CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

September 21, 2001 / Vol. 50 / No. 37

MMWR™
MORBIDITY AND MORTALITY
WEEKLY REPORT

Shigellosis Outbreak Associated With an Unchlorinated Fill-and-Drain Wading Pool — Iowa, 2001

On June 15, 2001, local physicians reported 11 cases of diarrhea to a county health department. Stool samples from two of these persons were culture confirmed as *Shigella sonnei*; one person was hospitalized. A preliminary investigation found that nine of these persons recently had visited a large city park with a wading pool. The Iowa Department of Public Health was asked to assist in an investigation of this outbreak. This report summarizes the results of the investigation, which implicated the inadequately disinfected wading pool as the source of the outbreak and presents strategies for preventing such outbreaks.

Beginning on June 15, telephone interviews were conducted using a questionnaire that included information about demographics, illness history, participation in group gatherings, water activities, and use of the park or wading pool. Ill persons were asked to identify others who were at the park or had similar symptoms. A primary case was defined as self-reported diarrhea in a person within 72 hours of visiting the park during June 11–13. A secondary case was defined as self-reported diarrhea in a person within 72 hours of household contact with a primary case-patient.

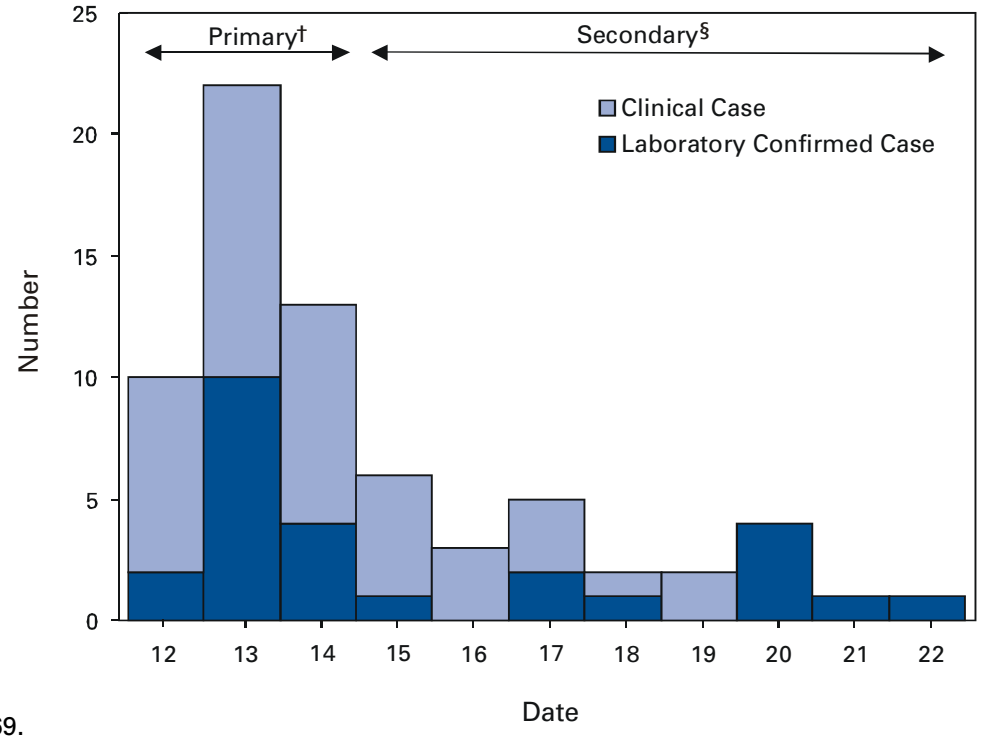
Of 89 persons interviewed, 69 met one of the case definitions. Of these, 45 (65%) were categorized as primary cases and 24 (35%) as secondary cases. Stool samples from 16 primary case-patients and 10 secondary case-patients were laboratory confirmed as *S. sonnei*, and all 26 isolates were indistinguishable by pulse field gel electrophoresis (PFGE). Of 24 isolates tested at a clinical laboratory, 16 (67%) were resistant to ampicillin and sensitive to trimethoprim-sulfamethoxazole, cefotaxime, and levofloxacin.

Illness onset among primary case-patients occurred during June 12–14 (Figure 1). The median age was 6 years (range: 1–31 years); 23 (51%) were female. Symptoms included diarrhea (100%), nausea (51%), vomiting (47%), bloody diarrhea (39%), and headache (29%). Seven (16%) patients were hospitalized. Pool exposure was associated significantly with illness (risk ratio=5.7; 95% confidence interval=1.6–20.4). Illness onset among the 24 secondary case-patients occurred during June 15–22 (Figure 1). The median age was 24 years (range: 0–63 years); 14 (58%) were female.

The pool, which has been in operation for approximately 60 years, is 40 feet in diameter, has a maximum depth of 14 inches, and has a 9400-gallon capacity. It is frequented by diaper- and toddler-aged children and as many as 20–30 children may be in the pool at one time. The pool is a "fill and drain" system and is filled each morning with potable city water through a direct inlet pipe and a centrally located fountain; it is drained and left empty each evening. The pool includes a backflow device but has no recirculation or

Shigellosis Outbreak — Continued

FIGURE 1. Number of laboratory confirmed and clinical shigellosis cases reported to a local health department, by date of onset — Iowa, June 12–22, 2001*



*n=69.
† Self-reported diarrhea in a person within 72 hours of visiting the park during June 11–13.
§ Self-reported diarrhea in a person within 72 hours of household contact with a primary case-patient.

disinfection system (i.e., pump, filter, or mechanical disinfection system). Each morning before filling, the pool is rinsed with a high-pressure washer and is scrubbed with a chlorine cleanser twice weekly. However, chlorine levels were not monitored and chlorine was not added to the pool water. Samples from the pool and other water sources in the park, including drinking fountains and faucets, were collected on June 15 and tested by the Colilert test, a rapid procedure to determine the presence of fecal coliforms. One pool sample tested positive for fecal coliforms and *Escherichia coli*. The pool was closed on June 15.

Reported by: CJ Lohff, MD, GM Nissen, ML Magnant, MP Quinlisk, MD, State Epidemiologist, Iowa Dept of Public Health; CL Tieskoetter, PL Kowalski, Visiting Nurse Association of Dubuque; PA Buss, PhD, Dubuque County Health Dept; TA Link, MR Corrigan, City of Dubuque Health Svcs Dept; JP Viner, MD, Dubuque County Board of Health; AJ Behnke, United Clinical Laboratories, Dubuque; MS DeMartino, AK Houston, Univ of Iowa Hygienic Laboratory, Iowa City, Iowa. Div of Bacterial and Mycotic Diseases and Div of Parasitic Diseases, National Center for Infectious Diseases, CDC.

Editorial Note: In this outbreak, the drain-and-fill pool contained municipal water (0.4–0.5 ppm free available chlorine) with no subsequent chlorination so that the pool was probably unchlorinated for most of the time it was in use. Inadequate disinfection of this pool, combined with heavy use by diaper- and toddler-aged children, who are often incontinent and may have an increased prevalence of enteric infections, created a favorable environment for transmission of shigellosis.

Shigellosis Outbreak — Continued

Transmission of shigellosis over several days may have been a result of the residual contaminated water left in the pipes after draining the pool and persons with diarrhea visiting the pool on subsequent days. The infectious dose for *Shigella* (*1*) is low; as a result, a small volume of ingested water can cause infection. The lack of chlorination that led to transmission of shigellosis in this wading pool also increased the risk for spreading life-threatening pathogens such as *E. coli* O157:H7.

This outbreak together with surveillance data that suggest an increase in disease outbreaks associated with recreational water exposure (*2*) illustrate the need for strict adherence of recreational water venues to existing health codes, enforcement of these codes, and education of pool operators about adequate disinfection and maintenance of pool water quality. Improved facility design and adequate water treatment can decrease the risk for transmission of illness. In addition to improved pool design and improved management and maintenance, increased education of pool staff and the public about the potential for spreading recreational water illness and development of strategies for reducing the spread of swimming-related illness is crucial to decreasing transmission (*3*).

Swimming is a shared water activity that can result in disease transmission, even with adequate chlorination, when water becomes contaminated and is subsequently swallowed. Strategies for prevention include 1) not swimming when ill with diarrhea, 2) not swallowing recreational water, and 3) practicing good hygiene when using a pool. Parents should take children on bathroom breaks regularly, use appropriate diaper changing areas, wash hands after using the toilet or changing diapers, and shower before entering the pool. Swim pants and diapers do not prevent leakage of diarrhea; therefore, they are not an acceptable solution for a child with diarrhea and are not a substitute for frequent diaper changing.

Approximately 10,000 cases of *S. sonnei* are diagnosed each year in the United States, and most occur in young children (*4*). Subsequent to the outbreak described in this report, a communitywide outbreak of shigellosis involving several local day care centers occurred; PFGE patterns were identical for both swimming-related and community-outbreak isolates. The ease with which single outbreaks can expand into communitywide outbreaks of *S. sonnei* (*5*) underscores the importance of educating the community about potential modes of transmission (e.g., child care facilities, food handlers, and swimming) and the implementation of appropriate prevention recommendations during outbreaks (e.g., thorough hand washing after using restrooms, changing diapers, and before handling/preparing food, enforcement of exclusion criteria at child care facilities, and exclusion of persons from swimming while ill with diarrhea). Child care facilities should follow strict hygiene recommendations, including supervised hand washing for young children, and may consider refraining from using water play tables and inflatable pools that may lead to transmission. In addition, communication with pool operators about ongoing outbreaks may improve vigilance in maintaining disinfectant levels necessary to reduce the risk for transmission among bathers at community pools. Additional information about preventing recreational water illness is available at <http://www.healthyswimming.org> (*3*).

References

1. Acheson DK, Bennish ML. *Shigella* and Enteroinvasive *Escherichia coli*. In: Blazer MJ, Smith PD, Ravdin JI, Greenberg HB, Guerrant RL, eds. Infections of the gastrointestinal tract. New York, New York: Raven Press, 1995.
2. Barwick RS, Levy DA, Beach MJ, Craun GF, Calderon RL. Surveillance for waterborne-disease outbreaks—United States, 1997–1998. In: CDC surveillance summaries (May). MMWR 2000;49(no. SS-4).

Shigellosis Outbreak — Continued

3. CDC. Healthy swimming 2001. Available at <http://www.healthyswimming.org>. Accessed August 2001.
4. CDC. Shigella surveillance: annual tabulation summary, 1999. Atlanta, Georgia: US Department of Health and Human Services, CDC, 2000.
5. CDC. Community outbreaks of shigellosis—United States. MMWR 1990;39:509–13,519.

Resistance of *Streptococcus pneumoniae* to Fluoroquinolones — United States, 1995–1999

Streptococcus pneumoniae is the leading cause of community-acquired pneumonia, meningitis, and otitis media in the United States. Because of the emergence of antimicrobial resistance in pneumococci, fluoroquinolones are now recommended by some groups for the treatment of pneumonia in adults, especially when antimicrobial resistance is suspected (*1–3*). Older fluoroquinolones with some antimicrobial activity against the pneumococcus include ciprofloxacin and ofloxacin. Newer fluoroquinolones with higher in vitro activity against the pneumococcus, including levofloxacin, grepafloxacin, gatifloxacin, and moxifloxacin, are available in the United States. Fluoroquinolone resistance to the pneumococcus is rare (*4,5*) but may be increasing in Canada (*6*). To determine trends of pneumococcal resistance to fluoroquinolones in the United States, invasive pneumococcal disease surveillance data were analyzed from Active Bacterial Core Surveillance (ABCs) during 1995–1999. Fluoroquinolone prescription data were obtained from the National Hospital Ambulatory Medical Care Survey (NHAMCS) during 1993–1998. This report summarizes the results of that analysis, which indicate that pneumococci with reduced susceptibility to fluoroquinolones are appearing in the United States. Appropriate use of antibiotics and continuous prospective surveillance for antimicrobial resistance are necessary to slow the emergence of fluoroquinolone-resistant pneumococci.

ABCs is an ongoing, active, population-based surveillance system for invasive pneumococcal disease conducted in selected areas of the United States. This analysis includes ABCs areas with continuous surveillance during 1995–1999. These areas include selected counties in California, Connecticut, Georgia, Maryland, Minnesota, Oregon, and Tennessee (aggregate population: 17.3 million). A case of invasive pneumococcal disease was defined as isolation of pneumococcus from blood or other normally sterile site from a resident of one of the surveillance areas. Isolates were tested for antimicrobial susceptibility to ofloxacin (1995–1997) or levofloxacin and trovafloxacin (1998–1999) using the broth microdilution method, as recommended by the National Committee for Clinical Laboratory Standards (NCCLS) (*7*). Definitions for interpretation of susceptible, intermediate, and resistant isolates also were from NCCLS (*8*); isolates that were either intermediate or resistant were considered nonsusceptible. Pulsed field gel electrophoresis (PFGE) was performed on levofloxacin-nonsusceptible isolates. All pneumococci isolated in 1998 and 1999 were serotyped using the quellung reaction.

NHAMCS collects data on the use and provision of ambulatory care services in hospital emergency and outpatient departments on a representative national sample. U.S. Bureau of the Census data were used to determine population denominators for fluoroquinolone use. The chi-square test for comparison of proportions and chi-square for linear trends were used for analysis. Statistical significance was defined as $p<0.05$.

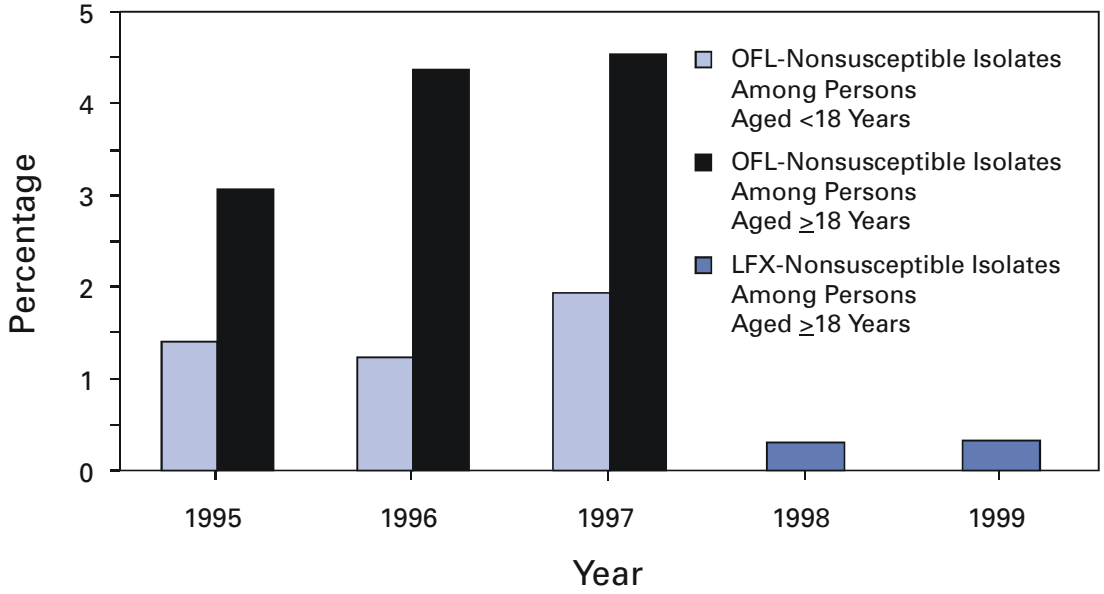
Streptococcus pneumoniae — *Continued*

During 1995–1997, susceptibility testing was performed on 8763 isolates from persons with pneumococcal invasive disease, representing 81.5% of cases identified through ABCs. During 1998–1999, susceptibility testing was available for 6529 cases of pneumococcal invasive disease, representing 84.9% of all identified cases. Overall, the prevalence of ofloxacin-nonsusceptible isolates (minimum inhibitory concentration [MIC]: ≥4 μg/mL) increased from 2.6% (65 of 2508) in 1995 to 3.8% (119 of 3108) in 1997 (chi-square for linear trend=5.24; p=0.02). Levofloxacin-nonsusceptible isolates (MIC: ≥4 μg/mL) were 0.2% of isolates in 1998 (seven of 3120) and in 1999 (eight of 3432) (Figure 1). Of 15 levofloxacin-nonsusceptible isolates, 13 also were nonsusceptible to trovafloxacin.

Isolates that were not susceptible to ofloxacin were more common among persons aged ≥18 years (225 [3.6%] of 6317) than among persons aged <18 years (64 [2.6%] of 2446) (p=0.02). Among adults, the prevalence of ofloxacin-nonsusceptible pneumococcal isolates increased from 3.1% (55 of 1791) in 1995 to 4.5% (103 of 2276) in 1997 (chi-square for linear trend=5.33; p=0.02). The proportion of ofloxacin-resistant isolates (MIC: ≥8 μg/mL) did not increase significantly (0.3% in 1995, 0.2% in 1996, and 0.4% in 1997). Of the 225 ofloxacin-nonsusceptible isolates from adults, 62.2% were from whites and 51.6% were from males. These proportions were similar for ofloxacin-susceptible isolates (57.7% from whites and 52.9% from males). Ofloxacin-nonsusceptible isolates were from patients residing in six of the seven surveillance areas.

All levofloxacin-nonsusceptible isolates were from adults (median age: 77 years; range: 44–89 years). Among adults, 0.2% (seven of 2340) of pneumococci were nonsusceptible (MIC: ≥4 μg/mL) to levofloxacin in 1998 and 0.3% (eight of 2451) in 1999. Of the 15 levofloxacin-nonsusceptible isolates, one was intermediately resistant. Fourteen (93.3%) of the levofloxacin-nonsusceptible isolates were from whites, and nine (60%) were from males. The proportion of levofloxacin-nonsusceptible isolates was significantly higher among isolates from persons aged ≥65 years (p<0.001) and among

FIGURE 1. Percentage of pneumococci isolates nonsusceptible to ofloxacin (OFL), 1995–1997, and nonsusceptible to levofloxacin (LFX), 1998–1999, by age group — United States



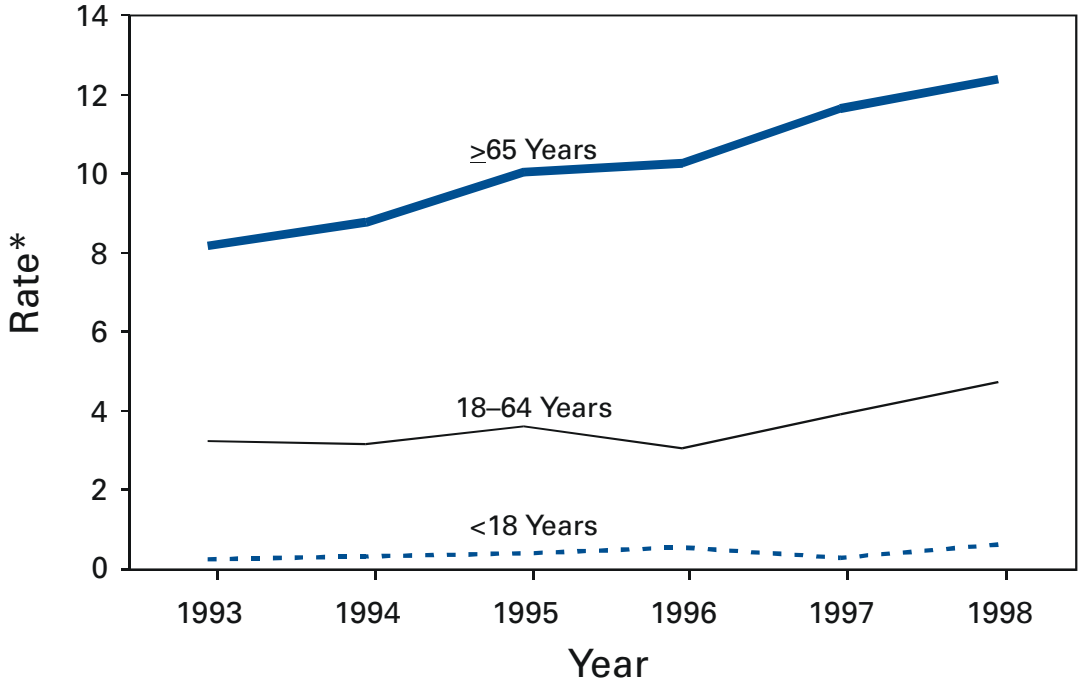
Streptococcus pneumoniae — *Continued*

whites (p<0.001), as compared with levofloxacin-susceptible isolates. Ten serotypes were identified among the 15 levofloxacin-nonsusceptible isolates: 6A, 6B, 9V, 14, 16, 18C, 19F, 22F, 23F, and 35B. Eight of the 15 isolates were obtained from residents residing in one surveillance area (Connecticut). In this area, 0.9% of invasive pneumococcal isolates were nonsusceptible to levofloxacin, compared with 0.2% for all other areas. Examination of the isolates from Connecticut using PFGE showed eight unrelated patterns.

Fluoroquinolone resistance was associated with resistance to other antimicrobials. Among the 225 isolates that were nonsusceptible to ofloxacin, 44 (19.6%) also were nonsusceptible to penicillin (MIC: ≥0.12 μg/mL), 23 (10.2%) to cefotaxime (MIC: ≥1 μg/mL), 20 (8.9%) to erythromycin (MIC: ≥0.5 μg/mL), and 68 (30.2%) to trimethoprim-sulfamethoxazole (MIC: ≥1/19 μg/mL). Among the 15 isolates nonsusceptible to levofloxacin, nine (60%) had decreased susceptibility to penicillin, eight (53.3%) were nonsusceptible to cefotaxime, five (33.3%) to erythromycin, and nine (60%) to trimethoprim-sulfamethoxazole. In comparison, among the 4623 levofloxacin-susceptible isolates, 1018 (22%) were nonsusceptible to penicillin, 594 (12.8%) were nonsusceptible to cefotaxime, 650 (14%) to erythromycin, and 1229 (26.6%) to trimethoprim-sulfamethoxazole.

During 1993–1998, fluoroquinolone prescriptions in the United States increased from 3.1 to 4.6 per 100 persons per year. The frequency of fluoroquinolone prescriptions was highest among persons aged ≥65 years and increased in this age group from 8.2 to 12.4 per 100 persons per year (Figure 2). Prescriptions written in the United States for all antibiotics decreased from 53.5 to 51.5 per 100 persons per year for all ages during this period.

FIGURE 2. Fluoroquinolone prescriptions, by age group — United States, 1993–1998



* Per 100 persons.

Streptococcus pneumoniae — *Continued*

Reported by: P Daily, MPH, L Gelling, MPH, G Rothrock, MPH, A Reingold, MD, California Emerging Infections Program, San Francisco; D Vugia, MD, Acting State Epidemiologist, California Dept of Health Svcs. NL Barrett, MS, J Hadler, MD, State Epidemiologist, Connecticut Dept of Public Health. W Baughman, MSPH, M Farley, MD, Veterans Administration Medical Center and Emory Univ School of Medicine, Atlanta; PA Blake, MD, State Epidemiologist, Georgia Dept of Health. MA Pass, J Roche, MD, LH Harrison, MD, Johns Hopkins Univ, Baltimore; J Roche, MD, Acting State Epidemiologist, Maryland State Dept of Health and Mental Hygiene. SK Johnson, MT, CA Lexau, MPH, R Lynfield, MD, R Danila, MD, Assistant State Epidemiologist, Minnesota Dept of Health. K Stefonek, MPH, PR Cieslak, MD, MA Kohn, MD, State Epidemiologist, Oregon Health Div. B Barnes, W Schaffner, A Craig, MD, State Epidemiologist, Tennessee Dept of Health. JH Jorgensen, PhD, L McElmeel, S Crawford, Univ of Texas Health Sciences Center, San Antonio, Texas. Respiratory Diseases Br, Div of Bacterial and Mycotic Diseases and Active Bacterial Core Surveillance/Emerging Infections Program Network, National Center for Infectious Diseases; and an EIS Officer, CDC.

Editorial Note: The findings in this report indicate that fluoroquinolone-nonsusceptible pneumococci are present in the United States; however, it is unclear whether resistance is increasing with the newer fluoroquinolones. The proportion of isolates that were ofloxacin-nonsusceptible isolates increased during 1995–1997. The main mechanisms of resistance to fluoroquinolone agents are alterations on DNA gyrase subunits and reduced penetration associated with decreased outer membrane protein production. These mechanisms are common between ofloxacin and the newer fluoroquinolone agents, although ofloxacin-resistant strains may be seen with a single mutation to DNA gyrase and newer fluoroquinolones and require mutations in both mechanisms for resistance (*9,10*). Therefore, trends in ofloxacin susceptibility may predict what will occur for other fluoroquinolone agents.

The growing use of fluoroquinolones probably contributes to the emergence of fluoroquinolone-resistant pneumococci. Fluoroquinolone-resistant isolates were more common among persons aged ≥65 years, who have the highest density of fluoroquinolone use. In comparison, penicillin-resistant strains are more common among isolates from young children, who have the highest rate of beta-lactam use. Fluoroquinolones are not licensed for use in children, a factor that may be helping to slow the rate of emerging fluoroquinolone resistance. PFGE results suggest that the emergence of resistant isolates does not result from spread of a single resistant clone.

Levofloxacin-nonsusceptible isolates had reduced susceptibility to other antimicrobials used for the treatment of pneumococcal pneumonia, notably penicillin, trimethoprim-sulfamethoxazole, erythromycin, and cefotaxime. Most levofloxacin-nonsusceptible isolates also were nonsusceptible to trovafloxacin. These findings have important implications given that fluoroquinolones are recommended for the treatment of pneumococcal infections when penicillin resistance or resistance to other antimicrobials is suspected. Few therapeutic options exist for invasive disease attributable to pneumococci resistant to quinolones and other agents.

Susceptibility testing for ofloxacin and levofloxacin at ABCs started in 1995 and 1998, respectively. Therefore, results presented in this report are limited by the short time that systematic testing for levofloxacin susceptibility has been available and by the lack of continuity for testing of a single fluoroquinolone agent during this period. Identification of decreased susceptibility to fluoroquinolones in ABCs sites is population based and representative of the areas under surveillance. ABCs does not provide comprehensive national surveillance, but provides a good approximation of national trends.

Streptococcus pneumoniae — *Continued*

Fluoroquinolones are important agents for treating pneumococcal infections and community-acquired pneumonia. Appropriate use of antibiotics is crucial for slowing the emergence of fluoroquinolone resistance. Principles for appropriate use of antibiotics in adults are available at <http://www.cdc.gov/antibioticresistance/technical.htm>. Continuous prospective surveillance for antimicrobial resistance in pneumococci is needed to determine whether increases in fluoroquinolone resistance will occur in the United States. If fluoroquinolone resistance becomes more common, clinical laboratories should consider routine susceptibility testing of fluoroquinolones on invasive pneumococcal isolates. Several state health departments have established surveillance for cases of invasive drug-resistant *S. pneumoniae*. Because fluoroquinolone-resistant isolates have been rare, clinicians and microbiology personnel are encouraged to report episodes of suspected fluoroquinolone resistance in pneumococcal isolates collected from blood or cerebrospinal fluid to their state or local health department.

References

1. Bartlett JG, Dowell SF, Mandell LA, File TM Jr, Musher DM, Fine MJ. Practice guidelines for the management of community-acquired pneumonia in adults. Clin Infect Dis 2000;31:347–82.
2. Campbell GD Jr. Commentary on the 1993 American Thoracic Society guidelines for the treatment of community-acquired pneumonia. Chest 1999;115:14–8.
3. Heffelfinger JD, Dowell SF, Jorgensen H, et al. Management of community-acquired pneumonia in the era of antimicrobial resistance: a report from the Drug-Resistant *Streptococcus pneumoniae* Therapeutic Working Group. Arch Intern Med 2000;160:1399–408.
4. Richard MP, Aguado AG, Mattina R, Marre R. Sensitivity to sparfloxacin and other antibiotics, of *Streptococcus pneumoniae, Haemophilus influenzae* and *Moraxella catarrhalis* strains isolated from adult patients with community-acquired lower respiratory tract infections: a European multicentre study. J Antimicrob Chemother 1998;41:207–14.
5. Odland BA, Jones RN, Verhoef J, Fluit A, Beach ML. Antimicrobial activity of gatifloxacin (AM-1155, CG5501), and four other fluoroquinolones tested against 2,284 recent clinical strains of *Streptococcus pneumoniae* from Europe, Latin America, Canada, and the United States. Diagn Microbiol Infect Dis 1999;34:315–20.
6. Chen DK, McGeer A, de Azavedo JC, Low DE. Decreased susceptibility of *Streptococcus pneumoniae* to fluoroquinolones in Canada. N Engl J Med 1999;341:233–9.
7. National Committee for Clinical Laboratory Standards. Methods for dilution antimicrobial susceptibility tests for bacteria that grow aerobically: approved standard M7-A5. Wayne, Pennsylvania: National Committee for Clinical Laboratory Standards, 2000.
8. National Committee for Clinical Laboratory Standards. Performance standards for antimicrobial susceptibility tests (M100-S11). Wayne, Pennsylvania: National Committee for Clinical Laboratory Standards, 2001.
9. Jorgensen JH, Weigel LM, Ferraro JM, Swenson JM, Tenover FC. Activities of newer fluoroquinolones against *Streptococcus pneumoniae* clinical isolates, including those with mutations in the *gyrA*, *parC*, and *parE* loci. Antimicrob Agents Chemother 1999;43:329–34.
10. Jorgensen JH, Weigel LM, Swenson JM, Whitney CG, Ferraro JM, Tenover FC. Activities of clinafloxacin, gatifloxacin, gemifloxacin, and trovafloxacin against recent clinical isolates of levofloxacin-resistant *Streptococcus pneumoniae*. Antimicrob Agents Chemother 2000;44:2962–8.

Weekly Update: West Nile Virus Activity — United States, September 12–18, 2001

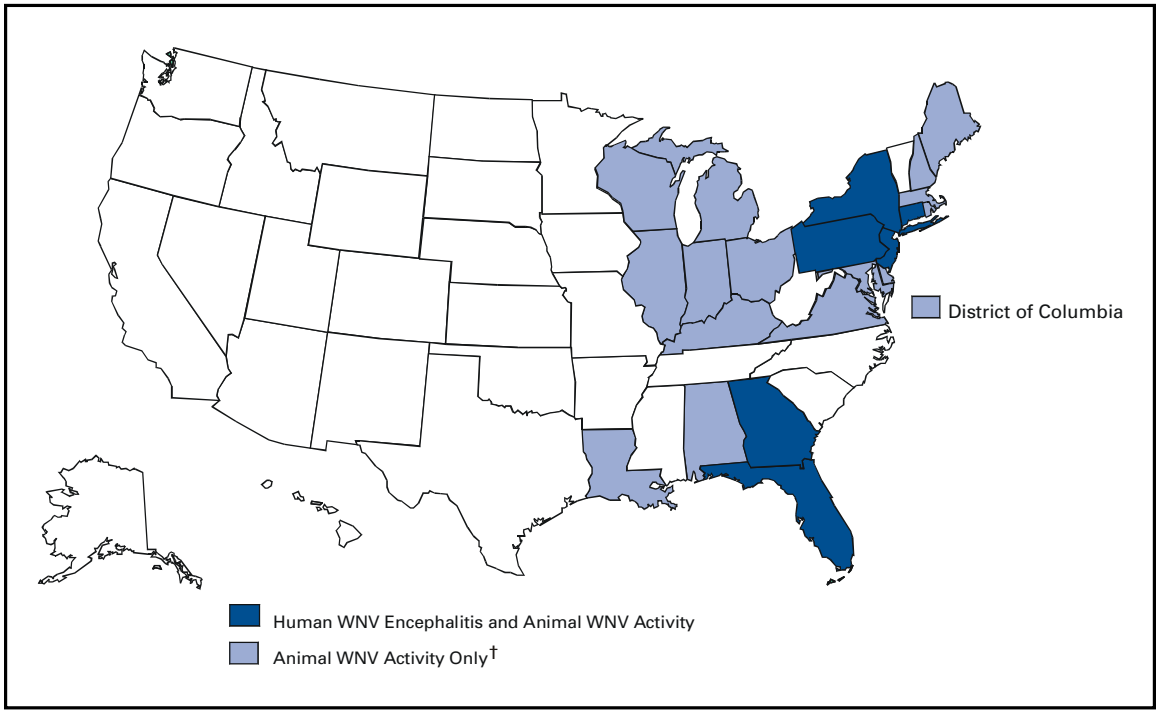
The following report summarizes surveillance data for West Nile virus (WNV) infection reported to CDC through ArboNET and verified by states and jurisdictions as of September 18, 2001.

During the week of September 12–18, three human cases of WNV encephalitis were reported, all in Connecticut; no deaths were reported. During the same period among animal WNV activity, 474 crows, 173 other birds, and 61 horses were verified as WNV-positive. Thirty-eight WNV-positive mosquito pools also were reported in three states (Florida, New Jersey, and Pennsylvania).

A year-to-date total of 12 human cases of WNV encephalitis has been identified in Connecticut (three), Florida (four), Georgia (one), New Jersey (one), and New York (three); one death occurred in Georgia. During 2001, a total of 2091 crows and 876 other birds were confirmed WNV-positive in 20 states and the District of Columbia (Figure 1); 80 WNV infections were confirmed in other animals (all horses) in nine states (Alabama, Connecticut, Florida, Georgia, Kentucky, Louisiana, Massachusetts, New York, and Pennsylvania); and 511 WNV-positive mosquito pools were found in 11 states (Connecticut, Florida, Georgia, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, and Rhode Island).

Additional information about WNV activity is available at <http://www.cdc.gov/ncidod/dvbid/westnile/index.htm> and <http://cindi.usgs.gov/hazard/event/west_nile/west_nile.html>.

FIGURE 1. Areas reporting West Nile virus (WNV) activity — United States, 2001*



*As of September 18, 2001.
† Kentucky reported WNV activity in a horse but no birds.

Notice to Readers

FDA Approval for a Combined Hepatitis A and B Vaccine

On May 11, 2001, the Food and Drug Administration (FDA) licensed a combined hepatitis A and B vaccine (Twinrix®) for use in persons aged ≥18 years. Twinrix is manufactured and distributed by GlaxoSmithKline Biologicals (Rixensart, Belgium), and is made of the antigenic components used in Havrix and Engerix-B (GlaxoSmithKline). The antigenic components in Twinrix have been used routinely in separate single antigen vaccines in the United States since 1995 and 1989 as hepatitis A and B vaccines, respectively.

Vaccine Description

Each dose of Twinrix contains at least 720 enzyme-linked immunosorbent assays units of inactivated hepatitis A virus and 20 mcg of recombinant hepatitis B surface antigen (HBsAg) protein, with 0.45 mg of aluminum in the form of aluminum hydroxide and aluminum phosphate as adjuvants, 5.0 mg 2-phenoxyethanol as a preservative, and pH stabilizer in normal saline. Trace amounts of thimerosal (<1 μg mercury), neomycin (≤20 ng), formalin (≤0.1 mg), and yeast protein (≤5%) also are present from the manufacturing process.

Indications and Usage

Twinrix is indicated for vaccination of persons aged ≥18 years against hepatitis A and B. Any person in this age group having an indication for both hepatitis A and B vaccination can be administered Twinrix, including patients with chronic liver disease, users of illicit injectable drugs, men who have sex with men, and persons with clotting factor disorders who receive therapeutic blood products (*1,2*). For international travel, hepatitis A vaccine is recommended for travelers to areas of high or intermediate hepatitis A endemicity; hepatitis B vaccine is recommended for travelers to areas of high or intermediate hepatitis B endemicity who plan to stay for ≥6 months and have frequent close contact with the local population (*3*). Primary vaccination consists of three doses, given on a 0-, 1-, and 6-month schedule, the same schedule as that used for single antigen hepatitis B vaccine.

Safety and Immunogenicity

Adverse experiences (AEs) were evaluated in clinical trials in which 6594 doses of Twinrix were administered to 2165 persons. Observed AEs generally were similar in type and frequency to those observed after vaccination with monovalent hepatitis A and B vaccines. The frequency of AEs did not increase with subsequent doses of Twinrix. No serious vaccine-related AEs were observed (GlaxoSmithKline Biologicals, unpublished data, 2001). Twinrix is contraindicated in persons with known hypersensitivity to any component of the vaccine.

Prelicensure clinical trials indicate that the immunogenicity of Twinrix is equivalent to that of the single antigen hepatitis vaccines. Data from 11 clinical trials that included adults aged 17–70 years indicated, 1 month after completion of the three dose series, seroconversion for antibodies against hepatitis A virus (anti-HAV titer ≥20 mIU/mL or 33mIU/mL [Enzymun-Test, Boehringer Mannheim Immunodiagnostics, Mannheim, Germany]) were elicited in 99.9% of vaccinees, and protective antibodies against HBsAg (anti-HBs ≥10 mIU/mL [AUSAB, Abbott Laboratories, Abbott Park, Illinois]) were elicited

Notices to Readers — Continued

in 98.5% of vaccinees. One month after one dose of Twinrix, seroconversion to anti-HAV was seen in 93.8% of vaccinees and protective anti-HBs concentrations in 30.8%. One month after the second dose, seroconversion to anti-HAV was seen in 98.8% of vaccinees, and protective anti-HBs concentrations in 78.2%. The efficacy of Twinrix is expected to be comparable with existing single antigen hepatitis vaccines. The persistence of anti-HAV and anti-HBs following Twinrix administration is similar to that following single antigen hepatitis A and B vaccine administration at 4 years follow-up (GlaxoSmithKline Biologicals, unpublished data, 2001). Additional information is available from the manufacturer's package insert and GlaxoSmithKline Vaccines, telephone (800) 366-8900.

References

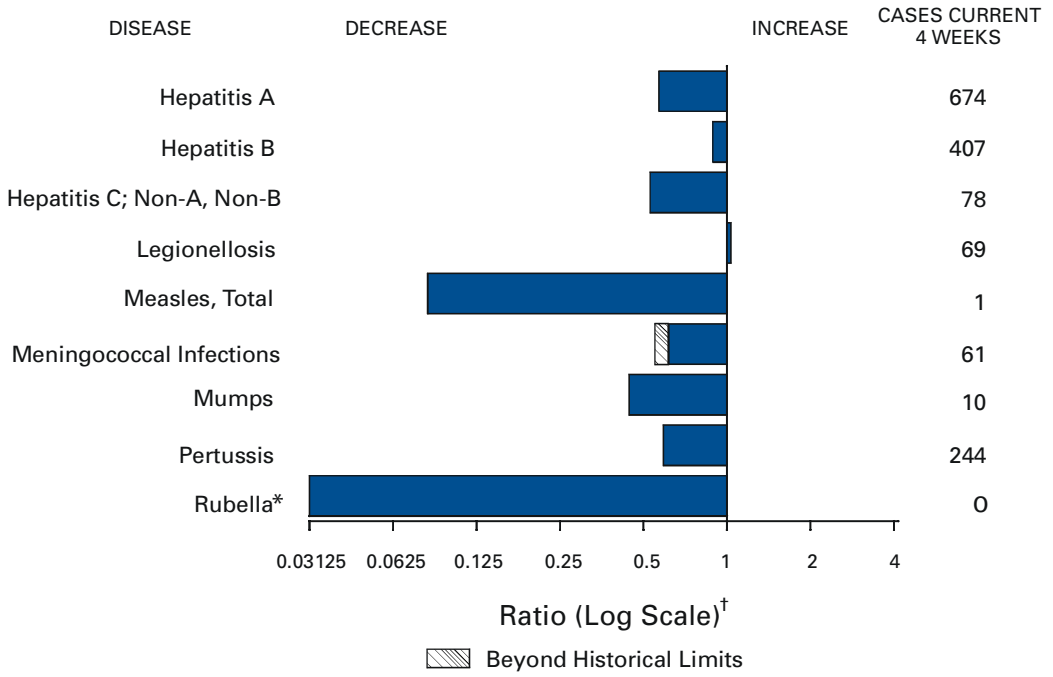
1. CDC. Prevention of hepatitis A through active or passive immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1999;48(no. RR-12).
2. CDC. Hepatitis B virus: a comprehensive strategy for eliminating transmission in the United States through universal childhood vaccination: recommendations of the Immunization Practices Advisory Committee (ACIP). MMWR 1991;40(no. RR-13).
3. CDC. Health information for international travel 2001–2002. Atlanta, Georgia: US Department of Health and Human Services, Public Health Service, CDC, 2001.

Notice to Readers

CDC Expression of Condolence and Support

The staff of CDC extends deepest sympathy to those affected by the terrorist attack that occurred on September 11, 2001, and our admiration and continued support to colleagues in the New York City Department of Health and others responding to this tragic event.

FIGURE I. Selected notifiable disease reports, United States, comparison of provisional 4-week totals ending September 15, 2001, with historical data



* No rubella cases were reported for the current 4-week period yielding a ratio for week 37 of zero (0).

† 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 of provisional cases of selected notifiable diseases, United States, cumulative, week ending September 15, 2001 (37th Week)*

		Cum. 2001		Cum. 2001
Anthrax		-	Poliomyelitis, paralytic	-
Brucellosis†		56	Psittacosis†	10
Cholera		3	Q fever†	16
Cyclosporiasis†		111	Rabies, human	1
Diphtheria		1	Rocky Mountain spotted fever (RMSF)	356
Ehrlichiosis:	human granulocytic (HGE)†	138	Rubella, congenital syndrome	-
	human monocytic (HME)†	56	Streptococcal disease, invasive, group A	2,671
Encephalitis:	California serogroup viral†	40	Streptococcal toxic-shock syndrome†	44
	eastern equine†	5	Syphilis, congenital¶	165
	St. Louis†	1	Tetanus	21
	western equine†	-	Toxic-shock syndrome	88
Hansen disease (leprosy)†		55	Trichinosis	15
Hantavirus pulmonary syndrome†		5	Tularemia†	76
Hemolytic uremic syndrome, postdiarrheal†		87	Typhoid fever	187
HIV infection, pediatric†§		131	Yellow fever	-
Plague		2		

-: No reported cases.
*Incidence data for reporting year 2001 are provisonal and cumulative (year-to-date).
† Not notifiable in all states.
§ Updated monthly from reports to the Division of HIV/AIDS Prevention — Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention (NCHSTP). Last update August 28, 2001.
¶ Updated from reports to the Division of STD Prevention, NCHSTP.

TABLE II. Provisional cases of selected notifiable diseases, United States, weeks ending September 15, 2001, and September 16, 2000 (37th Week)*

Reporting Area	AIDS		Chlamydia§		Cryptosporidiosis		*Escherichia coli* O157:H7†			
							NETSS		PHLIS	
	Cum. 2001¶	Cum. 2000	Cum. 2001	Cum. 2000	Cum. 2001	Cum. 2000	Cum. 2001	Cum. 2000	Cum. 2001	Cum. 2000
UNITED STATES	25,869	26,230	473,961	489,616	1,705	1,907	1,817	3,259	1,469	2,766
NEW ENGLAND	996	1,418	15,376	16,457	82	99	176	290	162	311
Maine	26	25	668	1,000	13	17	24	23	22	25
N.H.	27	25	865	768	6	14	27	28	21	31
Vt.	11	27	433	377	27	19	11	27	8	30
Mass.	541	889	6,857	6,923	29	29	89	134	77	139
R.I.	72	61	2,062	1,838	3	2	9	11	7	14
Conn.	319	391	4,491	5,551	4	18	16	67	27	72
MID. ATLANTIC	5,634	5,811	52,330	45,349	185	251	137	335	122	227
Upstate N.Y.	697	607	9,534	1,105	76	66	98	211	85	39
N.Y. City	2,742	3,135	20,641	18,716	68	133	8	20	8	14
N.J.	1,194	1,153	8,254	8,012	7	13	31	104	29	103
Pa.	1,001	916	13,901	17,516	34	39	N	N	-	71
E.N. CENTRAL	1,922	2,457	72,141	84,174	552	654	458	799	306	588
Ohio	367	388	13,962	22,026	124	168	117	185	85	172
Ind.	225	250	9,816	9,305	56	41	56	90	32	71
Ill.	882	1,364	18,973	23,594	1	82	105	156	80	126
Mich.	328	331	21,269	17,790	119	69	66	99	62	86
Wis.	120	124	8,121	11,459	252	294	114	269	47	133
W.N. CENTRAL	571	612	24,141	27,531	266	187	292	460	272	468
Minn.	104	115	4,698	5,643	115	22	95	105	98	145
Iowa	63	65	1,858	3,816	62	56	56	137	48	123
Mo.	271	285	9,400	9,297	28	23	39	90	58	81
N. Dak.	2	2	670	643	9	9	12	15	24	17
S. Dak.	19	6	1,268	1,267	6	13	29	40	36	46
Nebr.	49	43	2,132	2,608	45	55	47	52	-	44
Kans.	63	96	4,115	4,257	1	9	14	21	8	12
S. ATLANTIC	8,247	7,194	90,471	92,284	229	288	162	257	110	233
Del.	185	131	1,992	2,036	3	5	3	2	5	1
Md.	1,089	842	7,972	9,771	31	9	19	23	1	1
D.C.	591	499	1,869	2,196	10	7	-	1	U	U
Va.	673	461	13,036	11,238	16	13	41	50	36	50
W. Va.	58	42	1,639	1,508	2	3	9	13	8	7
N.C.	574	431	14,515	16,095	20	19	35	58	26	60
S.C.	500	530	7,990	6,532	-	-	7	17	11	14
Ga.	935	873	17,869	19,517	81	111	19	35	13	36
Fla.	3,642	3,385	23,589	23,391	66	121	29	58	10	64
E.S. CENTRAL	1,279	1,295	33,313	35,643	35	38	88	100	83	86
Ky.	245	146	6,304	5,599	3	5	42	29	39	27
Tenn.	408	531	9,857	10,079	10	10	26	45	32	43
Ala.	308	337	9,185	11,366	12	12	13	7	6	7
Miss.	318	281	7,967	8,599	10	11	7	19	6	9
W.S. CENTRAL	2,836	2,667	70,395	73,595	24	104	45	199	60	242
Ark.	144	126	5,059	4,729	6	9	7	54	-	36
La.	602	443	12,064	12,988	7	10	3	13	25	40
Okla.	172	219	7,501	6,177	9	9	18	13	20	11
Tex.	1,918	1,879	45,771	49,701	2	76	17	119	15	155
MOUNTAIN	955	1,006	27,382	27,967	119	99	199	302	114	230
Mont.	14	10	1,419	1,020	9	8	13	26	-	-
Idaho	17	16	1,241	1,309	12	8	40	48	-	30
Wyo.	2	7	589	545	4	5	9	13	1	9
Colo.	197	239	5,284	8,157	29	42	69	116	61	82
N. Mex.	84	107	4,193	3,478	18	12	11	16	8	15
Ariz.	395	318	9,912	9,126	6	10	21	36	19	29
Utah	84	97	1,454	1,569	37	11	25	37	24	55
Nev.	162	212	3,290	2,763	4	3	11	10	1	10
PACIFIC	3,429	3,770	88,412	86,616	213	187	260	517	240	381
Wash.	371	332	9,573	9,139	37	U	65	165	62	167
Oreg.	134	113	3,309	4,757	24	14	40	109	37	99
Calif.	2,871	3,224	70,984	68,446	148	173	136	205	137	102
Alaska	15	15	1,915	1,759	1	-	4	25	-	3
Hawaii	38	86	2,631	2,515	3	-	15	13	4	10
Guam	10	13	-	350	-	-	N	N	U	U
P.R.	816	759	1,849	U	-	-	1	6	U	U
V.I.	2	25	53	-	-	-	-	-	U	U
Amer. Samoa	-	-	U	U	U	U	U	U	U	U
C.N.M.I.	-	-	96	U	-	U	-	U	U	U

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

* Incidence data for reporting year 2001 are provisional and cumulative (year-to-date). Incidence data for reporting year 2000 are finalized and cumulative (year-to-date).

† Individual cases can be reported through both the National Electronic Telecommunications System for Surveillance (NETSS) and the Public Health Laboratory Information System (PHLIS).

§ Chlamydia refers to genital infections caused by *C. trachomatis*.

¶ Updated monthly from reports to the Division of HIV/AIDS Prevention — Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention. Last update August 28, 2001.

TABLE II. (Cont'd) Provisional cases of selected notifiable diseases, United States, weeks ending September 15, 2001, and September 16, 2000 (37th Week)*

Reporting Area	Gonorrhea		Hepatitis C; Non-A, Non-B		Legionellosis		Listeriosis	Lyme Disease	
	Cum. 2001	Cum. 2000	Cum. 2001	Cum. 2000	Cum. 2001	Cum. 2000	Cum. 2001	Cum. 2001	Cum. 2000
UNITED STATES	218,239	248,530	2,611	2,289	661	718	316	7,470	11,935
NEW ENGLAND	4,332	4,670	14	22	38	41	34	2,250	3,771
Maine	79	60	-	2	5	2	-	-	-
N.H.	116	76	-	-	8	2	3	98	41
Vt.	50	46	6	4	5	4	2	9	27
Mass.	2,089	1,885	8	11	9	15	17	484	1,017
R.I.	564	442	-	5	4	4	1	320	307
Conn.	1,434	2,161	-	-	7	14	11	1,339	2,379
MID. ATLANTIC	26,287	26,535	1,194	516	135	190	52	3,758	6,216
Upstate N.Y.	5,845	4,991	44	26	41	49	22	2,087	2,462
N.Y. City	8,627	8,028	-	-	13	30	8	2	155
N.J.	5,037	5,214	1,107	455	7	17	10	511	2,205
Pa.	6,778	8,302	43	35	74	94	12	1,158	1,394
E.N. CENTRAL	38,979	50,213	126	176	165	196	36	409	683
Ohio	7,674	13,424	8	8	84	80	12	96	47
Ind.	4,119	4,368	1	-	14	28	4	16	19
Ill.	11,933	14,833	12	17	-	25	1	-	33
Mich.	12,415	12,658	105	151	43	33	17	1	21
Wis.	2,838	4,930	-	-	24	30	2	296	563
W.N. CENTRAL	10,333	12,207	491	410	43	45	11	275	186
Minn.	1,510	2,249	8	5	9	3	-	227	100
Iowa	428	867	-	1	6	12	1	25	24
Mo.	5,683	5,921	473	393	18	21	6	18	44
N. Dak.	25	53	-	-	1	-	-	-	1
S. Dak.	200	202	-	-	3	2	-	-	-
Nebr.	701	1,035	3	4	5	3	1	3	3
Kans.	1,786	1,880	7	7	1	4	3	2	14
S. ATLANTIC	55,848	65,086	83	70	138	128	52	621	882
Del.	1,178	1,188	-	2	4	8	-	32	167
Md.	4,383	6,708	14	10	29	44	9	405	522
D.C.	1,714	1,755	-	3	7	-	-	8	3
Va.	7,770	7,057	-	3	18	24	9	99	113
W. Va.	458	471	9	13	N	N	5	10	23
N.C.	11,763	13,192	16	13	7	12	2	29	39
S.C.	5,465	6,011	5	1	6	4	4	3	4
Ga.	9,787	12,450	-	3	9	6	9	-	-
Fla.	13,330	16,254	39	22	58	30	14	35	11
E.S. CENTRAL	21,502	25,742	160	343	43	25	16	37	42
Ky.	2,476	2,458	6	29	9	14	4	18	8
Tenn.	6,579	8,107	51	73	21	8	7	11	26
Ala.	7,166	8,788	3	7	11	2	5	7	5
Miss.	5,281	6,389	100	234	2	1	-	1	3
W.S. CENTRAL	34,629	38,595	165	557	5	20	6	7	62
Ark.	3,134	2,717	3	7	-	-	1	-	5
La.	8,341	9,471	78	311	2	7	-	1	7
Okla.	3,431	2,663	3	7	3	2	2	-	-
Tex.	19,723	23,744	81	232	-	11	3	6	50
MOUNTAIN	6,986	7,470	277	58	41	27	27	14	7
Mont.	81	31	1	4	-	1	-	-	-
Idaho	55	61	2	3	2	4	1	6	1
Wyo.	53	37	230	2	5	-	1	3	3
Colo.	2,054	2,282	16	12	11	10	6	1	-
N. Mex.	679	776	11	12	2	1	6	-	-
Ariz.	2,750	3,066	9	13	11	6	6	-	-
Utah	116	162	2	-	7	5	1	2	1
Nev.	1,198	1,055	6	12	3	-	6	2	2
PACIFIC	19,343	18,012	101	137	53	46	82	99	86
Wash.	2,137	1,594	17	24	7	14	7	7	6
Oreg.	490	650	12	22	N	N	3	6	7
Calif.	15,995	15,194	72	89	42	32	68	84	71
Alaska	295	237	-	-	-	-	-	2	2
Hawaii	426	337	-	2	4	-	4	N	N
Guam	-	38	-	2	-	-	-	-	-
P.R.	424	371	1	1	2	1	-	N	N
V.I.	6	-	-	-	-	-	-	-	-
Amer. Samoa	U	U	U	U	U	U	-	U	U
C.N.M.I.	9	U	-	U	-	U	-	-	U

N: Not notifiable. U: Unavailable. - : No reported cases.
* Incidence data for reporting year 2001 are provisonal and cumulative (year-to-date). Incidence data for reporting year 2000 are finalized and cumulative (year-to-date).

TABLE II. (Cont'd) Provisional cases of selected notifiable diseases, United States, weeks ending September 15, 2001, and September 16, 2000 (37th Week)*

Reporting Area	Malaria		Rabies, Animal		Salmonellosis†			
					NETSS		PHLIS	
	Cum. 2001	Cum. 2000	Cum. 2001	Cum. 2000	Cum. 2001	Cum. 2000	Cum. 2001	Cum. 2000
UNITED STATES	807	1,022	4,530	5,068	23,745	26,795	18,195	23,283
NEW ENGLAND	50	54	508	585	1,668	1,634	1,518	1,698
Maine	4	5	47	99	145	97	121	77
N.H.	2	1	19	9	137	100	120	99
Vt.	1	2	49	45	55	92	45	93
Mass.	19	25	194	202	1,011	970	801	972
R.I.	6	5	46	42	88	83	114	121
Conn.	18	16	153	188	232	292	317	336
MID. ATLANTIC	204	265	906	935	3,022	3,566	2,554	3,846
Upstate N.Y.	45	48	573	591	857	848	816	953
N.Y. City	105	147	22	8	750	898	790	959
N.J.	25	40	150	130	651	882	527	757
Pa.	29	30	161	206	764	938	421	1,177
E.N. CENTRAL	78	109	104	129	3,425	3,790	2,690	2,545
Ohio	21	15	39	42	1,018	967	795	1,080
Ind.	14	5	3	-	371	457	310	465
Ill.	1	54	19	19	857	1,172	704	1
Mich.	28	23	37	57	593	647	566	698
Wis.	14	12	6	11	586	547	315	301
W.N. CENTRAL	27	41	260	431	1,497	1,716	1,518	1,891
Minn.	6	13	32	66	383	392	474	522
Iowa	5	2	62	64	228	258	209	252
Mo.	9	11	33	40	432	519	549	626
N. Dak.	-	2	33	99	43	48	59	62
S. Dak.	-	-	25	78	116	70	92	83
Nebr.	2	7	4	1	117	161	-	118
Kans.	5	6	71	83	178	268	135	228
S. ATLANTIC	223	225	1,634	1,722	5,979	5,212	3,818	4,279
Del.	1	3	25	38	58	83	61	100
Md.	95	77	242	308	610	573	603	517
D.C.	13	13	-	-	60	41	U	U
Va.	41	43	312	419	1,019	711	678	683
W. Va.	1	2	109	89	85	122	92	114
N.C.	12	23	430	419	871	749	723	800
S.C.	5	2	90	118	575	510	459	406
Ga.	12	15	271	218	921	861	884	1,279
Fla.	43	47	155	113	1,780	1,562	318	380
E.S. CENTRAL	23	34	159	151	1,659	1,594	1,057	1,272
Ky.	9	12	19	18	255	271	143	196
Tenn.	8	8	87	78	411	413	452	576
Ala.	4	13	51	54	477	457	328	414
Miss.	2	1	2	1	516	453	134	86
W.S. CENTRAL	10	63	514	672	1,655	3,381	1,297	2,026
Ark.	3	3	20	20	539	471	92	390
La.	4	10	-	3	274	561	458	446
Okla.	2	7	52	47	296	286	236	217
Tex.	1	43	442	602	546	2,063	511	973
MOUNTAIN	37	36	198	206	1,522	1,968	1,080	1,890
Mont.	2	1	31	53	55	69	-	-
Idaho	3	3	18	9	105	92	4	87
Wyo.	-	-	27	44	53	51	43	43
Colo.	18	18	-	-	406	529	360	525
N. Mex.	3	-	12	17	197	174	146	164
Ariz.	3	6	101	72	432	497	368	530
Utah	4	4	8	9	170	354	136	364
Nev.	4	4	1	2	104	202	23	177
PACIFIC	155	195	247	237	3,318	3,934	2,663	3,836
Wash.	5	23	-	-	371	393	491	500
Oreg.	9	32	1	7	171	228	230	282
Calif.	131	130	209	205	2,475	3,106	1,701	2,858
Alaska	1	-	37	25	28	41	2	26
Hawaii	9	10	-	-	273	166	239	170
Guam	-	2	-	-	-	21	U	U
P.R.	3	4	69	59	412	458	U	U
V.I.	-	-	-	-	-	-	U	U
Amer. Samoa	U	U	U	U	U	U	U	U
C.N.M.I.	-	U	-	U	10	U	U	U

N: Not notifiable. U: Unavailable. -: No reported cases.

* Incidence data for reporting year 2001 are provisonal and cumulative (year-to-date). Incidence data for reporting year 2000 are finalized and cumulative (year-to-date).

† Individual cases can be reported through both the National Electronic Telecommunications System for Surveillance (NETSS) and the Public Health Laboratory Information System (PHLIS).

TABLE II. (Cont'd) Provisional cases of selected notifiable diseases, United States, weeks ending September 15, 2001, and September 16, 2000 (37th Week)*

Reporting Area	Shigellosis† NETSS Cum. 2001	Shigellosis† NETSS Cum. 2000	Shigellosis† PHLIS Cum. 2001	Shigellosis† PHLIS Cum. 2000	Syphilis (Primary & Secondary) Cum. 2001	Syphilis (Primary & Secondary) Cum. 2000	Tuberculosis Cum. 2001	Tuberculosis Cum. 2000
UNITED STATES	11,525	15,627	5,466	8,883	3,935	4,273	8,278	9,895
NEW ENGLAND	200	296	182	287	37	58	301	295
Maine	6	9	2	11	-	1	7	12
N.H.	4	4	2	7	1	1	11	15
Vt.	7	4	5	-	2	-	2	4
Mass.	145	215	116	196	19	40	170	176
R.I.	16	19	20	25	7	4	27	25
Conn.	22	45	37	48	8	12	84	63
MID. ATLANTIC	1,004	1,993	583	1,289	336	197	1,610	1,600
Upstate N.Y.	398	566	93	179	20	7	235	212
N.Y. City	265	801	268	549	176	85	811	858
N.J.	185	418	157	360	83	48	358	378
Pa.	156	208	65	201	57	57	206	152
E.N. CENTRAL	3,041	3,251	1,343	898	676	891	885	961
Ohio	2,166	261	927	218	58	57	151	203
Ind.	158	1,254	28	134	121	267	72	93
Ill.	287	918	204	2	200	310	430	451
Mich.	220	557	163	500	279	217	179	153
Wis.	210	261	21	44	18	40	53	61
W.N. CENTRAL	1,165	1,716	943	1,446	55	51	319	357
Minn.	289	554	341	628	22	11	164	114
Iowa	317	377	265	265	1	10	18	25
Mo.	244	525	145	369	13	25	97	134
N. Dak.	20	14	23	29	-	-	3	2
S. Dak.	182	5	139	3	-	-	10	13
Nebr.	56	86	-	65	2	2	27	16
Kans.	57	155	30	87	17	3	-	53
S. ATLANTIC	1,693	1,976	547	831	1,381	1,416	1,679	2,006
Del.	8	15	10	16	9	8	14	14
Md.	114	142	63	79	163	209	151	184
D.C.	43	51	U	U	30	29	51	20
Va.	220	326	124	255	82	99	181	195
W. Va.	8	4	8	3	-	3	21	21
N.C.	264	150	125	184	321	373	247	271
S.C.	204	96	98	74	178	149	134	200
Ga.	173	179	91	139	241	270	305	436
Fla.	659	1,013	28	81	357	276	575	665
E.S. CENTRAL	1,013	710	402	387	431	621	529	656
Ky.	363	260	175	53	34	61	78	70
Tenn.	71	260	76	293	228	378	199	258
Ala.	179	43	124	36	85	87	179	217
Miss.	400	147	27	5	84	95	73	111
W.S. CENTRAL	1,083	2,474	718	771	492	582	714	1,466
Ark.	425	153	155	43	26	76	102	148
La.	116	204	135	130	112	159	-	135
Okla.	39	82	16	31	50	87	100	110
Tex.	503	2,035	412	567	304	260	512	1,073
MOUNTAIN	671	786	456	578	171	160	338	363
Mont.	3	7	-	-	-	-	6	10
Idaho	26	42	-	25	-	1	8	6
Wyo.	5	5	1	3	1	1	3	2
Colo.	157	153	157	136	31	7	78	57
N. Mex.	87	100	58	67	16	13	21	31
Ariz.	290	318	191	213	111	133	146	149
Utah	46	59	41	68	7	1	25	32
Nev.	57	102	8	66	5	4	51	76
PACIFIC	1,655	2,425	292	2,396	356	297	1,903	2,191
Wash.	146	353	167	330	37	50	175	172
Oreg.	59	127	78	89	8	10	77	66
Calif.	1,394	1,910	-	1,950	302	236	1,515	1,777
Alaska	5	7	1	3	-	-	35	79
Hawaii	51	28	46	24	9	1	101	97
Guam	-	34	U	U	-	3	-	39
P.R.	8	28	U	U	172	120	76	109
V.I.	-	-	U	U	-	-	-	-
Amer. Samoa	U	U	U	U	U	U	U	U
C.N.M.I.	4	U	U	U	3	U	22	U

N: Not notifiable. U: Unavailable. -: No reported cases.

* Incidence data for reporting year 2001 are provisonal and cumulative (year-to-date). Incidence data for reporting year 2000 are finalized and cumulative (year-to-date).

† Individual cases can be reported through both the National Electronic Telecommunications System for Surveillance (NETSS) and the Public Health Laboratory Information System (PHLIS).

TABLE III. Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending September 15, 2001, and September 16, 2000 (37th Week)*

Reporting Area	*H. influenzae*, Invasive		Hepatitis (Viral), By Type				Measles (Rubeola)					
			A		B		Indigenous		Imported†		Total	
	Cum. 2001§	Cum. 2000	Cum. 2001	Cum. 2000	Cum. 2001	Cum. 2000	2001	Cum. 2001	2001	Cum. 2001	Cum. 2001	Cum. 2000
UNITED STATES	979	907	6,826	9,208	4,544	4,912	1	48	-	42	90	66
NEW ENGLAND	59	73	392	277	66	81	-	4	-	1	5	6
Maine	1	1	9	14	5	5	-	-	-	-	-	-
N.H.	4	12	12	18	11	14	-	-	-	-	-	3
Vt.	3	7	8	8	4	6	-	1	-	-	1	3
Mass.	35	34	160	106	2	12	-	2	-	1	3	-
R.I.	3	4	29	19	20	14	-	-	-	-	-	-
Conn.	13	15	174	112	24	30	-	1	-	-	1	-
MID. ATLANTIC	139	171	693	1,028	680	847	-	4	-	11	15	21
Upstate N.Y.	54	71	178	157	100	89	-	1	-	4	5	10
N.Y. City	36	47	209	351	322	415	U	2	U	1	3	10
N.J.	33	31	159	201	64	134	-	-	-	1	1	-
Pa.	16	22	147	319	194	209	-	1	-	5	6	1
E.N. CENTRAL	127	140	730	1,215	640	515	-	-	-	10	10	7
Ohio	53	42	175	204	84	82	-	-	-	3	3	2
Ind.	38	25	66	67	35	36	-	-	-	4	4	-
Ill.	10	47	206	532	100	89	-	-	-	3	3	3
Mich.	7	9	241	345	421	285	-	-	-	-	-	2
Wis.	19	17	42	67	-	23	-	-	-	-	-	-
W.N. CENTRAL	51	51	295	554	134	212	-	4	-	-	4	1
Minn.	30	24	25	154	16	27	-	2	-	-	2	1
Iowa	-	-	26	56	16	23	-	-	-	-	-	-
Mo.	13	17	81	228	69	107	-	2	-	-	2	-
N. Dak.	6	2	2	3	-	2	-	-	-	-	-	-
S. Dak.	-	1	2	1	1	1	-	-	-	-	-	-
Nebr.	1	3	29	25	17	31	-	-	-	-	-	-
Kans.	1	4	130	87	15	21	-	-	-	-	-	-
S. ATLANTIC	282	203	1,646	985	977	842	-	4	-	1	5	3
Del.	-	-	-	11	-	10	-	-	-	-	-	-
Md.	68	58	197	149	102	93	-	2	-	1	3	-
D.C.	-	-	33	20	11	27	-	-	-	-	-	-
Va.	20	32	94	109	115	112	-	1	-	-	1	2
W. Va.	10	5	9	51	20	10	-	-	-	-	-	-
N.C.	41	19	141	112	141	165	-	-	-	-	-	-
S.C.	5	7	61	45	24	13	U	-	U	-	-	-
Ga.	69	52	639	189	244	155	-	1	-	-	1	-
Fla.	69	30	472	299	320	257	-	-	-	-	-	1
E.S. CENTRAL	61	38	276	316	305	345	-	2	-	-	2	-
Ky.	2	12	91	41	31	62	-	2	-	-	2	-
Tenn.	31	16	105	112	159	165	U	-	U	-	-	-
Ala.	26	8	64	43	61	38	-	-	-	-	-	-
Miss.	2	2	16	120	54	80	-	-	-	-	-	-
W.S. CENTRAL	36	56	642	1,776	474	779	-	1	-	-	1	-
Ark.	-	2	57	114	70	74	-	-	-	-	-	-
La.	3	16	54	64	30	109	-	-	-	-	-	-
Okla.	33	36	98	196	69	109	-	-	-	-	-	-
Tex.	-	2	433	1,402	305	487	-	1	-	-	1	-
MOUNTAIN	135	87	596	656	423	374	1	1	-	1	2	12
Mont.	-	1	9	5	3	5	-	-	-	-	-	-
Idaho	1	3	50	19	10	6	-	-	-	1	1	-
Wyo.	22	1	26	4	38	2	-	-	-	-	-	-
Colo.	29	20	61	149	79	60	-	-	-	-	-	2
N. Mex.	15	18	30	60	119	110	-	-	-	-	-	-
Ariz.	52	34	311	331	118	141	1	1	-	-	1	-
Utah	6	7	63	40	24	17	-	-	-	-	-	3
Nev.	10	3	46	48	32	33	U	-	U	-	-	7
PACIFIC	89	88	1,556	2,401	845	917	-	28	-	18	46	16
Wash.	2	5	98	210	100	74	-	13	-	2	15	3
Oreg.	17	25	63	141	71	81	-	3	-	-	3	-
Calif.	42	30	1,379	2,026	651	743	-	10	-	11	21	9
Alaska	6	6	15	11	8	9	-	-	-	-	-	1
Hawaii	22	22	1	13	15	10	-	2	-	5	7	3
Guam	-	1	-	1	-	9	U	-	U	-	-	-
P.R.	1	3	75	201	128	201	-	-	-	-	-	2
V.I.	-	-	-	-	-	-	U	-	U	-	-	-
Amer. Samoa	U	U	U	U	U	U	U	U	U	U	U	U
C.N.M.I.	-	U	-	U	28	U	-	-	-	-	-	U

N: Not notifiable. U: Unavailable. - : No reported cases.

* Incidence data for reporting year 2001 are provisonal and cumulative (year-to-date). Incidence data for reporting year 2000 are finalized and cumulative (year-to-date).

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

§ Of 206 cases among children aged <5 years, serotype was reported for 105, and of those, 19 were type b.

TABLE III. (Cont'd) Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending September 15, 2001, and September 16, 2000 (37th Week)*

Reporting Area	Meningococcal Disease		Mumps			Pertussis			Rubella		
	Cum. 2001	Cum. 2000	2001	Cum. 2001	Cum. 2000	2001	Cum. 2001	Cum. 2000	2001	Cum. 2001	Cum. 2000
UNITED STATES	1,614	1,624	3	158	257	70	3,194	4,565	-	18	122
NEW ENGLAND	88	96	-	-	4	-	277	1,171	-	-	12
Maine	1	8	-	-	-	-	-	32	-	-	-
N.H.	12	10	-	-	-	-	25	83	-	-	2
Vt.	5	2	-	-	-	-	25	179	-	-	-
Mass.	49	55	-	-	1	-	208	824	-	-	8
R.I.	3	8	-	-	1	-	5	14	-	-	1
Conn.	18	13	-	-	2	-	14	39	-	-	1
MID. ATLANTIC	167	183	1	18	20	10	230	432	-	5	9
Upstate N.Y.	46	50	-	3	7	-	118	191	-	1	1
N.Y. City	31	36	U	9	6	U	34	64	U	3	8
N.J.	40	34	-	2	3	-	13	30	-	1	-
Pa.	50	63	1	4	4	10	65	147	-	-	-
E.N. CENTRAL	212	282	-	15	19	26	435	540	-	3	1
Ohio	74	67	-	1	7	9	226	253	-	-	-
Ind.	31	32	-	1	1	6	56	70	-	1	-
Ill.	22	70	-	11	6	10	54	65	-	2	1
Mich.	49	82	-	2	4	1	45	59	-	-	-
Wis.	36	31	-	-	1	-	54	93	-	-	-
W.N. CENTRAL	112	115	-	7	15	2	184	336	-	3	1
Minn.	16	17	-	3	-	-	70	198	-	-	-
Iowa	21	24	-	-	6	-	17	39	-	1	-
Mo.	40	54	-	-	4	2	74	49	-	1	-
N. Dak.	5	2	-	-	1	-	-	3	-	-	-
S. Dak.	5	5	-	-	-	-	3	3	-	-	-
Nebr.	12	6	-	1	1	-	4	12	-	-	1
Kans.	13	7	-	3	3	-	16	32	-	1	-
S. ATLANTIC	303	226	1	28	37	1	170	345	-	4	72
Del.	3	-	-	-	-	-	-	8	-	-	-
Md.	35	23	-	5	8	-	27	85	-	-	-
D.C.	-	-	-	-	-	-	1	3	-	-	-
Va.	31	35	-	6	8	1	32	62	-	-	-
W. Va.	11	10	-	-	-	-	2	1	-	-	-
N.C.	58	32	-	3	5	-	51	77	-	-	64
S.C.	31	19	U	2	10	U	26	23	U	2	6
Ga.	36	38	-	7	2	-	7	34	-	-	-
Fla.	98	69	1	5	4	-	24	52	-	2	2
E.S. CENTRAL	106	110	-	5	5	-	88	91	-	-	5
Ky.	19	24	-	1	1	-	19	45	-	-	1
Tenn.	44	45	U	-	2	U	38	26	U	-	1
Ala.	30	30	-	-	2	-	27	17	-	-	3
Miss.	13	11	-	4	-	-	4	3	-	-	-
W.S. CENTRAL	177	173	-	9	27	8	265	252	-	-	8
Ark.	16	11	-	1	1	-	12	32	-	-	1
La.	56	40	-	2	5	-	2	18	-	-	1
Okla.	25	23	-	-	-	-	1	16	-	-	-
Tex.	80	99	-	6	21	8	250	186	-	-	6
MOUNTAIN	82	71	-	9	16	20	1,073	531	-	2	2
Mont.	4	4	-	1	1	10	31	32	-	-	-
Idaho	7	6	-	1	-	1	167	51	-	-	-
Wyo.	8	-	-	1	1	-	2	4	-	1	-
Colo.	27	23	-	1	-	-	205	291	-	1	1
N. Mex.	12	6	-	2	1	9	107	78	-	-	-
Ariz.	12	22	-	1	4	-	491	51	-	-	1
Utah	7	7	-	1	4	-	59	15	-	-	-
Nev.	5	3	U	1	5	U	11	9	U	-	-
PACIFIC	367	368	1	67	114	3	472	867	-	1	12
Wash.	53	39	-	1	7	3	110	268	-	-	7
Oreg.	31	46	N	N	N	-	35	94	-	-	-
Calif.	270	268	1	30	79	-	295	455	-	-	5
Alaska	2	7	-	1	8	-	3	18	-	-	-
Hawaii	11	8	-	35	20	-	29	32	-	1	-
Guam	-	-	U	-	12	U	-	3	U	-	1
P.R.	4	8	-	-	-	-	2	6	-	-	-
V.I.	-	-	U	-	-	U	-	-	U	-	-
Amer. Samoa	U	U	U	U	U	U	U	U	U	U	U
C.N.M.I.	-	U	-	-	U	-	-	U	-	-	U

N: Not notifiable. U: Unavailable. - : No reported cases.

* Incidence data for reporting year 2001 are provisonal and cumulative (year-to-date). Incidence data for reporting year 2000 are finalized and cumulative (year-to-date).

TABLE IV. Deaths in 122 U.S. cities,* week ending September 15, 2001 (37th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	485	359	73	32	9	12	41
Boston, Mass.	114	73	23	10	2	6	7
Bridgeport, Conn.	33	27	4	2	-	-	-
Cambridge, Mass.	14	12	-	-	1	1	4
Fall River, Mass.	21	18	3	-	-	-	1
Hartford, Conn.	43	28	5	10	-	-	1
Lowell, Mass.	28	23	4	1	-	-	4
Lynn, Mass.	11	8	3	-	-	-	2
New Bedford, Mass.	28	25	2	-	1	-	4
New Haven, Conn.	31	25	4	2	-	-	5
Providence, R.I.	29	23	4	-	-	2	-
Somerville, Mass.	2	2	-	-	-	-	-
Springfield, Mass.	40	29	8	1	-	2	5
Waterbury, Conn.	32	24	4	2	2	-	3
Worcester, Mass.	59	42	9	4	3	1	5
MID. ATLANTIC	1,306	921	238	86	34	26	81
Albany, N.Y.	46	34	7	1	2	2	5
Allentown, Pa.	17	16	1	-	-	-	1
Buffalo, N.Y.	93	66	18	5	4	-	13
Camden, N.J.	35	18	6	5	2	4	2
Elizabeth, N.J.	22	17	4	1	-	-	-
Erie, Pa.§	51	38	9	3	1	-	3
Jersey City, N.J.	37	23	8	5	1	-	-
New York City, N.Y.	U	U	U	U	U	U	U
Newark, N.J.	68	28	29	6	2	3	2
Paterson, N.J.	36	24	8	1	2	1	3
Philadelphia, Pa.	506	356	83	43	13	10	18
Pittsburgh, Pa.§	36	26	6	2	-	2	3
Reading, Pa.	21	17	3	1	-	-	3
Rochester, N.Y.	123	98	20	2	3	-	11
Schenectady, N.Y.	19	14	3	2	-	-	2
Scranton, Pa.§	35	29	3	2	1	-	1
Syracuse, N.Y.	115	87	18	4	2	4	13
Trenton, N.J.	22	15	5	2	-	-	1
Utica, N.Y.	24	15	7	1	1	-	-
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	1,639	1,124	319	118	39	39	88
Akron, Ohio	43	29	12	1	-	1	4
Canton, Ohio	36	27	6	2	-	1	4
Chicago, Ill.	U	U	U	U	U	U	U
Cincinnati, Ohio	98	68	12	10	2	6	14
Cleveland, Ohio	135	90	32	7	4	2	5
Columbus, Ohio	222	164	28	20	6	4	6
Dayton, Ohio	95	68	15	7	3	2	3
Detroit, Mich.	185	95	51	27	9	3	10
Evansville, Ind.	51	37	11	2	1	-	3
Fort Wayne, Ind.	59	36	18	4	-	1	2
Gary, Ind.	18	9	4	1	2	2	1
Grand Rapids, Mich.	24	15	4	1	1	3	3
Indianapolis, Ind.	186	120	42	19	4	1	8
Lansing, Mich.	36	31	4	-	-	1	4
Milwaukee, Wis.	121	88	26	5	1	1	7
Peoria, Ill.	52	37	7	3	2	3	4
Rockford, Ill.	48	36	6	3	1	2	1
South Bend, Ind.	55	44	10	-	-	1	1
Toledo, Ohio	99	70	22	3	2	2	6
Youngstown, Ohio	76	60	9	3	1	3	2
W.N. CENTRAL	725	503	126	56	21	19	51
Des Moines, Iowa	62	45	12	4	-	1	3
Duluth, Minn.	31	25	5	1	-	-	2
Kansas City, Kans.	43	26	7	5	5	-	4
Kansas City, Mo.	78	54	12	4	5	3	2
Lincoln, Nebr.	26	21	4	1	-	-	1
Minneapolis, Minn.	119	95	14	6	1	3	13
Omaha, Nebr.	94	73	15	3	2	1	11
St. Louis, Mo.	118	60	27	20	5	6	4
St. Paul, Minn.	70	47	13	5	1	4	7
Wichita, Kans.	84	57	17	7	2	1	4
S. ATLANTIC	1,231	799	256	107	30	39	53
Atlanta, Ga.	181	98	48	22	3	10	2
Baltimore, Md.	154	88	42	20	2	2	9
Charlotte, N.C.	97	54	27	9	3	4	11
Jacksonville, Fla.	149	109	24	9	1	6	5
Miami, Fla.	75	52	14	5	3	1	6
Norfolk, Va.	67	49	9	4	1	4	3
Richmond, Va.	62	43	5	6	4	4	2
Savannah, Ga.	64	43	13	5	2	1	5
St. Petersburg, Fla.	64	51	9	1	1	2	3
Tampa, Fla.	198	135	38	15	6	4	7
Washington, D.C.	100	57	27	11	4	1	-
Wilmington, Del.	20	20	-	-	-	-	-
E.S. CENTRAL	840	540	186	62	22	28	59
Birmingham, Ala.	175	118	37	8	5	6	20
Chattanooga, Tenn.	72	47	15	3	2	5	2
Knoxville, Tenn.	89	68	13	4	2	1	9
Lexington, Ky.	93	58	26	6	3	-	5
Memphis, Tenn.	161	95	34	20	3	9	7
Mobile, Ala.	39	21	10	5	1	2	-
Montgomery, Ala.	58	40	13	2	-	3	7
Nashville, Tenn.	153	93	38	14	6	2	9
W.S. CENTRAL	1,382	895	281	124	48	34	84
Austin, Tex.	84	53	21	4	-	6	6
Baton Rouge, La.	52	32	15	5	-	-	1
Corpus Christi, Tex.	47	38	6	2	1	-	4
Dallas, Tex.	213	132	48	17	11	5	16
El Paso, Tex.	68	48	16	2	1	1	3
Ft. Worth, Tex.	104	60	27	9	2	6	1
Houston, Tex.	400	234	80	50	27	9	27
Little Rock, Ark.	U	U	U	U	U	U	U
New Orleans, La.	U	U	U	U	U	U	U
San Antonio, Tex.	230	165	40	20	1	4	10
Shreveport, La.	76	57	5	7	4	3	11
Tulsa, Okla.	108	76	23	8	1	-	5
MOUNTAIN	949	641	185	75	23	23	50
Albuquerque, N.M.	67	54	9	3	1	-	4
Boise, Idaho	48	32	6	6	2	2	2
Colo. Springs, Colo.	72	45	20	6	-	1	2
Denver, Colo.	101	62	25	8	3	3	7
Las Vegas, Nev.	190	132	34	16	6	2	8
Ogden, Utah	30	23	3	3	-	1	1
Phoenix, Ariz.	167	97	40	16	4	8	12
Pueblo, Colo.	23	17	4	1	1	-	1
Salt Lake City, Utah	109	76	18	9	4	2	6
Tucson, Ariz.	142	103	26	7	2	4	7
PACIFIC	1,842	1,309	335	120	39	36	139
Berkeley, Calif.	20	14	5	1	-	-	4
Fresno, Calif.	169	121	32	11	3	2	6
Glendale, Calif.	28	25	3	-	-	-	1
Honolulu, Hawaii	62	44	10	5	1	2	2
Long Beach, Calif.	77	54	19	3	-	1	8
Los Angeles, Calif.	499	353	81	38	14	13	30
Pasadena, Calif.	32	22	5	3	-	2	5
Portland, Oreg.	83	52	12	9	4	6	5
Sacramento, Calif.	207	150	41	9	6	1	17
San Diego, Calif.	173	115	42	11	2	3	20
San Francisco, Calif.	U	U	U	U	U	U	U
San Jose, Calif.	191	137	33	14	2	5	17
Santa Cruz, Calif.	25	21	3	1	-	-	4
Seattle, Wash.	119	82	25	8	3	1	9
Spokane, Wash.	45	38	4	2	1	-	5
Tacoma, Wash.	112	81	20	5	3	-	6
TOTAL	10,399¶	7,091	1,999	780	265	256	646

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. 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.

Contributors to the Production of the *MMWR* (Weekly)

Weekly Notifiable Disease Morbidity Data and 122 Cities Mortality Data

Samuel L. Groseclose, D.V.M., M.P.H.
Wayne S. Brathwaite

State Support Team
Robert Fagan
Jose Aponte
Gerald Jones
David Nitschke
Scott Noldy
Jim Vaughan
Carol A. Worsham

CDC Operations Team
Carol M. Knowles
Deborah A. Adams
Willie J. Anderson
Lateka M. Dammond
Patsy A. Hall
Mechele A. Hester
Felicia J. Connor
Pearl Sharp

Informatics

T. Demetri Vacalis, Ph.D.
Michele D. Renshaw Erica R. Shaver

All *MMWR* references are available on the Internet at <http://www.cdc.gov/mmwr/>. Use the search function to find specific articles.

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

References to non-CDC sites on the Internet are provided as a service to *MMWR* readers and do not constitute or imply endorsement of these organizations or their programs by CDC or the U.S. Department of Health and Human Services. CDC is not responsible for the content of pages found at these sites.

The *Morbidity and Mortality Weekly Report (MMWR)* Series is prepared by the Centers for Disease Control and Prevention (CDC) and is available free of charge in electronic format and on a paid subscription basis for paper copy. To receive an electronic copy on Friday of each week, send an e-mail message to *listserv@listserv.cdc.gov*. The body content should read *SUBscribe mmwr-toc*. Electronic copy also is available from CDC's World-Wide Web server at *http://www.cdc.gov/mmwr* or from CDC's file transfer protocol server at *ftp://ftp.cdc.gov/pub/Publications/mmwr*. To subscribe for paper copy, contact Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202) 512-1800.

Data in the weekly *MMWR* 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 following Friday. Address inquiries about the *MMWR* Series, including material to be considered for publication, to: Editor, *MMWR* Series, Mailstop C-08, CDC, 1600 Clifton Rd., N.E., Atlanta, GA 30333; telephone (888) 232-3228.

All material in the *MMWR* Series is in the public domain and may be used and reprinted without permission; citation as to source, however, is appreciated.

Director, Centers for Disease Control and Prevention
Jeffrey P. Koplan, M.D., M.P.H.

Deputy Director for Science and Public Health, Centers for Disease Control and Prevention
David W. Fleming, M.D.

Director, Epidemiology Program Office
Stephen B. Thacker, M.D., M.Sc.

Editor, *MMWR* Series
John W. Ward, M.D.

Acting Managing Editor, *MMWR* (Weekly)
Teresa F. Rutledge

Writers-Editors, *MMWR* (Weekly)
Jill Crane
David C. Johnson

Desktop Publishing
Lynda G. Cupell
Morie M. Higgins

☆U.S. Government Printing Office: 2001-633-173/49011 Region IV