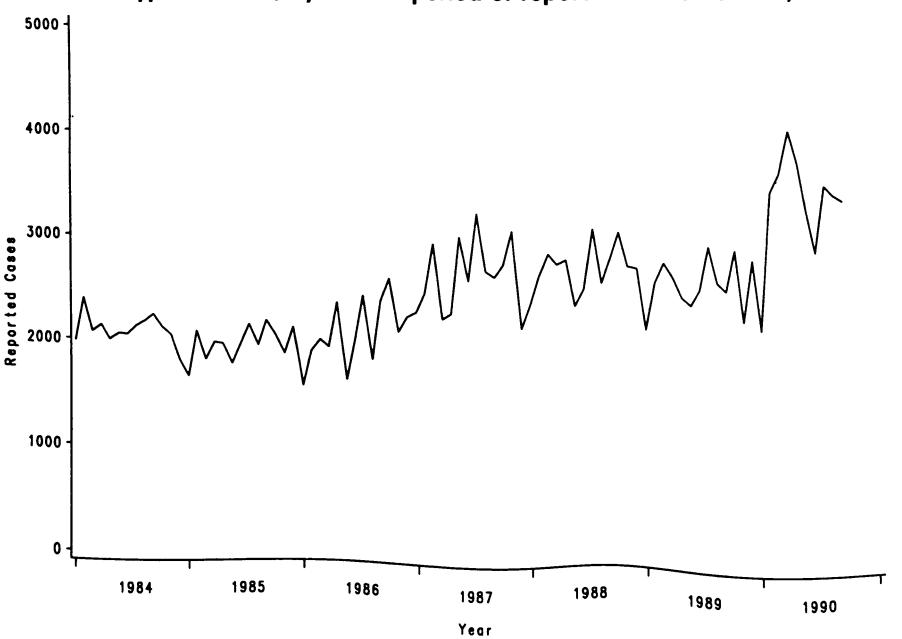


FIGURE V. Syphilis cases, by 4-week period of report — United States, 1984–1990



Erratum: Vol. 38, No. 54

The *MMWR Summary of Notifiable Diseases, United States, 1989* (published October 5, 1990), contains a mislabeled graph on page 15. The graph titled "ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)—Pediatric cases by year of report, United States, 1981–1989," should be titled "ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)—Cases among women of reproductive age (15–44 years) by year of report, United States, 1981–1989."

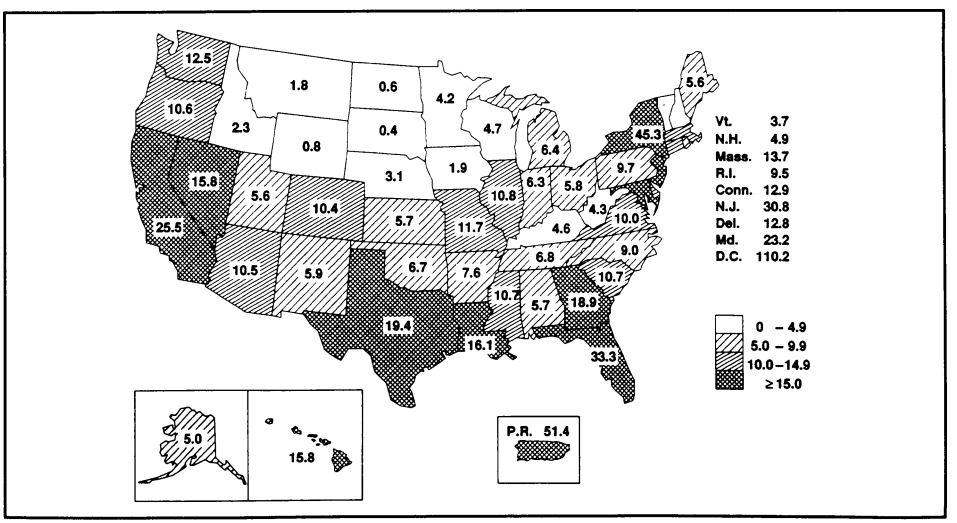
Erratum: Vol. 39, No. 41

In the article, "Public Health Burden of Vaccine-Preventable Diseases among Adults: Standards for Adult Immunization Practice," the third sentence of the first full paragraph on page 726 should read, "Annual rates for pneumococcal bacteremia estimated in 1984 and 1986–87 are 15–19 per 100,000 population and 50 per 100,000 persons ≥65 years of age, representing twofold to threefold increases over previously documented rates (*5,6*)."

Quarterly AIDS Map

The following map provides information on the reported number of acquired immunodeficiency syndrome (AIDS) cases per 100,000 population by state of residence for October 1989 through September 1990. The map appears quarterly in *MMWR*. More detailed information on AIDS cases is provided in the monthly *HIV/AIDS Surveillance Report*, single copies of which are available free from the National AIDS Information Clearinghouse, P.O. Box 6003, Rockville, MD 20850; telephone (800) 458-5231.

AIDS cases per 100,000 population — United States, October 1989–September 1990



The *Morbidity and Mortality Weekly Report* is prepared by the Centers for Disease Control, Atlanta, Georgia, and is available on a paid subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, (202) 783-3238.

The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday. Accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials, as well as matters pertaining to editorial or other textual considerations should be addressed to: Editor, *Morbidity and Mortality Weekly Report*, Mailstop C-08, Centers for Disease Control, Atlanta, Georgia 30333; telephone (404) 332-4555.

☆U.S. Government Printing Office: 1991-531-130/22029 Region IV

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
Atlanta, Georgia 30333

Official Business
Penalty for Private Use $300

FIRST-CLASS MAIL
POSTAGE & FEES PAID
PHS/CDC
Permit No. G-284

HHS Publication No. (CDC) 91-8017