CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION
November 28, 1997 / Vol. 46 / No. 47

MMWR™
MORBIDITY AND MORTALITY WEEKLY REPORT

Viral Gastroenteritis Associated with Eating Oysters — Louisiana, December 1996–January 1997

Viral gastroenteritis outbreaks caused by caliciviruses (i.e., Norwalk-like viruses or small round-structured viruses) have been associated with eating contaminated shellfish, particularly oysters (*Crassostrea virginica*) (*1–3*). This report describes the findings of the investigation of an outbreak of oyster-associated viral gastroenteritis in Louisiana during the 1996–97 winter season and implicates sewage from oyster harvesting vessels as the probable cause of contaminated oysters.

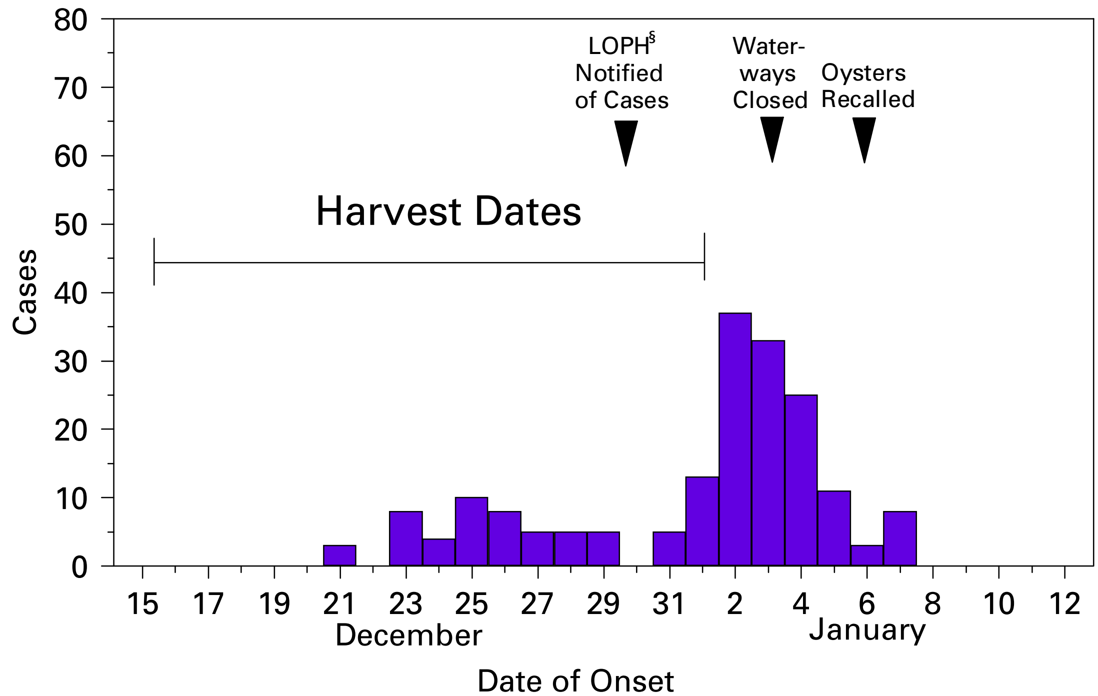
On December 30, 1996, the Louisiana Office of Public Health (LOPH) was notified about a cluster of six persons who had onset of gastroenteritis after eating raw oysters on December 25. During December 30, 1996–January 3, 1997, three additional clusters were identified. In all four clusters, ill persons had eaten oysters harvested from Louisiana waterways. LOPH notified all state epidemiologists in the United States about the apparent association of gastroenteritis with eating oysters and requested reports of suspected cases.

A case of gastroenteritis was defined as three or more watery stools or vomiting within a 24-hour period, with onset during December 15–January 9. A cluster of oyster-related cases was defined as a group of three or more persons who had shared a common meal, at least one of whom had eaten oysters and at least one of whom developed gastroenteritis. Sixty clusters comprising 493 persons were reported from Alabama, Florida, Georgia, Louisiana, and Mississippi, and all were included in the subsequent traceback investigation. Of the 60 clusters, data were included in the descriptive analysis of the illness only for those 34 clusters for whom all persons in a cluster could be interviewed. The 34 clusters comprised 290 persons who completed interviews and were included in the descriptive analysis; 271 of 290 persons supplied information on oyster consumption.

Onsets of illness occurred during December 21–January 7 (Figure 1). Of the 290 persons interviewed, 179 (62%) had symptoms that met the case definition. The most common symptoms were diarrhea (83%), abdominal cramps (78%), vomiting (58%), headache (50%), and fever (50%). The median incubation period was 38 hours (range: 8–90 hours), and the median duration of illness was 2 days (range: 1–14 days). The median age of case-patients was 42 years (range: 14–83 years), and 111 (62%) were male. The number of reported cases peaked during December 31–January 5 (Figure 1); the harvest dates of subsequently implicated oysters ranged

Gastroenteritis — Continued

FIGURE 1. Number of cases of gastroenteritis* associated with eating oysters harvested from Louisiana waterways, December 1996–January 1997†



*Defined as three or more watery stools or vomiting within a 24 hour period, with onset during December 15–January 9.
†n=179.
§Louisiana Office of Public Health.

from December 15 to January 1. Of 201 persons who ate raw oysters, 153 (76%) became ill, compared with 13 (19%) of 70 persons who did not eat raw oysters (risk ratio=4.0). Small round-structured viruses were found by direct electron microscopy in fecal specimens from eight of 11 ill persons. Sequence analysis of nucleic acid from eight specimens representing six clusters demonstrated three unique genetic sequences that corresponded with oysters harvested from three separate harvest sites. Small round-structured viruses were detected in oysters, but genetic sequencing could not be conducted.

The LOPH traced oysters eaten by ill persons to retailers, wholesalers, and harvesters. Restaurants and seafood markets were inspected to observe handling and storage of shellfish, and tags that identified the date and site of harvesting and the harvester's identification number were obtained from purchasers and retailers of sacks that were definitely or possibly implicated. Retailer records were cross-referenced with records from wholesalers and harvesters to establish the accuracy of information about harvester and site of harvest. Oysters associated with the 60 clusters were traced to 26 retailers, 11 wholesalers, and 20 harvesters. Records from several wholesalers did not agree with the information on the oyster sack tag.

As of February 15 (6 weeks after notification of the outbreak), LOPH, despite repeated attempts, had been successful in completing interviews with only three of 20 harvesters about the date and specific location of harvesting of potentially

Gastroenteritis — Continued

contaminated oysters. However, with the assistance of Louisiana Department of Wildlife and Fisheries, 12 additional harvesters were interviewed. Of eight oyster harvesting boats inspected, seven had inadequate sewage collection and disposal systems.

Testing by the LOPH Molluscan Shellfish Program determined that a toxic algal bloom, which causes paralytic shellfish poisoning, was present in Louisiana's northeastern waterways beginning November 13, 1996; these findings prompted LOPH to close these waterways that day and required harvesters to move to southeastern harvest sites. In addition, on November 15, a freshwater diversion was opened to decrease the salinity and eliminate the algal bloom in the northeastern waters; the diversion also decreased the salinity in the southeastern waters.

On January 3, 1997, LOPH mandated an emergency closure of eight waterways with suspected contamination southeast of the Mississippi River, and on January 6, LOPH recalled oysters harvested from these sites after December 22, 1996. On January 23, 1997, harvesting was permitted to resume, and no additional cases of oyster-associated gastroenteritis were reported.

Reported by: TA Farley, MD, L McFarland, PhD, Epidemiology Section, Louisiana Dept of Health and Hospitals. M Estes, K Schwab, Baylor Univ, Dept of Virology, Houston, Texas. Viral Gastroenteritis Section, Respiratory and Enteric Viruses Br, Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases; Div of Applied Public Health Training (proposed), Epidemiology Program Office, CDC.

Editorial Note: Caliciviruses are small single-stranded RNA viruses that cause acute gastroenteritis characterized by vomiting and/or diarrhea (*4*). The viruses are difficult to detect, requiring relatively sophisticated molecular methods to identify the virus in fecal specimens and in oysters. There is no reliable marker for indicating presence of the virus in oyster harvesting waters.

This report represents the third oyster-related gastroenteritis outbreak attributed to calicivirus in Louisiana since 1993. An outbreak in 1993 accounted for cases of illness in 73 persons in Louisiana and approximately 130 persons in other states (*5*) who had consumed oysters from Louisiana. In that outbreak, a harvester with a high level of immunoglobulin A to Norwalk virus reported having been ill before the outbreak and admitted to dumping sewage directly into harvest waters. The findings of the investigation of that outbreak suggested that one ill harvester could contaminate large quantities of oysters in a relatively large oyster bed (*6*). An oyster-associated outbreak in 1996 was attributed to a malfunctioning sewage disposal system on an oil rig on which some workers had been ill with Norwalk-like gastroenteritis (LOPH, unpublished data, 1997). However, harvesters dumping feces overboard could not be excluded as an additional source of oyster contamination. In both outbreaks, recommendations focused on proper sewage disposal and its regulation.

In this outbreak, the link to the large number of wholesalers and retailers suggests that the oyster contamination preceded distribution and probably occurred in the oyster beds. In addition, harvest sites were 12–15 miles from the nearest community sewage outlet, recreational boating was infrequent in December, commercial boating traffic was infrequent because of the shallow depth of the water, and all oil rigs were considered to have had adequate sewage facilities. The only known source of caliciviruses, such as that implicated in this outbreak, is feces from ill persons. Therefore, based on these considerations, the probable source of human sewage found in the implicated waterways was oyster harvesters, who admitted to routinely

Gastroenteritis — Continued

discharging their sewage overboard, despite recent recommendations in Louisiana for proper sewage collection and disposal (*6*; LOPH, unpublished data, 1997).

In previous outbreak investigations, molecular tracebacks generally identified a single strain from a single source. A distinguishing feature of this outbreak was its protracted duration and involvement of three geographically separate harvest sites, each associated with a unique strain of calicivirus. These characteristics suggest a contributory role for different oyster harvesters who were concurrently infected with genetically distinct strains of calicivirus, and each of whom dumped their sewage in different waterways, possibly when environmental conditions (e.g., low water temperatures and decreased salinity) facilitated contamination of oysters with caliciviruses.

Findings in this investigation underscore some of the inadequacies in both the current sewage-disposal practices of oyster harvesting vessels and the oyster tagging system designed to reduce the risk for and magnitude of oyster-associated gastroenteritis outbreaks. Oyster-related outbreaks of viral gastroenteritis probably will continue unless seafood regulators and the oyster industry develop, adopt, and enforce standards for the proper disposal of human sewage from oyster harvesting vessels. Traceback investigations of oysters in outbreaks such as this are difficult because of the prevalence of mislabeling in wholesalers' records and on oyster tags and because harvest identification numbers cannot be consistently traced to harvesters. In this investigation, the inability to accurately trace many of the contaminated oysters hampered efforts to contain the outbreak and prevent recurrences and caused a recall of more products than may have been necessary.

Prevention of oyster-related outbreaks of gastroenteritis requires intensified efforts to 1) develop and enforce laws for appropriate sewage containers on oyster harvesting boats with dump-pumpout stations at docks, 2) educate workers in the oyster industry about the consequences of improper sewage disposal, 3) improve recordkeeping by oyster harvesters, wholesalers, and retailers to enhance the reliability of traceback investigations, and 4) further assess the relation between environmental conditions and contamination of oysters.

References

1. Murphy AM, Grohmann GS, Christopher PJ, Lopez WA, Davey GR, Millsom RH. An Australia-wide outbreak of gastroenteritis from oysters caused by Norwalk virus. Med J Aust 1979; 2:329–33.
2. Gill ON, Cubitt WD, McSwiggan DA, Watney BM, Bartlett CL. Epidemic of gastroenteritis caused by oysters contaminated with small round structured viruses. Br Med J [Clin Res] 1983; 287:1532–4.
3. Gunn RA, Janowski HT, Lieb S, Prather EC, Greenberg HB. Norwalk virus gastroenteritis following raw oyster consumption. Am J Epidemiol 1982;115:348–51.
4. Estes MK, Atmar RL, Hardy ME. Norwalk and related diarrhea viruses in clinical virology. New York, New York: Churchill Livingstone, 1997:1073–95.
5. Dowell SF, Groves C, Kirkland KB, et al. A multistate outbreak of oyster-associated gastroenteritis: implications for interstate tracing of contaminated shellfish. J Infect Dis 1995;171: 1497–503.
6. Kohn MA, Farley TA, Ando T, et al. An outbreak of Norwalk virus gastroenteritis associated with eating raw oysters: implications for maintaining safe oyster beds. JAMA 1995;273:466–71.

Progress Toward Poliomyelitis Eradication — Western Pacific Region, January 1, 1996–September 27, 1997

In 1988, the World Health Assembly adopted the goal of global poliomyelitis eradication by 2000 (*1*), which was endorsed in each of the six regions of the World Health Organization (WHO) (*2*). In the Western Pacific Region (WPR), where the last known case of polio associated with isolation of wild poliovirus occurred in March 1997, the reported number of cases decreased from 5963 in 1990 to 197 in 1996. This report documents progress toward polio eradication in WPR from January 1, 1996, through September 27, 1997, in countries where polio is endemic (Cambodia, China, Laos, Papua New Guinea, Philippines, and Vietnam) or recently was endemic (Malaysia and Mongolia) (*3–6*) and describes the routine and supplemental vaccination activities necessary to interrupt wild poliovirus transmission in the region.

Routine Vaccination Coverage

In all 36 WPR countries, oral poliovirus vaccine (OPV) is used for routine vaccination of infants. In 1996, regional coverage with three doses of OPV (OPV3) by age 1 year was 95% (country-specific range: 57%–96%), an increase compared with the year-specific coverage during 1993, 1994, and 1995 (92%, 92%, and 93%, respectively). During 1993–1996, routine OPV3 coverage increased substantially in Laos (from 26% to 68%), Cambodia (36% to 76%), and Papua New Guinea (46% to 57%).

National or Sub-National Immunization Days

Supplementary vaccination activities to interrupt widespread poliovirus circulation began in WPR during 1990 with Subnational Immunization Days (SNIDs)* in People's Republic of China. Except for Malaysia and Papua New Guinea, National Immunization Days (NIDs) have been conducted for at least 3 years in all countries where polio is endemic or recently was endemic, including Cambodia, China, Laos, Mongolia, Philippines, and Vietnam; Papua New Guinea is conducting its first full NIDs in 1997. Each year during NIDs, an estimated 105 million children (80%–95% of the target population) in WPR received two doses of OPV.

High-Risk Response Immunizations

The goal of high-risk response immunizations (HRRIs)† (similar to mopping-up activities in other regions) is to eliminate remaining focal reservoirs of wild poliovirus. Following the importation of four polio cases associated with wild poliovirus from Myanmar into Yunnan Province (China) during November 1995–April 1996, two rounds of HRRIs were conducted in the affected border area of Yunnan during March–April 1996.

Based on surveillance data, the last focus of wild poliovirus transmission in WPR is in the Mekong River and Tonle Sap Lake areas of Cambodia and Vietnam. Wild poliovirus was identified in those areas until early 1997 despite reported high

*Mass campaigns over a short period (days to weeks) during which two doses of OPV are administered to all children in the target age group (usually 0–4 years) regardless of previous vaccination history, with an interval of 4–6 weeks between doses.

†Planned mass vaccination campaigns over a short period (days to weeks) in response to ongoing poliovirus transmission in which two doses of oral poliovirus vaccine are administered to all children in the target group (usually 0–4 years) regardless of previous vaccination history, with an interval of 4–6 weeks between doses, and providing these doses by going house-to-house and boat-to-boat to reach those children that have not been reached previously by routine or supplemental vaccination activities.

Poliomyelitis Eradication — Continued

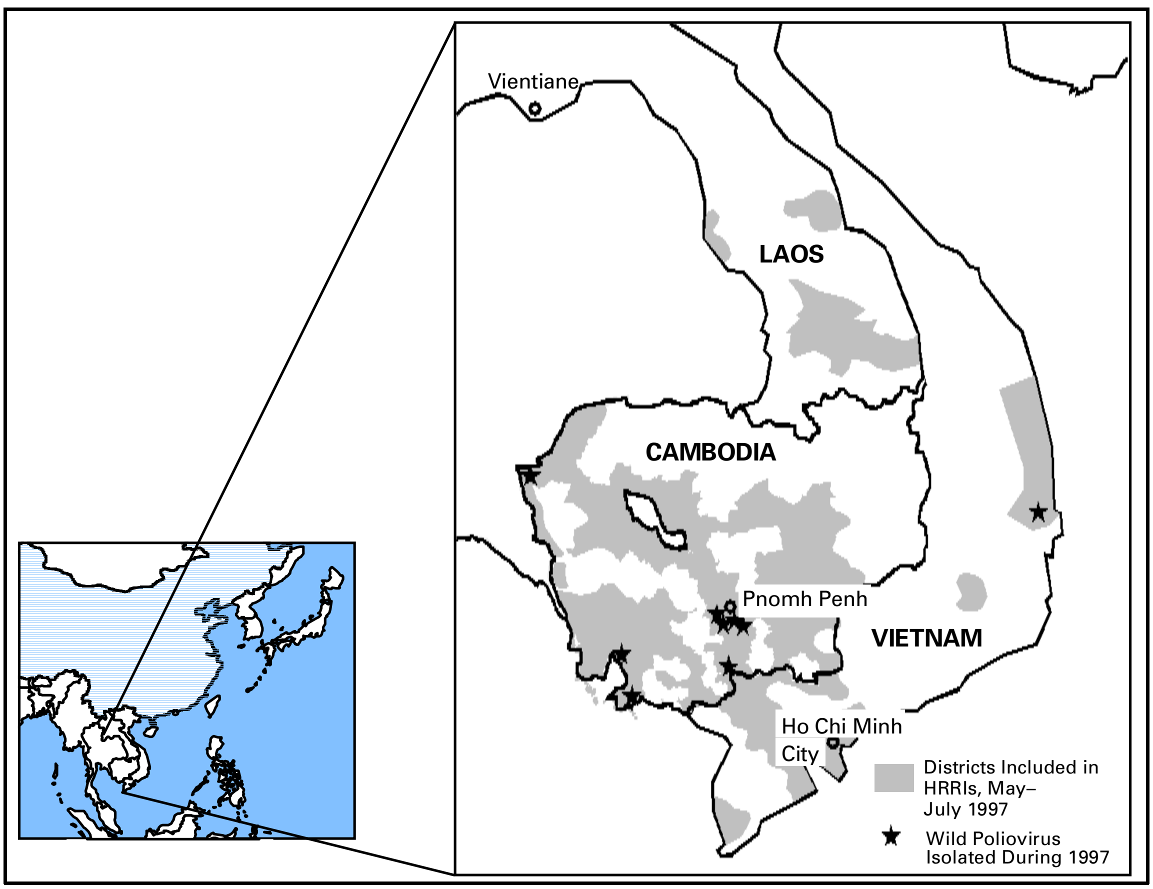
supplemental vaccination coverage in both countries. To interrupt wild poliovirus transmission in these areas, HRRIs were conducted in Cambodia, Laos, and Vietnam during May–July 1997 (Figure 1).

Surveillance

In WPR, 5291 cases of acute flaccid paralysis (AFP) were reported with onset in 1996 (nonpolio AFP rate of 1.2 per 100,000 [Table 1]). Two adequate stool specimens were obtained from 79% of AFP cases, and at least one specimen was collected from 94%. Of the 5291 cases, 197 were identified as polio based on clinical (176 cases) and virologic (21) classification criteria[§]. Of the 21 wild poliovirus-associated cases, 17 were in children in Cambodia and Vietnam (near the lower Mekong River and its delta), one was in a child in southern Laos, and three were in children from Myanmar who were taken to hospitals in Yunnan Province.

[§]In 1996 and 1997, virologic classification criteria were used by China and Vietnam; all other countries used clinical criteria.

FIGURE 1. Areas targeted for high-risk response immunizations (HRRIs)* and location of wild poliovirus isolations — Cambodia, Laos, and Vietnam, 1997



*Planned mass vaccination campaigns over a short period (days to weeks) in response to ongoing poliovirus transmission in which two doses of oral poliovirus vaccine are administered to all children in the target group (usually 0–4 years) regardless of previous vaccination history, with an interval of 4–6 weeks between doses, and providing these doses by going house-to-house and boat-to-boat to reach those children that have not been reached previously by routine or supplemental vaccination activities.

TABLE 1. Number of reported cases of acute flaccid paralysis (AFP) and confirmed poliomyelitis and key surveillance indicators among countries with AFP surveillance, by country and year — Western Pacific Region (WPR), World Health Organization, January 1, 1996–September 27, 1997

	1996					1997				
				No. confirmed polio cases					No. confirmed polio cases	
Country	No. AFP cases reported	AFP with adequate specimens*	Nonpolio AFP ratio†	Clinical	Wild virus associated	No. AFP cases reported	AFP with adequate specimens	Nonpolio AFP rate§	Clinical	Wild virus associated
Cambodia	134	50%	0.9	84	15	112	73%	1.7	40	8
China	4372	83%	1.4	3	3	3033	86%	1.3	0	0
Laos	41	41%	0.9	21	1	55	80%	3.3	2	0
Malaysia	32	34%	0.3	3	0	37	32%	0.5	0	0
Mongolia	19	62%	1.5	0	0	10	70%	1.0	0	0
Papua New Guinea	14	9%	0.5	4	0	15	13%	0.8	3	0
Philippines	175	41%	0.3	80	0	253	49%	1.0	54	0
Vietnam	495	81%	1.7	2	2	276	84%	1.3	1	1
Pacific island countries¶**	6	0	0.7	0	0	4	0	0.6	0	0
Others**	3	33%	0	0	0	1	100%	0	0	0
Total	**5291**	**79%**	**1.2**	**197**	**21**	**3796**	**82%**	**1.1**	**100**	**9**

*Two stool specimens collected 24–48 hours apart within 14 days of paralysis onset.
† Per 100,000 children aged <15 years.
§ Annualized nonpolio AFP rate.
¶ These countries have been grouped together for reporting purposes.
**Countries of WPR where polio is not endemic or has not been recently endemic.

Poliomyelitis Eradication — Continued

As of September 27, 1997, a total of 3796 cases of AFP were reported with onset in 1997 in WPR (projected annual nonpolio AFP rate of 1.1 per 100,000); two adequate stool specimens were collected for 82% of these. Nine of the 3796 AFP cases have been confirmed as polio by isolation of wild poliovirus; eight of these nine confirmed cases (including the last wild poliovirus-associated case) were in children in the same areas of Cambodia as children with confirmed cases in 1996, and the ninth was in a child from Vietnam (Figure 1). During 1996–1997, all virus-confirmed polio cases (except for two of the imported cases in China, which were type 3) were associated with wild poliovirus type 1.

All countries in WPR where polio was recently endemic (except for Papua New Guinea) have reached or exceeded the WHO-established minimum rate of AFP, which indicates a sensitive surveillance system (i.e., ≥1 nonpolio AFP case per 100,000 children aged <15 years). Except for Papua New Guinea, the percentage of AFP cases for which specimens were adequate (i.e., two specimens collected within 14 days of onset of paralysis) is projected to be ≥60% by the end of 1997 for all countries where polio recently was endemic; this indicator is ≥80% in China, Laos, and Vietnam.

Laboratory Network

The regional polio laboratory network consists of 13 laboratories (10 national laboratories, two regional reference laboratories, and one specialized reference laboratory) (*7*). In addition, there are 30 provincial laboratories in China. A passing score (≥80%) was achieved by six of the 10 network laboratories that underwent proficiency testing during 1997 and by 29 of the 30 provincial laboratories in China during 1996. From 1995 to 1997, the average interval from onset of paralysis to reporting of results of intratypic differentiation of isolates (vaccine-related versus wild poliovirus) improved throughout the region (e.g., in China from 127 days to 81 days and in Cambodia from 211 days to 46 days). Genomic sequencing data are available from all recent isolates of wild poliovirus.

Certification of Polio Eradication

The Regional Commission for the Certification of Poliomyelitis Eradication in WPR was convened April 15–16, 1996. To be certified, a WPR country must demonstrate evidence consistent with the absence of wild poliovirus for 3 years; all countries where polio is endemic must demonstrate that high-quality AFP surveillance has been maintained. National certification committees and a special subregional committee for the Pacific island countries will compile the documentation needed for certification for each country. Those countries that have been polio-free for an extended period (i.e., >5 years) also must demonstrate a capacity to respond to detected importation of wild poliovirus.

Reported by: Expanded Program on Immunization and Poliomyelitis Eradication Unit, Regional Office for the Western Pacific, World Health Organization, Manila, Philippines. Global Program for Vaccines and Immunization, World Health Organization, Geneva, Switzerland. Respiratory and Enteric Viruses Br, Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases; Polio Eradication Activity, National Immunization Program, CDC.

Editorial Note: WPR is likely to be the second WHO region (following the Western Hemisphere [WHO Region of the Americas] [*8*]) to eliminate the last remaining chains of wild poliovirus transmission. This progress was accomplished by conducting high-quality NIDs, SNIDs, and HRRIs; sustaining and further improving already high levels

Poliomyelitis Eradication — Continued

of routine vaccination in China, Malaysia, Mongolia, Philippines, and Vietnam; dramatically improving low levels of routine vaccination in Cambodia, Laos, and Papua New Guinea during 1993–1996; and establishing sensitive systems for surveillance. The quality of surveillance has improved in all countries where polio is endemic and is expected to reach the levels necessary for certification.

Enhanced surveillance and timely availability of laboratory results have been critical to identify and target intense vaccination activities to the last areas with known or suspected circulation of wild poliovirus. Detailed and timely information about AFP cases is available to program managers, and wherever wild poliovirus transmission is suspected or confirmed, rapid action has been taken. The mapping of key surveillance data (i.e., distribution of "polio-compatible" AFP cases) and detailed vaccination coverage information were essential in identifying high-risk areas for HRRIs in Cambodia, Laos, and Vietnam in 1997.

The governments of WPR countries have provided the largest share of the resources needed for polio eradication in the region. In addition, essential technical and financial support has been provided by WHO; United Nations Children's Fund (UNICEF); and other partner agencies, especially Rotary International, the government of Japan through JICA, the government of Australia through AusAID, and the U.S. government through CDC.

Seven months have elapsed since wild poliovirus was last detected in WPR. For the region to be certified as polio-free by 2000, there can be no new cases of indigenous wild poliovirus in 1998 and beyond. This goal probably will be met because 1) polio eradication continues to be given high priority in the countries concerned; 2) by the end of 1997, six rounds of high-quality supplementary vaccination will have been conducted in the areas with known transmission during the previous 14 months, with additional rounds planned for early 1998; and 3) all countries are now approaching or exceeding the level of AFP surveillance needed to ensure confidence in their reports of polio-free status and required for certification. Sustaining the momentum needed to achieve and maintain regional and global certification requires the continuation of high-quality surveillance, external funding, national priority of polio eradication in participating countries, and rapid progress in the global eradication initiative.

References

1. World Health Assembly. Global eradication of poliomyelitis by the year 2000. Geneva, Switzerland: World Health Organization, 1988. (Resolution no. WHA41.28).
2. Regional Committee for the Western Pacific, World Health Organization. Eradication of poliomyelitis by 1995. Manila, Philippines: World Health Organization, Regional Committee for the Western Pacific, 1988. (Resolution no. WPR/RC39.R15).
3. CDC. Progress toward global eradication of poliomyelitis, 1995. MMWR 1996;45:565–8.
4. CDC. Progress toward poliomyelitis eradication—People's Republic of China, 1990–1994. MMWR 1994;43:857–9.
5. CDC. Progress toward poliomyelitis eradication—Socialist Republic of Vietnam, 1991–1993. MMWR 1994;43:387–91.
6. CDC. National immunization days and status of poliomyelitis eradication—Philippines, 1993. MMWR 1994;43:6–9,13.
7. CDC. Status of the global laboratory network for poliomyelitis eradication, 1994–1996. MMWR 1997;46:692–4.
8. CDC. Certification of poliomyelitis eradication—the Americas, 1994. MMWR 1994;43:720–22.

Surveillance for Fetal Alcohol Syndrome Using Multiple Sources — Atlanta, Georgia, 1981–1989

Fetal alcohol syndrome (FAS) is caused by heavy alcohol consumption during pregnancy and is characterized by specific anomalies of the face; prenatal and postnatal growth deficits; and a variety of central nervous system (CNS) abnormalities, including mental retardation (*1*). Children with either full or partial FAS* often incur severe and costly secondary disabilities (*2*). Despite the importance of surveillance for establishing the magnitude of FAS and in monitoring trends in the occurrence of this disease, population-based surveillance for FAS has been difficult because the syndrome can be diagnosed only by clinical observation and often is not recognized until after the child reaches school age. Although most FAS surveillance has been based on diagnoses among newborns (*3*), most (89%) cases (full FAS and partial FAS) are diagnosed after the age of 6 years (*2*). To develop a more accurate estimate of the prevalence of FAS in a defined population, in 1997 CDC linked data from the Metropolitan Atlanta Congenital Defects Program (MACDP) and the Metropolitan Atlanta Developmental Disabilities Surveillance Program (MADDSP) for children born in Atlanta during 1981–1989 (the most recent birth year for which data were available for 3–10-year-olds). This report presents a multiple-source method for FAS surveillance that is more complete than previous methods and that enables comparison of rates between states.

MACDP monitors infants born to residents of five metropolitan Atlanta counties. Infants reported to MACDP may have any of approximately 200 specific major anomalies, including FAS. Abstractors visit all birth hospitals, neonatal intensive-care units, and genetics clinics to identify and document possible cases. MADDSP identifies children aged 3–10 years living in the same five metropolitan Atlanta counties who have either mental retardation, cerebral palsy, hearing impairment, or vision impairment. The affected children are primarily enrolled in public special education programs or are receiving other special services. This study included any child born to a resident of metropolitan Atlanta during 1981–1989 who had been assigned a code for FAS or possible FAS by either system based on hospital or school-record abstractions performed by surveillance personnel.

Hospital records for all children with possible FAS were reviewed to determine maternal alcohol use during pregnancy; children's weight, length, or head circumference at various ages; and whether any facial anomalies were noted. Cognitive test results from the MADDSP database were used to identify functional CNS impairment. Criteria based on those of the Institute of Medicine (IOM) were used to categorize children as having full FAS, partial FAS, or not having FAS (*1*). In this analysis, the category "partial FAS" included the IOM categories of "partial FAS" and "alcohol-related neurodevelopmental disorder." The number of live-born infants was obtained from Georgia birth certificate files, which indicated that 285,538 children were born to residents of metropolitan Atlanta during 1981–1989.

*Full FAS=all four of the following criteria: 1) confirmed maternal alcohol exposure; 2) characteristic facial anomalies (e.g., short palpebral fissures, smooth philtrum, and thin upper lip); 3) growth retardation; and 4) structural central nervous system abnormalities (e.g., microcephaly). Partial FAS=1, 2, and either 3, 4, or 5) a pattern of cognitive or behavioral abnormalities. Alcohol-related neurodevelopmental disorder=1 and either 3, 4, or 5 (*1*).

Fetal Alcohol Syndrome — Continued

During 1981–1989, MACDP and MADDSP combined identified 92 children with possible FAS: MACDP uniquely identified 50 (54%) of these possible cases; MADDSP uniquely identified 31 (34%); and both registries identified 11 (12%). Hospital records were available for 91 of the children and their mothers; of these children, clinical signs and symptoms in 70 (77%) met the case definition for an alcohol-related diagnosis; signs and symptoms in 29 (32%) children met the case definition for full FAS and in 41 (45%), for partial FAS. The observed prevalence of full FAS was 1.0 cases per 10,000 live-born infants, and the observed prevalence of both full and partial FAS was 2.5 cases per 10,000.

To estimate the completeness of case ascertainment, a capture-recapture analysis was used (*4*). This approach estimates the total number of cases (T) from overlapping samples of observed cases that are independently identified by two different sources. The analysis indicated that the observed 29 cases of full FAS accounted for approximately 64% of the estimated total number of cases (T=45)[†]; the estimated prevalence was 1.6 cases per 10,000 (95% confidence interval [CI]=0.9–2.2). The observed 70 cases of combined full and partial FAS accounted for approximately 48% of the estimated total number of cases (T=146). The estimated prevalence derived from capture-recapture analysis was 5.1 cases of full and partial FAS per 10,000 (95% CI=3.0–7.2). During 1981–1989, prevalence of full or full and partial FAS remained stable.

Reported by: Fetal Alcohol Syndrome Prevention Section, Developmental Disabilities Br, and Birth Defects and Genetic Diseases Br, Div of Birth Defects and Developmental Disabilities, National Center for Environmental Health, CDC.

Editorial Note: The findings in this report indicate that, based on case confirmations conducted in 1997, the observed prevalence of full FAS among children born in Atlanta during 1981–1989 was 1.0 cases per 10,000 live-born infants and 2.5 per 10,000 for both full and partial FAS. These rates are similar to those recently reported by active surveillance systems in nine states participating in the National Birth Defects Prevention Network (range: 0.3–4.2 cases per 10,000) (*5*). Two other states have used linkage of multiple data sources to calculate prevalences of full FAS. In Alaska, the range of rates for races other than American Indian/Alaskan Native during 1977–1992 was comparable to the rate in this report (*6*). Unpublished results from the birth defects surveillance system in Colorado also indicated a similar prevalence for FAS among children born during 1989–1993 (L. Miller, M.D., Colorado Department of Public Health and Environment, personal communication, 1997).

The advantages of using existing multiple data sources to calculate the prevalence of FAS are the feasibility of the method and more complete casefinding. Because of the use of existing data sources, the method is less costly than establishing a new surveillance program or actively ascertaining cases by examining a representative selection of the members of a community. In addition, compared with single-source methods (e.g., counting *International Classification of Diseases* [ICD] codes on newborn hospital discharges), linkage of data sources improves completeness of ascertainment. This completeness can then be further assessed by capture-recapture methods. Use of a uniform case definition, rather than relying on hospital ICD-coded

[†] $T=[(R + 1)(S + 1)/(C + 1)]-1$. Variance $(T)=(R + 1)(S + 1)\,N1N2 / [(C + 1)^2 (C + 2)]$. The 95% confidence interval of $(T)=T \pm 1.96 \sqrt{Variance\,(T)}$, where R=the number identified by system 1, S=the number identified by system 2, C=the number identified by both systems, N1=the number uniquely identified by system 1, and N2=the number uniquely identified by system 2.

Fetal Alcohol Syndrome — Continued

cases of FAS, also enables comparisons of findings from different surveillance systems. To further improve the comparability of different surveillance systems, each clinical criterion of the FAS definition should be standardized.

The findings in this report are subject to at least three limitations. First, because procedures to identify children with FAS did not include a confirmatory physical examination by a dysmorphologist, the validity of this surveillance system could not be formally analyzed. Second, the observed FAS prevalence documented in Atlanta is considered to be a minimum prevalence because of underdiagnosis of FAS, insufficient documentation of the criteria, and loss to follow-up or death before FAS could be diagnosed. The children identified with FAS whose diagnoses were confirmed are most likely those who were more severely affected, a finding supported by the higher rate of completeness of capture for full FAS than for full and partial FAS. Third, the prevalence derived using the capture-recapture method probably is an underestimate because of some "positive dependence" between the two surveillance systems (*7*) (i.e., children identified by MACDP may have had an increased likelihood of being identified by MADDSP because a child already identified as having FAS probably is more likely to have cognitive evaluations and to enter special education).

The approach and analysis used in this report can be employed by other health jurisdictions in conducting surveillance for FAS. Surveillance is necessary to monitor patterns of FAS and the impact of prevention efforts. For many states, birth defect registries are an existing data source that can be used to develop multiple-source surveillance systems for FAS. Thirty-one states now operate birth defects registries (either active or passive), and five states have recently been funded by CDC to establish multiple-source FAS registries.

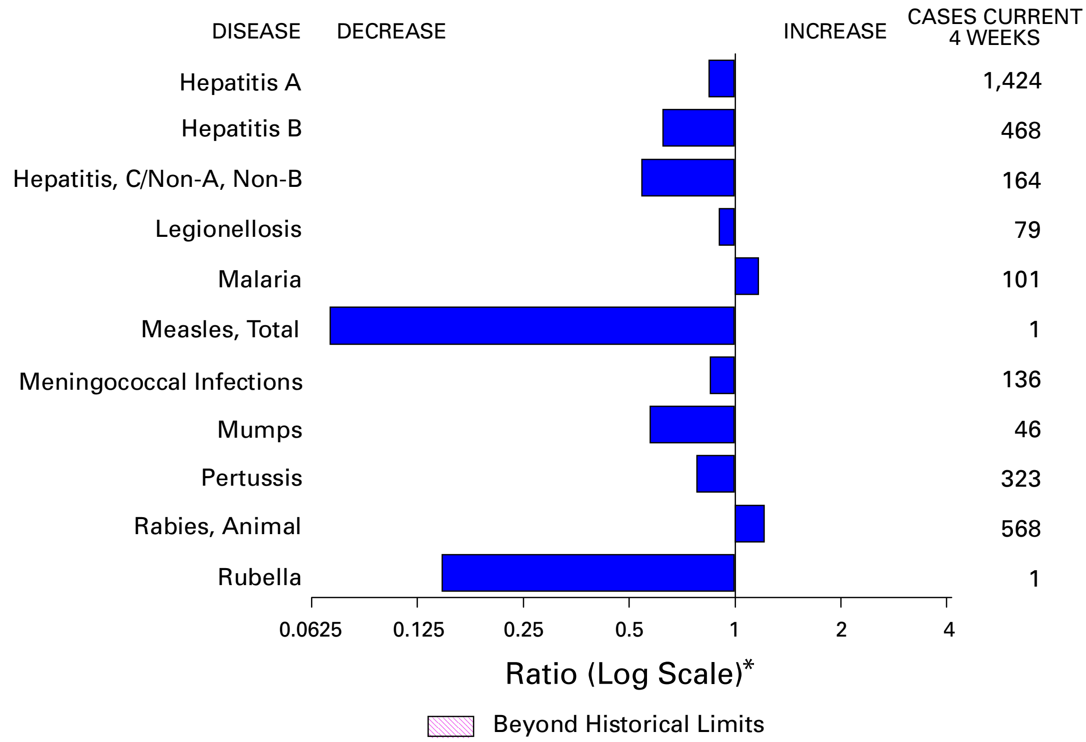
References

1. Stratton K, Howe C, Battaglia F. Fetal alcohol syndrome: diagnosis, epidemiology, prevention, and treatment. Washington, DC: National Academy Press, 1996.
2. Streissguth AP, Barr HM, Kogan J, Bookstein FL. Understanding the occurrence of secondary disabilities in clients with fetal alcohol syndrome (FAS) and fetal alcohol effects (FAE). Seattle, Washington: University of Washington Publication Services, 1996.
3. CDC. Update: trends in fetal alcohol syndrome—United States, 1979–1993. MMWR 1995;44: 249–51.
4. Stroup DF. Special analytic issues. In: SM Teutsch, RE Churchill, eds. Principles and practice of public health surveillance. New York, New York: Oxford University Press, 1994:136–49.
5. National Birth Defects Prevention Network. Birth defects surveillance data from selected states. Teratology 1997;56:115–72.
6. Egeland GM, Perham-Hester KA, Gessner BD, Ingle D, Berner J, Middaugh JP. Fetal alcohol syndrome in Alaska, 1977–1992: an administrative prevalence derived from multiple data sources. Am J Public Health 1998 (in press).
7. Brenner H. Use and limitations of the capture-recapture method in disease monitoring with two dependent sources. Epidemiology 1995;6:42–8.

Erratum: Vol. 46, No. 46

In the box, "World AIDS Day—December 1, 1997," on page 1085, and asterisk footnote to the article "Update: Perinatally Acquired HIV/AIDS—United States, 1997," on page 1086, the commercial telephone number for CDC's National AIDS Clearinghouse was incorrect. The correct number is (301) 519-*0459*.

FIGURE I. Selected notifiable disease reports, comparison of provisional 4-week totals ending November 22, 1997, 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 November 22, 1997 (47th Week)

	Cum. 1997		Cum. 1997
Anthrax	-	Plague	3
Brucellosis	70	Poliomyelitis, paralytic¶	1
Cholera	9	Psittacosis	38
Congenital rubella syndrome	4	Rabies, human	2
Cryptosporidiosis*	1,770	Rocky Mountain spotted fever (RMSF)	383
Diphtheria	5	Streptococcal disease, invasive Group A	1,251
Encephalitis: California*	110	Streptococcal toxic-shock syndrome*	29
eastern equine*	7	Syphilis, congenital**	525
St. Louis*	14	Tetanus	41
western equine*	-	Toxic-shock syndrome	118
Hansen Disease	99	Trichinosis	8
Hantavirus pulmonary syndrome*†	16	Typhoid fever	316
Hemolytic uremic syndrome, post-diarrheal*	58	Yellow fever	-
HIV infection, pediatric*§	197		

-: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 October 28, 1997.
¶One suspected case of polio with onset in 1997 has also been reported to date.
**Updated from reports to the Division of STD Prevention, NCHSTP.

TABLE II. Provisional cases of selected notifiable diseases, United States, weeks ending November 22, 1997, and November 23, 1996 (47th Week)

Reporting Area	AIDS		Chlamydia		*Escherichia coli* O157:H7		Gonorrhea		Hepatitis C/NA,NB	
					NETSS[†]	PHLIS[§]				
	Cum. 1997*	Cum. 1996	Cum. 1997	Cum. 1996	Cum. 1997	Cum. 1997	Cum. 1997	Cum. 1996	Cum. 1997	Cum. 1996
UNITED STATES	49,050	59,765	419,339	385,425	2,180	1,449	260,921	288,556	2,825	3,166
NEW ENGLAND	2,112	2,534	15,921	15,605	189	118	5,284	5,777	51	93
Maine	50	42	906	838	17	-	61	50	-	-
N.H.	35	85	725	685	12	14	83	147	8	7
Vt.	32	18	385	357	8	3	46	42	2	24
Mass.	734	1,248	6,699	6,292	102	86	1,955	1,963	34	56
R.I.	133	158	1,687	1,678	10	-	375	452	7	6
Conn.	1,128	983	5,519	5,755	40	15	2,764	3,123	-	-
MID. ATLANTIC	15,008	16,340	55,104	53,021	131	46	34,146	38,673	317	273
Upstate N.Y.	2,274	2,273	N	N	91	-	5,552	6,760	241	218
N.Y. City	8,026	8,715	28,847	25,391	11	7	13,187	12,341	-	3
N.J.	2,903	3,258	8,604	11,317	29	24	6,619	8,115	-	-
Pa.	1,805	2,094	17,653	16,313	N	15	8,788	11,457	76	52
E.N. CENTRAL	3,578	4,612	62,847	77,233	387	264	38,510	53,403	461	438
Ohio	724	1,019	17,838	18,830	101	49	11,196	13,717	18	33
Ind.	462	495	8,258	8,926	77	40	5,415	5,889	11	8
Ill.	1,523	2,078	9,826	21,416	66	31	4,772	15,164	72	84
Mich.	641	779	18,840	18,652	143	100	13,531	14,183	360	313
Wis.	228	241	8,085	9,409	N	44	3,596	4,450	-	-
W.N. CENTRAL	964	1,419	27,653	28,589	519	393	12,286	13,825	147	87
Minn.	177	269	5,551	4,494	226	198	1,974	1,881	4	4
Iowa	93	80	3,943	3,960	115	73	1,018	1,077	32	38
Mo.	452	741	10,800	11,285	53	66	6,717	7,812	96	22
N. Dak.	13	12	623	901	15	12	44	32	3	-
S. Dak.	8	12	1,134	1,313	28	32	129	165	-	-
Nebr.	84	88	2,100	2,566	59	-	866	990	3	8
Kans.	137	217	3,502	4,070	23	12	1,538	1,868	9	15
S. ATLANTIC	12,066	14,817	81,859	45,730	200	128	81,165	84,689	247	180
Del.	194	247	1,276	1,148	5	4	1,117	1,325	-	1
Md.	1,741	2,150	6,766	U	24	12	11,849	10,120	18	4
D.C.	895	1,132	N	N	2	-	4,011	4,082	-	-
Va.	1,011	1,027	10,417	10,582	N	41	7,819	8,336	24	16
W. Va.	112	103	2,658	2,049	N	1	848	723	16	9
N.C.	761	831	16,663	U	68	34	16,523	17,026	47	46
S.C.	698	715	11,326	U	9	7	10,416	10,380	37	28
Ga.	1,468	2,069	10,978	11,197	41	-	12,844	16,657	U	-
Fla.	5,186	6,543	21,775	20,754	43	29	15,738	16,040	105	76
E.S. CENTRAL	1,749	2,071	29,154	29,185	94	39	29,342	32,488	313	533
Ky.	319	362	5,695	6,053	30	-	3,662	3,853	12	29
Tenn.	684	726	11,518	12,201	46	39	10,090	10,880	218	371
Ala.	456	569	7,764	7,583	14	-	10,852	12,217	11	7
Miss.	290	414	4,177	3,348	4	-	4,738	5,538	72	126
W.S. CENTRAL	5,206	6,241	54,857	47,592	67	16	36,297	33,241	459	346
Ark.	193	245	2,296	1,591	9	5	3,953	3,656	10	8
La.	899	1,335	9,098	6,680	6	3	8,862	7,225	213	194
Okla.	256	245	6,665	6,703	10	5	4,328	4,379	7	1
Tex.	3,858	4,416	36,798	32,618	42	3	19,154	17,981	229	143
MOUNTAIN	1,409	1,790	21,690	23,631	233	136	7,585	6,838	433	526
Mont.	36	34	999	1,124	24	-	41	34	21	18
Idaho	48	36	1,470	1,373	35	23	133	93	63	96
Wyo.	13	6	542	547	16	12	47	39	217	171
Colo.	332	461	1,896	3,260	82	57	2,038	1,283	35	62
N. Mex.	145	154	2,838	3,579	7	6	1,031	811	52	72
Ariz.	348	535	10,501	9,692	N	28	3,518	3,360	25	69
Utah	119	172	1,589	1,412	58	-	249	262	5	19
Nev.	368	392	1,855	2,644	11	10	528	956	15	19
PACIFIC	6,958	9,940	70,254	64,839	360	306	16,306	19,622	397	690
Wash.	576	637	8,405	8,389	116	131	1,759	1,887	24	50
Oreg.	261	438	4,499	4,851	76	83	672	772	3	8
Calif.	6,004	8,665	54,472	48,833	156	82	13,098	16,143	230	432
Alaska	37	30	1,330	1,139	12	3	329	395	-	3
Hawaii	80	170	1,548	1,627	N	7	448	425	140	197
Guam	2	4	193	335	N	-	27	61	-	6
P.R.	1,714	2,014	U	U	41	U	499	595	141	140
V.I.	86	17	N	N	N	U	-	-	-	-
Amer. Samoa	-	-	-	-	N	U	-	-	-	-
C.N.M.I.	1	-	N	N	N	U	17	11	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 October 28, 1997.

[†]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 November 22, 1997, and November 23, 1996 (47th Week)

Reporting Area	Legionellosis		Lyme Disease		Malaria		Syphilis (Primary & Secondary)		Tuberculosis		Rabies, Animal
	Cum. 1997	Cum. 1996	Cum. 1997	Cum. 1996	Cum. 1997	Cum. 1996	Cum. 1997	Cum. 1996	Cum. 1997	Cum. 1996	Cum. 1997
UNITED STATES	918	993	9,630	14,256	1,585	1,492	7,229	10,455	15,306	17,519	7,183
NEW ENGLAND	72	67	2,799	3,899	78	70	119	169	397	372	1,132
Maine	2	2	8	53	1	8	2	-	11	19	206
N.H.	7	4	38	46	8	3	-	1	15	14	43
Vt.	12	5	8	23	2	8	-	-	5	1	109
Mass.	23	27	335	258	29	25	59	70	231	185	250
R.I.	11	29	380	479	7	8	2	4	31	27	34
Conn.	17	N	2,030	3,040	31	18	56	94	104	126	490
MID. ATLANTIC	194	220	5,530	8,790	391	432	334	475	2,797	3,242	1,526
Upstate N.Y.	62	67	2,221	4,075	61	78	34	67	333	407	1,121
N.Y. City	9	19	89	391	223	257	79	129	1,468	1,674	U
N.J.	20	14	1,354	1,949	77	65	119	163	616	668	174
Pa.	103	120	1,866	2,375	30	32	102	116	380	493	231
E.N. CENTRAL	272	321	91	406	125	161	615	1,499	1,406	1,791	174
Ohio	118	101	56	27	18	13	187	562	228	280	114
Ind.	45	50	29	30	16	14	148	194	132	166	13
Ill.	14	31	6	10	39	78	66	411	709	913	19
Mich.	81	97	-	20	39	40	128	166	247	341	28
Wis.	14	42	U	319	13	16	86	166	90	91	-
W.N. CENTRAL	71	59	143	210	58	42	157	320	486	446	431
Minn.	3	10	111	106	28	19	13	38	133	98	55
Iowa	12	10	8	18	10	2	8	23	45	59	143
Mo.	32	17	17	46	11	10	105	217	210	180	23
N. Dak.	2	-	-	1	3	1	-	-	12	8	69
S. Dak.	2	2	1	-	1	-	-	-	10	17	62
Nebr.	15	15	2	5	1	3	5	10	17	21	2
Kans.	5	5	4	34	4	7	26	32	59	63	77
S. ATLANTIC	118	154	695	663	325	282	2,946	3,471	3,017	3,221	2,884
Del.	11	11	69	170	5	4	20	35	18	36	54
Md.	24	32	460	332	81	80	836	648	287	263	558
D.C.	4	7	9	3	19	8	102	117	91	123	5
Va.	25	37	61	49	64	53	220	359	275	282	625
W. Va.	N	N	10	11	1	5	3	9	49	50	82
N.C.	14	12	32	63	18	28	662	978	375	460	838
S.C.	8	6	2	6	18	12	333	360	242	315	173
Ga.	1	3	7	1	46	27	490	627	545	585	298
Fla.	30	46	45	28	73	65	280	338	1,135	1,107	251
E.S. CENTRAL	46	48	72	75	32	38	1,480	2,260	1,038	1,231	259
Ky.	7	9	9	26	8	10	123	143	138	210	27
Tenn.	31	19	39	20	8	14	673	776	357	422	143
Ala.	4	5	10	8	10	6	380	503	387	385	84
Miss.	4	15	14	21	6	8	304	838	156	214	5
W.S. CENTRAL	36	23	89	111	54	60	1,101	1,604	2,194	2,216	317
Ark.	-	1	25	22	5	1	130	231	171	182	54
La.	6	2	3	6	13	7	331	455	198	200	5
Okla.	7	10	26	22	8	-	112	167	154	154	103
Tex.	23	10	35	61	28	52	528	751	1,671	1,680	155
MOUNTAIN	61	51	21	8	64	58	189	141	435	564	177
Mont.	1	1	-	-	2	7	-	-	17	18	46
Idaho	2	-	4	1	-	-	1	4	13	7	-
Wyo.	1	7	5	3	2	7	-	2	2	6	31
Colo.	17	9	6	-	29	24	14	24	75	77	24
N. Mex.	3	2	1	1	8	2	16	7	53	79	12
Ariz.	12	19	2	-	11	7	144	83	202	214	50
Utah	18	6	1	1	3	5	5	2	27	51	6
Nev.	7	7	2	2	9	6	9	19	46	112	8
PACIFIC	48	50	190	94	458	349	288	516	3,536	4,436	283
Wash.	8	6	10	17	46	22	9	9	225	252	-
Oreg.	-	-	18	19	24	23	9	9	137	154	14
Calif.	39	38	160	57	378	291	268	495	2,969	3,784	246
Alaska	-	1	2	-	3	3	1	-	66	65	23
Hawaii	1	5	-	1	7	10	1	3	139	181	-
Guam	-	1	-	-	-	-	3	3	13	76	-
P.R.	-	-	-	-	5	2	217	194	164	182	63
V.I.	-	1	-	-	-	1	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	-	9	1	2	-	-

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

TABLE III. Provisional cases of selected notifiable diseases preventable by vaccination, United States, weeks ending November 22, 1997, and November 23, 1996 (47th Week)

Reporting Area	*H. influenzae,* invasive		Hepatitis (Viral), by type				Measles (Rubeola)					
			A		B		Indigenous		Imported†		Total	
	Cum. 1997*	Cum. 1996	Cum. 1997	Cum. 1996	Cum. 1997	Cum. 1996	1997	Cum. 1997	1997	Cum. 1997	Cum. 1997	Cum. 1996
UNITED STATES	937	910	25,390	26,210	7,937	8,877	-	71	-	55	126	491
NEW ENGLAND	56	32	579	386	135	195	-	11	-	8	19	16
Maine	5	-	59	22	6	2	-	-	-	1	1	-
N.H.	9	11	32	20	15	17	-	1	-	-	1	-
Vt.	3	1	13	12	7	12	-	-	-	-	-	2
Mass.	34	18	224	182	48	76	-	10	-	6	16	12
R.I.	3	2	126	22	14	10	-	-	-	-	-	-
Conn.	2	-	125	128	45	78	-	-	-	1	1	2
MID. ATLANTIC	126	189	1,730	1,784	1,186	1,274	-	18	-	8	26	37
Upstate N.Y.	33	46	322	406	279	306	-	2	-	3	5	11
N.Y. City	32	49	634	554	406	449	-	8	-	2	10	11
N.J.	42	55	246	339	200	260	-	3	-	-	3	3
Pa.	19	39	528	485	301	259	-	5	-	3	8	12
E.N. CENTRAL	143	163	2,506	2,344	806	985	-	6	-	3	9	20
Ohio	81	85	290	693	79	114	-	-	-	-	-	5
Ind.	14	13	296	326	88	127	-	-	-	-	-	-
Ill.	33	47	598	684	192	310	-	6	-	1	7	3
Mich.	14	9	1,185	459	406	350	-	-	-	2	2	3
Wis.	1	9	137	182	41	84	U	-	U	-	-	9
W.N. CENTRAL	59	38	1,984	2,379	423	481	-	12	-	5	17	23
Minn.	44	23	191	129	42	59	-	3	-	5	8	18
Iowa	7	4	433	311	41	66	-	-	-	-	-	1
Mo.	4	8	987	1,259	292	283	-	1	-	-	1	3
N. Dak.	-	-	10	135	4	2	-	-	-	-	-	-
S. Dak.	2	1	21	42	1	5	-	8	-	-	8	-
Nebr.	1	1	101	143	15	37	-	-	-	-	-	-
Kans.	1	1	241	360	28	29	-	-	-	-	-	1
S. ATLANTIC	156	165	1,883	1,251	1,157	1,211	-	1	-	13	14	11
Del.	-	2	30	20	6	9	-	-	-	-	-	1
Md.	55	58	201	220	169	154	-	-	-	2	2	2
D.C.	-	5	32	36	29	32	-	-	-	1	1	-
Va.	13	9	211	171	115	130	-	-	-	1	1	3
W. Va.	4	10	11	15	16	30	-	-	-	-	-	-
N.C.	21	24	187	163	235	313	-	-	-	2	2	2
S.C.	4	5	99	50	90	91	-	-	-	1	1	-
Ga.	32	34	559	149	126	32	-	-	-	1	1	2
Fla.	27	18	553	427	371	420	-	1	-	5	6	1
E.S. CENTRAL	45	25	560	1,182	639	828	-	-	-	-	-	2
Ky.	6	6	68	51	34	75	-	-	-	-	-	-
Tenn.	25	9	343	741	413	464	-	-	-	-	-	2
Ala.	14	9	81	186	72	71	-	-	-	-	-	-
Miss.	-	1	68	204	120	218	-	-	-	-	-	-
W.S. CENTRAL	48	38	5,364	5,257	1,147	1,123	-	3	-	5	8	26
Ark.	1	-	207	438	59	77	-	-	-	-	-	-
La.	13	4	219	180	160	140	-	-	-	-	-	-
Okla.	29	29	1,326	2,236	46	24	-	-	-	1	1	-
Tex.	5	5	3,612	2,403	882	882	-	3	-	4	7	26
MOUNTAIN	84	51	3,975	4,076	819	1,054	-	6	-	2	8	157
Mont.	-	1	69	110	12	16	-	-	-	-	-	-
Idaho	1	1	123	224	46	86	-	-	-	-	-	1
Wyo.	4	-	37	33	38	44	-	-	-	-	-	1
Colo.	14	15	384	455	141	120	-	-	-	-	-	7
N. Mex.	9	10	330	337	239	390	-	-	-	-	-	17
Ariz.	30	17	2,123	1,546	189	219	-	5	-	-	5	8
Utah	3	7	527	969	87	94	-	-	-	1	1	118
Nev.	23	-	382	402	67	85	U	1	U	1	2	5
PACIFIC	220	209	6,809	7,551	1,625	1,726	-	14	-	11	25	199
Wash.	5	4	588	683	70	94	-	1	-	1	2	38
Oreg.	30	29	346	816	100	121	-	-	-	-	-	14
Calif.	171	168	5,716	5,906	1,424	1,484	-	11	-	8	19	45
Alaska	7	6	32	44	21	15	-	-	-	-	-	63
Hawaii	7	2	127	102	10	12	-	2	-	2	4	39
Guam	-	-	-	7	3	1	U	-	U	-	-	-
P.R.	-	2	251	225	1,336	926	-	-	-	-	-	3
V.I.	-	-	-	35	-	39	U	-	U	-	-	-
Amer. Samoa	-	-	-	-	-	-	U	-	U	-	-	-
C.N.M.I.	6	10	1	1	34	5	U	1	U	-	1	-

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

*Of 211 cases among children aged <5 years, serotype was reported for 112 and of those, 47 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 November 22, 1997, and November 23, 1996 (47th Week)

	Meningococcal Disease		Mumps			Pertussis			Rubella		
Reporting Area	Cum. 1997	Cum. 1996	1997	Cum. 1997	Cum. 1996	1997	Cum. 1997	Cum. 1996	1997	Cum. 1997	Cum. 1996
UNITED STATES	2,851	2,941	16	539	633	138	4,641	5,854	-	157	221
NEW ENGLAND	179	128	-	9	1	7	815	1,383	-	1	27
Maine	17	12	-	-	-	1	7	48	-	-	-
N.H.	15	7	-	-	-	1	124	141	-	-	-
Vt.	4	4	-	-	-	2	214	192	-	-	2
Mass.	87	56	-	2	1	3	428	940	-	1	21
R.I.	19	14	-	6	-	-	16	30	-	-	-
Conn.	37	35	-	1	-	-	26	32	-	-	4
MID. ATLANTIC	294	316	3	51	83	10	338	519	-	31	13
Upstate N.Y.	66	82	-	9	24	1	123	301	-	4	5
N.Y. City	42	46	-	3	18	-	59	50	-	27	5
N.J.	63	64	1	6	4	-	9	31	-	-	2
Pa.	123	124	2	33	37	9	147	137	-	-	1
E.N. CENTRAL	407	414	2	66	118	12	409	699	-	5	3
Ohio	153	142	1	31	41	1	151	254	-	-	-
Ind.	51	56	-	12	8	1	55	78	-	-	-
Ill.	124	121	-	12	22	8	85	154	-	2	1
Mich.	47	43	1	11	44	2	46	51	-	-	2
Wis.	32	52	U	-	3	U	72	162	U	3	-
W.N. CENTRAL	211	211	-	17	20	34	451	375	-	-	-
Minn.	34	25	-	6	6	10	268	291	-	-	-
Iowa	45	46	-	9	2	21	90	19	-	-	-
Mo.	90	80	-	-	9	2	61	38	-	-	-
N. Dak.	2	4	-	-	2	-	2	1	-	-	-
S. Dak.	5	10	-	-	-	-	5	4	-	-	-
Nebr.	15	21	-	2	-	1	12	9	-	-	-
Kans.	20	25	-	-	1	-	13	13	-	-	-
S. ATLANTIC	517	560	9	78	103	13	414	613	-	83	91
Del.	5	2	-	-	-	-	1	24	-	-	-
Md.	42	56	-	7	33	-	114	245	-	-	-
D.C.	9	5	-	-	-	-	3	3	-	1	1
Va.	57	56	8	18	16	9	51	98	-	1	2
W. Va.	17	16	-	-	-	-	6	2	-	-	-
N.C.	87	68	-	10	20	3	115	97	-	59	77
S.C.	54	58	-	11	7	1	28	42	-	19	1
Ga.	100	126	-	10	3	-	13	19	-	-	-
Fla.	146	173	1	22	24	-	83	83	-	3	10
E.S. CENTRAL	218	215	2	27	20	2	126	194	-	-	2
Ky.	45	28	-	3	-	1	54	140	-	-	-
Tenn.	81	59	1	6	1	1	37	21	-	-	-
Ala.	73	79	-	9	4	-	27	24	-	-	2
Miss.	19	49	1	9	15	-	8	9	-	-	N
W.S. CENTRAL	272	302	-	60	48	18	244	145	-	4	8
Ark.	31	32	-	1	1	-	60	8	-	-	-
La.	47	57	-	14	13	1	19	9	-	-	1
Okla.	39	37	-	-	1	17	46	19	-	-	-
Tex.	155	176	-	45	33	-	119	109	-	4	7
MOUNTAIN	169	169	-	54	24	21	1,064	515	-	6	6
Mont.	9	9	-	-	-	-	19	34	-	-	-
Idaho	10	23	-	3	-	-	573	101	-	1	2
Wyo.	4	4	-	1	1	-	7	8	-	-	-
Colo.	45	39	-	3	4	10	285	219	-	-	2
N. Mex.	28	25	N	N	N	11	109	62	-	-	-
Ariz.	41	36	-	32	1	-	35	32	-	5	1
Utah	15	16	-	8	3	-	18	21	-	-	-
Nev.	17	17	U	7	15	U	18	38	U	-	1
PACIFIC	584	626	-	177	216	21	780	1,411	-	27	71
Wash.	79	91	-	19	21	18	356	651	-	5	15
Oreg.	116	114	N	N	N	-	19	60	-	-	1
Calif.	380	406	-	131	162	3	378	664	-	14	52
Alaska	2	9	-	4	3	-	14	3	-	-	-
Hawaii	7	6	-	23	30	-	13	33	-	8	3
Guam	1	4	U	1	10	U	-	-	U	-	-
P.R.	10	12	-	7	1	-	1	3	-	-	-
V.I.	-	-	U	-	2	U	-	-	U	-	-
Amer. Samoa	-	-	U	-	-	U	-	-	U	-	-
C.N.M.I.	-	-	U	4	-	U	-	-	U	-	-

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

TABLE IV. Deaths in 122 U.S. cities,* week ending November 22, 1997 (47th Week)

Reporting Area	All Causes, By Age (Years)						P&I[†] Total
	All Ages	>65	45-64	25-44	1-24	<1	
NEW ENGLAND	556	393	104	39	8	12	40
Boston, Mass.	168	105	40	11	5	7	11
Bridgeport, Conn.	34	28	2	4	-	-	3
Cambridge, Mass.	12	7	4	-	-	1	1
Fall River, Mass.	39	35	4	-	-	-	4
Hartford, Conn.	48	32	10	3	1	2	1
Lowell, Mass.	21	15	4	2	-	-	5
Lynn, Mass.	18	14	2	2	-	-	1
New Bedford, Mass.	27	23	2	2	-	-	-
New Haven, Conn.	31	20	9	1	1	-	1
Providence, R.I.	U	U	U	U	U	U	U
Somerville, Mass.	5	2	3	-	-	-	-
Springfield, Mass.	50	34	11	4	-	1	7
Waterbury, Conn.	30	22	4	3	1	-	2
Worcester, Mass.	73	56	9	7	-	1	4
MID. ATLANTIC	2,293	1,601	467	164	34	27	116
Albany, N.Y.	54	32	20	1	-	1	6
Allentown, Pa.	20	17	2	1	-	-	2
Buffalo, N.Y.	60	39	17	2	1	1	3
Camden, N.J.	32	21	6	3	1	1	1
Elizabeth, N.J.	26	19	6	1	-	-	-
Erie, Pa.	42	33	7	2	-	-	4
Jersey City, N.J.	49	36	9	4	-	-	6
New York City, N.Y.	1,203	851	231	90	18	13	49
Newark, N.J.	68	30	28	7	3	-	1
Paterson, N.J.	37	21	13	-	2	1	-
Philadelphia, Pa.	300	198	63	30	2	7	13
Pittsburgh, Pa.§	45	29	11	2	1	2	4
Reading, Pa.	21	18	1	2	-	-	1
Rochester, N.Y.	131	104	17	6	3	1	9
Schenectady, N.Y.	25	22	2	1	-	-	1
Scranton, Pa.	35	27	5	1	2	-	2
Syracuse, N.Y.	103	76	20	6	1	-	11
Trenton, N.J.	28	17	7	4	-	-	3
Utica, N.Y.	14	11	2	1	-	-	-
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	2,285	1,577	419	176	55	58	129
Akron, Ohio	54	37	11	1	1	4	-
Canton, Ohio	38	29	6	3	-	-	4
Chicago, Ill.	386	231	81	44	13	17	30
Cincinnati, Ohio	118	87	17	10	1	3	13
Cleveland, Ohio	129	84	24	15	3	3	4
Columbus, Ohio	211	147	39	13	8	4	19
Dayton, Ohio	144	106	26	5	5	2	7
Detroit, Mich.	210	126	46	27	8	3	4
Evansville, Ind.	59	48	9	1	-	1	1
Fort Wayne, Ind.	66	47	17	2	-	-	4
Gary, Ind.	8	3	3	2	-	-	-
Grand Rapids, Mich.	66	52	10	1	2	1	2
Indianapolis, Ind.	290	201	51	19	7	12	15
Lansing, Mich.	37	28	4	2	1	2	2
Milwaukee, Wis.	122	92	16	13	1	-	7
Peoria, Ill.	56	37	14	2	1	2	2
Rockford, Ill.	46	37	5	3	1	-	-
South Bend, Ind.	56	44	8	2	-	2	5
Toledo, Ohio	114	77	22	11	3	1	8
Youngstown, Ohio	75	64	10	-	-	1	2
W.N. CENTRAL	858	619	138	49	25	19	57
Des Moines, Iowa	U	U	U	U	U	U	U
Duluth, Minn.	26	22	4	-	-	-	-
Kansas City, Kans.	40	23	10	4	3	-	2
Kansas City, Mo.	114	74	22	9	1	-	5
Lincoln, Nebr.	46	36	6	2	1	1	7
Minneapolis, Minn.	247	188	37	6	7	9	26
Omaha, Nebr.	88	63	10	10	1	4	6
St. Louis, Mo.	100	65	19	11	3	2	-
St. Paul, Minn.	112	85	17	4	5	1	10
Wichita, Kans.	85	63	13	3	4	2	1
S. ATLANTIC	1,124	761	242	78	18	24	53
Atlanta, Ga.	154	90	31	17	6	10	4
Baltimore, Md.	237	157	48	19	7	6	17
Charlotte, N.C.	90	63	24	3	-	-	3
Jacksonville, Fla.	108	73	24	8	1	2	3
Miami, Fla.	101	73	20	7	-	1	-
Norfolk, Va.	50	32	13	-	2	3	2
Richmond, Va.	U	U	U	U	U	U	U
Savannah, Ga.	68	56	6	5	1	-	6
St. Petersburg, Fla.	46	32	11	2	-	1	1
Tampa, Fla.	190	141	38	9	1	-	15
Washington, D.C.	61	38	17	5	-	1	2
Wilmington, Del.	19	6	10	3	-	-	-
E.S. CENTRAL	913	648	150	73	25	15	45
Birmingham, Ala.	196	138	37	13	3	3	7
Chattanooga, Tenn.	75	52	15	4	3	1	8
Knoxville, Tenn.	76	53	11	7	3	2	7
Lexington, Ky.	64	52	6	3	-	3	5
Memphis, Tenn.	207	149	30	17	9	2	13
Mobile, Ala.	98	69	15	9	3	2	-
Montgomery, Ala.	49	35	7	5	1	1	3
Nashville, Tenn.	148	100	29	15	3	1	2
W.S. CENTRAL	1,506	1,002	294	132	38	40	74
Austin, Tex.	79	53	18	5	1	2	4
Baton Rouge, La.	34	25	7	2	-	-	-
Corpus Christi, Tex.	46	38	7	-	-	1	3
Dallas, Tex.	204	144	34	14	6	6	6
El Paso, Tex.	58	39	9	6	1	3	5
Ft. Worth, Tex.	100	64	19	9	4	4	2
Houston, Tex.	415	256	86	47	16	10	26
Little Rock, Ark.	71	46	15	7	1	2	3
New Orleans, La.	107	57	25	15	4	6	-
San Antonio, Tex.	201	141	38	16	3	3	12
Shreveport, La.	81	58	16	5	-	2	6
Tulsa, Okla.	110	81	20	6	2	1	7
MOUNTAIN	817	567	146	66	23	14	44
Albuquerque, N.M.	95	72	10	5	7	1	1
Boise, Idaho	40	29	6	2	1	2	-
Colo. Springs, Colo.	54	44	7	2	-	1	3
Denver, Colo.	U	U	U	U	U	U	U
Las Vegas, Nev.	139	78	35	20	4	1	6
Ogden, Utah	27	24	2	1	-	-	3
Phoenix, Ariz.	174	118	31	16	5	4	18
Pueblo, Colo.	22	14	6	2	-	-	2
Salt Lake City, Utah	131	91	20	11	4	5	6
Tucson, Ariz.	135	97	29	7	2	-	5
PACIFIC	1,711	1,185	326	123	45	32	152
Berkeley, Calif.	15	11	2	2	-	-	-
Fresno, Calif.	68	45	13	6	2	2	7
Glendale, Calif.	15	12	1	2	-	-	1
Honolulu, Hawaii	74	51	15	7	1	-	4
Long Beach, Calif.	73	58	11	2	2	-	19
Los Angeles, Calif.	239	158	56	14	7	4	8
Pasadena, Calif.	23	13	7	2	1	-	3
Portland, Oreg.	171	121	29	12	5	4	5
Sacramento, Calif.	187	132	39	10	6	-	19
San Diego, Calif.	157	101	37	11	3	5	21
San Francisco, Calif.	113	70	21	16	2	4	13
San Jose, Calif.	252	180	45	16	5	6	28
Santa Cruz, Calif.	19	17	1	1	-	-	3
Seattle, Wash.	146	99	22	14	7	4	5
Spokane, Wash.	64	48	10	4	-	2	7
Tacoma, Wash.	95	69	17	4	4	1	9
TOTAL	12,063¶	8,353	2,286	900	271	241	710

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.

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

Weekly Notifiable Disease Morbidity Data and 122 Cities Mortality Data

Denise Koo, M.D., M.P.H.

State Support Team
Robert Fagan
Karl A. Brendel
Siobhan Gilchrist, M.P.H.
Harry Holden
Gerald Jones
Felicia Perry
Carol A. Worsham

CDC Operations Team
Carol M. Knowles
Deborah A. Adams
Willie J. Anderson
Christine R. Burgess
Patsy A. Hall
Myra A. Montalbano
Angela Trosclair, M.S.

Desktop Publishing and Graphics Support

Morie M. Higgins
Peter M. Jenkins

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/* or from CDC's file transfer protocol server at *ftp.cdc.gov*. 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.

☆U.S. Government Printing Office: 1998-633-228/67042 Region IV