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Adoption of Hospital Policies for Prevention of Perinatal Group B Streptococcal Disease — United States, 1997

Group B streptococcal (GBS) infections are the leading bacterial cause of disease and deaths among newborns in the United States. In 1993, the annual cost of caring for newborns with sepsis caused by group B *Streptococcus* was an estimated $294 million (*1*). A survey of hospital GBS disease prevention practices in 1994 indicated that those hospitals with a prenatal screening policy had fewer neonatal GBS disease cases (*2*). In 1996, to promote a coordinated approach to prevention, CDC issued consensus guidelines about GBS disease prevention that were endorsed by the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics (*3–5*). These consensus guidelines recommend using either a screening-based strategy or a risk-based strategy for identifying women who should receive intrapartum antimicrobial prophylaxis. To evaluate adoption of the consensus guidelines, in 1997, hospitals in eight surveillance areas were surveyed, and the results were compared with findings of a similar survey conducted in 1994. The proportion of hospitals with prevention policies in each site was compared with the site's rate of early-onset disease to assess the impact of the prevention policies. This report presents the survey findings, which indicate that more hospitals have adopted GBS disease prevention policies since issuance of the consensus guidelines.

In 1997, a comprehensive survey was mailed to all 189 hospitals providing obstetric services in the following surveillance areas: the 20-county metropolitan statistical area of Atlanta, Georgia (n=31 hospitals); the three-county San Francisco Bay area of California (n=24); the seven-county Rochester area of New York (n=12); the seven-county Twin Cities area of Minnesota (n=20); the three-county Portland area of Oregon (n=13); five urban counties in Tennessee (n=24); and the entire states of Connecticut (n=30) and Maryland (n=35). The survey assessed laboratory methods used to identify group B streptococci, several patient demographic characteristics, and obstetric policies. In 1994, three separate surveys evaluating the same topics were sent to all 295 hospitals providing obstetric services in an eight-county Atlanta area of Georgia (n=20); the three-county San Francisco Bay area of California (n=29); and the entire states of Maryland (n=36), Missouri (n=123), and Oklahoma (n=87) (*2*). Survey responses to the 1997 study were compared with those to the 1994 study using the chi-square test. For

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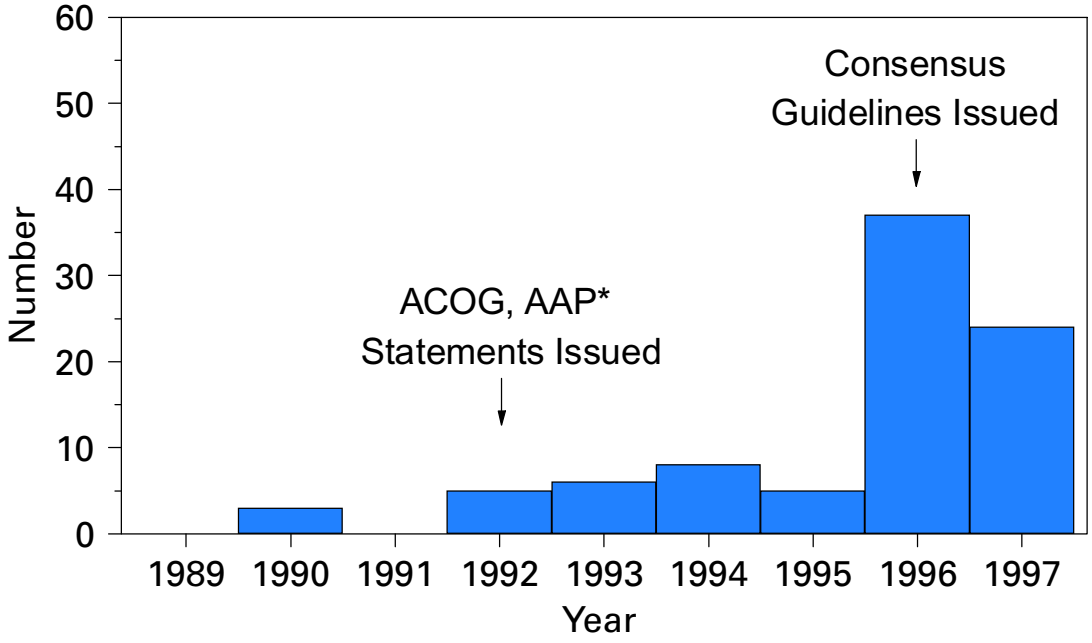
the hospitals that responded to the survey in both years, survey responses were compared using McNemar's test.

To identify GBS disease cases, surveillance personnel regularly requested standardized reports of cases of invasive GBS disease from each laboratory that served acute-care hospitals within the specified surveillance areas. Periodic audits of laboratory records were conducted to validate completeness of reporting. A case of early-onset neonatal GBS disease was defined as isolation of group B streptococci from a normally sterile site (e.g., blood or cerebrospinal fluid) from a resident of an area under surveillance with illness onset before 7 days of age. To calculate the incidence of early-onset GBS disease for the surveillance areas, the number of live-born infants for 1996 was obtained from the respective state health departments or from CDC's National Center for Health Statistics. The incidence of GBS disease in 1996 was not available for the seven counties in New York.

Of the 189 hospitals surveyed in 1997, a total of 177 (94%) completed the survey. Of those that responded, 103 (58%) had a general GBS disease prevention policy, and 82 (46%) had a written policy. To determine who should receive intrapartum antibiotics, 50 (28%) followed the screening-based strategy in the consensus guidelines, 36 (20%) followed the risk-based strategy in the consensus guidelines, and seven (4%) followed both strategies. Most of these policies were established in 1996 and 1997 (Figure 1). Hospitals with a neonatal intensive-care unit (NICU) were equally likely as those without an NICU to have a GBS disease prevention policy (54 [59%] of 91 versus 49 [57%] of 86). Although more hospitals with academic affiliations had GBS disease prevention policies than hospitals without those affiliations (38 [67%] of 57 versus 64 [54%] of 118), the difference was not statistically significant.

FIGURE 1. Number of hospitals with group B streptococcal (GBS) disease prevention policies, by year of policy establishment — United States, 1989–1997



*In 1992, the American College of Obstetricians and Gynecologists (ACOG) and the American Academy of Pediatrics (AAP) issued initial statements on GBS prevention.

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Of the 295 hospitals surveyed in 1994, a total of 154 (52%) completed the obstetric policy section, 234 (79%) completed the hospital patient demographics section, and 247 (84%) completed the laboratory section (*2*). Compared with 1994, a higher proportion of hospitals in 1997 had obstetric policies for preventing neonatal GBS disease and recommended appropriate laboratory methods (including the use of selective broth media) for isolation of group B streptococci (Table 1). In 1997, 80% of GBS disease prevention policies were written policies, compared with 34% in 1994. Of those hospitals with prenatal screening policies, the proportion with policies consistent with the 1996 recommendation to screen all women and to culture specimens from both

TABLE 1. Total respondents and number and percentage of hospitals with group B streptococcal (GBS) disease prevention policies, by policies and policy components — United States, 1994 and 1997

	1994			1997			
Policies and policy contents	Total respondents	No. with policy	(%)	Total respondents	No. with policy	(%)	p value
Respondents to obstetric policy component of survey							
Any GBS disease prevention policy	147	58	(39%)	177	103	(58%)	<0.01
Written policy	147	20	(14%)	177	82	(46%)	<0.01
Intrapartum antibiotic prophylaxis policy	147	50	(35%)	177	95	(54%)	<0.01
Indication for treatment							
Positive for group B *Streptococcus*	45*	16	(36%)	95	50	(53%)	0.09
Risk factors identified by guidelines†	45	8	(18%)	95	36	(38%)	0.03
Both of the above	45	13	(29%)	95	7	(7%)	<0.01
Prenatal screening policy	145	36	(25%)	177	66	(37%)	0.02
Indication for screening							
Screen all women§	32*	9	(26%)	66	34	(52%)	0.05
On request	32	6	(19%)	66	3	(5%)	0.05
Per physician discretion	32	16	(50%)	66	25	(38%)	0.36
No one screened	32	2	(6%)	66	1	(2%)	0.25
Screening culture sites							
Vagina and rectum§	32	10	(31%)	64*	48	(75%)	<0.01
Vagina and cervix	32	8	(25%)	64	2	(3%)	<0.01
Vagina only	32	9	(28%)	64	5	(8%)	0.01
Cervix only	32	3	(6%)	64	2	(3%)	0.33
Timing of culture							
Recommended time¶	32	7	(22%)	65*	46	(65%)	<0.01
Laboratory isolation methods for prenatal screening							
Selective broth media§	24	14	(6%)	161	76	(47%)	<0.01
Respondents to both 1994 and 1997 surveys							
Any GBS disease prevention policy	51	18	(35%)	51	29	(57%)	0.21
Written policy	51	8	(16%)	51	21	(41%)	<0.01
Recommend selective broth media	60	3	(5%)	60	32	(53%)	<0.01

* Totals differ from number with intrapartum antibiotic policy or number with screening policy because of missing data.
† Risk factors in the 1992 American College of Obstetricians and Gynecologists guidelines (intrapartum fever, preterm labor, prolonged duration of membrane rupture, or previous infant with GBS disease) for 1994 survey; risk factors in the 1996 consensus guidelines (1992 risk factors and GBS bacteriuria during current pregnancy) for 1997 survey.
§ Recommended by the 1996 consensus guidelines.
¶ For 1994 survey, 26–28 weeks' gestation; for 1997 survey, 35–37 weeks' gestation.

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the vagina and rectum increased from 1994 to 1997. Among the hospitals for which a response was available for both 1994 and 1997, the proportion of hospitals with written policies and recommendations for using appropriate selective broth culture media increased from 1994 to 1997 (Table 1).

According to 1996 surveillance data from seven areas, the incidence of early-onset GBS disease ranged from 0.6 cases per 1000 live births to 1.8 cases per 1000 live births. Geographic areas in which a higher proportion of hospitals had GBS disease prevention policies had lower incidences of early-onset GBS disease (R^2=0.62; p=0.03) (Figure 2).

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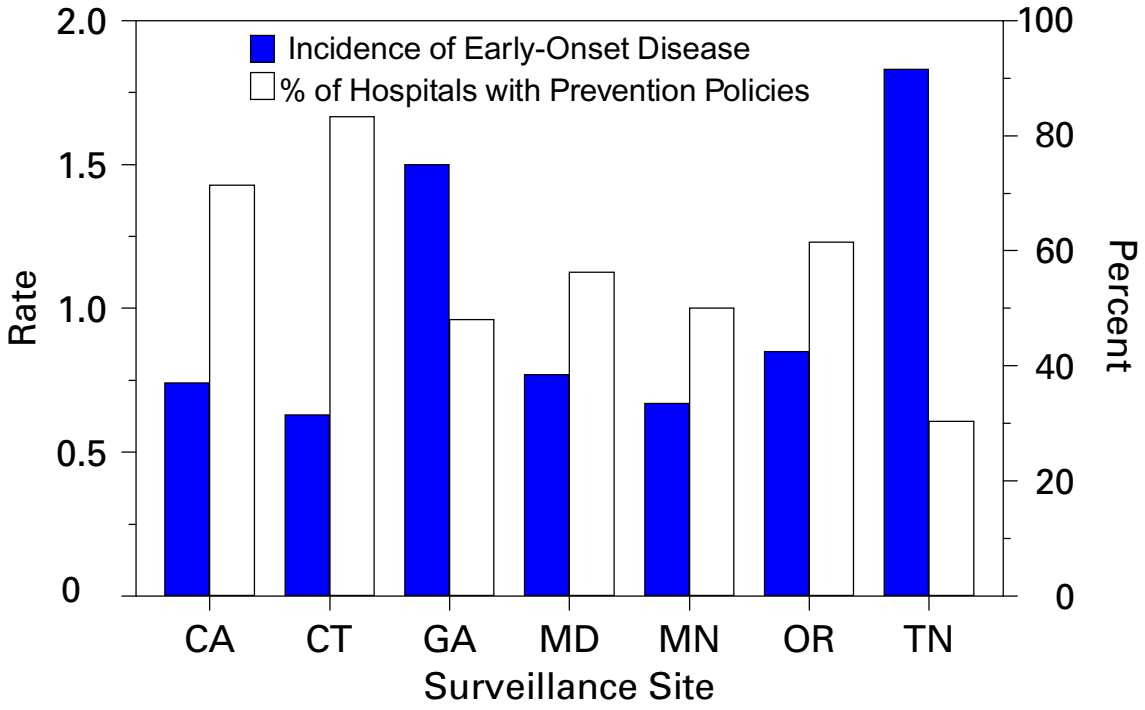
FIGURE 2. Incidence rate* of early-onset group B streptococcal (GBS) disease†, 1996, and percentage of hospitals with GBS disease prevention policies, 1997, by surveillance site§ — United States



*Per 1000 live-born infants.

†Defined as isolation of group B streptococci from a normally sterile site (e.g., blood or cerebrospinal fluid) from a resident of an area under surveillance with illness onset before 7 days of age.

§Surveillance sites included the following areas: the 20-county metropolitan statistical area of Atlanta, Georgia (n=31 hospitals); the three-county San Francisco Bay area of California (n=24); the seven-county Twin Cities area of Minnesota (n=20); the three-county Portland area of Oregon (n=13); five urban counties in Tennessee (n=24); and the entire states of Connecticut (n=30) and Maryland (n=35).

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Editorial Note: Early-onset GBS disease can be prevented by targeted use of antimicrobial prophylaxis after onset of labor or rupture of membranes (*3*). The preventable portion of early-onset GBS disease has been estimated as 78% for the screening-based approach and as 41% for the risk-based approach (*6*). Surveillance data for 1993–1995, which included four of the eight sites surveyed in 1997, revealed a significant decrease in the incidence of early-onset GBS disease (*7*). Since the consensus guidelines were issued in 1996, substantially more hospitals have adopted GBS disease prevention policies and laboratory methods for isolating group B *Streptococcus* that may be effective against early-onset GBS disease. This increase in adoption of GBS disease prevention policies and appropriate laboratory methods should result in a continued decrease in the incidence of early-onset GBS disease.

The findings of the analysis that combined 1996 GBS surveillance data with hospital survey results indicate that geographic areas in which more hospitals have GBS disease prevention policies have less early-onset GBS disease. Although the survey measured policies and not actual practices, this finding suggests that prevention policies are being followed. Ongoing studies in the surveillance areas will assess how strongly GBS disease prevention policies affect hospital-specific rates of early-onset disease.

In 1994, hospitals with academic affiliations were more likely to have prevention policies than those without academic affiliations (36% versus 18%; p=0.03), and hospitals with an NICU also were more likely than those without an NICU to have prevention policies (53% versus 31%; p=0.02) (*2*). However, by 1997, differences between these specialized hospitals and others were no longer statistically significant. These data suggest that issuance of the consensus guidelines has resulted in increased use of GBS disease prevention strategies by providers in community hospitals.

The findings in this report of an increase in the number of hospitals with GBS disease prevention policies suggest that issuance of consensus guidelines may have played a role in adoption of such policies. However, nearly half of the hospitals surveyed are not using either of the two strategies recommended in the consensus guidelines. In addition, approximately half of the hospitals are not using appropriate selective broth culture media. The use of selective broth media is key to an effective prenatal screening program, improving the yield of prenatal screening cultures by up to 50% (*8*).

Strategies to prevent neonatal GBS disease should include efforts directed toward health-care providers in both community and academic institutions. These efforts should focus on increasing awareness of GBS disease as a preventable disease, increasing use of the screening-based strategy or the risk-based strategy, and increasing use of selective broth media. Integration of GBS disease prevention efforts with programs for prevention of other perinatal diseases (e.g., maternal use of folic acid to prevent neural tube defects [*9*] and screening and vaccination to prevent perinatal hepatitis B infections [*10*]) may increase awareness and acceptance of these perinatal

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disease prevention strategies. Tracking the progress of strategies for preventing these diseases should continue to be an important national health objective.

Copies of the GBS disease prevention guidelines, clinical posters, technical slide sets for health professionals, and both printed and video material for prenatal patients are available from CDC's Division of Bacterial and Mycotic Diseases, National Center for Infectious Diseases, Mailstop C-23, 1600 Clifton Road, N.E., Atlanta, GA 30333, or from the World-Wide Web at http://www.cdc.gov/ncidod/dbmd/gbs/.

References

1. Mohle-Boetani J, Schuchat A, Plikaytis BD, Smith D, Broome CV. Comparison of prevention strategies for neonatal group B streptococcal infection: a population-based economic analysis. JAMA 1993;270:1442–8.
2. Whitney CG, Plikaytis BD, Gozansky WS, Wenger JD, Schuchat A. Prevention practices for perinatal group B streptococcal disease: a multistate surveillance analysis. Obstet Gynecol 1997;89:28–32.
3. CDC. Prevention of perinatal group B streptococcal disease: a public health perspective. MMWR 1996;45(no. RR-7).
4. Committee on Obstetric Practice, American College of Obstetricians and Gynecologists. Prevention of early-onset group B streptococcal disease in newborns. Washington, DC: American College of Obstetricians and Gynecologists, 1996; ACOG committee opinion no. 173.
5. Committee on Infectious Diseases/Committee on Fetus and Newborn, American Academy of Pediatrics. Revised guidelines for prevention of early-onset group B streptococcal (GBS) infection. Pediatrics 1997;99:489–96.
6. Rosenstein NE, Schuchat A, Neonatal GBS Study Group. Opportunities for prevention of perinatal group B streptococcal disease: a multistate surveillance analysis. Obstet Gynecol 1997; 90:901–6.
7. CDC. Decreasing incidence of perinatal group B streptococcal disease—United States, 1993–1995. MMWR 1997;46:473–7.
8. Philipson EH, Palermino DA, Robinson A. Enhanced antenatal detection of group B streptococcal colonization. Obstet Gynecol 1995;85:437–9.
9. CDC. Recommendations for use of folic acid to reduce the number of cases of spina bifida and other neural tube defects. MMWR 1992;41(no. RR-14).
10. CDC. Program to prevent perinatal hepatitis B virus transmission in a health-maintenance organization—Northern California, 1990–1995. MMWR 1997;46:378–80.

Rural Health-Care Providers' Attitudes, Practices, and Training Experience Regarding Intimate Partner Violence — West Virginia, March 1997

Primary health-care providers are an important resource to women who have experienced intimate partner violence (IPV) (*1*). IPV patients in rural areas often face obstacles to preventive services such as physical isolation from health care and a lack of adequate community services. In March 1997, a pilot project was conducted to survey the attitudes and practices of rural health-care providers (RHCPs) toward women at risk for IPV* in primary-care clinics in West Virginia and to determine the training experience of RHCPs in IPV intervention and prevention during the preceding 2 years. This report summarizes the results of the survey, which indicate that most RHCPs recognized barriers to identification and referral of abused women in their practices but few screened female patients for IPV or have had recent continuing education on IPV.

*In this report, IPV is used interchangeably with "domestic violence" (DV), which was the term used in the questionnaire.

Intimate Partner Violence — Continued

The survey was conducted by the West Virginia Coalition Against Domestic Violence Health Partnership in collaboration with the West Virginia University Center for Rural Emergency Medicine and the Rural Health Education Partnership, which coordinates rural health educational experiences for health sciences undergraduates at West Virginia University. The survey instrument was adapted from surveys designed by the Family Violence Prevention Fund, American College of Emergency Physicians, and the Emergency Nurses Association (*2*).

Of 15 primary-care clinics recommended by the Rural Health Education Partnership's site coordinators, 13 agreed to participate, representing 12 counties in West Virginia. All RHCPs at each participating clinic were asked to complete a survey. For this survey, domestic violence was defined as physical abuse by a current or former partner (e.g., throwing an object at a person, hitting with a fist, or sexual abuse) and/or verbal abuse (e.g., threatening physical harm). A partner could be of the opposite or same sex. For this survey, respondents were asked to limit their responses to female patients. All health-care providers did not respond to each question.

Of 127 health-care providers at primary-care clinics, 97 (76%) responded; most (64 [70%]) were female. The average age of respondents was 40 years (n=87; range: 21–66 years) (for five respondents, sex and professional status were not reported). Respondents included physicians (37 [40%]), nurses (31 [34%]), physician assistants/family nurse practitioners (PAs/FNPs) (13 [14%]), and persons with other occupations (11 [12%]). Only respondents responsible for obtaining medical histories (physicians, PAs/FNPs, and nurses) were included in the analysis.

To assess perceptions of barriers to identification and referral to community or on-site services for persons who experience IPV, all RHCPs were asked whether they agreed or disagreed with items on a list of potential hindrances. The five barriers to identification most often agreed with were "patient denies battering as a cause of injury" (84% [76 of 91]), "patient fears repercussions of being identified as abused" (82% [75 of 91]), "patient does not mention abuse during history-taking" (79% [74 of 94]), "patient lacks privacy within the clinic" (77% [72 of 93]), and "what I view as abuse, my patient accepts as normal" (72% [67 of 93]). The two barriers to referral to community services most often agreed with were "fear of partner's reaction to referral" (78% [69 0f 88]) and "battered patients do not want a referral" (72% [63 of 88]).

Forty-six percent (13 of 28) of physicians, 42% (five of 12) of PAs/FNPs, and 46% (13 of 28) of nurses reported that their facility adequately identified victims of abuse, and 73% (22 of 30) of physicians, 58% (seven of 12) PAs/FNPs, and 68% (19 of 28) of nurses reported that their facility adequately counseled, informed, and referred victims of IPV. Half (18 of 36) of physicians, 54% (seven of 13) PAs/FNPs, and 37% (11 of 30) of nurses reported attending a continuing education or in-service program on domestic violence during the preceding 2 years. However, 16% (six of 37) of physicians, 31% (four of 13) of PAs/FNPs, and 21% (six of 29) of nurses indicated that they "routinely ask female patients if they have been physically hurt or threatened during the past twelve months." Forty-three percent (16 of 37) of physicians, 46% (six of 13) of PAs/FNPs, and 17% (five of 29) of nurses reported they "routinely ask female patients if their headaches, insomnia, or other stress-related disorders are related to domestic violence," and 29% (10 of 35) of physicians, 8% (one of 13) of PAs/FNPs, and 57% (16 of 28) of nurses reported that they were "not sure how to screen for abuse."

Intimate Partner Violence — Continued

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Editorial Note: RHCPs care for many victims of abuse and treat injuries and illnesses that are directly related to IPV (*3–5*). In rural areas, health-care providers may be the only persons with whom victims have contact who can assist with developing a safety plan, make a referral to a shelter, or provide reassurance that a partner's violence is not the woman's fault. However, the findings in this report suggest that, in West Virginia, few rural physicians routinely screen for physical abuse or stress-related disorders related to domestic violence; this finding is consistent with previous studies of the health-care experiences of IPV patients (*5*).

Barriers to health care for many residents of rural communities may include poverty; underinsurance or lack of health insurance; shortages of health-care providers; lack of public transportation systems; physical obstacles for women with disabilities; and communication difficulties for those who cannot speak, read, or write English. In addition, women residing in rural areas may have less access to resources (e.g., advanced education, job opportunities, and adequate child care) that would make leaving an abusive relationship easier (*6*). RHCPs may be acquainted with or related to their patients and their families, creating a barrier to disclosing abuse confidentially and further isolating these women (*4*).

Although many physicians in this study reported barriers to identifying and referring victims of IPV, some reported that their facility was adequately identifying, counseling, informing, and referring victims of IPV. Health services research can address discrepancies between clinical preventive services guidelines and practices (*7*). Systems approaches, such as continuous quality improvement, should be considered for improving IPV screening practices.

The findings in this report are subject to at least three limitations. First, because a convenience sample was used, these findings cannot be generalized to all rural health-care providers in West Virginia. Second, the small sample size reduces the reliability of these findings. Finally, because respondents tend to provide socially desirable responses, self-reported data may overestimate screening practices of health-care providers.

American Medical Association guidelines recommend that health-care providers screen all women for evidence of IPV (*8*). RHCPs who adhere to practice guidelines can play a critical role in a woman's decision to obtain preventive services (*9*). Barriers to ascertainment of IPV by physicians include the perception of low prevalence of family and intimate violence in clinical populations (*1,4*). This perception may be accentuated among RHCPs; however, rural or suburban residence does not decrease a woman's risk for IPV (*10*). The special needs of rural patients must be included in curricula and protocols developed for practicing RHCPs on IPV prevention and intervention, including attention to isolation, lack of programs, cultural attitudes, issues of confidentiality, and use of community resources (*4*).

References

1. Reid SA, Glasser M. Primary care physicians' recognition of and attitudes toward domestic violence. Acad Med 1997;72:51–3.
2. CDC. Emergency departments response to domestic violence—California, 1992. MMWR 1992; 42:617–20.

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3. Johnson MM, Elliott BA. Domestic violence among family practice patients in midsized and rural communities. J Fam Pract 1997;44:391–400.
4. Goeckermann C, Hamberger K, Barber K. Issues of domestic violence unique to rural areas. Wis Med J 1994;93:473–9.
5. Hamberger KL, Saunders D, Hovey M. Prevalence of domestic violence in community practice and rate of physician inquiry. Fam Med 1992;24:283–7.
6. Bushy A. Health issues of women in rural environments: an overview. JAMWA 1998;53:53–6.
7. Solberg L, Kottke TE, Brekke ML, et al. Using continuous quality improvement to increase preventive services in clinical practice—going beyond guidelines. Prev Med 1996;25:259–67.
8. American Medical Association. Diagnostic and treatment guidelines on domestic violence. Chicago, Illinois: American Medical Association, March, 1992.
9. Lantz P, Weigers M, House J. Education and income differentials in breast and cervical cancer screening: policy implications for rural women. Med Care 1997;35:219–36.
10. Bachman R, Saltzman LE, eds. Violence against women: estimates from the redesigned survey. Washington, DC: US Department of Justice, August 1995.

Update: Leptospirosis and Unexplained Acute Febrile Illness Among Athletes Participating in Triathlons — Illinois and Wisconsin, 1998

Since July 14, 1998, the Illinois Department of Health, the Wisconsin Department of Health, the U.S. Department of Agriculture (USDA), and CDC, in collaboration with other state and local health departments, have been investigating an outbreak of acute febrile illness among athletes from 44 states and seven countries who participated in triathlons* in Springfield, Illinois, on June 21, 1998, and in Madison, Wisconsin, on July 5, 1998 (*1*). Initial testing at CDC of specimens from four athletes identified leptospirosis as the illness in all four (*1*). This report updates the ongoing investigation of this outbreak through August 13, which indicates that *Leptospira* was the etiologic agent for illness in athletes and in persons with occupational or recreational exposure to Lake Springfield, where the event was held in Illinois.

To identify cases of febrile illness, a standardized telephone survey was conducted of athletes who participated in the event in Illinois, the event in Wisconsin, or both events. Including late registrants and excluding preregistrants who did not participate in either event, respondents included 733 (95%) of 775 athletes who participated only in the Illinois event, 370 (67%) of 553 athletes who participated only in the Wisconsin event, and 91 (95%) of 96 athletes who participated in both events. A suspected case of leptospirosis was defined as onset of fever during June 21–August 13 in a triathlon participant that was associated with at least two of the following symptoms or signs: chills, headache, myalgia, diarrhea, eye pain, or red eyes (*1*). Of the 1194 athletes surveyed, 110 (9%) who participated in one or both events described an illness meeting the case definition; no cases occurred after July 24. The median age of suspected case-patients was 35 years (range: 15–80 years); 76% were male. Ill athletes were similar in age and sex to athletes who were not ill. Of the 110, a total of 73 (66%) sought medical care; 23 (32%) of those were hospitalized.

Attack rates among respondents varied by triathlon site: 84 (11%) Illinois-only participants; 20 (5%) Wisconsin-only participants; and six (7%) athletes participating in both events. Compared with Wisconsin-only participants, Illinois-only participants were more likely to have had an illness meeting the case definition (relative risk

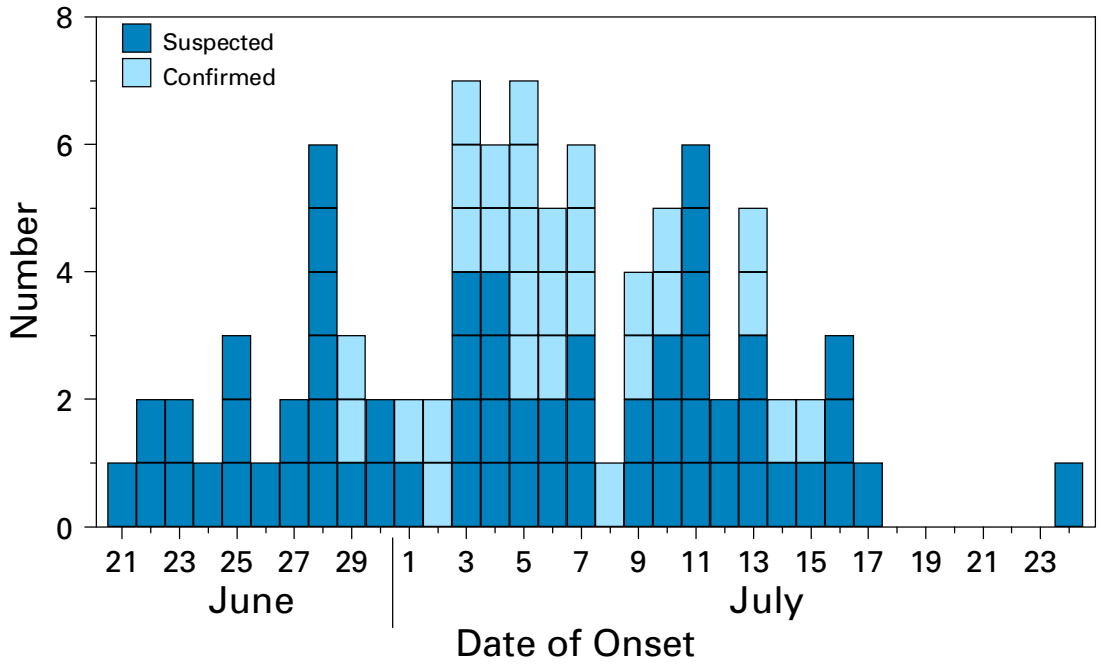
*A triathlon is a race consisting of swimming, biking, and running competitions.

Leptospirosis — Continued

[RR]=2.0; 95% confidence interval [CI]=1.3–4.0). Illinois-only case-patients also were more likely to have had chills, myalgias, or headache than Wisconsin-only case-patients (p<0.05); however, diarrhea was less common among Illinois-only case-patients. In addition, illness in Illinois-only case-patients had longer incubation periods (days from event to onset of fever: 14 days [Illinois-only] versus 7 days [Wisconsin-only]; p<0.01). Illinois-only case-patients were more likely to seek medical care than Wisconsin-only case-patients (RR=1.8; 95% CI=1.2–2.8). All 23 hospitalized athletes participated in the Illinois triathlon; none of the athletes participating only in the Wisconsin event were hospitalized.

Laboratory evidence for leptospirosis was defined as 1) a positive result for *Leptospira* on screening IgM enzyme-linked immunosorbent assay (ELISA) with confirmatory testing by a single microagglutination test (MAT) titer of ≥400, or a four-fold or greater rise in MAT titer between acute-phase and convalescent serum specimens (*2*); 2) a positive tissue immunohistochemical (IHC) stain using rabbit polyclonal reference antiserum reactive with 16 different leptospiral strains (*3*); or 3) a positive culture. Acute-phase serum specimens have been tested for 374 of 871 athletes who participated in the Illinois triathlon; 70 of these specimens were obtained from the 90 athletes whose illness met the case definition (Figure 1). Acute-phase serum specimens from 30 (43%) of these 70 case-patients and serum specimens from three (1%) of 304 athletes who had illness not meeting the case definition tested positive by ELISA. Of the 30 case-patients with a positive ELISA, 24 tested positive by confirmatory MAT with highest titers to pathogenic *Leptospira* serovars grippotyphosa, bratislava, and djasiman. In comparison, acute-phase serum specimens have been tested for 70 of 553 athletes who participated in only the Wisconsin triathlon, including 10 specimens

FIGURE 1. Onset of febrile illness among suspected (n=60) and laboratory-confirmed (n=30) case-patients who participated in the Springfield, Illinois, triathlon, by date — June 21–August 13, 1998*



*As of August 13, 1998.

Leptospirosis — Continued

from the 20 athletes whose illness met the case definition; none tested positive. Because serologic response can be delayed, convalescent specimens are required to interpret accurately serologic test results; paired, 2-week convalescent serum specimens are being obtained for all athletes whose acute-phase serum specimens have been tested. No positive cultures for *Leptospira* have been identified in either group of athletes.

On July 24, the Springfield and the Illinois departments of health issued a precautionary advisory not to swim, water ski, or use personal watercraft at Lake Springfield. To identify Springfield residents with only occupational or recreational exposure to Lake Springfield, the Springfield Department of Health initiated active and passive surveillance using the same case definition without specified time constraints. A total of 228 community case-patients in Springfield have been identified; 146 (64%) have had acute-phase serum specimens tested at CDC by ELISA. Specimens from five of these persons were positive by ELISA. Of these five, confirmatory testing by MAT has been performed for four; leptospirosis was confirmed in three case-patients, and confirmation for the fourth case-patient will require further testing of convalescent serum. Two hospitalized community residents who are suspected case-patients (serum specimens have yet to be tested) and who were treated with intravenous (IV) penicillin developed a Jarisch-Herxheimer reaction (a transient immunologic reaction following antibiotic treatment) (*4*) requiring hemodynamic support.

CDC, in collaboration with USDA and state and local health departments, is continuing epidemiologic, laboratory, and environmental investigations of these outbreaks. The objectives are to 1) identify additional cases of leptospirosis among athletes and among occupational and recreational users of Lake Springfield, 2) determine the etiology of illness and identify the source and mode of transmission among athletes who participated in only the Wisconsin triathlon, and 3) develop prevention and control measures for both outbreaks.

Reported by: Wisconsin Outbreak Investigation Team, Wisconsin Div of Health. Illinois Outbreak Investigation Team, Springfield Dept of Health and Illinois Dept of Public Health. Council of State and Territorial Epidemiologists, Atlanta, Georgia. Zoonotic Diseases Research Unit, Agriculture Research Svc, US Dept of Agriculture. Meningitis and Special Pathogens Br, Div of Bacterial and Mycotic Diseases, National Center for Infectious Diseases; and EIS officers, CDC.

Editorial Note: Leptospirosis is an acute febrile illness with a typical incubation period ranging from a few days to 4 weeks that usually begins abruptly with fever, chills, rigors, myalgia, and headache, and may include conjunctivitis, abdominal pain, vomiting, diarrhea, skin rashes, and meningeal symptoms (*5*). The acute septicemic phase can be followed by a secondary phase of severe disease characterized by aseptic meningitis, jaundice, renal failure, hemorrhage, or hemodynamic collapse. Mild infections can be treated with oral doxycycline; patients requiring hospitalization should be treated with IV penicillin (*1,5*).

Epidemiologic, serologic, and IHC staining evidence suggest that *Leptospira* was the etiologic agent causing disease among the athletes who participated in the Illinois triathlon. Similar illness and serologic confirmation among persons with occupational and recreational exposure to the same lake where the event was held support this theory. Athletes who participated in only the Wisconsin triathlon have demonstrated a different spectrum of symptoms and signs, have had a less severe illness, and have lacked serologic evidence for leptospirosis. However, additional serologic testing for leptospirosis among these athletes and additional testing for viral agents are needed.

Leptospirosis — Continued

Establishing an epidemiologic link between species of *Leptospira* obtained through environmental sampling (e.g., testing water, mud, and wild and domestic animals) and pathogenic serovars of *Leptospira* causing illness in humans in the same environments can be particularly difficult. Pathogenic *Leptospira* infect a variety of domestic and wild animals that subsequently excrete the organism in their urine. In temperate climates, both pathogenic and saprophytic *Leptospira* species can be found in fresh water, damp soil, vegetation, and mud, particularly during summer months (*6*). Therefore, no natural body of water can be expected to be free of *Leptospira*. Pathogenic and saprophytic *Leptospira* species obtained from environmental samples can be distinguished through a variety of tests, including molecular diagnostic testing (*6–8*); however, these techniques are difficult and time-consuming. The identification by culture or MAT of specific serovars causing leptospirosis in humans may facilitate identification of potential animal reservoirs (domestic and/or wild) of the environmental contamination.

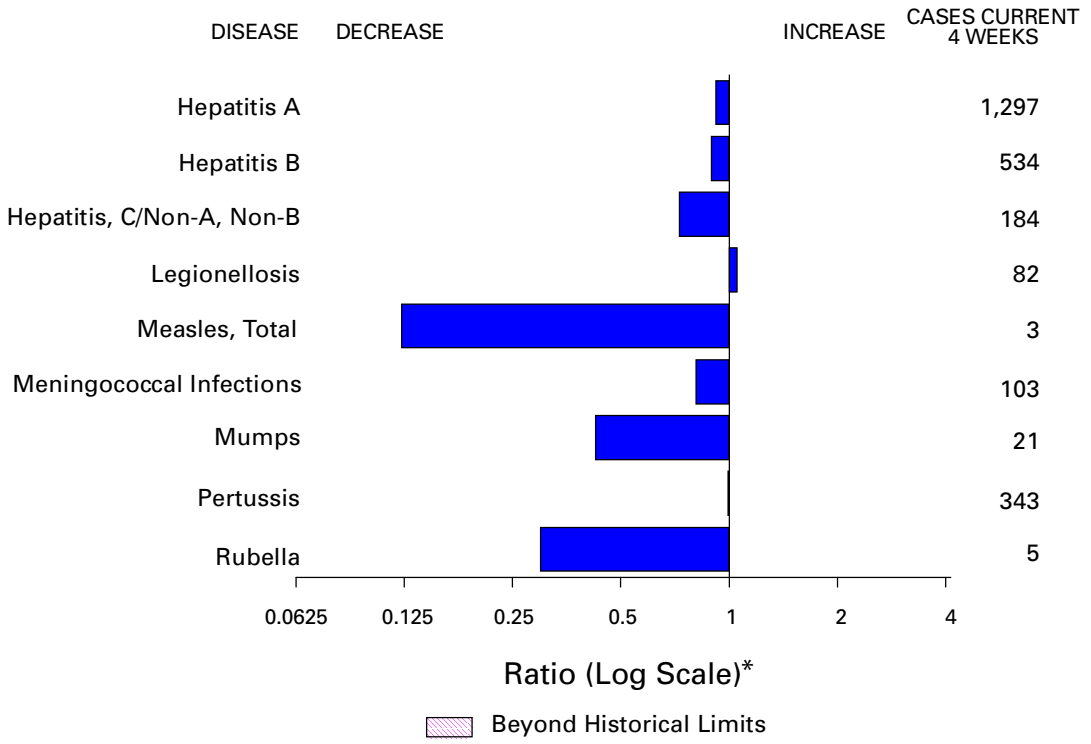
Although leptospirosis has not been described among competitive athletes (*9*), recreational exposure to natural water sources is a common route of transmission (*7*). In the absence of a defined source of prior or continued contamination of Lake Springfield with pathogenic *Leptospira*, enhanced passive and active surveillance for symptoms and signs of illness of leptospirosis will be necessary to monitor the safety of recreational use of Lake Springfield.

Additional information regarding this outbreak is available from CDC, telephone (888) 688-2732 ([888] OUTBREAK); on the World-Wide Web site, http://www.cdc.gov/ncidod/dbmd/lepto.htm; or through state and local health departments.

References

1. CDC. Outbreak of acute febrile illness among athletes participating in triathlons—Wisconsin and Illinois, 1998. MMWR 1998;47:585–8.
2. Kaufmann AF, Weyant RS. Leptospiraceae. In: Murray PR, Baron EJ, Pfaller MA, Tenover FC, Yolken RH, eds. Manual of clinical microbiology. 6th ed. Washington, DC: American Society for Microbiology, 1995:621–5.
3. Zaki SR, Shieh W-J, and the Epidemic Working Group. Leptospirosis associated with outbreak of acute febrile illness and pulmonary hemorrhage, Nicaragua, 1995 [Letter]. Lancet 1996; 347:535–6.
4. Friedland JS, Warrell DA. The Jarisch-Herxheimer reaction in leptospirosis: possible pathogenesis and review. Rev Infect Dis 1991;13:207–10.
5. Faine S. Leptospirosis. In: Hausler WJ Jr, Sussman M, eds. Volume 3, bacterial infections. Collier L, Balows A, Sussman M, eds. Topley and Wilson's microbiology and microbial infections. 9th ed. London, England: Arnold, 1998:849–69.
6. Henry RA, Johnson RC. Distribution of the genus *Leptospira* in soil and water. Appl Environ Microbiol 1978;35:492–9.
7. Jackson LA, Kaufmann AF, Adams WG, et al. Outbreak of leptospirosis associated with swimming. Pediatr Infect Dis J 1993;12:48–54.
8. Gravekamp C, Van de Kemp H, Franzen M, et al. Detection of seven species of pathogenic leptospires by PCR using two sets of primers. J Gen Microb 1993;139:1691–700.
9. Goodman RA, Thacker SB, Solomon SL, Osterholm MT, Hughes JM. Infectious diseases in competitive sports. JAMA 1994;271:862–7.

FIGURE I. Selected notifiable disease reports, comparison of provisional 4-week totals ending August 15, 1998, with historical data — United States



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

TABLE I. Summary — provisional cases of selected notifiable diseases, United States, cumulative, week ending August 15, 1998 (32nd Week)

	Cum. 1998		Cum. 1998
Anthrax	-	Plague	6
Brucellosis	46	Poliomyelitis, paralytic	1
Cholera	6	Psittacosis	27
Congenital rubella syndrome	3	Rabies, human	-
Cryptosporidiosis*	1,248	Rocky Mountain spotted fever (RMSF)	158
Diphtheria	2	Streptococcal disease, invasive Group A	1,461
Encephalitis: California*	21	Streptococcal toxic-shock syndrome*	39
eastern equine*	2	Syphilis, congenital¶	185
St. Louis*	1	Tetanus	21
western equine*	-	Toxic-shock syndrome	78
Hansen Disease	69	Trichinosis	9
Hantavirus pulmonary syndrome*†	9	Typhoid fever	187
Hemolytic uremic syndrome, post-diarrheal*	38	Yellow fever	-
HIV infection, pediatric*§	145		

-:no reported cases
*Not notifiable in all states.
† Updated weekly from reports to the Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases (NCID).
§ Updated monthly to the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention (NCHSTP), last update July 26, 1998.
¶ Updated from reports to the Division of STD Prevention, NCHSTP.

TABLE II. Provisional cases of selected notifiable diseases, United States, weeks ending August 15, 1998, and August 9, 1997 (32nd Week)

Reporting Area	AIDS		Chlamydia		*Escherichia coli* O157:H7		Gonorrhea		Hepatitis C/NA,NB	
					NETSS†	PHLIS§				
	Cum. 1998*	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997
UNITED STATES	27,399	35,436	330,087	275,168	1,436	817	197,164	172,758	2,303	2,152
NEW ENGLAND	1,025	1,470	12,094	10,559	180	135	3,413	3,572	32	41
Maine	21	36	631	589	21	-	41	36	-	-
N.H.	26	19	570	479	23	32	54	64	-	-
Vt.	14	24	258	236	10	7	23	32	-	2
Mass.	522	528	5,002	4,362	94	80	1,228	1,335	29	32
R.I.	78	97	1,448	1,187	5	1	219	278	3	7
Conn.	364	766	4,185	3,706	27	15	1,848	1,827	-	-
MID. ATLANTIC	7,578	11,061	39,372	34,044	140	36	22,253	21,995	247	206
Upstate N.Y.	961	1,728	N	N	106	-	3,637	3,845	193	150
N.Y. City	4,074	5,735	21,086	16,302	4	7	9,172	8,091	-	-
N.J.	1,475	2,273	6,403	5,969	30	28	3,933	4,453	-	-
Pa.	1,068	1,325	11,883	11,773	N	1	5,511	5,606	54	56
E.N. CENTRAL	2,078	2,556	54,394	36,809	225	149	37,672	23,676	325	365
Ohio	430	561	15,545	13,481	55	22	9,877	8,640	7	12
Ind.	355	394	3,678	5,500	57	28	2,363	3,632	4	11
Ill.	825	892	15,848	U	55	14	12,850	U	20	64
Mich.	353	545	13,174	11,224	58	35	10,051	8,633	294	257
Wis.	115	164	6,149	6,604	N	50	2,531	2,771	-	21
W.N. CENTRAL	532	696	18,686	19,044	221	165	9,269	8,493	114	42
Minn.	104	128	3,649	3,997	86	78	1,300	1,402	7	3
Iowa	49	74	2,063	2,650	66	32	660	720	6	21
Mo.	244	331	7,161	7,220	15	29	5,233	4,588	96	6
N. Dak.	4	7	290	508	6	11	29	32	-	2
S. Dak.	11	3	984	763	15	10	154	82	-	-
Nebr.	48	65	1,375	1,169	19	-	495	440	2	2
Kans.	72	88	3,164	2,737	14	5	1,398	1,229	3	8
S. ATLANTIC	6,869	8,699	66,814	57,451	124	79	54,859	55,951	122	148
Del.	91	159	1,512	-	-	1	829	720	-	-
Md.	826	1,078	5,071	4,255	19	9	5,941	6,990	6	4
D.C.	567	658	N	N	1	-	2,229	2,660	-	-
Va.	502	719	7,239	7,165	N	25	4,367	4,874	9	18
W. Va.	59	60	1,686	1,778	7	3	479	581	4	13
N.C.	456	503	13,193	10,421	23	31	11,370	10,223	15	38
S.C.	452	475	11,394	7,568	5	2	7,369	6,802	3	27
Ga.	725	1,071	14,314	10,741	45	-	12,263	12,214	9	-
Fla.	3,191	3,976	12,405	15,523	24	8	10,012	10,887	76	48
E.S. CENTRAL	1,084	1,188	24,319	20,866	74	27	23,560	20,861	108	229
Ky.	156	211	3,822	3,993	20	-	2,189	2,508	16	10
Tenn.	378	495	8,001	7,806	32	24	6,912	6,556	87	155
Ala.	330	287	6,349	4,896	19	2	8,045	6,995	5	6
Miss.	220	195	6,147	4,171	U	1	6,414	4,802	U	58
W.S. CENTRAL	3,328	3,601	50,306	35,796	80	12	29,242	23,463	556	286
Ark.	123	131	2,129	1,805	6	6	1,220	2,955	5	9
La.	586	640	8,967	5,671	3	2	7,808	5,301	21	128
Okla.	183	188	6,147	4,546	11	4	3,371	2,873	8	6
Tex.	2,436	2,642	33,063	23,774	60	-	16,843	12,334	522	143
MOUNTAIN	967	1,032	13,426	17,564	199	87	4,980	4,804	259	185
Mont.	18	26	739	653	10	-	26	27	7	14
Idaho	19	34	1,066	890	23	7	107	68	86	36
Wyo.	1	13	399	351	49	-	18	36	46	43
Colo.	186	264	10	3,899	37	33	1,339	1,269	18	21
N. Mex.	153	105	2,235	2,333	16	11	550	538	64	33
Ariz.	377	247	6,919	6,606	21	13	2,477	2,150	3	23
Utah	70	86	1,415	990	37	15	153	145	21	3
Nev.	143	257	643	1,842	6	8	310	571	14	12
PACIFIC	3,938	5,133	50,676	43,035	193	127	11,916	9,943	540	650
Wash.	270	417	6,582	5,525	31	22	1,132	1,162	12	19
Oreg.	116	188	3,432	2,971	60	61	494	461	2	2
Calif.	3,439	4,449	38,229	32,607	99	35	9,839	7,779	471	522
Alaska	17	42	1,158	876	3	-	193	236	1	-
Hawaii	96	37	1,275	1,056	N	9	258	305	54	107
Guam	-	2	8	193	N	-	2	27	-	-
P.R.	1,141	1,198	U	U	2	U	245	392	-	-
V.I.	18	70	N	N	N	U	U	U	U	U
Amer. Samoa	-	-	U	U	N	U	U	U	U	U
C.N.M.I.	-	1	N	N	N	U	14	17	-	2

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

*Updated monthly to the Division of HIV/AIDS Prevention–Surveillance and Epidemiology, National Center for HIV, STD, and TB Prevention, last update July 26, 1998.

†National Electronic Telecommunications System for Surveillance.

§Public Health Laboratory Information System.

TABLE II. (Cont'd.) Provisional cases of selected notifiable diseases, United States, weeks ending August 15, 1998, and August 9, 1997 (32nd Week)

Reporting Area	Legionellosis		Lyme Disease		Malaria		Syphilis (Primary & Secondary)		Tuberculosis		Rabies, Animal
	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998*	Cum. 1997	Cum. 1998
UNITED STATES	695	533	6,116	5,714	725	1,060	4,431	5,146	7,395	10,759	4,225
NEW ENGLAND	39	42	1,932	1,622	41	47	42	100	254	266	835
Maine	1	2	6	8	4	1	1	-	5	16	126
N.H.	3	4	27	9	3	2	1	-	6	10	37
Vt.	4	8	6	6	-	2	4	-	1	4	38
Mass.	15	12	462	224	14	23	25	47	135	147	281
R.I.	8	5	266	194	2	5	1	2	34	19	52
Conn.	8	11	1,165	1,181	18	14	10	51	73	70	301
MID. ATLANTIC	166	95	3,488	2,882	177	326	160	249	1,712	1,946	980
Upstate N.Y.	52	27	2,031	1,102	52	47	22	24	194	262	693
N.Y. City	23	9	12	129	82	200	34	56	907	985	U
N.J.	7	14	646	939	22	59	53	102	361	394	118
Pa.	84	45	799	712	21	20	51	67	250	305	169
E.N. CENTRAL	210	179	62	503	65	100	592	401	644	1,097	82
Ohio	86	76	43	21	4	12	80	133	U	176	41
Ind.	38	29	13	17	6	9	144	99	76	90	5
Ill.	16	13	5	9	22	42	225	U	393	590	9
Mich.	47	40	1	17	31	25	104	93	172	168	19
Wis.	23	21	U	439	2	12	39	76	3	73	8
W.N. CENTRAL	44	35	76	57	52	32	87	113	241	337	476
Minn.	3	1	53	32	26	10	6	14	90	90	84
Iowa	6	9	17	4	6	8	-	6	20	38	108
Mo.	14	5	1	15	10	7	68	67	86	131	19
N. Dak.	-	2	-	-	2	2	-	-	3	8	98
S. Dak.	2	2	-	1	-	-	1	-	14	7	90
Nebr.	15	12	3	2	1	1	4	2	10	14	5
Kans.	4	4	2	3	7	4	8	24	18	49	72
S. ATLANTIC	85	70	405	448	168	180	1,841	2,090	1,273	1,954	1,265
Del.	8	7	12	90	1	2	16	16	U	20	17
Md.	20	14	267	286	51	56	411	568	180	190	318
D.C.	6	3	4	7	12	10	49	77	67	59	-
Va.	10	15	38	24	32	44	99	153	174	194	376
W. Va.	N	N	8	3	1	-	2	3	27	37	57
N.C.	6	9	37	21	12	10	460	496	263	251	136
S.C.	7	3	3	1	4	10	179	237	185	210	98
Ga.	4	-	5	1	20	21	483	346	307	363	135
Fla.	23	19	31	15	35	27	142	194	70	630	128
E.S. CENTRAL	43	36	49	54	18	22	746	1,123	634	812	185
Ky.	19	7	11	12	3	6	72	91	113	113	26
Tenn.	12	22	26	24	9	6	355	484	223	298	98
Ala.	5	2	12	4	4	7	169	277	162	250	59
Miss.	U	5	U	14	U	3	150	271	136	151	U
W.S. CENTRAL	20	12	19	51	20	13	617	749	248	1,592	119
Ark.	-	1	6	14	1	2	71	112	73	124	27
La.	2	2	3	2	6	8	255	230	U	135	-
Okla.	8	1	2	9	2	3	36	72	102	135	92
Tex.	10	8	8	26	11	-	255	335	-	1,198	-
MOUNTAIN	42	33	10	7	36	50	142	102	251	338	103
Mont.	2	1	-	-	-	2	-	-	12	6	35
Idaho	2	2	3	2	7	-	-	-	8	7	-
Wyo.	1	1	-	1	-	2	1	-	3	2	46
Colo.	8	9	3	-	11	24	8	8	U	57	1
N. Mex.	2	2	2	1	11	7	19	4	34	32	3
Ariz.	10	8	-	1	6	7	108	78	124	156	11
Utah	16	6	-	-	1	3	3	4	36	14	7
Nev.	1	4	2	2	-	5	3	8	34	64	-
PACIFIC	46	31	75	90	148	290	204	219	2,138	2,417	180
Wash.	8	6	5	5	14	13	23	7	144	191	-
Oreg.	-	-	9	12	13	15	3	5	72	102	1
Calif.	37	24	60	73	118	254	178	205	1,792	1,949	157
Alaska	-	-	1	-	1	3	-	1	32	53	22
Hawaii	1	1	-	-	2	5	-	1	98	122	-
Guam	-	-	-	-	-	-	-	3	-	13	-
P.R.	-	-	-	-	-	4	122	154	46	129	33
V.I.	U	U	U	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U	U	U	U
C.N.M.I.	-	-	-	-	-	-	98	9	54	2	-

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

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

TABLE III. Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending August 15, 1998, and August 9, 1997 (32nd Week)

Reporting Area	*H. influenzae*, invasive		Hepatitis (Viral), by type				Measles (Rubeola)					
			A		B		Indigenous		Imported†		Total	
	Cum. 1998*	Cum. 1997	Cum. 1998	Cum. 1997	Cum. 1998	Cum. 1997	1998	Cum. 1998	1998	Cum. 1998	Cum. 1998	Cum. 1997
UNITED STATES	690	715	13,345	17,040	4,978	5,723	-	28	-	19	47	102
NEW ENGLAND	38	40	158	433	85	106	-	1	-	2	3	19
Maine	2	3	13	45	2	6	-	-	-	-	-	1
N.H.	7	6	8	21	10	7	-	-	-	-	-	1
Vt.	4	3	13	8	3	5	-	-	-	1	1	-
Mass.	22	24	50	184	22	45	-	1	-	1	2	16
R.I.	2	2	11	95	48	11	-	-	-	-	-	-
Conn.	1	2	63	80	-	32	-	-	-	-	-	1
MID. ATLANTIC	95	104	907	1,349	712	835	-	9	-	4	13	22
Upstate N.Y.	39	27	218	199	189	176	-	2	-	-	2	5
N.Y. City	18	28	221	606	181	314	-	-	-	-	-	7
N.J.	33	34	218	195	135	158	-	7	-	1	8	3
Pa.	5	15	250	349	207	187	-	-	-	3	3	7
E.N. CENTRAL	114	118	1,852	1,742	516	925	-	11	-	3	14	8
Ohio	40	66	207	218	47	55	-	-	-	1	1	-
Ind.	27	11	101	191	64	71	-	2	-	1	3	-
Ill.	40	27	312	462	102	178	-	-	-	-	-	6
Mich.	3	14	1,116	741	280	263	-	9	-	1	10	2
Wis.	4	-	116	130	23	358	-	-	-	-	-	-
W.N. CENTRAL	64	37	966	1,285	248	310	-	-	-	-	-	12
Minn.	49	27	83	111	24	23	-	-	-	-	-	3
Iowa	2	4	372	226	42	23	-	-	-	-	-	-
Mo.	8	3	391	676	151	227	U	-	U	-	-	1
N. Dak.	-	-	3	10	4	4	-	-	-	-	-	-
S. Dak.	-	2	18	17	1	1	-	-	-	-	-	8
Nebr.	-	1	24	52	9	9	-	-	-	-	-	-
Kans.	5	-	75	193	17	23	-	-	-	-	-	-
S. ATLANTIC	144	113	1,153	1,021	735	740	-	3	-	5	8	9
Del.	-	-	3	21	-	4	-	-	-	1	1	-
Md.	41	44	197	133	100	106	-	-	-	1	1	2
D.C.	-	-	36	16	8	25	-	-	-	-	-	1
Va.	13	9	146	137	66	78	-	-	-	2	2	1
W. Va.	4	3	1	6	4	9	-	-	-	-	-	-
N.C.	21	17	67	121	140	161	-	-	-	-	-	1
S.C.	3	3	18	72	22	62	-	-	-	-	-	1
Ga.	30	22	342	230	120	83	-	1	-	1	2	1
Fla.	32	15	343	285	275	212	-	2	-	-	2	2
E.S. CENTRAL	43	40	261	407	245	413	-	-	-	2	2	1
Ky.	6	6	15	51	27	26	-	-	-	-	-	-
Tenn.	25	24	153	254	171	280	-	-	-	-	-	-
Ala.	10	8	50	58	47	43	-	-	-	2	2	1
Miss.	U	2	U	44	U	64	U	U	U	U	U	-
W.S. CENTRAL	39	33	2,557	3,496	835	728	-	-	-	-	-	7
Ark.	-	2	67	145	54	56	-	-	-	-	-	-
La.	18	7	51	136	63	93	-	-	-	-	-	-
Okla.	19	22	373	988	58	25	-	-	-	-	-	-
Tex.	2	2	2,066	2,227	660	554	-	-	-	-	-	7
MOUNTAIN	73	66	2,074	2,639	535	547	-	-	-	-	-	7
Mont.	-	-	67	56	5	6	-	-	-	-	-	-
Idaho	-	1	174	87	21	17	-	-	-	-	-	-
Wyo.	1	2	26	21	2	17	-	-	-	-	-	-
Colo.	15	11	163	273	71	102	U	-	U	-	-	-
N. Mex.	5	7	100	209	220	177	-	-	-	-	-	-
Ariz.	41	27	1,325	1,314	135	125	-	-	-	-	-	5
Utah	4	3	134	401	50	64	-	-	-	-	-	-
Nev.	7	15	85	278	31	39	-	-	-	-	-	2
PACIFIC	80	164	3,417	4,668	1,067	1,119	-	4	-	3	7	17
Wash.	7	3	696	328	71	48	U	-	U	1	1	1
Oreg.	33	26	239	237	70	68	-	-	-	-	-	-
Calif.	32	126	2,440	3,986	913	984	-	4	-	2	6	12
Alaska	1	2	14	25	8	11	-	-	-	-	-	-
Hawaii	7	7	28	92	5	8	-	-	-	-	-	4
Guam	-	-	-	-	-	3	U	-	U	-	-	-
P.R.	2	-	38	202	268	469	-	-	-	-	-	-
V.I.	U	U	U	U	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U	U	U	U	U
C.N.M.I.	-	6	1	1	28	34	U	-	U	-	-	1

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

*Of 158 cases among children aged <5 years, serotype was reported for 85 and of those, 33 were type b.

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

TABLE III. (Cont'd.) Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending August 15, 1998, and August 9, 1997 (32nd Week)

Reporting Area	Meningococcal Disease		Mumps			Pertussis			Rubella		
	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997	1998	Cum. 1998	Cum. 1997
UNITED STATES	1,772	2,247	6	303	397	82	2,949	3,241	-	295	125
NEW ENGLAND	75	139	-	2	8	4	520	615	-	36	1
Maine	5	15	-	-	-	-	5	7	-	-	-
N.H.	4	12	-	-	-	-	40	71	-	-	-
Vt.	1	3	-	-	-	2	57	181	-	-	-
Mass.	37	71	-	1	2	-	384	332	-	6	1
R.I.	3	12	-	-	5	2	7	12	-	1	-
Conn.	25	26	-	1	1	-	27	12	-	29	-
MID. ATLANTIC	164	236	-	18	45	3	314	242	-	124	28
Upstate N.Y.	44	64	-	3	10	3	162	91	-	110	4
N.Y. City	18	41	-	4	3	-	9	55	-	9	24
N.J.	43	44	-	2	7	-	5	11	-	4	-
Pa.	59	87	-	9	25	-	138	85	-	1	-
E.N. CENTRAL	267	329	1	54	49	30	281	323	-	-	5
Ohio	96	121	-	21	18	30	120	95	-	-	-
Ind.	50	35	1	6	6	-	68	35	-	-	-
Ill.	66	96	-	7	8	-	35	45	-	-	1
Mich.	31	48	-	20	14	-	41	32	-	-	-
Wis.	24	29	-	-	3	-	17	116	-	-	4
W.N. CENTRAL	146	165	-	21	12	11	255	199	-	27	-
Minn.	25	29	-	10	5	10	159	132	-	-	-
Iowa	27	38	-	7	6	-	52	10	-	-	-
Mo.	53	71	U	3	-	U	16	33	U	2	-
N. Dak.	2	1	-	1	-	-	2	1	-	-	-
S. Dak.	6	4	-	-	-	-	6	3	-	-	-
Nebr.	7	6	-	-	1	-	8	4	-	-	-
Kans.	26	16	-	-	-	1	12	16	-	25	-
S. ATLANTIC	311	381	4	39	47	7	181	293	-	9	58
Del.	1	5	-	-	-	-	2	1	-	-	-
Md.	24	36	-	-	1	-	31	94	-	-	-
D.C.	-	6	-	-	-	-	1	3	-	-	-
Va.	24	38	-	5	9	-	8	34	-	-	1
W. Va.	12	14	-	-	-	-	1	5	-	-	-
N.C.	46	74	-	9	7	3	68	80	-	6	50
S.C.	44	40	1	5	10	-	22	14	-	-	6
Ga.	66	75	-	1	6	-	10	8	-	-	-
Fla.	94	93	3	19	14	4	38	54	-	3	1
E.S. CENTRAL	153	165	-	11	21	2	71	79	-	1	1
Ky.	19	38	-	-	3	-	22	30	-	-	-
Tenn.	47	58	-	1	3	-	24	26	-	-	-
Ala.	66	52	-	6	6	2	22	16	-	1	1
Miss.	U	17	U	U	9	U	U	7	U	U	-
W.S. CENTRAL	198	217	-	40	44	1	202	127	-	80	3
Ark.	25	25	-	-	1	1	28	10	-	-	-
La.	44	46	-	8	11	-	2	13	-	-	-
Okla.	30	24	-	-	-	-	18	17	-	-	-
Tex.	99	122	-	32	32	-	154	87	-	80	3
MOUNTAIN	100	130	-	27	49	15	609	823	-	5	6
Mont.	3	7	-	-	-	-	3	15	-	-	-
Idaho	7	8	-	3	2	2	196	473	-	-	2
Wyo.	5	1	-	1	1	-	8	6	-	-	-
Colo.	19	35	U	8	3	U	129	224	U	-	-
N. Mex.	17	22	N	N	N	-	74	57	-	1	-
Ariz.	34	33	-	5	31	7	139	23	-	1	4
Utah	11	11	-	3	6	1	37	12	-	2	-
Nev.	4	13	-	7	6	5	23	13	-	1	-
PACIFIC	358	485	1	91	122	9	516	540	-	13	23
Wash.	50	59	U	7	14	U	193	224	U	9	5
Oreg.	61	94	N	N	N	6	44	24	-	-	-
Calif.	241	326	-	65	86	-	268	271	-	2	10
Alaska	2	2	-	2	5	2	5	6	-	-	-
Hawaii	4	4	1	17	17	1	6	15	-	2	8
Guam	-	1	U	-	1	U	-	-	U	-	-
P.R.	6	8	-	1	5	-	2	-	-	-	-
V.I.	U	U	U	U	U	U	U	U	U	U	U
Amer. Samoa	U	U	U	U	U	U	U	U	U	U	U
C.N.M.I.	-	-	U	2	4	U	1	-	U	-	-

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

TABLE IV. Deaths in 122 U.S. cities,* week ending August 15, 1998 (32nd Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	>65	45-64	25-44	1-24	<1	
NEW ENGLAND	561	383	98	56	15	9	41
Boston, Mass.	152	97	22	23	8	2	21
Bridgeport, Conn.	29	22	5	-	1	1	1
Cambridge, Mass.	13	7	5	1	-	-	1
Fall River, Mass.	31	25	2	4	-	-	2
Hartford, Conn.	58	34	12	8	2	2	2
Lowell, Mass.	24	22	2	-	-	-	1
Lynn, Mass.	7	7	-	-	-	-	1
New Bedford, Mass.	24	19	5	-	-	-	2
New Haven, Conn.	39	29	4	6	-	-	2
Providence, R.I.	51	28	17	5	1	-	-
Somerville, Mass.	7	6	-	1	-	-	1
Springfield, Mass.	35	22	8	3	-	2	-
Waterbury, Conn.	36	24	10	2	-	-	2
Worcester, Mass.	55	41	6	3	3	2	5
MID. ATLANTIC	1,944	1,357	383	140	38	26	89
Albany, N.Y.	41	29	6	1	2	3	-
Allentown, Pa.	24	15	6	3	-	-	2
Buffalo, N.Y.	85	53	22	4	5	1	7
Camden, N.J.	30	18	4	1	3	4	2
Elizabeth, N.J.	14	10	2	2	-	-	-
Erie, Pa.	49	39	8	-	2	-	1
Jersey City, N.J.	16	10	6	-	-	-	-
New York City, N.Y.	1,061	744	207	86	16	8	39
Newark, N.J.	52	28	11	10	2	1	1
Paterson, N.J.	16	9	2	3	1	1	-
Philadelphia, Pa.	200	130	49	16	4	1	13
Pittsburgh, Pa.§	52	32	11	5	-	4	3
Reading, Pa.	37	31	4	1	-	1	2
Rochester, N.Y.	124	92	28	3	1	-	8
Schenectady, N.Y.	22	17	2	2	1	-	1
Scranton, Pa.	27	23	3	1	-	-	1
Syracuse, N.Y.	55	44	6	2	1	2	5
Trenton, N.J.	19	17	2	-	-	-	2
Utica, N.Y.	20	16	4	-	-	-	2
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	1,655	1,160	300	111	41	43	100
Akron, Ohio	36	25	8	2	-	1	1
Canton, Ohio	32	22	6	3	-	1	6
Chicago, Ill.	U	U	U	U	U	U	U
Cincinnati, Ohio	147	102	28	9	5	3	22
Cleveland, Ohio	135	102	18	9	4	2	1
Columbus, Ohio	182	120	38	14	6	4	19
Dayton, Ohio	129	97	23	5	1	3	9
Detroit, Mich.	209	111	59	24	6	9	4
Evansville, Ind.	47	37	5	3	-	2	2
Fort Wayne, Ind.	69	51	15	3	-	-	4
Gary, Ind.	10	2	3	3	2	-	-
Grand Rapids, Mich.	51	39	11	1	-	-	3
Indianapolis, Ind.	163	124	21	10	3	5	-
Lansing, Mich.	52	40	6	3	-	3	2
Milwaukee, Wis.	115	82	20	6	3	4	16
Peoria, Ill.	45	35	7	1	2	-	2
Rockford, Ill.	51	32	10	5	3	1	2
South Bend, Ind.	45	38	3	2	1	1	1
Toledo, Ohio	70	53	11	3	3	-	4
Youngstown, Ohio	67	48	8	5	2	4	2
W.N. CENTRAL	657	470	100	44	19	19	36
Des Moines, Iowa	U	U	U	U	U	U	U
Duluth, Minn.	30	25	3	1	1	-	-
Kansas City, Kans.	14	8	3	3	-	-	1
Kansas City, Mo.	86	58	12	8	3	1	2
Lincoln, Nebr.	35	20	6	5	3	1	5
Minneapolis, Minn.	178	138	22	7	3	7	14
Omaha, Nebr.	85	59	13	6	3	4	5
St. Louis, Mo.	101	62	20	12	4	3	-
St. Paul, Minn.	75	61	10	1	-	3	8
Wichita, Kans.	53	39	11	1	2	-	1

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	>65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,170	752	262	98	32	24	57
Atlanta, Ga.	147	90	41	11	3	2	-
Baltimore, Md.	216	136	50	16	7	6	21
Charlotte, N.C.	88	59	15	9	3	2	8
Jacksonville, Fla.	109	73	26	4	2	4	3
Miami, Fla.	115	69	29	11	5	1	2
Norfolk, Va.	37	26	5	3	-	3	-
Richmond, Va.	67	42	11	9	5	-	6
Savannah, Ga.	64	50	11	2	1	-	4
St. Petersburg, Fla.	47	40	4	-	1	2	2
Tampa, Fla.	160	102	35	19	2	1	10
Washington, D.C.	108	55	35	12	3	3	1
Wilmington, Del.	12	10	-	2	-	-	-
E.S. CENTRAL	747	466	174	62	27	17	35
Birmingham, Ala.	173	105	48	9	5	5	16
Chattanooga, Tenn.	51	32	9	8	2	-	2
Knoxville, Tenn.	71	46	18	5	2	-	1
Lexington, Ky.	61	41	11	3	1	5	2
Memphis, Tenn.	118	70	30	10	5	3	5
Mobile, Ala.	77	52	13	4	6	2	1
Montgomery, Ala.	44	28	9	5	1	1	2
Nashville, Tenn.	152	92	36	18	5	1	6
W.S. CENTRAL	1,401	896	301	129	49	26	69
Austin, Tex.	80	49	18	7	4	2	2
Baton Rouge, La.	46	28	12	4	2	-	2
Corpus Christi, Tex.	43	31	8	4	-	-	4
Dallas, Tex.	194	106	47	26	9	6	3
El Paso, Tex.	47	33	6	3	4	1	4
Ft. Worth, Tex.	118	81	22	9	3	3	6
Houston, Tex.	347	204	78	42	16	7	26
Little Rock, Ark.	67	46	16	1	2	2	3
New Orleans, La.	93	60	17	10	5	1	-
San Antonio, Tex.	214	142	52	14	2	4	12
Shreveport, La.	47	39	6	-	2	-	1
Tulsa, Okla.	105	77	19	9	-	-	6
MOUNTAIN	760	519	119	70	33	17	44
Albuquerque, N.M.	98	59	12	18	6	3	2
Boise, Idaho	35	25	6	1	2	1	4
Colo. Springs, Colo.	44	33	7	2	1	1	2
Denver, Colo.	88	62	15	7	2	2	7
Las Vegas, Nev.	148	103	23	15	3	4	4
Ogden, Utah	23	18	5	-	-	-	1
Phoenix, Ariz.	70	42	14	7	4	1	8
Pueblo, Colo.	31	20	7	2	2	-	-
Salt Lake City, Utah	101	73	9	9	8	2	8
Tucson, Ariz.	122	84	21	9	5	3	8
PACIFIC	1,259	881	215	85	49	27	115
Berkeley, Calif.	12	10	-	2	-	-	1
Fresno, Calif.	95	77	3	6	6	3	8
Glendale, Calif.	U	U	U	U	U	U	U
Honolulu, Hawaii	65	52	8	2	3	-	2
Long Beach, Calif.	59	41	9	3	3	3	6
Los Angeles, Calif.	U	U	U	U	U	U	U
Pasadena, Calif.	16	10	4	2	-	-	1
Portland, Oreg.	109	80	19	6	2	2	3
Sacramento, Calif.	168	128	28	8	2	2	24
San Diego, Calif.	136	89	21	10	8	6	15
San Francisco, Calif.	117	73	26	12	5	1	11
San Jose, Calif.	208	130	46	13	12	7	25
Santa Cruz, Calif.	30	21	6	3	-	-	3
Seattle, Wash.	116	78	20	12	4	2	2
Spokane, Wash.	52	41	9	1	-	1	8
Tacoma, Wash.	76	51	16	5	4	-	6
TOTAL	10,154¶	6,884	1,952	795	303	208	586

U: Unavailable -: no reported cases

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

†Pneumonia and influenza.

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

¶Total includes unknown ages.

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