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Cardiac Valvulopathy Associated with Exposure to Fenfluramine or Dexfenfluramine: U.S. Department of Health and Human Services Interim Public Health Recommendations, November 1997

Fenfluramine and dexfenfluramine are appetite suppressants that were in widespread use in the United States. On July 8, 1997, 24 cases of valvular heart disease in women who had been treated with fenfluramine and phentermine were publicly reported (*1*). Although valvular lesions were observed on both sides of the heart, a left-sided valve was affected in all cases. The histopathologic features were similar to those observed in carcinoid-induced valvular disease, a serotonin-related syndrome. Based on these data, the Food and Drug Administration (FDA) issued a public health advisory on July 8, followed by letters from FDA to 700,000 U.S. health-care practitioners and institutions requesting information about any additional similar patients (*2*). Subsequently, reports of fenfluramine- or dexfenfluramine-associated valvulopathy increased. This report summarizes the data used by FDA in its decision to request voluntary withdrawal of these drugs from the market and presents interim public health recommendations for persons exposed to these drugs.

As of September 30, FDA had received 144 individual, provider-initiated (i.e., "spontaneous") reports involving fenfluramine or dexfenfluramine, with or without phentermine, in association with valvulopathy (this total included the 24 publicly reported cases [*1*]). Minimal degrees of regurgitation (i.e., trace or mild mitral regurgitation [MR] or trace aortic regurgitation [AR]) are relatively common in the general population and are not generally considered abnormal. Therefore, in this analysis, a case of fenfluramine- or dexfenfluramine-associated cardiac valvulopathy was defined as documented AR of mild or greater severity and/or MR of moderate or greater severity after exposure to these drugs.

Of the 132 spontaneous reports with complete information, 113 (86%) met the case definition. Of these 113 cases, 111 (98%) occurred among women; the median age of case-patients was 44 years (range: 22–68 years). Of these 113 cases, two (2%) used fenfluramine alone; 16 (14%), dexfenfluramine alone; 89 (79%), a combination of fenfluramine and phentermine; and six (5%), a combination of all three drugs. None of the cases used phentermine alone. The median duration of drug use was 9 months (range: 1–39 months). Overall, 87 (77%) of the 113 cases were symptomatic. A total of 27 (24%) case-patients required cardiac valve-replacement surgery; of these, three patients died after surgery.

Cardiac Valvulopathy — Continued

Because symptoms frequently occur relatively late during the course of valvular incompetence, the prevalence of valve lesions was assessed for patients who were exposed to these drugs but who had no obvious history of cardiac disease or cardiac symptoms. In early September, FDA received echocardiographic reports from five independent, unpublished echocardiographic prevalence surveys of patients who had received dexfenfluramine or fenfluramine alone or in combination with phentermine (Table 1). Although the methodology of these surveys differed, the prevalence of valvular disease meeting the case definition was similar in all five survey populations, ranging from 30.0% to 38.3% (overall: 32.8%; 95% confidence interval=27.7%–38.9%) (Figure 1) (Division of Pharmacovigilance and Epidemiology, Center for Drug Evaluation and Research, FDA, personal communication, 1997). Where the echocardiographic diagnostic classfication was intermediate, the classification was upgraded to the higher level: for example, the classification of mild to moderate was upgraded to moderate. Downgrading of the diagnostic classification did not substantially alter the prevalence of valvulopathy that met the case definition. The duration of exposure to the drugs was determined for patients based on the time they were treated by the centers providing the prevalence survey data. Preliminary data suggest that the prevalence of valvulopathy may be higher among persons exposed for ≥6 months: for

TABLE 1. Selected characteristics of five echocardiographic prevalence surveys of persons exposed to fenfluramine or dexfenfluramine*, by reporting area, 1997

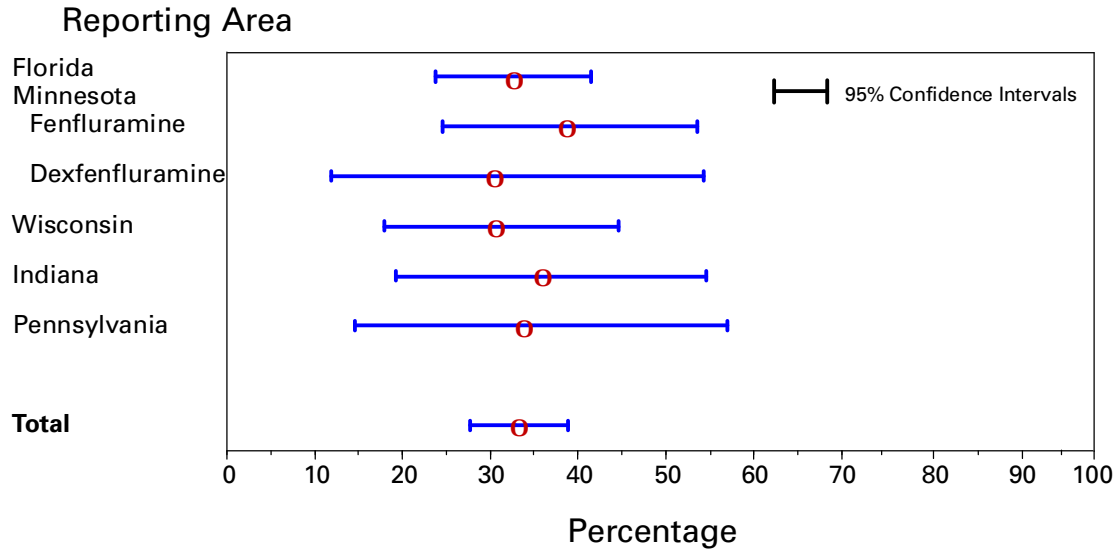
Reporting area	Sample size	% Females	Median age (yrs)	Median initial weight (lbs)	Median dose of drug(s)† (mg/d)	Median duration of exposure (mos)
Florida	115§	87%	48	190	F, 20.0 P, 30.0 D, 15.0	12
Minnesota						
Fenfluramine	47¶	85%	51	234	F, 60.0 P, 30.0	30
Dexfenfluramine	20¶	80%	46	239	D, 30.0 P, 30.0	9
Wisconsin	50§	94%	48	239	F, 60.0 P, 37.5 D, 30.0	14
Indiana	31§	77%	47	234	F, 20.0 P, 37.5 D, 15.0	6
Pennsylvania	21**	100%	48	213	F, 60.0 P, 15.0	24
Total	**284**	**87%**	**48**	**219**	**F, 40.0 P, 30.0 D, 30.0††**	**14**

*Alone or in combination with phentermine.
†D=dexfenfluramine, F=fenfluramine, and P=phentermine.
§Convenience sample.
¶Random sample.
**Complete study sample (n=19); convenience sample (n=2).
††A total of 15 persons received dexfenfluramine alone; 21, dexfenfluramine and phentermine; and 45, dexfenfluramine (with or without phentermine) and fenfluramine (with or without phentermine) sequentially.

Source: Division of Pharmacovigilance and Epidemiology, Center for Drug Evaluation and Research, FDA.

Cardiac Valvulopathy — Continued

FIGURE 1. Percentage of persons who had received fenfluramine or dexfenfluramine* who had valvulopathy — five echocardiographic prevalence surveys, 1997



*Alone or in combination with phentermine.

Source: Division of Pharmacovigilance and Epidemiology, Center for Drug Evaluation and Research, FDA.

persons with <3 months' exposure, the prevalence was 22% (five of 23 cases); for persons with 3–5 months' exposure, 22% (five of 23); and for persons with ≥6 months' exposure, 35% (83 of 236). However, some patients may have been treated with these drugs before visiting the centers; therefore, these patients may have been exposed for longer durations. Of patients with valvulopathy in these surveys, 86% had AR, and 19% had MR either alone or in combination. An audible cardiac murmur was auscultated in 17% of the patients meeting the case definition. The 32.8% overall prevalence of valvular lesions meeting the case definition in exposed persons is substantially higher than would be expected in the general population (*3*). Preliminary reports from large population-based studies of adults indicate that the prevalence of valvular regurgitation meeting the FDA case definition is an estimated ≤5% and may be lower among obese persons than among nonobese persons (*4*; R. Devereux, New York Hospital-Cornell Medical Center, personal communication, 1997). However, the results of studies specifically designed to estimate the prevalence of regurgitant valvular lesions among obese adults who have lost weight or who have not been exposed to these drugs have not yet been reported. Based on data from the five prevalence surveys, FDA requested the voluntary withdrawal of fenfluramine and dexfenfluramine from the U.S. market; on September 15, the manufacturers and FDA announced the withdrawal of the drugs.

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Cardiac Valvulopathy — Continued

Editorial Note: In 1959, FDA approved the prescription appetite suppressant phentermine (Adipex®, Fastin®, and Ionamin®) for single-drug, short-term ("a few weeks") treatment of obesity. In 1973, fenfluramine (Pondimin®) also was approved for single-drug, short-term use as a prescription appetite suppressant, and in 1996, FDA approved dexfenfluramine (the dex-isomer of fenfluramine, Redux®) as a single-drug, prescription appetite suppressant for longer term use in markedly obese persons, noting that safety beyond 1 year of use had not been established in clinical trials. Both fenfluramine and dexfenfluramine appear to act by affecting the metabolism of the neurotransmitter serotonin in the brain. Recently, fenfluramine has been widely used both in combination with phentermine ("fen-phen") and for periods longer than a few weeks. Since 1995, approximately 14 million prescriptions have been written for either fenfluramine or dexfenfluramine; most of the product use was in women and persons aged <60 years (*5*). Based on an assumed median treatment course of 3–12 months and an average prescription length of 1 month, an estimated 1.2–4.7 million persons in the United States have been exposed to these drugs.

The findings in this report indicate that a higher than expected prevalence of cardiac valvulopathy may have occurred among persons exposed to fenfluramine or dexfenfluramine. Factors potentially associated with these lesions but not yet determined are 1) the natural history of these lesions, including the relation between the development of the lesions and duration of drug use and whether the lesions generally resolve, progress, or remain unchanged when the drug is discontinued; 2) the clinical importance of mild valvulopathy in asymptomatic persons without audible murmurs; and 3) what, if any, characteristics might predispose a person to develop cardiac valve abnormalities during exposure to these drugs. Based on the preliminary data indicating a higher than expected prevalence of valvulopathy in exposed, asymptomatic persons without murmurs, history, and physical examination alone do not appear to be sufficiently sensitive to detect this valvulopathy in all exposed patients, particularly in those in whom obesity impedes auscultation of murmurs.

Patients with acquired, primarily left-sided, valvular heart disease may be at increased risk for development of bacterial endocarditis following certain invasive procedures. FDA is aware of one person whose condition met the case definition and who presented with fever and signs and symptoms of cardiac failure and, on echocardiogram, had both AR, MR, and a large endocarditic vegetation; blood cultures from this patient were positive for streptococci (H. Connolly, Mayo Clinic, personal communication, 1997). Although the degree to which patients with these valvular lesions are at risk for developing endocarditis has not yet been determined, prudent medical management of these patients should include appropriate antimicrobial prophylaxis before certain invasive procedures and should be based on 1997 American Heart Association (AHA) recommendations for preventing bacterial endocarditis (*6*).

The U.S. Department of Health and Human Services (DHHS) is issuing the following interim recommendations for persons previously exposed to fenfluramine or dexfenfluramine. These recommendations have been developed collaboratively by CDC, FDA, and the National Institutes of Health (the National Heart, Lung, and Blood Institute and the National Institute of Diabetes and Digestive and Kidney Diseases) in consultation with the American Heart Association, the American College of Cardiology, and the American Dental Association and are based on data associating exposure to these drugs (as single agents or as part of combination therapy) with

Cardiac Valvulopathy — Continued

cardiac valvulopathies. As more definitive data about the natural history of the disease become available, these DHHS interim recommendations may be revised. To determine whether valvulopathy is present in potentially affected persons and to provide such persons with optimal care, DHHS recommends that:

1. All persons exposed to fenfluramine or dexfenfluramine, for any period of time, either alone or in combination with other agents, should undergo a medical history and cardiovascular examination by their physician to determine the presence or absence of cardiopulmonary signs or symptoms.
2. An echocardiographic evaluation be performed on all persons who were exposed to fenfluramine or dexfenfluramine for any period of time, either alone or in combination with other agents, and who exhibit cardiopulmonary signs (including a new murmur) or symptoms suggestive of valvular disease (e.g., dyspnea).
3. Although the clinical importance of asymptomatic valvular regurgitation in exposed patients and the risk for developing bacterial endocarditis in these patients are unknown, practitioners should strongly consider performing echocardiography on all persons—regardless of whether they have cardiopulmonary signs or symptoms—who have been exposed to fenfluramine or dexfenfluramine for any period of time, either alone or in combination with other agents, BEFORE the patient undergoes any invasive procedure for which antimicrobial endocarditis prophylaxis is recommended by 1997 AHA guidelines. Any echocardiographic findings that meet the AHA criteria for prophylaxis—regardless of whether they are attributable to possible fenfluramine or dexfenfluramine use—should be recognized as indications for antibiotic prophylaxis. The invasive procedures include certain medical or dental procedures where antibiotic prophylaxis is recommended as defined by the 1997 AHA guidelines. For emergency procedures for which cardiac evaluation cannot be performed, empiric antibiotic prophylaxis should be administered according to the 1997 AHA guidelines.
4. Because of the prevalence of minimal degrees of regurgitation in the general population, the current case definition of drug-associated valvulopathy should include exposed patients with echocardiographically demonstrated AR of mild or greater severity and/or MR of moderate or greater severity, based on published criteria (*7*,*8*).

Optimal timing of follow-up echocardiography to determine progression, regression, or stabilization of valvular lesions is currently unknown. DHHS anticipates that within 1 year, sufficient data will become available to make recommendations about the need for continued echocardiographic monitoring. During the interim, because patients with documented valvular disease who are at risk for bacterial endocarditis should be offered antimicrobial prophylaxis after their initial echocardiogram and because no other intervention in asymptomatic patients is indicated, DHHS is not issuing recommendations for follow-up echocardiography. Practitioners should use their best judgment, based on the individual patient's history, clinical presentation, and current valvular or pulmonary hypertension status, to determine the need for additional echocardiographic follow-up.

Health-care practitioners should continue to report to FDA those patients with cardiac valvular lesions who have been exposed to fenfluramine, dexfenfluramine, phentermine, or any combination of these products. The specific information requested can be obtained from FDA's World-Wide Web site at http://www.fda.gov/cder

Cardiac Valvulopathy — Continued

(click on "What's Happening" or "Drug Information") or by calling FDA, telephone (301) 827-3172. These reports can be sent directly to FDA through FDA's MedWatch program (either by using the postage-paid MedWatch form or by fax [(800) 332-0178] or can be given over the phone [(800) 332-1088]).

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Creutzfeldt-Jakob Disease Associated with Cadaveric Dura Mater Grafts — Japan, January 1979–May 1996

In 1997, a nongovernmental surveillance group for Creutzfeldt-Jakob disease (CJD) in Japan reported to the Ministry of Health and Welfare its analysis of a 1996 mail questionnaire survey of neurologic, psychiatric, and neuropathologic institutions throughout Japan. This analysis identified 829 patients with CJD diagnosed by physicians during January 1979–May 1996, including a large number (43 patients) who had received a cadaveric dura mater graft during a neurosurgical (42) or orthopedic (one) procedure during 1979–1991. This report presents a summary of features of these 43 cases, which indicated that at least 41 of these patients had received dura mater grafts from the same processor, and describes CJD in the most recent recipient of a dura mater graft. The findings indicate that an international outbreak of CJD associated with a single brand of dura mater grafts is larger than previously recognized and that recipients of contaminated grafts may remain at risk for CJD at least 16 years following receipt of grafts.

Summary Findings

Of the 4017 institutions surveyed, 2962 (74%) responded. Follow-up investigation of the 43 CJD cases associated with dura mater grafts revealed that at least 41 (95%) persons had received a single brand of dura mater graft, LYODURA®*, processed by B. Braun Melsungen AG. The grafts had been processed before May 1987, when the company revised its procedures for collection and processing dura. The revised procedures, designed to reduce the risk for CJD transmission, included conversion from

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

Creutzfeldt-Jakob Disease — Continued

batch to individual processing of dura mater and treatment of each dura mater graft with 1.0 normal sodium hydroxide (NaOH).

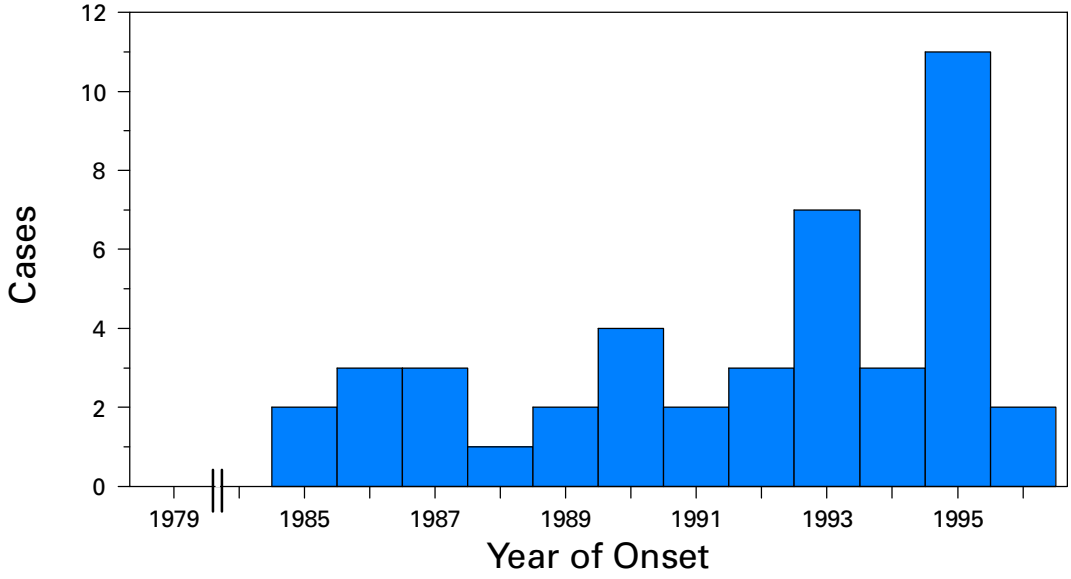
The 43 patients with CJD had onsets of illness from September 1985 to May 1996 (Figure 1). The mean (±1 standard deviation) age of the 43 patients at onset of dura mater graft-associated CJD was 53 years (±13 years) compared with a mean age at onset (63 years [±10 years]) of the other CJD cases identified in this survey ($p<0.05$); of the 43 patients who had received a dura mater graft, eight were aged <40 years at onset of CJD. The mean latency period between receipt of a dura mater graft and onset of CJD was 89 months (±44 months) (range: 16–193 months). Neuropathologic examinations were performed for 10 decedents who underwent autopsy; typical spongiform degeneration was present in the cerebral and cerebellar cortex of all 10.

Of the 43 CJD patients, 42 received their dura mater graft during 1979–1989 (Figure 2). All but one of the 42 patients were reported to have received LYODURA® that had been processed without exposure to NaOH. The brand of graft used in one patient who had undergone a neurosurgical operation in 1985 was unknown; however, LYODURA® was the only brand of dura mater graft used at the hospital. A total of 33 (77%) of the patients received their grafts during 1983–1987 (Figure 2), when an estimated 100,000 patients may have received LYODURA® in Japan. All of these 33 patients died of CJD within 12 years after receipt of the grafts (approximately 1 case of CJD per 3000 LYODURA® recipients). None of the lot numbers of the dura mater grafts used in the 43 patients could be identified.

Case Description

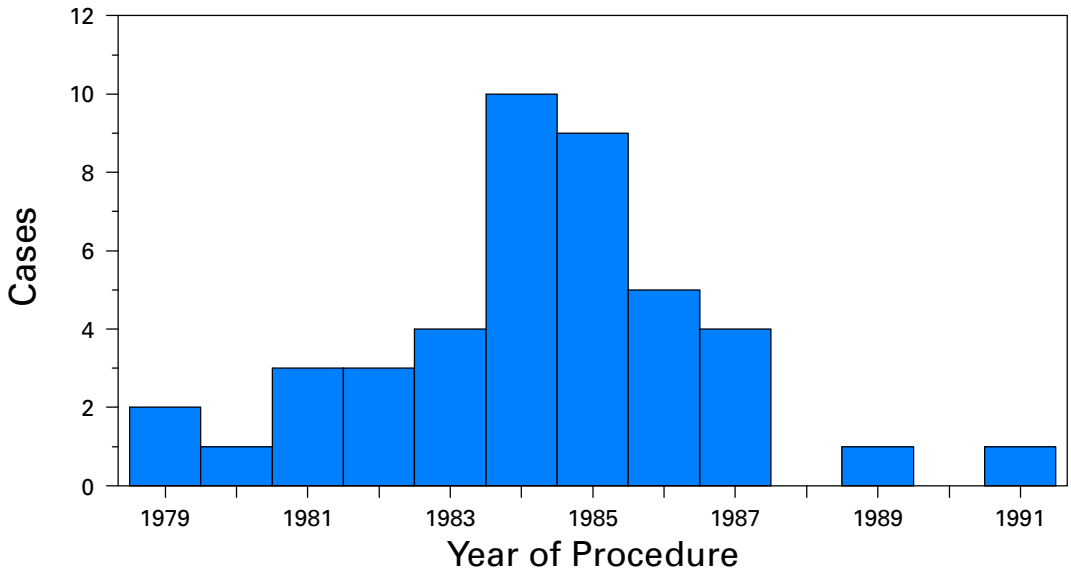
The most recent recipient of a dura mater graft among the 43 graft-associated CJD patients was a woman aged 65 years at the time of onset of CJD. She had two neurosurgical procedures in 1991 to repair a cerebral arterial aneurysm (one in September and one in October); dura mater grafts were used during both operations. In February 1994, 28 months after the second operation, she developed progressive dysphagia, dysarthria, and unsteady gait, followed within a few weeks by dementia.

FIGURE 1. Number of cases of Creutzfeldt-Jakob disease associated with dura mater grafts, by year of onset — Japan, January 1979–May 1996



Creutzfeldt-Jakob Disease — Continued

FIGURE 2. Year of neurosurgical or orthopedic procedure in the 43 cases of Creutzfeldt-Jakob disease associated with dura mater grafts — Japan, 1979–1991



In April 1995, she developed generalized myoclonic jerks and akinetic mutism. An electroencephalograph showed a 6- to 10-Hz background rhythm with the periodic synchronized slow activity complexes typical of CJD. Examination of the cerebrospinal fluid revealed a normal protein level and cell count. A magnetic resonance imaging scan showed marked cerebral and cerebellar atrophy. The patient died in October 1995, and no autopsy was performed.

Neither the brand nor year of processing of the dura mater grafts used in this patient in 1991 could be determined. However, the hospital in which both neurosurgical procedures were performed opened in 1989 and reported using only two brands of dura mater grafts in 1991, LYODURA® and Tutoplast (Pfrimmer-Viggo GmbH+Co, Erlangen, Germany). The investigation suggested that in this patient, the use of LYODURA® processed before May 1987 was unlikely but could not be ruled out.

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Editorial Note: In June 1987, after an investigation of the first reported LYODURA®-associated CJD case (*1*), CDC published a description of differences between the processing of LYODURA® and other similar products and suggested that LYODURA® may be associated with a higher risk for transmitting CJD than other dura mater products used in the United States (*2*). Also in June 1987, representatives of B. Braun Melsungen AG reported that as of May 1, 1987, their procedures for collecting and processing dura were revised to reduce the risk for CJD transmission (*3*). By including the present report from Japan, the total number of reported LYODURA®-associated CJD cases has now increased to at least 61 worldwide (*3–5*).

Despite limitations in the information about the number and subsequent vital status of recipients of LYODURA® and other dura mater grafts, the findings and

Creutzfeldt-Jakob Disease — Continued

evidence in this report strongly indicate that the LYODURA® grafts were the vehicle of transmission of the CJD agent in Japan. This evidence includes the high overall estimated incidence of CJD among the LYODURA® graft recipients and the identification, almost exclusively, of the same brand of graft produced during the same early period that had been associated with at least 21 other reported CJD cases worldwide.

In comparison with the strong evidence of CJD transmission by LYODURA® produced before May 1987, the evidence in Japan is substantially weaker for CJD transmission by a non-LYODURA® brand of graft or a LYODURA® graft produced after May 1987; such an association was reported as likely in only one CJD patient who was not unusually young. However, for this patient, the investigation cannot exclude a causal relation between disease and receipt of a graft other than LYODURA® produced before May 1987. Even stringent donor screening and processing of each dura separately to avoid possible cross-contamination may not completely eliminate the potential for an infectious graft. In addition, the treatment of dura with NaOH may not inactivate all of the infectious agent that may be present (*6*). Therefore, surgeons should be aware of the possibly inherent risk for CJD transmission by dura mater grafts and may want to consider the alternative use of autologous fascia lata, fascia temporalis, or synthetic substitutes (*4*).

The cases described in this report indicate that recipients of contaminated grafts may remain at risk for CJD at least 16 years after receiving grafts. In the United States, patients who have rapidly progressive dementing illnesses consistent with CJD and who have received an allograft should be reported through their respective local or state health departments to CDC's Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases, telephone (404) 639-3091.

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Tornado Disaster — Texas, May 1997

On May 27, 1997, multiple tornadoes swept through Williamson and Travis counties in central Texas. The tornadoes caused 32 injuries, 29 deaths, and an estimated $20 million in personal and commercial insured losses. This report summarizes the injuries and deaths associated with these tornadoes based on information from emergency department and hospital records and death certificates.

Tornado Disaster — Continued

Three tornadoes swept through the towns of Jarrell, Cedar Park, and Pedernales Valley at approximately 3:40 p.m., 4:00 p.m., and 4:50 p.m., respectively (Table 1). The first tornado, a slow-moving multivortex F-5 (Fujita Tornado Intensity Scale) (Table 2), swept a path 7.6 miles long and approximately 1320 yards wide through a residential subdivision of Jarrell, a predominantly rural town in Williamson County, destroying 30 permanent homes, eight mobile homes, and three businesses (Table 1). The second tornado (F-3) touched down in Cedar Park in Williamson County and swept a path 9.2 miles long and 250 yards wide, destroying 11 permanent homes and three businesses (Table 1). The third tornado (F-4) swept a path 5.6 miles long and 440 yards wide through Pedernales Valley, a heavily wooded area in western Travis County, destroying 15 permanent homes, three mobile homes, and two businesses (Table 1).

A total of 33 persons presented to six area hospitals for treatment of injuries sustained directly or indirectly by the three tornadoes. Of these 33 persons, 13 (39%) had multiple diagnoses. The categories of injuries included lacerations (18 [55%]), contusions (15 [46%]), abrasions (10 [30%]), strains/sprains/muscle spasms (six [18%]), fractures (two [6%]), penetrating wound (one [3%]), and closed-head injury (one [3%]). The median age of the injured persons was 38 years (range: 1–75 years). Twenty-seven persons were treated and released from area hospitals, and five were admitted;

TABLE 1. Population of towns struck by tornadoes and characteristics of injuries, deaths, damage, and each tornado, by location — Williamson and Travis counties, Texas, May 27, 1997

Population/ Characteristics	Town		
	Jarrell*	Cedar Park*	Pedernales Valley†
Estimated population	800	15,000	7,000
Persons injured			
Level of care			
Treated and released	8	14	5
Hospitalized	4	1	0
Total	**12**	**15**	**5**
Median age (yrs)	*25*	*45*	*47*
Deaths			
Cause			
Multiple trauma	26	0	0
Myocardial infarction	0	1	0
Asphyxia	1	0	0
Head injury	0	0	1
Total	**27**	**1**	**1**
Median age of decedents (yrs)	*17*	*69*	*25*
Buildings destroyed			
Permanent homes	30	11	15
Mobile homes	8	0	3
Businesses	3	3	2
Tornado characteristics			
Watch issued	12:54 pm	12:54 pm	3:31 pm
Warning issued	3:30 pm	3:30 pm	4:09 pm
Time of impact	3:40 pm	4:00 pm	4:50 pm
Intensity	F-5	F-3	F-4

*Williamson County.
†Travis County.

Tornado Disaster — Continued

TABLE 2. Fujita Tornado Intensity Scale*

Category	Description	Approximate wind speed	Examples of damage
F-0	Gale tornado	40– 72 mph	Chimney damage; broken tree limbs; small trees uprooted
F-1	Moderate tornado	73–112 mph	Roof surfaces partially removed; mobile homes overturned; moving automobiles pushed from roads
F-2	Significant tornado	113–157 mph	Roof surfaces removed; mobile homes demolished; railroad cars overtuned; large trees uprooted or split; lightweight objects thrown
F-3	Severe tornado	158–206 mph	Roofs and walls removed; trains overturned; most trees uprooted; heavy cars thrown
F-4	Devastating tornado	207–260 mph	Houses leveled; structures with foundations moved; heavy cars and large objects thrown
F-5	Incredible tornado	261–318 mph	Homes destroyed; trees debarked; cars thrown >100 yards; incredible phenomena occur

*Reference *1*.

one person died in an emergency department. Among patients admitted to the hospital, the median length of stay was 21 days (range: 1–31 days). Four persons were discharged, and one person was transferred to an inpatient rehabilitation facility.

Of the 29 tornado-related deaths, 27 (93%) occurred in Jarrell. Decedents' ages ranged from 5 to 69 years (median: 22 years), and 14 (48%) were aged <18 years; most (16 [55%]) were males. All but one death occurred at the site of the tornado. The immediate cause of death for 26 (90%) of the victims was multiple traumatic injuries; other causes of death included myocardial infarction, head injury, and asphyxia. At the time the tornadoes struck, none of the decedents were in structures with basements. In nine families, there were two or more deaths, and five members of one family were killed.

Tornado watches were issued by the National Weather Service (NWS) for Williamson County at 12:54 p.m. and Travis County at 3:31 p.m. Tornado warnings were issued for Williamson County at 3:30 p.m. and Travis County at 4:09 p.m. (Table 1). None of the three areas had tornado shelters or warning sirens. The Jarrell volunteer fire department siren was sounded when the tornado was spotted; however, this siren is not used as a tornado warning but to summon volunteers to the firehouse. Jarrell had experienced an F-3 tornado in 1989, resulting in one death and 28 injuries. Tornadoes have not been reported previously in Cedar Park or Pedernales Valley.

Reported by: Williamson County Emergency Medical Svcs; J Hobbs, J Bitts, Williamson County Justices of the Peace, Williamson County; R Bayardo, MD, Travis County Medical Examiner; Travis County Emergency Medical Svcs, Travis County; Div of Emergency Management, Texas

Tornado Disaster — Continued

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Editorial Note: During 1953–1991, the number of tornadoes and tornado-related deaths were greater in Texas than in any other state (*2,3*). However, by state-specific areas, Texas ranks ninth and Florida ranks first in number of tornadoes per 100,000 square miles (*2*). The Fujita Tornado Intensity Scale (F-0 through F-5) ranks tornadoes according to their estimated speed, damage to structures, and damage to the environment (Table 2) (*1*). Most tornadoes (60%) are weak (F-0 or F-1) and have limited injury or destruction potential (*2*). Although violent tornadoes (F-4 and F-5) are rare (1%–2%), they cause severe damage and account for approximately half of tornado-related deaths (*2*). During 1990–1996, only five tornadoes in the United States were assigned an F-5 rating (NWS, unpublished data, 1997). Previous F-5 tornadoes in Texas occurred in 1976 in Brown County and in 1973 in McLennan and Bosque counties (*2*); although no injuries or deaths were associated with either tornado in 1973, 11 nonfatal injuries were reported in the 1976 tornado (*2*). The last F-5 tornado in Texas involving deaths occurred in Lubbock in 1970 and accounted for 28 deaths and 500 injuries (*2,4*).

The risk for injury and death increases with a tornado's intensity (*3*). Factors associated with fatalities in Jarrell may have included the intensity and slow progression of the tornado and the lack of underground shelters, such as basements. In many southern states, including Texas, homes are often constructed on concrete slabs; approximately 20% have partial or full basements (*5*). NWS interviews with area residents after the tornadoes in 1997 indicated that most persons in the paths of the storms understood tornado safety and followed recommended protocols for homes without basements by seeking shelter in hallways or interior rooms (J.H. Henderson, NWS, personal communication, 1997). Survivors in the path of the Jarrell tornado were in bathrooms or in a storm cellar built by a neighbor. Survivors of the Cedar Park and Pedernales Valley tornadoes sought shelter in interior rooms or bathtubs.

NWS tornado watches and warnings are the primary method of alerting communities of an approaching tornado and are disseminated through public safety organizations, sirens, television, radio, or other electronic media (*6*). A tornado watch is issued when weather conditions indicate that a tornado may develop; a tornado warning is issued when a tornado has been sighted or detected by advanced weather technology (*6*). Weather warnings can be received directly from the NWS through the National Oceanic and Atmospheric Administration (NOAA) weather radio network. Weather radios are equipped with a battery back-up and stand-by feature that emits a high-pitched tone followed by an official NWS report. This type of radio is activated for all NWS severe weather warnings in an approximate 40-mile radius (*6*). Recent technology changes in the NOAA weather radio network includes a Specific Area Message Encoder (SAME) (*7*) that allows the NWS to alert specific counties within the 40-mile radius when severe weather is expected or ongoing. SAME will reduce the number of counties alarmed by the older weather radios for severe weather in adjacent counties. Both types of weather radios are commercially available.

Persons who attempt to outrun tornadoes in vehicles are at high risk for injury or death (*8,9*); when possible, those in high-risk areas should seek adequate shelter, preferably below ground. NWS offers the following recommendations for persons in

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areas for which tornado warnings are issued: 1) abandon vehicles and take shelter in a permanent structure or lie flat in nearby ditches or depressions; 2) in permanent homes or buildings, move to predesignated shelters, such as basements, and stay away from windows; 3) if underground shelters are unavailable, move to interior rooms or hallways on the lowest floor and get under a piece of sturdy furniture; 4) abandon mobile homes and take shelter in a permanent structure; and 5) if outside, lie flat in nearby ditches or depressions (*6*).

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Serious Hearing Impairment Among Children Aged 3–10 Years — Atlanta, Georgia, 1991–1993

Hearing impairment without appropriate intervention among young children can delay the acquisition of speech and language skills that, in turn, can result in learning and other problems at school age (*1*). Interventions to reduce the occurrence of communication disabilities associated with hearing impairment are most successful if affected children are identified early, ideally during the first few months of life (*1*). Technologies are now available to accurately and routinely screen all newborns for hearing impairment before hospital discharge (*2,3*). One of the national health objectives for the year 2000 is to reduce the average age at which children with serious hearing impairment are identified to no more than 12 months (objective 17.16) (*4*). Since 1991, CDC's Metropolitan Atlanta Developmental Disabilities Surveillance Program (MADDSP) has monitored the prevalence of serious hearing impairment

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among children aged 3–10 years in the metropolitan Atlanta area. This report presents findings from MADDSP for 1991–1993 (the most recent years for which data were available) about the age of diagnosis of serious bilateral hearing impairment among children born from 1981 through 1990 and highlights the public health intervention opportunity of universal newborn hearing screening programs for the earlier identification of and intervention for children with hearing impairment.

For surveillance purposes, MADDSP defines hearing impairment as a bilateral, pure-tone hearing loss at frequencies of 500, 1000, and 2000 Hertz averaging 40 decibels (dBs) or more, unaided, in the better ear as indicated by the results of an audiologic test. Children for whom test results are not available but for whom records include a description, by a licensed or certified audiologist or qualified physician, of a hearing loss of ≥40 dBs in their better ear also are considered to be hearing impaired. The MADDSP identifies children with serious hearing impairment by reviewing existing records at multiple sources, including the special education programs in the nine public school systems serving the surveillance area; state schools for the hearing impaired; the three pediatric specialty care hospitals and associated clinics in the area; and facilities operated by the Georgia Department of Human Resources that provide services for children with sensory, motor, or mental impairments. For all children with hearing impairments, MADDSP seeks information on type of hearing impairment (sensorineural, conductive, or mixed), level of impairment (moderate, 40–64 dBs; severe, 65–84 dBs; or profound, ≥85 dBs), and the earliest age when the children's hearing loss first met the MADDSP criteria.

During 1991–1993, an estimated 263,000 children aged 3–10 years resided in the metro-Atlanta area during each of those years. For this period, MADDSP identified 413 children (283 in 1991, 288 in 1992, and 293 in 1993) who met the surveillance case definition for hearing impairment. The average annual prevalence rate was 1.1 per 1000 children aged 3–10 years.

Approximately two thirds (283 [69%]) of the children had a sensorineural hearing loss that did not result from a postnatal cause and was presumed to be present at birth. To ensure more complete information about age at first diagnosis, additional analysis was restricted to the subgroup of these children who were born to a resident of the study area (n=173). Of these, 13 (8%) children had had their hearing impairment diagnosed during their first year of life, and 81 (47%) did not have their impairment diagnosed until they were aged ≥3 years (Figure 1). The mean age at earliest known diagnosis was 2.9 years. In general, the severity of the hearing impairment varied inversely with the child's age at diagnosis: among children with severe to profound hearing loss, the mean age at diagnosis was 2.4 years, compared with 3.6 years for children with a moderate loss. In addition, 50 (29%) of the 173 children had at least one other developmental disability (i.e., mental retardation, cerebral palsy, or vision impairment) and 17 (10%) had been very low birthweight (<3 lbs, 5 oz [<1500 g]) infants. However, very low birthweight was not statistically associated with an earlier age at diagnosis (2.6 years compared with 2.9 years for children with hearing impairment born weighing ≥3 lbs, 5 oz [≥1500 g]; p=0.7).

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Editorial Note: Based on the analysis in this report, a substantial proportion of children born with serious bilateral hearing impairment in Atlanta during 1981–1990 were

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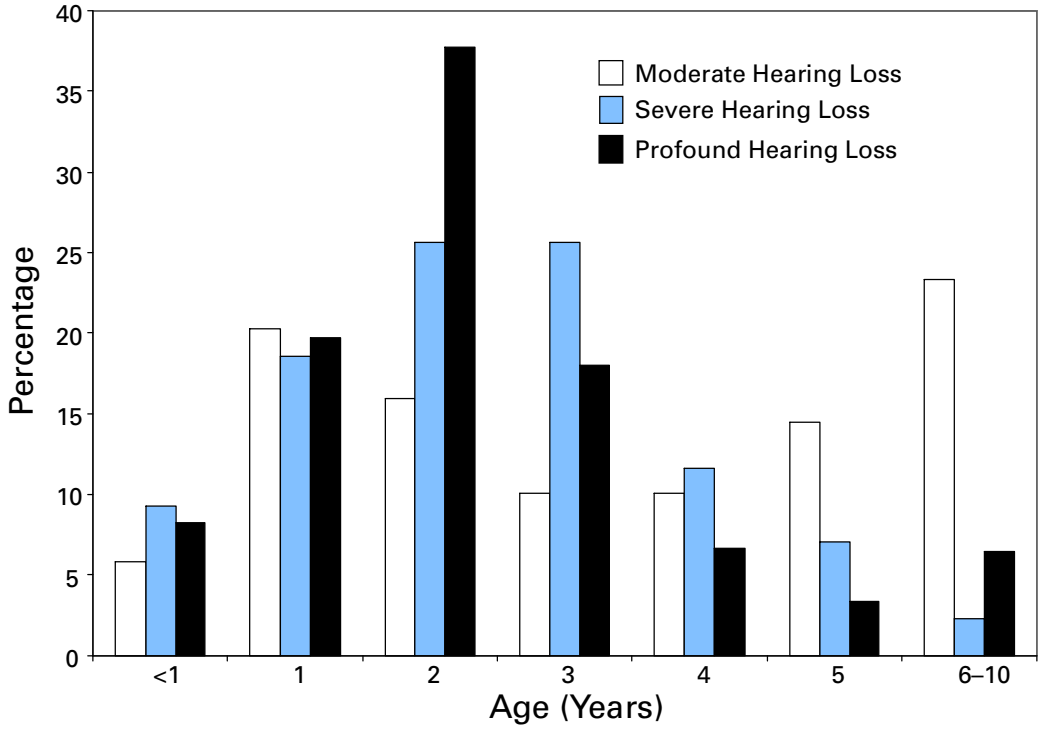
FIGURE 1. Percentage of children with presumed congenital sensorineural hearing impairment, by earliest known age at diagnosis and hearing level* — Metropolitan Atlanta Developmental Disabilities Surveillance Program, 1991–1993



*n=173.

not diagnosed at a sufficiently early age to benefit fully from intervention services to minimize delays in the acquisition of speech and language skills and, possibly, reduce the occurrence of other disabilities associated with hearing impairments. Because MADDSP focuses primarily on children with serious bilateral hearing impairment, these findings probably underestimate the actual magnitude of delayed diagnosis. Specifically, while the prevalence of hearing impairment in MADDSP is comparable to other population-based studies using similar definitions of hearing loss (*5*), studies of less severe loss (e.g., >20 dBs, including unilateral losses) have documented higher prevalence rates (3.0–5.0 per 1000 children) (*6,7*). Losses of 25–30 dB and greater are considered to interfere with the development of communication skills, even if the loss is unilateral (*1*).

The findings in this report are subject to at least two limitations. First, data were obtained from existing records that were accessible to the surveillance staff. As a result, some information relevant to a child's disability may not have been found in the records available for review. Second, the age at earliest diagnosis used by MADDSP refers to the age when the child's hearing loss first met the MADDSP case definition; this age may not be the earliest time when a less serious loss was noticed. As a result, information about the age at earliest diagnosis in the MADDSP may be inaccurate for some children.

In 1982, the Joint Committee on Infant Hearing recommended audiologic screening for infants with one or more specified risk factors (e.g., a birthweight <3 lbs 5 oz

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[<1500 g]), bacterial meningitis, and anatomic malformations of the ear) for hearing loss (*8*). However, one or more of these risk factors are present in only 50% of all children among whom substantial hearing impairment is eventually diagnosed (*1*). In Atlanta, the mean age at diagnosis for children with sensorineural hearing impairment who were born weighing <3 lbs, 5 oz (<1500 g) was similar to that for children of greater birthweight, indicating that even in some high-risk children, hearing impairment is not diagnosed until substantially after the first year of life.

The more recent recommendations, including those from the 1994 Joint Committee on Infant Hearing, specify universal newborn screening by age 3 months and the initiation of appropriate intervention by age 6 months (*9,10*). Children reported in MADDSP were born during 1981–1990, before the issuance of recommendations for universal newborn hearing screening. Some states have recently implemented universal newborn hearing screening programs while others, including Georgia, have begun planning for such services. For example, beginning in 1997, 20 hospitals in Georgia (which account for 24% of all births) are either offering or preparing to offer universal newborn hearing screening programs.

The findings in this report emphasize the public health opportunity for the early identification of and appropriate intervention for children with hearing impairment and the need for the development and evaluation of universal newborn hearing screening programs.

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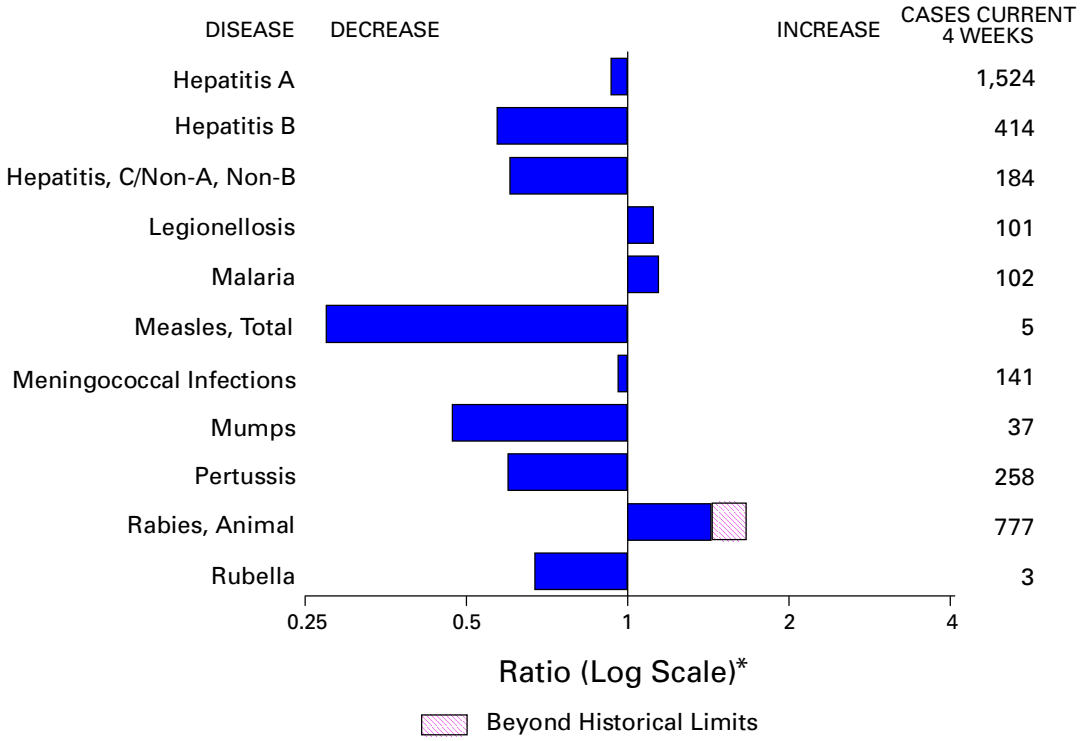
FIGURE I. Selected notifiable disease reports, comparison of provisional 4-week totals ending November 8, 1997, with historical data — United States



*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 8, 1997 (45th Week)

	Cum. 1997		Cum. 1997
Anthrax	-	Plague	3
Brucellosis	62	Poliomyelitis, paralytic	-
Cholera	8	Psittacosis	38
Congenital rubella syndrome	4	Rabies, human	2
Cryptosporidiosis*	1,642	Rocky Mountain spotted fever (RMSF)	369
Diphtheria	5	Streptococcal disease, invasive Group A	1,196
Encephalitis: California*	106	Streptococcal toxic-shock syndrome*	29
eastern equine*	7	Syphilis, congenital[¶]	445
St. Louis*	11	Tetanus	38
western equine*	-	Toxic-shock syndrome	115
Hansen Disease	91	Trichinosis	8
Hantavirus pulmonary syndrome*[†]	16	Typhoid fever	300
Hemolytic uremic syndrome, post-diarrheal*	57	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.
[¶]Updated from reports to the Division of STD Prevention, NCHSTP.

TABLE II. Provisional cases of selected notifiable diseases, United States, weeks ending November 8, 1997, and November 9, 1996 (45th 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	56,551	399,589	372,283	2,103	1,300	248,884	278,217	2,715	3,018
NEW ENGLAND	2,112	2,324	15,113	15,000	185	117	4,990	5,566	51	93
Maine	50	38	837	795	16	-	56	50	-	-
N.H.	35	73	697	655	12	14	82	144	8	7
Vt.	32	18	373	340	8	3	46	42	2	24
Mass.	734	1,132	6,409	6,025	99	85	1,886	1,885	34	56
R.I.	133	158	1,644	1,626	10	-	369	431	7	6
Conn.	1,128	905	5,153	5,559	40	15	2,551	3,014	-	-
MID. ATLANTIC	15,008	15,835	52,384	50,977	127	41	32,094	37,202	312	255
Upstate N.Y.	2,274	2,178	N	N	87	-	5,178	6,436	236	206
N.Y. City	8,026	8,644	27,406	24,910	11	6	12,415	12,094	-	3
N.J.	2,903	3,075	7,933	10,844	29	23	6,149	7,764	-	-
Pa.	1,805	1,938	17,045	15,223	N	12	8,352	10,908	76	46
E.N. CENTRAL	3,578	4,422	60,079	74,333	379	227	36,859	51,401	437	412
Ohio	724	938	17,420	18,056	102	48	10,915	13,200	17	32
Ind.	462	493	8,110	8,554	72	35	5,334	5,589	10	8
Ill.	1,523	1,980	9,382	20,903	64	-	4,540	14,972	69	81
Mich.	641	778	17,628	17,705	141	100	12,711	13,365	341	291
Wis.	228	233	7,539	9,115	N	44	3,359	4,275	-	-
W.N. CENTRAL	964	1,309	25,910	27,421	502	376	11,575	13,195	144	86
Minn.	177	259	4,507	4,494	218	185	1,606	1,881	4	4
Iowa	93	75	3,943	3,749	113	73	1,018	993	29	38
Mo.	452	667	10,309	10,849	49	63	6,438	7,413	95	22
N. Dak.	13	11	623	793	15	12	44	27	3	-
S. Dak.	8	11	1,134	1,273	28	32	129	161	-	-
Nebr.	84	87	2,074	2,359	58	-	867	936	3	7
Kans.	137	199	3,320	3,904	21	11	1,473	1,784	10	15
S. ATLANTIC	12,066	14,156	78,330	43,812	186	127	77,558	81,537	237	173
Del.	194	246	1,276	1,148	4	4	1,063	1,264	-	1
Md.	1,741	1,995	6,366	U	22	11	11,319	9,710	17	2
D.C.	895	1,116	N	N	2	-	3,729	3,928	-	-
Va.	1,011	964	9,861	9,962	N	41	7,489	8,127	24	16
W. Va.	112	101	2,534	1,895	N	1	808	705	16	9
N.C.	761	746	15,993	U	65	34	15,865	16,433	46	45
S.C.	698	715	10,901	U	8	7	10,066	9,819	36	28
Ga.	1,468	2,065	10,434	11,050	38	-	12,091	16,357	U	-
Fla.	5,186	6,208	20,965	19,757	42	29	15,128	15,194	98	72
E.S. CENTRAL	1,749	1,924	28,202	27,986	92	36	28,387	30,804	304	507
Ky.	319	345	5,466	5,852	30	-	3,548	3,685	12	28
Tenn.	684	702	11,073	11,830	45	36	9,679	10,472	215	354
Ala.	456	511	7,486	7,282	14	-	10,422	11,728	11	4
Miss.	290	366	4,177	3,022	3	-	4,738	4,919	66	121
W.S. CENTRAL	5,206	5,687	53,950	47,187	66	16	35,227	32,775	434	335
Ark.	193	226	2,072	1,582	9	5	3,466	3,555	8	8
La.	899	1,253	8,666	6,479	6	3	8,457	7,000	201	193
Okla.	256	227	6,414	6,508	9	5	4,150	4,239	7	1
Tex.	3,858	3,981	36,798	32,618	42	3	19,154	17,981	218	133
MOUNTAIN	1,409	1,639	21,308	22,565	227	133	7,432	6,613	402	506
Mont.	36	34	878	1,077	23	-	36	32	21	17
Idaho	48	34	1,416	1,329	32	22	126	92	61	94
Wyo.	13	5	519	531	16	12	45	38	191	163
Colo.	332	434	1,896	2,926	80	57	1,934	1,249	36	58
N. Mex.	145	139	2,774	3,476	7	6	1,011	791	49	69
Ariz.	348	488	10,501	9,298	N	26	3,518	3,230	25	67
Utah	119	159	1,469	1,395	58	-	234	261	5	19
Nev.	368	346	1,855	2,533	11	10	528	920	14	19
PACIFIC	6,958	9,254	64,313	63,002	339	224	14,762	19,124	394	651
Wash.	576	585	7,949	8,201	111	54	1,683	1,808	23	50
Oreg.	261	411	4,318	4,649	73	83	645	742	3	6
Calif.	6,004	8,071	49,297	47,520	144	77	11,690	15,788	228	411
Alaska	37	28	1,301	1,091	11	3	324	384	-	3
Hawaii	80	159	1,448	1,541	N	7	420	402	140	181
Guam	2	4	193	324	N	-	27	59	-	6
P.R.	1,714	2,014	U	U	39	U	495	577	135	139
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 8, 1997, and November 9, 1996 (45th 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	872	925	9,040	13,716	1,515	1,426	6,994	10,137	14,561	16,636	6,902
NEW ENGLAND	71	62	2,643	3,783	75	66	116	161	362	367	1,064
Maine	2	2	8	52	1	7	1	-	11	19	174
N.H.	7	3	38	46	8	2	-	1	15	14	37
Vt.	12	5	8	23	2	8	-	-	5	1	109
Mass.	22	25	304	232	26	24	57	67	217	183	238
R.I.	11	27	357	458	7	7	2	3	31	27	33
Conn.	17	N	1,928	2,972	31	18	56	90	83	123	473
MID. ATLANTIC	178	205	5,140	8,404	380	418	326	464	2,681	3,094	1,466
Upstate N.Y.	55	65	2,066	3,842	60	76	34	67	333	388	1,079
N.Y. City	9	19	72	381	215	249	75	127	1,382	1,596	U
N.J.	20	14	1,311	1,893	77	63	119	159	586	640	164
Pa.	94	107	1,691	2,288	28	30	98	111	380	470	223
E.N. CENTRAL	257	299	89	398	124	160	588	1,462	1,396	1,728	171
Ohio	111	95	55	24	18	13	183	544	228	255	112
Ind.	43	48	29	29	16	14	147	186	132	160	12
Ill.	14	31	5	9	39	78	64	404	699	900	19
Mich.	78	84	-	17	39	39	111	166	247	323	28
Wis.	11	41	U	319	12	16	83	162	90	90	-
W.N. CENTRAL	68	53	142	199	50	41	154	312	467	423	420
Minn.	2	8	111	95	21	19	12	38	123	94	51
Iowa	11	10	7	18	10	2	8	19	45	55	141
Mo.	31	16	17	46	10	10	103	213	204	171	23
N. Dak.	2	-	-	1	3	1	-	-	12	8	66
S. Dak.	2	2	1	-	1	-	-	-	10	17	62
Nebr.	15	12	2	5	1	2	5	10	17	21	2
Kans.	5	5	4	34	4	7	26	32	56	57	75
S. ATLANTIC	113	145	668	649	300	267	2,830	3,351	2,810	3,084	2,769
Del.	11	11	69	170	5	3	20	35	18	34	54
Md.	23	30	447	321	80	77	795	622	275	257	536
D.C.	4	7	8	3	19	8	100	114	82	122	5
Va.	24	36	57	48	64	47	213	351	254	282	598
W. Va.	N	N	9	11	1	5	3	9	48	50	82
N.C.	13	12	32	63	16	27	633	940	371	431	806
S.C.	7	6	2	6	17	12	331	351	242	302	165
Ga.	1	3	1	1	32	26	465	600	519	570	278
Fla.	29	40	43	26	66	62	270	329	1,001	1,036	245
E.S. CENTRAL	42	45	70	75	30	38	1,448	2,167	1,030	1,172	252
Ky.	7	8	8	26	8	10	120	135	138	197	27
Tenn.	28	19	38	20	7	14	650	740	357	408	138
Ala.	3	4	10	8	10	6	374	481	379	362	82
Miss.	4	14	14	21	5	8	304	811	156	205	5
W.S. CENTRAL	36	22	85	107	51	41	1,080	1,579	2,049	2,018	313
Ark.	-	1	24	22	5	-	125	229	169	169	52
La.	6	2	3	5	13	7	318	441	194	196	5
Okla.	7	9	24	22	8	-	109	158	153	149	101
Tex.	23	10	34	58	25	34	528	751	1,533	1,504	155
MOUNTAIN	60	46	20	8	62	55	187	135	423	538	177
Mont.	1	1	-	-	2	7	-	-	7	18	46
Idaho	2	-	4	1	-	-	1	4	13	7	-
Wyo.	1	7	4	3	2	7	-	2	2	6	31
Colo.	17	8	6	-	27	21	12	24	73	74	24
N. Mex.	3	2	1	1	8	2	16	7	53	77	12
Ariz.	12	18	2	-	11	7	144	79	202	197	50
Utah	17	3	1	1	3	5	5	2	27	51	6
Nev.	7	7	2	2	9	6	9	17	46	108	8
PACIFIC	47	48	183	93	443	340	265	506	3,343	4,212	270
Wash.	8	6	9	16	44	21	9	9	225	247	-
Oreg.	-	-	17	19	22	20	9	8	125	147	14
Calif.	38	37	155	57	367	286	245	486	2,792	3,583	233
Alaska	-	1	2	-	3	3	1	-	66	62	23
Hawaii	1	4	-	1	7	10	1	3	135	173	-
Guam	-	1	-	-	-	-	3	3	13	75	-
P.R.	-	-	-	-	5	2	213	184	164	182	62
V.I.	-	-	-	-	-	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 8, 1997, and November 9, 1996 (45th 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	900	882	24,238	24,852	7,496	8,421	-	69	1	55	124	485
NEW ENGLAND	55	31	562	359	121	187	-	11	-	8	19	16
Maine	5	-	52	21	6	2	-	-	-	1	1	-
N.H.	9	11	31	18	15	16	-	1	-	-	1	-
Vt.	3	1	12	11	6	12	-	-	-	-	-	2
Mass.	33	17	218	172	48	72	-	10	-	6	16	12
R.I.	3	2	126	20	14	9	-	-	-	-	-	-
Conn.	2	-	123	117	32	76	-	-	-	1	1	2
MID. ATLANTIC	121	180	1,631	1,699	1,127	1,217	-	17	-	8	25	37
Upstate N.Y.	31	44	304	390	254	292	-	2	-	3	5	11
N.Y. City	30	47	600	518	393	434	-	8	-	2	10	11
N.J.	41	50	246	323	200	241	-	2	-	-	2	3
Pa.	19	39	481	468	280	250	-	5	-	3	8	12
E.N. CENTRAL	140	157	2,307	2,229	748	940	-	7	-	3	10	20
Ohio	78	82	277	677	76	112	-	-	-	-	-	5
Ind.	14	13	265	301	80	119	-	-	-	-	-	-
Ill.	33	44	509	658	177	299	-	6	-	1	7	3
Mich.	14	9	1,123	415	376	328	-	-	-	2	2	3
Wis.	1	9	133	178	39	82	U	1	U	-	1	9
W.N. CENTRAL	56	38	1,928	2,217	400	451	-	12	-	5	17	22
Minn.	42	23	183	115	37	57	-	3	-	5	8	18
Iowa	6	4	414	307	39	65	-	-	-	-	-	-
Mo.	4	8	963	1,165	276	259	-	1	-	-	1	3
N. Dak.	-	-	10	118	4	2	-	-	-	-	-	-
S. Dak.	2	1	19	42	1	5	-	8	-	-	8	-
Nebr.	1	1	100	129	15	35	-	-	-	-	-	-
Kans.	1	1	239	341	28	28	-	-	-	-	-	1
S. ATLANTIC	144	160	1,714	1,192	1,093	1,139	-	1	1	13	14	11
Del.	-	2	30	18	6	9	-	-	-	-	-	1
Md.	51	56	198	211	159	146	-	-	-	2	2	2
D.C.	-	5	28	35	28	30	U	-	U	1	1	-
Va.	12	9	202	164	111	129	-	-	-	1	1	3
W. Va.	3	10	11	14	16	28	-	-	-	-	-	-
N.C.	21	24	176	157	215	278	-	-	-	2	2	2
S.C.	4	4	97	47	90	84	-	-	-	1	1	-
Ga.	28	32	459	149	110	32	U	-	U	1	1	2
Fla.	25	18	513	397	358	403	-	1	1	5	6	1
E.S. CENTRAL	41	25	521	1,146	582	772	-	-	-	-	-	2
Ky.	5	6	68	46	33	69	-	-	-	-	-	-
Tenn.	23	9	321	727	387	432	-	-	-	-	-	2
Ala.	13	9	78	176	64	63	-	-	-	-	-	-
Miss.	-	1	54	197	98	208	U	-	U	-	-	-
W.S. CENTRAL	47	38	5,252	4,965	1,107	1,082	-	3	-	5	8	26
Ark.	1	-	202	409	55	75	-	-	-	-	-	-
La.	13	4	218	175	147	138	-	-	-	-	-	-
Okla.	28	29	1,303	2,115	42	24	-	-	-	1	1	-
Tex.	5	5	3,529	2,266	863	845	-	3	-	4	7	26
MOUNTAIN	82	48	3,871	3,920	782	1,016	-	6	-	2	8	157
Mont.	-	1	66	106	9	15	U	-	U	-	-	-
Idaho	1	1	121	218	41	85	-	-	-	-	-	1
Wyo.	4	-	34	32	31	42	-	-	-	-	-	1
Colo.	12	14	377	407	138	114	-	-	-	-	-	7
N. Mex.	9	10	321	328	233	378	-	-	-	-	-	17
Ariz.	30	15	2,060	1,526	182	219	-	5	-	-	5	8
Utah	3	7	519	921	83	81	-	-	-	1	1	118
Nev.	23	-	373	382	65	82	U	1	U	1	2	5
PACIFIC	214	205	6,452	7,125	1,536	1,617	-	12	-	11	23	194
Wash.	5	4	577	596	65	90	-	1	-	1	2	38
Oreg.	29	27	337	780	97	92	-	-	-	-	-	13
Calif.	167	166	5,385	5,626	1,345	1,410	U	9	U	8	17	45
Alaska	6	6	27	42	19	13	U	-	U	-	-	63
Hawaii	7	2	126	81	10	12	U	2	U	2	4	35
Guam	-	-	-	7	3	1	U	-	U	-	-	-
P.R.	-	2	246	207	1,297	891	-	-	-	-	-	3
V.I.	-	-	-	32	-	35	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 202 cases among children aged <5 years, serotype was reported for 108 and of those, 45 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 8, 1997, and November 9, 1996 (45th Week)

Reporting Area	Meningococcal Disease		Mumps			Pertussis			Rubella		
	Cum. 1997	Cum. 1996	1997	Cum. 1997	Cum. 1996	1997	Cum. 1997	Cum. 1996	1997	Cum. 1997	Cum. 1996
UNITED STATES	2,772	2,828	14	507	607	76	4,367	5,420	-	155	221
NEW ENGLAND	175	122	-	9	1	4	778	1,288	-	1	27
Maine	17	11	-	-	-	-	6	44	-	-	-
N.H.	15	7	-	-	-	2	118	124	-	-	-
Vt.	4	4	-	-	-	1	206	154	-	-	2
Mass.	84	52	-	2	1	1	406	904	-	1	21
R.I.	19	13	-	6	-	-	16	30	-	-	-
Conn.	36	35	-	1	-	-	26	32	-	-	4
MID. ATLANTIC	280	292	1	46	79	6	314	430	-	30	13
Upstate N.Y.	61	78	-	9	24	-	112	242	-	3	5
N.Y. City	42	41	-	3	18	-	59	41	-	27	5
N.J.	59	58	-	5	4	-	9	29	-	-	2
Pa.	118	115	1	29	33	6	134	118	-	-	1
E.N. CENTRAL	396	396	5	64	115	10	390	660	-	5	3
Ohio	151	139	2	30	41	6	150	241	-	-	-
Ind.	48	52	3	12	8	3	54	66	-	-	-
Ill.	121	116	-	12	21	1	73	151	-	2	1
Mich.	45	40	-	10	42	-	44	45	-	-	2
Wis.	31	49	U	-	3	U	69	157	U	3	-
W.N. CENTRAL	210	205	-	15	19	15	389	367	-	-	-
Minn.	34	25	-	5	6	14	247	288	-	-	-
Iowa	45	44	-	8	2	-	56	19	-	-	-
Mo.	91	77	-	-	8	1	56	34	-	-	-
N. Dak.	2	4	-	-	2	-	2	1	-	-	-
S. Dak.	5	10	-	-	-	-	4	4	-	-	-
Nebr.	14	21	-	2	-	-	11	8	-	-	-
Kans.	19	24	-	-	1	-	13	13	-	-	-
S. ATLANTIC	497	544	6	69	97	7	394	559	-	82	91
Del.	5	2	-	-	-	-	1	22	-	-	-
Md.	42	54	2	7	31	2	110	214	-	-	-
D.C.	8	5	U	-	-	U	3	3	U	1	1
Va.	52	54	-	10	15	-	42	80	-	1	2
W. Va.	16	16	-	-	-	-	6	2	-	-	-
N.C.	84	68	-	10	20	3	112	97	-	59	77
S.C.	51	54	1	11	6	-	25	41	-	19	1
Ga.	95	123	U	10	3	U	13	19	U	-	-
Fla.	144	168	3	21	22	2	82	81	-	2	10
E.S. CENTRAL	210	208	-	24	20	2	124	192	-	-	2
Ky.	43	27	-	3	-	-	53	140	-	-	-
Tenn.	78	56	-	5	1	-	36	20	-	-	-
Ala.	71	76	-	9	4	2	27	23	-	-	2
Miss.	18	49	U	7	15	U	8	9	U	-	N
W.S. CENTRAL	267	294	2	55	44	12	226	142	-	4	8
Ark.	31	30	-	1	1	8	60	7	-	-	-
La.	47	57	1	13	13	-	18	9	-	-	1
Okla.	39	35	-	-	1	2	29	17	-	-	-
Tex.	150	172	1	41	29	2	119	109	-	4	7
MOUNTAIN	164	163	-	54	23	7	1,018	476	-	6	6
Mont.	9	9	U	-	-	U	18	33	U	-	-
Idaho	10	22	-	3	-	3	563	101	-	1	2
Wyo.	4	4	-	1	-	-	7	6	-	-	-
Colo.	44	37	-	3	4	1	268	184	-	-	2
N. Mex.	26	25	N	N	N	3	91	62	-	-	-
Ariz.	41	35	-	32	1	-	35	31	-	5	1
Utah	13	15	-	8	3	-	18	21	-	-	-
Nev.	17	16	U	7	15	U	18	38	U	-	1
PACIFIC	573	604	-	171	209	13	734	1,306	-	27	71
Wash.	76	89	-	19	20	13	335	550	-	5	15
Oreg.	113	107	N	N	N	-	17	59	-	-	1
Calif.	375	394	U	125	156	U	355	661	U	14	52
Alaska	2	8	U	4	3	U	14	3	U	-	-
Hawaii	7	6	U	23	30	U	13	33	U	8	3
Guam	1	4	U	1	10	U	-	-	U	-	-
P.R.	10	11	-	7	1	-	1	3	-	-	-
V.I.	-	-	U	-	1	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 8, 1997 (45th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	>65	45-64	25-44	1-24	<1	
NEW ENGLAND	564	410	92	38	17	6	23
Boston, Mass.	143	100	24	12	7	-	6
Bridgeport, Conn.	37	21	8	3	2	3	-
Cambridge, Mass.	21	18	2	1	-	-	1
Fall River, Mass.	34	29	4	1	-	-	-
Hartford, Conn.	47	35	6	2	1	3	1
Lowell, Mass.	14	11	1	1	1	-	1
Lynn, Mass.	19	16	2	1	-	-	-
New Bedford, Mass.	22	21	1	-	-	-	2
New Haven, Conn.	36	19	12	3	2	-	5
Providence, R.I.	46	35	7	3	-	-	-
Somerville, Mass.	4	3	1	-	-	-	-
Springfield, Mass.	50	31	11	6	2	-	2
Waterbury, Conn.	22	17	5	-	-	-	1
Worcester, Mass.	69	54	8	5	2	-	4
MID. ATLANTIC	2,296	1,611	429	166	40	49	125
Albany, N.Y.	55	43	7	4	1	-	4
Allentown, Pa.	18	14	4	-	-	-	1
Buffalo, N.Y.	55	36	12	4	1	2	3
Camden, N.J.	34	23	6	3	1	1	3
Elizabeth, N.J.	33	19	8	-	-	6	-
Erie, Pa.	49	38	4	7	-	-	3
Jersey City, N.J.	54	36	11	3	2	2	1
New York City, N.Y.	1,170	839	218	80	17	16	51
Newark, N.J.	54	20	21	7	2	4	3
Paterson, N.J.	24	15	5	2	1	1	-
Philadelphia, Pa.	397	245	94	35	11	11	26
Pittsburgh, Pa.§	47	39	4	3	1	-	4
Reading, Pa.	26	21	1	4	-	-	2
Rochester, N.Y.	118	89	18	6	3	2	11
Schenectady, N.Y.	31	26	3	1	-	1	2
Scranton, Pa.	33	29	2	2	-	-	1
Syracuse, N.Y.	71	55	9	4	-	3	6
Trenton, N.J.	15	13	1	1	-	-	4
Utica, N.Y.	12	11	1	-	-	-	-
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	1,934	1,312	383	120	61	57	100
Akron, Ohio	50	36	6	5	1	2	-
Canton, Ohio	49	35	9	4	-	1	3
Chicago, Ill.	386	234	85	34	14	18	21
Cincinnati, Ohio	100	64	20	6	2	8	4
Cleveland, Ohio	152	97	33	11	7	4	3
Columbus, Ohio	169	114	38	8	5	4	11
Dayton, Ohio	126	90	28	5	2	1	9
Detroit, Mich.	213	123	55	17	9	9	9
Evansville, Ind.	46	37	7	2	-	-	2
Fort Wayne, Ind.	69	55	10	3	-	1	4
Gary, Ind.	27	12	6	-	7	2	1
Grand Rapids, Mich.	57	48	4	3	2	-	4
Indianapolis, Ind.	U	U	U	U	U	U	U
Lansing, Mich.	42	30	7	1	2	2	4
Milwaukee, Wis.	123	91	23	4	4	1	8
Peoria, Ill.	50	42	6	1	-	1	5
Rockford, Ill.	39	25	8	2	4	-	2
South Bend, Ind.	61	47	7	6	-	1	3
Toledo, Ohio	109	84	19	4	2	-	4
Youngstown, Ohio	66	48	12	4	-	2	3
W.N. CENTRAL	785	588	103	58	16	15	41
Des Moines, Iowa	28	22	2	2	2	-	3
Duluth, Minn.	29	26	2	1	-	-	2
Kansas City, Kans.	47	32	10	4	1	-	1
Kansas City, Mo.	91	65	12	4	2	3	2
Lincoln, Nebr.	48	32	8	7	1	-	2
Minneapolis, Minn.	182	145	24	8	2	3	13
Omaha, Nebr.	85	63	11	8	1	2	5
St. Louis, Mo.	98	72	10	10	3	3	-
St. Paul, Minn.	101	82	12	6	1	-	11
Wichita, Kans.	76	49	12	8	3	4	2

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	>65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,156	745	243	102	33	32	61
Atlanta, Ga.	113	72	24	14	1	2	-
Baltimore, Md.	198	120	49	21	2	6	17
Charlotte, N.C.	85	52	21	7	2	3	10
Jacksonville, Fla.	119	74	26	9	4	5	3
Miami, Fla.	78	40	22	9	4	3	-
Norfolk, Va.	51	33	12	2	1	3	5
Richmond, Va.	71	44	15	7	3	2	5
Savannah, Ga.	U	U	U	U	U	U	U
St. Petersburg, Fla.	68	51	10	2	3	2	4
Tampa, Fla.	193	141	29	15	6	2	12
Washington, D.C.	180	118	35	16	7	4	5
Wilmington, Del.	U	U	U	U	U	U	U
E.S. CENTRAL	901	603	170	82	28	18	57
Birmingham, Ala.	164	125	21	13	3	2	10
Chattanooga, Tenn.	79	51	15	8	4	1	6
Knoxville, Tenn.	70	50	14	4	1	1	8
Lexington, Ky.	67	42	16	7	1	1	5
Memphis, Tenn.	245	154	54	20	12	5	22
Mobile, Ala.	59	45	3	9	1	1	3
Montgomery, Ala.	60	39	13	6	-	2	2
Nashville, Tenn.	157	97	34	15	6	5	1
W.S. CENTRAL	1,483	956	317	130	49	31	92
Austin, Tex.	83	53	11	8	8	3	6
Baton Rouge, La.	65	34	18	9	3	1	1
Corpus Christi, Tex.	43	32	4	3	1	3	1
Dallas, Tex.	204	120	48	24	7	5	4
El Paso, Tex.	68	50	11	6	-	1	3
Ft. Worth, Tex.	113	78	23	9	2	1	4
Houston, Tex.	370	233	84	27	18	8	39
Little Rock, Ark.	89	59	23	4	1	2	-
New Orleans, La.	84	51	22	9	2	-	-
San Antonio, Tex.	204	139	41	16	3	5	18
Shreveport, La.	53	32	12	7	1	1	8
Tulsa, Okla.	107	75	20	8	3	1	8
MOUNTAIN	917	629	166	71	30	20	62
Albuquerque, N.M.	124	92	22	8	2	-	1
Boise, Idaho	35	22	9	3	1	-	3
Colo. Springs, Colo.	48	35	6	5	1	1	5
Denver, Colo.	110	68	19	11	5	7	10
Las Vegas, Nev.	157	110	33	7	4	3	3
Ogden, Utah	25	22	-	2	1	-	1
Phoenix, Ariz.	150	91	35	13	4	6	14
Pueblo, Colo.	37	29	6	2	-	-	4
Salt Lake City, Utah	110	78	17	6	6	3	14
Tucson, Ariz.	121	82	19	14	6	-	7
PACIFIC	1,476	1,044	264	95	37	35	82
Berkeley, Calif.	14	11	3	-	-	-	1
Fresno, Calif.	U	U	U	U	U	U	U
Glendale, Calif.	25	22	2	1	-	-	2
Honolulu, Hawaii	69	54	8	4	3	-	3
Long Beach, Calif.	64	45	13	4	1	1	7
Los Angeles, Calif.	441	314	73	30	14	10	16
Pasadena, Calif.	28	15	9	4	-	-	5
Portland, Oreg.	79	57	17	4	-	1	1
Sacramento, Calif.	U	U	U	U	U	U	U
San Diego, Calif.	146	97	24	13	4	8	7
San Francisco, Calif.	130	86	28	7	3	5	7
San Jose, Calif.	200	139	39	13	4	5	21
Santa Cruz, Calif.	23	17	4	1	1	-	1
Seattle, Wash.	125	90	21	8	3	3	8
Spokane, Wash.	43	31	6	2	3	1	2
Tacoma, Wash.	89	66	17	4	1	1	1
TOTAL	11,512¶	7,898	2,167	862	311	263	643

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

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