CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

June 11, 1993 / Vol. 42 / No. 22

MMWR
MORBIDITY AND MORTALITY WEEKLY REPORT

Emerging Infectious Diseases

Outbreak of Acute Illness — Southwestern United States, 1993

Beginning in May 1993, cases of acute illness characterized by fever, myalgias, headache, and cough, followed by rapid development of respiratory failure, have been reported to the New Mexico Department of Health (NMDOH), Arizona Department of Health Services (ADHS), Colorado Department of Health (CDH), and Utah Department of Health (UDH). This report presents preliminary findings from an ongoing investigation of this problem, which suggest this illness is associated with a previously unrecognized hantavirus.

On May 14, the NMDOH was notified by the Office of the Medical Investigator that two persons living in the same household had died within 5 days of each other. Their illnesses were characterized by abrupt onset of fever, myalgias, headache, and cough, followed by the rapid development of respiratory failure. Tests for *Yersinia pestis* and other bacterial and viral pathogens were negative. After additional persons who had recently died following a similar clinical course were reported to the the NMDOH by the Indian Health Service (IHS), the ADHS, CDH, and UDH were contacted by the NMDOH seeking other possible cases.

To identify cases, public health officials established a provisional surveillance case definition of 1) radiographic evidence of unexplained bilateral pulmonary interstitial infiltrates with hypoxemia (arterial oxygen saturation of <90% while breathing room air) or 2) an autopsy finding of unexplained noncardiogenic pulmonary edema occurring during 1993. Through June 7, a total of 24 case-patients have been identified. Case-patients had onsets of illness beginning in December 1992; most (14) had onset in May (Figure 1). The most recent case-patient had onset of illness June 1. Case-patients resided in New Mexico (17), Arizona (five), Utah (one), and Colorado (one). Their median age was 34 years (range: 13–87 years; 17 were aged 18–50 years). Thirteen were male. Fourteen case-patients were American Indians, nine were white, and one was Hispanic. Twelve (50%) case-patients have died.

Clinical and autopsy specimens are being processed and analyzed by CDC. Preliminary results include detection of rising titers of antibodies to hantaviruses in paired serum specimens from two of the nine case-patients; elevated single antibody titers were present in four other of the nine case-patients. The pattern of cross-reactivity to

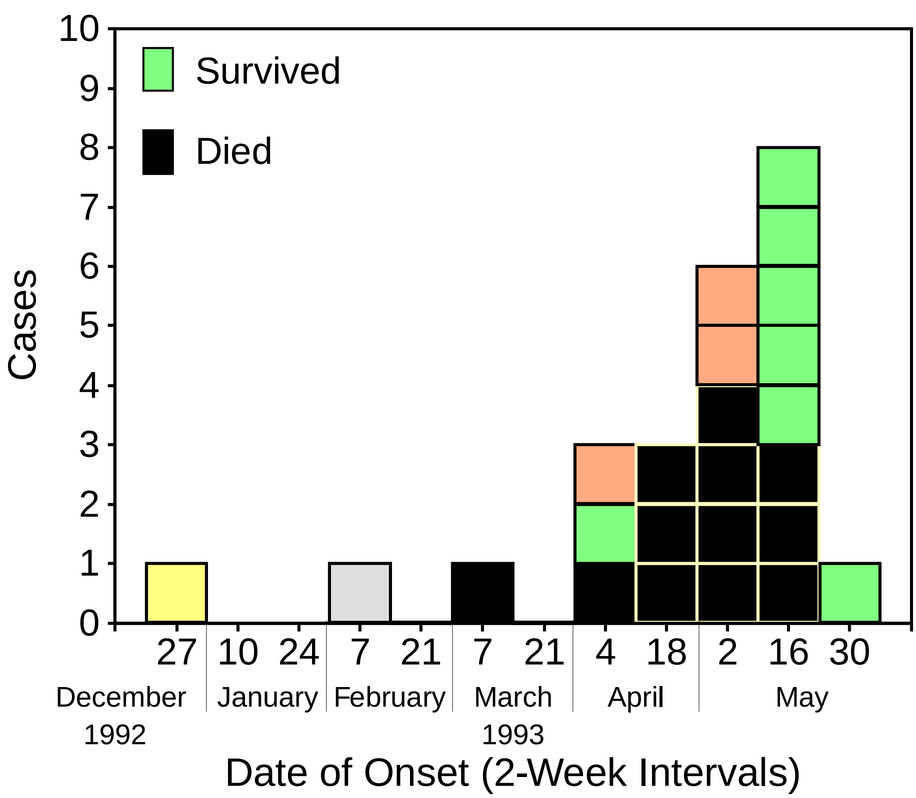
Unexplained Acute Illness — Continued

four different hantaviruses suggests that the infection is due to a previously unknown hantavirus. The NMDOH, ADHS, CDH, UDH, IHS, and CDC, with the assistance of the Navajo Nation Division of Health, are conducting intensive epidemiologic, laboratory, and environmental investigations to further define this unexplained illness cluster, determine the etiology of the illness, identify the source and mode of transmission, and develop prevention and control measures.

Reported by: F Koster, MD, H Levy, MD, G Mertz, MD, S Young, PhD, K Foucar, MD, J McLaughlin, PhD, B Bryt, MD, Univ of New Mexico School of Medicine, T Merlin, MD, Lovelace Medical Center, Albuquerque; R Zumwalt, MD, P McFeely, MD, K Nolte, MD, New Mexico Office of the Medical Examiner; M Burkhart, MPH, Secretary of Health, N Kalishman, MD, M Gallaher, MD, R Voorhees, MD, M Samuel, DrPH, M Tanuz, G Simpson, MD, L Hughes, PhD, E Umland, MD, G Oty, MS, L Nims, MS, CM Sewell, DrPH, State Epidemiologist, New Mexico Dept of Health. L Sands, DO, K Komatsu, MPH, C Kioski, MPH, K Fleming, MA, J Doll, PhD, C Levy, MS, TM Fink, P Murphy, B England, MD, M Smolinski, MD, B Erickson, PhD, W Slanta, G Gellert, MD, State Epidemiologist, Arizona Dept of Health Svcs. P Schillam, MSPH, RE Hoffman, MD, State Epidemiologist, Colorado Dept of Health. S Lanser, MPH, CR Nichols, MPA, State Epidemiologist, Utah Dept of Health. L Hubbard-Pourier, MPH, Div of Health, Navajo Nation, Window Rock, Arizona. J Cheek, MD, A Craig, MD, R Haskins, MPH, B Muneta, MD, B Tempest, MD, Indian Health Svc. Div of Field Epidemiology, Epidemiology Program Office; National Center for Environmental Health; Div of Bacterial and Mycotic Diseases, Div of Vector-Borne Infectious Diseases, and Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases, CDC.

Editorial Note: The preliminary laboratory findings of this investigation suggest a possible role for a hantavirus or related agent as a cause of this outbreak. Although this unexplained illness shares some clinical features with syndromes caused by hanta-

FIGURE 1. Cases of acute illness, by 2–week interval of onset — Arizona, Colorado, New Mexico, and Utah, December 27, 1992–June 5, 1993



Unexplained Acute Illness — Continued

viruses, it lacks the prominent renal involvement and hemorrhagic manifestations previously reported with these agents (*1*). Additional data are necessary to confirm these preliminary results. If verified, the role of this agent in the pathogenesis of the illnesses will require further study.

Isolation of the first recognized hantavirus (Hantaan virus) was reported from Korea in 1978 (*2*). Although there are four recognized members (Hantaan, Puumala, Seoul, and Prospect Hill) of the genus *Hantavirus* of the family *Bunyaviridae* (*3*), additional unidentified members likely exist. Hantaan, Puumala, and Seoul viruses are known human pathogens; Prospect Hill has not been associated with disease. Since the 1930s, epidemic and sporadic hantavirus-associated disease has been described throughout Eurasia, especially in Scandinavia and northeastern Asia. In the 1950s, thousands of United Nations military personnel were infected with hantaviruses during the Korean conflict (*1*); more recently, transmission has been documented among U.S. military personnel training in Korea (*4*). Hantaviruses have been isolated from rodents in the United States (*5*), and serologic studies have documented human infections with hantaviruses (*6*). However, acute disease associated with infection by pathogenic hantaviruses has not previously been reported in the Western Hemisphere.

The clinical manifestations of infection with these viruses vary; illness resulting from Hantaan virus infection generally includes fever, renal abnormalities, and in severe cases, shock, bleeding, and pulmonary edema (*1*). The incubation period for the known pathogenic hantaviruses, although highly variable, generally ranges from 2 to 4 weeks (*3*).

Rodents are the natural hosts for all known hantaviruses (*3*). Humans are thought to be at risk for infection after exposure to rodent excreta, either through the aerosol route or direct inoculation. There is no evidence of person-to-person transmission for any of the known hantaviruses, nor has occupational transmission been documented to health-care workers. Laboratory workers practicing universal precautions while processing routine clinical materials (such as blood, urine, and respiratory specimens) are not considered to be at increased risk for hantavirus infection. However, laboratory-acquired infections have occurred among persons who handled infected wild or laboratory rodents (*7*). Therefore, laboratory work that may result in propagation of hantaviruses should be conducted in a biosafety level 3 facility (*8*).

No restriction of travel to areas affected by this outbreak is considered necessary; however, activities that may disrupt rodent burrows or result in contact with rodents or aerosolization of rodent excreta should be avoided. In the affected area, measures prudent for rodent control should be carried out in domestic settings, including wetting of rodent nests and dead rodents with disinfectant before their removal, securing foods from rodent access, and trapping rodents indoors. Broader measures to control rodents will be recommended once the specific rodent host(s) has been identified and the expected effects on the ecology of local rodentborne diseases, particularly plague, have been considered.

In one controlled study, intravenous administration of the antiviral drug ribavirin was effective in treating severe cases of hantavirus infection when administered early in the course of illness (*9*). However, intravenous ribavirin is not licensed for use in the United States. Therefore, in the affected areas of the Southwest, clinicians considering

Unexplained Acute Illness — Continued

use of ribavirin for treatment of potential cases should consult with their state health department.

The surveillance case definition used in this investigation is provisional. As additional information is gathered and the etiologic agent is characterized, the definition may require revision. Suspected cases should be reported immediately to public health authorities for further investigation. CDC has established a hotline to provide updated information on the unexplained illness outbreak and to report suspected cases; the number is (800) 532-9929.

This cluster of unexplained acute illnesses in the Southwest illustrates the potential for new infectious disease problems to emerge at any time within the United States (*10*). These diseases may emerge because of microbial adaptation, environmental disturbances or changes, or population shifts. Vigilance and surveillance are required to rapidly recognize and determine the etiology of these emerging microbial threats to health so that prevention and control strategies can be implemented.

References

1. Sheedy JA, Froeb HF, Batson HA, et al. The clinical course of epidemic hemorrhagic fever. Am J Med 1954;16:619–28.
2. Lee HW, Lee PW, Johnson KM. Isolation of the etiologic agent of Korean hemorrhagic fever. J Infect Dis 1978;137:298–308.
3. McKee KT Jr, LeDuc JW, Peters CJ. Hantaviruses. In: Belshe RB, ed. Textbook of human virology, 2nd ed. St. Louis: Mosby Year Book, 1991:615–32.
4. CDC. Korean hemorrhagic fever. MMWR 1988;37:87–90,95–6.
5. LeDuc JW, Smith GA, Johnson KM. Hantaan-like viruses from domestic rats captured in the United States. Am J Trop Med Hyg 1984;33:992–8.
6. Childs JE, Glass GE, Korch GW, et al. Evidence of human infection with a rat-associated hantavirus in Baltimore, Maryland. Am J Epidemiol 1988;127:875–8.
7. Desmyter J, LeDuc JW, Johnson KM, Brasseur F, Deckers C, van Ypersele de Strihou C. Laboratory rat associated outbreak of haemorrhagic fever with renal syndrome due to Hantaan-like virus in Belgium. Lancet 1983;2:1445–8.
8. CDC/National Institutes of Health. Biosafety in microbiological and biomedical laboratories. 2nd ed. Atlanta: US Department of Health and Human Services, CDC, 1988; DHHS publication no. (CDC)88-8395.
9. Huggins JW, Hsiang CM, Cosgriff TM, et al. Prospective, double-blind, concurrent, placebo-controlled clinical trial of intravenous ribavirin therapy for hemorrhagic fever with renal syndrome. J Infect Dis 1991;164:119–27.
10. Lederberg J, Shope RE, Oaks SC Jr, eds. Emerging infections: microbial threats to health in the United States. Washington, DC: National Academy Press, 1992.

Current Trends

Selective Screening to Augment Syphilis Case-Finding — Dallas, 1991

Increased use of crack cocaine and the exchange of sex for drugs have been major contributors to the increased occurrence of syphilis in U.S. urban, minority populations (*1–3*). Because many persons who use drugs do not voluntarily seek health care (*1,4*), and because their sex partners are often difficult to locate (*5*), a substantial number of persons may have undiagnosed syphilis infections, thereby contributing to continuing transmission. Because of the continuing increase in the number of persons in Dallas County (1990 population: 1.8 million), Texas, in whom early syphilis* had been diagnosed, and who had reported having had sex partners at crack motels and crack houses (i.e., places where crack cocaine was sold), in February 1991, the Dallas Countywide Health Department (DCHD) developed a sexually transmitted disease (STD) screening program aimed specifically at those sites. This report describes Dallas County's selective screening program and summarizes results of the program from March 1 through December 31, 1991.

Program Development

The Dallas County STD Program (DCSTDP) modified a previously used approach (*1*) to address needs specific to the target population in Dallas and to augment other STD intervention methods employed by the DCHD. To reach the high-risk population, the DCSTDP identified 21 sites for STD screening—predominantly crack motels and crack houses named by persons with early syphilis during interviews with disease intervention specialists. Information sought during interviews included not only the identity of sex partners of syphilis patients but locations where syphilis may have been acquired.

A team consisting of a supervisor and two disease intervention specialists familiar with the community visited the sites and was responsible for 1) obtaining specimens on-site for serologic testing for syphilis and human immunodeficiency virus (HIV); 2) ensuring treatment of all persons determined to have been infected with or exposed to an STD; and 3) collecting and maintaining data for case-finding and follow-up, including names and aliases of identified syphilis patients and their sex partners and sites where high-risk sexual contact or illicit drug use were known to occur (e.g., lists of crack motels or crack houses).

Two physicians in private practice in the affected communities assisted in the screening program. These physicians examined patients, obtained serologic tests for syphilis and HIV, and treated patients referred by the health department for syphilis; the STD program provided medication and a monetary stipend to the physicians. The DCHD also developed cooperative agreements with social service and community-based organizations† to provide comprehensive care for persons using crack cocaine. Care included, for example, HIV pretest counseling at the time of syphilis screening and drug rehabilitation referrals.

Selective Screening Activities

All persons tested for syphilis also received HIV pretest counseling; patients were offered a choice of either confidential or anonymous voluntary testing§. To decrease the number of persons lost to follow-up, the team emphasized establishing rapport between public health workers and persons at each site. The team also distributed condoms and business cards and conducted demonstrations for individuals and groups on the correct use of condoms.

---

*Syphilis with a duration of less than 1 year.

†These included the Behavior Modification Research Project of the HIV Census Tract, Project Impact and the Parent Mentor Project of the Texas Department of Human Services, the Minority HIV Prevention Project of the Dallas Urban League, and the Dallas Council on Alcohol and Drug Abuse.

§State law requires that every patient be offered the choice of either anonymous or confidential HIV-antibody testing.

Syphilis Case-Finding — Continued

From March 1 through December 31, 1991, 250 persons were serologically tested by rapid plasma reagin tests at the 21 sites. Persons were identified for testing if they either had sexual contact with a person who had early syphilis or had been identified during a cluster interview¶ (*6*) as having other risk factors for syphilis. Of the 250 persons, 78 (31%) tested positive and were treated for early syphilis (six with primary syphilis; 29, secondary syphilis; and 43, early latent syphilis), 42 (17%) were preventively treated, 15 (6%) were determined to have been treated previously, and 112 (45%) were uninfected; three (1%) persons were lost to follow-up.

Of the 250, 126 chose to receive an HIV-antibody test. Of those, six (5%) tested positive. Four of the six reported injecting-drug use, and all six reported high-risk sexual exposure.

Of the 78 persons identified with untreated syphilis, 61 (78%) received clinical examination and treatment at the DCHD clinic; of these, 38 (62%) also had other STDs: 13 had gonorrhea; 12, pelvic inflammatory disease; seven, nongonococcal urethritis; two, herpes; two, chancroid; one, human papillomavirus infection; and one, lymphogranuloma venereum.

Reported by: D Hutcheson, T Tucker, J Mayfield, C Parker, A Gonzales, P Yacovone, R Stinson, L Mims, G Stokes, M Davis, STD Program; JR Farris, MD, Dallas Countywide Health Department, Dallas. Clinical Research Br, Div of Sexually Transmitted Diseases and HIV Prevention, National Center for Prevention Svcs, CDC.

Editorial Note: The Dallas project successfully employed nontraditional outreach methods to facilitate identification and serologic testing of persons at high risk for syphilis and HIV infection because of behaviors associated with their crack cocaine use. For example, because sex-partner notification is difficult among this population, community-based efforts focused on the identification of specific sex-for-drugs locations rather than named sex partners of persons with early syphilis. Because most crack-related activities occur within well-defined areas (*7*), the recognition of these locations facilitated identification, testing, and appropriate follow-up of sex partners and other persons at high risk for syphilis. In addition, the team approach and the involvement of private-sector physicians established in the community and of community-based organizations appeared to contribute to the high follow-up rate for persons who were tested. During a similar outreach effort in Philadelphia (*1*), 33% of seroreactive persons could not be located, compared with the 1% who were lost to follow-up in the Dallas project.

The approach of the Dallas project combined innovative methods, traditional partner notification, and cluster investigation methods. Measures to improve relations between the DCSTDP and the target community also may have contributed to the success of the project. Efforts to identify and treat infected persons in Dallas were considered effective when compared with methods employed in other locations (*1,6,8*). In addition, this approach permitted DCSTDP to identify and work effectively with a previously inaccessible high-risk population.

The findings in this report underscore the potential effectiveness of a team approach in disease-control strategies and the role for community coalitions in the

¶Cluster investigation methods and the cluster interview are methods to identify persons at high risk for syphilis other than those who were sex partners of the personbeing interviewed.

Syphilis Case-Finding — Continued

identification, treatment, and follow-up of persons belonging to disenfranchised groups (*9*). The Dallas project may serve as a model for other health departments and communities with high rates of syphilis and other STDs, although future projects should consider including data and design elements necessary to fully evaluate efficacy and cost-effectiveness.

References

1. CDC. Alternative case-finding methods in a crack-related syphilis epidemic—Philadelphia. MMWR 1991;40:77–80.
2. Aral SO, Holmes KK. Sexually transmitted diseases in the AIDS era. Sci Am 1991;264:62–9.
3. Rolfs RT, Goldberg M, Sharrar RG. Risk factors for syphilis: cocaine use and prostitution. Am J Public Health 1990;80:853–7.
4. Marx R, Aral SO, Rolfs RT, Sterk CE, Kahn JG. Crack, sex, and STD. Sex Transm Dis 1991;18:92–101.
5. Greenberg J, Schnell D, Conlon R. Behavior of crack cocaine users and their impact on early syphilis intervention. Sex Transm Dis 1992;19:346–50.
6. CDC. Epidemic early syphilis—Montgomery County, Alabama, 1990–1991. MMWR 1992; 42:790–4.
7. Bowser BP. Crack and AIDS: an ethnographic impression. J Natl Med Assoc 1989;81:538–40.
8. CDC. Epidemic early syphilis—Escambia County, Florida, 1987 and July 1989–June 1990. MMWR 1991;40:323–5.
9. CDC. Gang-related outbreak of penicillinase-producing *Neisseria gonorrhoeae* and other sexually transmitted diseases—Colorado Springs, Colorado, 1989–1991. MMWR 1993;42:25–8.

Emerging Infectious Diseases

Outbreak of Multidrug-Resistant Tuberculosis at a Hospital — New York City, 1991

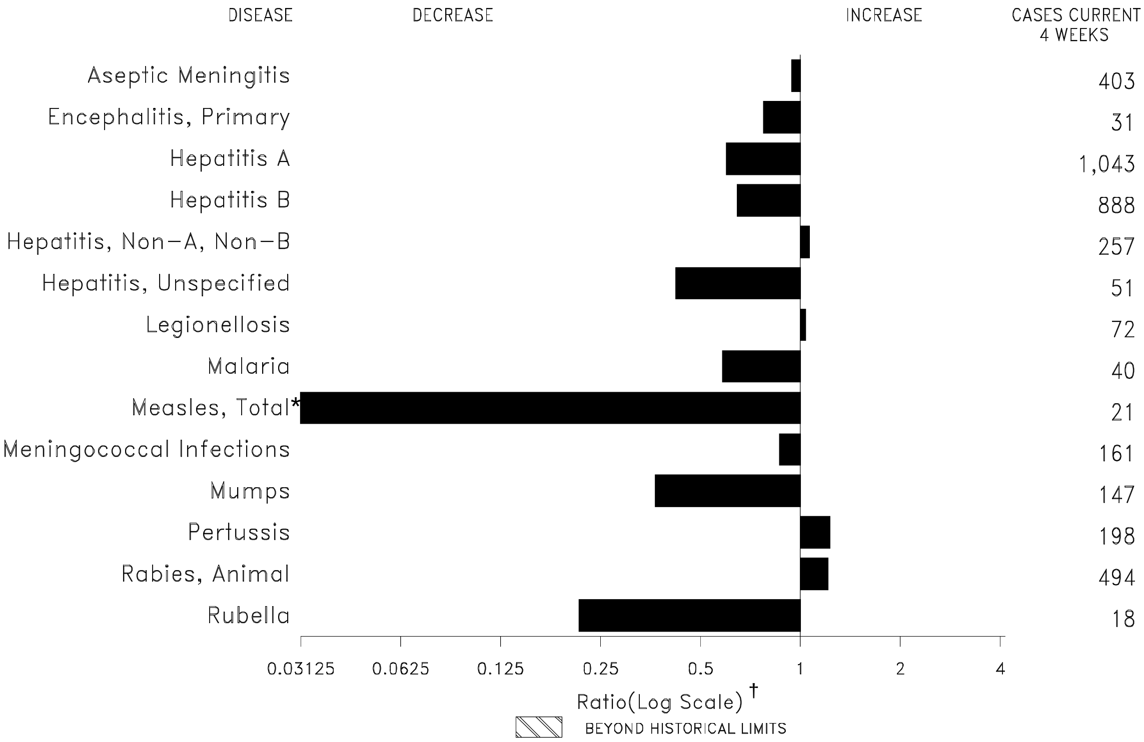
From January 1991 through July 1992, multidrug-resistant (i.e., resistant to at least isoniazid [INH] and rifampin [RIF]) *Mycobacterium tuberculosis* (MDR-TB) was isolated from 43 (22%) of 198 patients with newly diagnosed TB at a New York City hospital. This report summarizes an epidemiologic investigation by the hospital infection-control, infectious diseases, and employee services staffs and presents information for the 32 patients in whom MDR-TB was diagnosed during January 1991–March 1992 (these were the only patients for whom complete information was available and analyzed).

A case was defined as a TB isolate resistant to at least INH and RIF from a person who had been treated as an inpatient from December 1990 through March 1992. Sixteen (50%) patients were men; mean age was 37 years (range: 22–78 years). Of the 32 patients, 29 (91%) have died; all 29 were seropositive for human immunodeficiency virus (HIV). Of those remaining, one was seronegative, and two refused testing. Thirty-one had been patients on the HIV ward and had been treated for complications of HIV infection. In addition to INH and RIF resistance, isolates from 29 (91%) of the 32 patients were resistant to ethambutol and streptomycin.

Of the 32 inpatients with MDR-TB, 28 (88%) had documented exposure to an infectious MDR-TB patient while in the hospital 30 or more days before being diagnosed with TB. Transmission of MDR-TB was not documented to patients other than those on wards with other MDR-TB patients. Isolates from 18 patients studied with restric-

(Continued on page 433)

FIGURE I. Notifiable disease reports, comparison of 4-week totals ending June 5, 1993, with historical data — United States



*The large apparent decrease in reported cases of measles(total) reflects dramatic fluctuations in the historical baseline. (Ratio [log scale] for week twenty-two is 0.02164).

† 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 thehatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary — cases of specified notifiable diseases, United States, cumulative, week ending June 5, 1993 (22nd Week)

	Cum. 1993		Cum. 1993
AIDS*	51,608	Measles: imported	18
Anthrax	-	indigenous	115
Botulism: Foodborne	6	Plague	3
Infant	11	Poliomyelitis, Paralytic§	-
Other	2	Psittacosis	22
Brucellosis	30	Rabies, human	-
Cholera	11	Syphilis, primary & secondary	11,368
Congenital rubella syndrome	5	Syphilis, congenital, age < 1 year	-
Diphtheria	-	Tetanus	11
Encephalitis, post-infectious	74	Toxic shock syndrome	105
Gonorrhea	160,868	Trichinosis	7
Haemophilus influenzae (invasive disease)†	605	Tuberculosis	8,262
Hansen Disease	73	Tularemia	30
Leptospirosis	15	Typhoid fever	141
Lyme Disease	1,322	Typhus fever, tickborne (RMSF)	52

*Updated monthly; last update June 5, 1993.
†Of 511 cases of known age, 181 (35%) were reported among children less than 5 years of age.
§No cases of suspected poliomyelitis have been reported in 1993; 4 cases of suspected poliomyelitis were reported in 1992; 6 of the 9 suspected cases with onset in 1991 were confirmed; the confirmed cases were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending June 5, 1993, and May 30, 1992 (22nd Week)

Reporting Area	AIDS*	Aseptic Menin-gitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionel-losis	Lyme Disease
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1992	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993
UNITED STATES	51,608	2,750	220	74	160,868	205,964	8,776	4,870	1,942	268	458	1,322
NEW ENGLAND	2,166	56	5	4	3,054	4,243	227	203	175	7	19	185
Maine	59	6	1	-	35	35	8	8	-	-	3	1
N.H.	63	7	-	1	16	53	12	43	167	1	2	20
Vt.	14	6	1	-	13	11	3	3	2	-	-	-
Mass.	1,188	30	3	3	1,203	1,546	127	108	3	6	11	39
R.I.	104	7	-	-	154	331	46	12	3	-	3	33
Conn.	738	-	-	-	1,633	2,267	31	29	-	-	-	92
MID. ATLANTIC	11,379	278	7	6	17,627	21,388	522	616	129	4	92	888
Upstate N.Y.	1,938	101	-	3	3,553	4,733	138	152	69	1	23	600
N.Y. City	6,197	104	1	-	4,260	7,055	177	121	1	-	3	3
N.J.	2,072	-	-	-	2,897	2,976	137	177	41	-	14	95
Pa.	1,172	73	6	3	6,917	6,624	70	166	18	3	52	190
E.N. CENTRAL	4,160	369	70	15	31,473	39,256	854	471	338	6	122	12
Ohio	662	112	24	3	8,727	11,812	133	103	28	-	66	10
Ind.	502	49	4	7	3,310	3,598	378	73	5	1	21	1
Ill.	1,442	79	15	-	10,988	12,627	232	89	18	2	3	1
Mich.	1,083	120	24	5	6,358	9,500	106	201	267	3	24	-
Wis.	471	9	3	-	2,090	1,719	5	5	20	-	8	-
W.N. CENTRAL	2,163	164	8	-	7,603	11,248	1,164	307	84	5	30	29
Minn.	431	44	5	-	320	1,250	190	31	3	4	1	4
Iowa	130	39	-	-	602	733	15	11	3	1	5	5
Mo.	1,270	30	-	-	4,784	6,142	759	229	61	-	10	3
N. Dak.	-	3	2	-	23	38	36	-	-	-	1	1
S. Dak.	20	7	1	-	116	77	10	-	-	-	-	-
Nebr.	100	2	-	-	170	596	107	7	8	-	10	-
Kans.	212	39	-	-	1,588	2,412	47	29	9	-	3	16
S. ATLANTIC	10,888	661	41	29	44,779	65,451	529	879	241	34	75	141
Del.	208	5	3	-	552	723	4	62	59	-	6	71
Md.	1,216	55	10	-	6,978	6,138	75	127	6	3	20	20
D.C.	548	19	-	-	2,421	3,121	2	13	-	-	8	2
Va.	731	73	12	3	4,817	7,764	60	65	19	11	2	16
W. Va.	38	5	7	-	246	384	3	17	13	-	1	2
N.C.	453	53	8	-	10,536	10,214	21	138	28	-	8	15
S.C.	673	4	-	-	4,114	4,937	5	17	-	1	8	1
Ga.	1,562	43	1	-	4,660	21,000	44	33	20	-	12	-
Fla.	5,459	404	-	26	10,455	11,170	315	407	96	19	10	14
E.S. CENTRAL	1,396	130	9	4	18,045	19,986	111	475	379	1	18	5
Ky.	161	55	4	4	1,893	2,079	61	42	4	-	7	2
Tenn.	528	20	4	-	5,461	6,240	17	383	367	-	9	1
Ala.	463	36	1	-	6,451	6,930	23	47	3	1	-	2
Miss.	244	19	-	-	4,240	4,737	10	3	5	-	2	-
W.S. CENTRAL	5,311	222	18	-	19,261	19,481	733	628	90	70	13	11
Ark.	227	14	-	-	3,532	3,541	22	26	2	-	-	1
La.	727	20	-	-	4,884	2,903	33	83	33	-	2	-
Okla.	423	-	4	-	1,504	1,955	49	94	22	6	8	6
Tex.	3,934	188	14	-	9,341	11,082	629	425	33	64	3	4
MOUNTAIN	2,599	162	11	3	4,531	5,085	1,780	254	139	45	44	3
Mont.	15	-	-	1	20	41	50	4	-	-	5	-
Idaho	43	5	-	-	70	54	84	19	-	1	1	-
Wyo.	28	3	-	-	39	21	10	12	45	-	5	2
Colo.	868	37	3	-	1,444	1,942	419	28	20	26	3	-
N. Mex.	212	30	3	2	399	387	142	110	43	1	2	-
Ariz.	881	63	4	-	1,643	1,673	633	40	9	7	8	-
Utah	185	5	1	-	146	98	414	17	18	10	7	1
Nev.	367	19	-	-	770	869	28	24	4	-	13	-
PACIFIC	11,546	708	51	13	14,495	19,826	2,856	1,037	367	96	45	48
Wash.	764	-	-	-	1,579	1,790	307	88	89	7	5	1
Oreg.	502	-	-	-	868	629	50	20	7	-	-	-
Calif.	10,149	668	48	13	11,618	16,875	2,101	915	265	87	35	46
Alaska	12	4	2	-	195	305	359	6	4	-	-	-
Hawaii	119	36	1	-	235	227	39	8	2	2	5	1
Guam	-	2	-	-	32	36	2	1	-	1	-	-
P.R.	1,561	25	-	-	197	72	33	136	21	1	-	-
V.I.	33	-	-	-	48	44	-	2	-	-	-	-
Amer. Samoa	-	-	-	-	11	17	10	-	-	-	-	-
C.N.M.I.	-	2	-	-	40	22	-	-	-	1	-	-

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

*Updated monthly; last update June 5, 1993.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending June 5, 1993, and May 30, 1992 (22nd Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1993	1993	Cum. 1993	1993	Cum. 1993	Cum. 1992	Cum. 1993	1993	Cum. 1993	1993	Cum. 1993	Cum. 1992	1993	Cum. 1993	Cum. 1992
UNITED STATES	376	10	115	-	18	1,004	1,200	48	761	53	1,068	577	1	91	84
NEW ENGLAND	29	-	45	-	4	14	74	-	5	8	263	57	-	1	5
Maine	1	-	-	-	-	-	4	-	-	-	7	2	-	1	-
N.H.	4	-	-	-	-	1	9	-	-	4	138	20	-	-	-
Vt.	1	-	30	-	1	-	4	-	-	-	42	-	-	-	-
Mass.	10	-	7	-	2	8	40	-	2	1	55	26	-	-	-
R.I.	2	-	-	-	1	1	1	-	2	-	2	-	-	-	4
Conn.	11	-	8	-	-	4	16	-	1	3	19	9	-	-	1
MID. ATLANTIC	71	-	6	-	2	187	142	-	55	1	167	72	-	27	11
Upstate N.Y.	23	-	-	-	1	96	58	-	17	1	63	23	-	3	8
N.Y. City	24	-	2	-	-	34	19	-	-	-	12	9	-	17	-
N.J.	17	-	4	-	1	52	20	-	8	-	21	18	-	6	2
Pa.	7	-	-	-	-	5	45	-	30	-	71	22	-	1	1
E.N. CENTRAL	22	-	-	-	-	31	162	8	118	20	159	49	-	2	7
Ohio	6	-	-	-	-	5	52	6	50	17	102	15	-	1	-
Ind.	3	-	-	-	-	19	25	1	2	3	24	11	-	-	-
Ill.	11	-	-	-	-	5	50	-	27	-	15	7	-	-	7
Mich.	2	-	-	-	-	1	34	1	39	-	16	1	-	1	-
Wis.	-	-	-	-	-	1	1	-	-	-	2	15	-	-	-
W.N. CENTRAL	9	-	1	-	2	6	74	-	24	4	79	43	-	1	5
Minn.	2	-	-	-	-	5	2	-	-	-	39	15	-	-	-
Iowa	1	-	-	-	-	1	15	-	7	-	1	1	-	-	-
Mo.	2	-	1	-	-	-	29	-	12	3	20	16	-	1	1
N. Dak.	-	-	-	-	-	-	3	-	4	-	2	6	-	-	-
S. Dak.	2	-	-	-	-	-	3	-	-	-	1	2	-	-	-
Nebr.	1	-	-	-	-	-	3	-	1	1	5	2	-	-	-
Kans.	1	-	-	-	2	-	19	-	-	-	11	1	-	-	4
S. ATLANTIC	110	-	19	-	3	99	242	32	229	13	108	59	1	7	3
Del.	1	-	3	-	-	1	10	-	4	-	1	-	-	2	-
Md.	11	-	-	-	2	10	21	3	42	2	35	12	-	1	-
D.C.	5	-	-	-	-	-	4	-	-	-	1	-	-	-	-
Va.	8	-	-	-	1	6	20	-	14	-	9	4	-	-	-
W. Va.	2	-	-	-	-	-	9	-	6	-	6	2	-	-	-
N.C.	59	-	-	-	-	21	43	19	119	5	18	14	-	-	-
S.C.	-	-	-	-	-	29	18	-	13	-	5	7	-	-	-
Ga.	2	-	-	-	-	-	57	9	9	2	5	6	-	-	-
Fla.	22	-	16	-	-	32	60	1	22	4	28	14	1	4	3
E.S. CENTRAL	7	-	-	-	-	410	76	1	31	3	43	11	-	-	1
Ky.	-	-	-	-	-	393	15	-	-	-	3	-	-	-	-
Tenn.	3	-	-	-	-	-	15	-	9	3	26	5	-	-	1
Ala.	2	-	-	-	-	-	28	1	17	-	13	6	-	-	-
Miss.	2	-	-	-	-	17	18	-	5	-	1	-	-	-	-
W.S. CENTRAL	10	-	1	-	-	170	99	4	106	1	31	18	-	12	-
Ark.	2	-	-	-	-	-	12	1	4	-	2	6	-	-	-
La.	-	-	1	-	-	-	21	3	10	1	5	-	-	1	-
Okla.	3	-	-	-	-	9	9	-	2	-	11	12	-	1	-
Tex.	5	U	-	U	-	161	57	U	90	U	13	-	U	10	-
MOUNTAIN	12	-	2	-	-	7	104	1	33	2	69	98	-	4	3
Mont.	1	-	-	-	-	-	7	-	-	-	-	1	-	-	-
Idaho	-	-	-	-	-	-	6	-	5	-	10	14	-	1	1
Wyo.	-	-	-	-	-	1	2	-	2	-	1	-	-	-	-
Colo.	7	-	2	-	-	6	14	-	8	-	25	20	-	-	-
N. Mex.	4	-	-	-	-	-	3	N	N	2	18	20	-	-	-
Ariz.	-	-	-	-	-	-	61	-	6	-	8	37	-	1	1
Utah	-	-	-	-	-	-	4	-	3	-	7	5	-	1	1
Nev.	-	-	-	-	-	-	7	1	9	-	-	1	-	1	-
PACIFIC	106	10	41	-	7	80	227	2	160	1	149	170	-	37	49
Wash.	5	-	-	-	-	10	34	-	8	-	17	47	-	-	6
Oreg.	3	-	-	-	-	-	17	N	N	1	1	12	-	1	2
Calif.	96	10	31	-	2	41	160	2	134	-	121	107	-	18	34
Alaska	-	-	-	-	-	9	9	-	5	-	3	-	-	1	-
Hawaii	2	-	10	-	5	20	7	-	13	-	7	4	-	17	7
Guam	1	U	1	U	-	10	1	U	6	U	-	-	U	-	1
P.R.	-	-	122	-	-	204	5	-	1	1	1	9	-	-	-
V.I.	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
Amer. Samoa	-	-	1	-	-	-	-	-	-	-	2	6	-	-	-
C.N.M.I.	-	-	-	-	1	-	-	1	11	-	-	1	-	-	-

*For measles only, imported cases include both out-of-state and international importations.
N: Not notifiable U: Unavailable [†] International [§] Out-of-state

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending June 5, 1993, and May 30, 1992 (22nd Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-Shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1993	Cum. 1992	Cum. 1993	Cum. 1993	Cum. 1992	Cum. 1993	Cum. 1993	Cum. 1993	Cum. 1993
UNITED STATES	11,368	14,634	105	8,262	8,400	30	141	52	3,211
NEW ENGLAND	163	273	7	161	127	-	10	2	556
Maine	2	-	1	7	10	-	-	-	-
N.H.	5	22	2	1	-	-	-	-	29
Vt.	-	1	-	3	2	-	-	-	15
Mass.	79	127	3	87	64	-	8	2	193
R.I.	7	15	1	28	-	-	-	-	-
Conn.	70	108	-	35	51	-	2	-	319
MID. ATLANTIC	1,088	2,045	21	1,801	2,033	-	43	3	1,164
Upstate N.Y.	95	182	11	154	284	-	8	1	866
N.Y. City	541	1,087	1	1,100	1,150	-	26	-	-
N.J.	158	287	-	273	337	-	6	2	180
Pa.	294	489	9	274	262	-	3	-	118
E.N. CENTRAL	1,827	2,181	34	865	850	3	13	1	28
Ohio	510	299	15	127	139	1	5	-	3
Ind.	164	104	1	91	74	1	1	-	-
Ill.	700	993	3	428	413	-	4	1	4
Mich.	288	448	15	186	192	1	3	-	2
Wis.	165	337	-	33	32	-	-	-	19
W.N. CENTRAL	696	573	8	164	189	7	2	6	151
Minn.	14	40	2	26	46	-	-	-	21
Iowa	32	15	4	16	15	-	-	-	25
Mo.	569	435	-	79	81	2	2	5	4
N. Dak.	-	1	-	2	3	-	-	-	30
S. Dak.	-	-	-	9	14	3	-	1	19
Nebr.	7	17	-	8	9	-	-	-	2
Kans.	74	65	2	24	21	2	-	-	50
S. ATLANTIC	3,030	4,088	12	1,444	1,619	1	15	10	833
Del.	60	95	1	16	23	-	1	-	68
Md.	163	299	-	164	109	-	3	-	259
D.C.	177	183	-	74	51	-	-	-	6
Va.	276	344	2	176	116	-	1	1	166
W. Va.	2	9	-	37	25	-	-	-	36
N.C.	828	996	3	185	217	-	-	6	32
S.C.	466	547	-	164	170	-	-	-	74
Ga.	521	862	-	350	355	-	1	1	172
Fla.	537	753	6	278	553	1	9	2	20
E.S. CENTRAL	1,547	1,938	4	562	468	3	2	5	40
Ky.	126	64	2	148	164	-	-	3	5
Tenn.	437	529	1	131	-	2	-	-	-
Ala.	363	795	1	196	169	1	2	-	35
Miss.	621	550	-	87	135	-	-	2	-
W.S. CENTRAL	2,456	2,508	1	775	791	13	2	23	248
Ark.	439	386	-	73	38	7	-	-	15
La.	1,032	1,067	-	-	55	-	1	-	-
Okla.	154	113	1	135	57	4	-	23	48
Tex.	831	942	-	567	641	2	1	-	185
MOUNTAIN	99	182	4	183	221	1	4	2	41
Mont.	1	2	-	5	-	-	-	-	9
Idaho	-	1	1	5	11	-	-	-	-
Wyo.	3	1	-	1	-	1	-	2	6
Colo.	31	25	1	8	17	-	3	-	1
N. Mex.	17	19	-	18	31	-	-	-	2
Ariz.	40	88	-	96	103	-	1	-	23
Utah	2	5	2	9	33	-	-	-	-
Nev.	5	41	-	41	26	-	-	-	-
PACIFIC	462	846	14	2,307	2,102	2	50	-	150
Wash.	25	49	1	111	126	1	3	-	-
Oreg.	46	23	-	40	40	-	-	-	-
Calif.	387	767	13	2,020	1,801	1	45	-	134
Alaska	2	3	-	17	34	-	-	-	16
Hawaii	2	4	-	119	101	-	2	-	-
Guam	-	2	-	28	34	-	-	-	-
P.R.	239	125	-	64	55	-	-	-	22
V.I.	24	23	-	2	3	-	-	-	-
Amer. Samoa	-	-	-	1	-	-	-	-	-
C.N.M.I.	2	4	-	13	12	-	-	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending June 5, 1993 (22nd Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	493	325	93	48	13	14	36
Boston, Mass.	168	105	36	17	4	6	23
Bridgeport, Conn.	29	18	4	4	1	2	1
Cambridge, Mass.	16	14	1	1	-	-	-
Fall River, Mass.	19	14	4	-	1	-	1
Hartford, Conn.	29	12	7	6	3	1	-
Lowell, Mass.	11	8	3	-	-	-	-
Lynn, Mass.	20	14	3	3	-	-	-
New Bedford, Mass.	24	19	3	2	-	-	-
New Haven, Conn.	45	27	9	4	2	3	4
Providence, R.I.	31	21	7	2	1	-	2
Somerville, Mass.	6	5	1	-	-	-	-
Springfield, Mass.	U	U	U	U	U	U	U
Waterbury, Conn.	34	25	5	3	1	-	3
Worcester, Mass.	61	43	10	6	-	2	2
MID. ATLANTIC	2,339	1,530	430	258	58	63	92
Albany, N.Y.	46	39	3	2	1	1	3
Allentown, Pa.	19	16	2	1	-	-	-
Buffalo, N.Y.	100	64	20	10	5	1	2
Camden, N.J.	32	19	5	3	2	3	-
Elizabeth, N.J.	10	7	3	-	-	-	-
Erie, Pa.§	48	39	6	-	-	3	2
Jersey City, N.J.	44	29	11	4	-	-	2
New York City, N.Y.	1,211	772	221	166	31	21	43
Newark, N.J.	73	26	25	12	7	3	2
Paterson, N.J.	30	16	7	5	1	1	-
Philadelphia, Pa.	302	187	54	35	5	21	21
Pittsburgh, Pa.§	91	66	16	2	1	6	3
Reading, Pa.	12	9	-	2	1	-	-
Rochester, N.Y.	127	103	16	5	-	3	8
Schenectady, N.Y.	27	22	3	1	1	-	-
Scranton, Pa.§	24	17	3	4	-	-	1
Syracuse, N.Y.	61	43	16	1	1	-	2
Trenton, N.J.	26	17	6	3	-	-	2
Utica, N.Y.	20	16	4	-	-	-	-
Yonkers, N.Y.	36	23	9	2	2	-	1
E.N. CENTRAL	1,674	1,051	337	152	85	49	84
Akron, Ohio	62	44	13	3	1	1	-
Canton, Ohio	38	33	5	-	-	-	5
Chicago, Ill.	343	135	73	73	52	10	14
Cincinnati, Ohio	97	70	16	6	2	3	7
Cleveland, Ohio	130	84	31	10	1	4	4
Columbus, Ohio	113	79	21	8	5	-	9
Dayton, Ohio	90	67	19	3	-	1	1
Detroit, Mich.	141	75	35	15	11	5	4
Evansville, Ind.	32	26	4	1	-	1	2
Fort Wayne, Ind.	32	23	6	2	-	1	1
Gary, Ind.	11	7	1	2	1	-	-
Grand Rapids, Mich.	50	34	11	1	1	3	5
Indianapolis, Ind.	159	102	40	10	3	4	10
Madison, Wis.	31	19	8	2	1	1	1
Milwaukee, Wis.	95	71	11	4	1	8	5
Peoria, Ill.	34	28	4	1	-	1	2
Rockford, Ill.	37	27	5	2	2	1	1
South Bend, Ind.	33	22	9	2	-	-	1
Toledo, Ohio	82	53	17	5	3	4	9
Youngstown, Ohio	64	52	8	2	1	1	3
W.N. CENTRAL	734	540	114	47	24	9	29
Des Moines, Iowa	118	88	20	2	6	2	8
Duluth, Minn.	16	10	5	-	-	1	-
Kansas City, Kans.	18	13	4	-	-	1	1
Kansas City, Mo.	126	92	20	9	5	-	1
Lincoln, Nebr.	30	24	4	1	1	-	2
Minneapolis, Minn.	173	128	26	15	2	2	13
Omaha, Nebr.	73	52	12	7	1	1	-
St. Louis, Mo.	104	77	11	9	5	2	4
St. Paul, Minn.	39	26	9	3	1	-	-
Wichita, Kans.	37	30	3	1	3	-	-
S. ATLANTIC	1,211	717	261	147	43	42	63
Atlanta, Ga.	149	85	30	27	5	2	7
Baltimore, Md.	175	102	48	17	7	-	13
Charlotte, N.C.	89	52	17	6	4	10	4
Jacksonville, Fla.	100	68	19	8	4	1	5
Miami, Fla.	108	68	22	14	1	3	1
Norfolk, Va.	59	37	9	5	3	5	2
Richmond, Va.	66	41	11	11	3	-	6
Savannah, Ga.	62	46	9	4	1	2	3
St. Petersburg, Fla.	41	26	11	2	1	1	5
Tampa, Fla.	124	77	33	7	4	3	12
Washington, D.C.	216	102	45	45	10	14	5
Wilmington, Del.	22	13	7	1	-	1	-
E.S. CENTRAL	633	398	122	63	31	19	50
Birmingham, Ala.	89	52	16	7	7	7	4
Chattanooga, Tenn.	54	36	10	2	5	1	3
Knoxville, Tenn.	77	50	18	5	3	1	5
Lexington, Ky.	70	50	14	4	2	-	10
Memphis, Tenn.	181	111	33	25	9	3	11
Mobile, Ala.	38	23	7	5	2	1	2
Montgomery, Ala.	U	U	U	U	U	U	U
Nashville, Tenn.	124	76	24	15	3	6	15
W.S. CENTRAL	840	555	152	81	26	23	44
Austin, Tex.	48	30	10	6	1	1	1
Baton Rouge, La.	41	34	4	2	1	-	3
Corpus Christi, Tex.	23	16	4	2	-	1	1
Dallas, Tex.	152	88	25	27	6	6	4
El Paso, Tex.	52	36	11	4	1	-	6
Ft. Worth, Tex.	96	63	13	12	2	6	3
Houston, Tex.	U	U	U	U	U	U	U
Little Rock, Ark.	49	36	9	1	2	1	5
New Orleans, La.	68	39	12	8	3	3	-
San Antonio, Tex.	186	132	33	13	6	2	6
Shreveport, La.	43	26	13	1	1	2	7
Tulsa, Okla.	82	55	18	5	3	1	8
MOUNTAIN	743	462	150	87	20	23	50
Albuquerque, N.M.	87	52	18	10	3	4	1
Colo. Springs, Colo.	46	27	11	6	2	-	5
Denver, Colo.	93	55	15	14	3	6	7
Las Vegas, Nev.	99	57	30	8	2	1	7
Ogden, Utah	21	17	3	1	-	-	-
Phoenix, Ariz.	190	117	37	24	5	7	12
Pueblo, Colo.	18	13	3	2	-	-	-
Salt Lake City, Utah	85	55	13	9	5	3	10
Tucson, Ariz.	104	69	20	13	-	2	8
PACIFIC	1,721	1,146	277	194	57	43	113
Berkeley, Calif.	17	15	1	-	1	-	2
Fresno, Calif.	84	46	19	15	2	2	2
Glendale, Calif.	24	15	8	-	1	-	1
Honolulu, Hawaii	72	54	10	4	3	1	2
Long Beach, Calif.	72	38	18	12	-	4	10
Los Angeles, Calif.	417	265	81	39	21	8	21
Pasadena, Calif.	32	22	4	4	-	2	5
Portland, Oreg.	131	96	11	17	2	5	4
Sacramento, Calif.	137	92	23	16	3	3	14
San Diego, Calif.	143	92	23	13	7	8	14
San Francisco, Calif.	171	100	23	41	2	4	1
San Jose, Calif.	141	101	21	10	7	2	14
Santa Cruz, Calif.	34	28	3	3	-	-	5
Seattle, Wash.	135	93	20	13	6	3	3
Spokane, Wash.	58	44	8	3	2	1	10
Tacoma, Wash.	53	45	4	4	-	-	5
TOTAL	10,388¶	6,724	1,936	1,077	357	285	561

*Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

†Pneumonia and influenza.

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

¶Total includes unknown ages.

U: Unavailable.

MDR-TB Outbreak — Continued

tion fragment length polymorphism analysis had the same DNA pattern, suggesting transmission of a common strain.

During November 1991, tuberculin skin tests (TSTs) were administered to the 21 health-care workers (HCWs) with negative TSTs in the previous year but who were regularly assigned to the HIV inpatient unit. Of these, TSTs were reactive (i.e., ≥5 mm induration) for 12 (57%): seven nurses, four aides, and one clerical worker. Chest roentgenograms performed on all TST-reactive HCWs were negative, and none had become symptomatic as of mid-July 1992. HCWs had not used respiratory protection during the period transmission was documented (January 1991–March 1992).

Hospital charts of all persons with MDR-TB were reviewed to determine patients' HIV status, drug use, and previous history of TB diagnosis and hospitalization. TB was not initially suspected in 16 case-patients, and acid-fast bacillus (AFB) precautions either had not been used or were instituted late during hospitalization. Health-care workers observed that MDR-TB patients (before and/or after diagnosis) frequently left their rooms to visit other patients, meet visitors, or walk to the day room. Doors to the patient rooms in the HIV ward were frequently left open.

An environmental investigation of the ventilation system for the HIV unit revealed that all rooms were at positive pressure with respect to the hall. The exhaust vents were nonfunctional because they were obstructed with dust and dirt.

Control measures implemented since January 1991 have included repairs of the ventilation system and restoration of negative pressure to the isolation rooms, educating clinicians regarding the need to consider TB in all patients with fever and respiratory symptoms, institution of AFB isolation (i.e., placing patients in negative-pressure rooms) for any patient with suspected or confirmed TB, and rapid microbiologic evaluation of HIV-infected patients for TB. In April 1993, the hospital opened one ward that had been modified to serve as a TB unit; all rooms meet the CDC AFB isolation room recommendations (i.e., negative pressure, at least six air exchanges per hour, and air exhausted to the outside away from intake vents, persons, and animals [*1*]).

Reported by: D Hewlett, Jr, MD, D Franchini, MD, D Horn, MD, C Alfalla, MD, R Yap, MD, D Di Pietro, MD, S Peterson, MD, H Eisenberg, MD, Dept of Medicine, Y Lue, PhD, Dept of Pathology, M Rodriguez, M Roberto, MD, Employee Health Svcs, Lincoln Medical and Mental Health Center, Bronx, and New York Medical College, Valhalla, New York; D Alland, MD, Div of Infectious Diseases, Albert Einstein School of Medicine, Bronx, New York. S Opal, MD, Brown Univ School of Medicine, Providence, Rhode Island.

Editorial Note: Since 1989, eight nosocomial MDR-TB outbreaks have been documented by CDC in the United States (*2–4*; CDC, unpublished data). The outbreak described in this report involved HIV-infected patients who were not recognized as being infected with TB or were not suspected of having MDR-TB and who had been housed on a dedicated HIV ward; delays in disease recognition consequently delayed initiation of appropriate isolation (i.e., negative-pressure rooms or confinement to rooms).

In this report, HCWs also were at risk for infection. Factors that may have contributed to infection of the HCWs were the inability to properly isolate patients with MDR-TB in negative-pressure rooms, exposure to inadequately masked infectious MDR-TB patients, and/or inadequate respiratory protection of HCWs. Identification of HCWs infected with TB requires active surveillance and TST programs (*1*).

MDR-TB Outbreak — Continued

The findings in this report and investigation of other MDR-TB outbreaks underscore the importance of fully implementing CDC guidelines for preventing TB transmission in health-care settings (*1*). In one national survey, approximately 27% of U.S. hospitals had no rooms with AFB isolation facilities (*5*), and capabilities of many laboratories to isolate, identify, and determine antimicrobial susceptibility of *M. tuberculosis* isolates are limited (*6*).

The morbidity and mortality associated with MDR-TB outbreaks emphasize the need for implementation of guidelines that include 1) education of clinicians to consider TB in any patient with fever and respiratory symptoms, particularly among immunocompromised persons; 2) effective AFB isolation of suspected/confirmed TB patients; 3) early institution of effective treatment regimens; and 4) appropriate follow-up of discharged patients (*7*). Consideration should be given to treating all patients with directly observed therapy to insure that all antituberculous medications are taken for the full course of therapy (*8*). In addition, patients exposed to other patients with infectious TB for whom effective AFB isolation was not in place should be identified, evaluated for TB infection and disease, and evaluated for preventive therapy once active TB has been ruled out (*1,8*).

References

1. CDC. Guidelines for preventing the transmission of tuberculosis in health-care settings, with special focus on HIV-related issues. MMWR 1990;39(no. RR-17).
2. CDC. Nosocomial transmission of multidrug-resistant tuberculosis among HIV-infected persons—Florida and New York, 1988–1991. MMWR 1991;40:585–91.
3. Edlin BR, Tokars JI, Grieco MH, et al. An outbreak of multidrug-resistant tuberculosis among hospitalized patients with the acquired immunodeficiency syndrome. N Engl J Med 1992; 326:1514–21.
4. Pearson ML, Jereb JA, Frieden TR, et al. Nosocomial transmission of multidrug-resistant *Mycobacterium tuberculosis*: a risk to patients and health care workers. Ann Intern Med 1992; 117:191–6.
5. Rudnick JR, Kroc K, Manangan L, Banerjee S, Pugliese G, Jarvis W. Are U.S. hospitals prepared to control nosocomial transmission of tuberculosis? [Abstract]. In: Program and abstracts of the Epidemic Intelligence Service 42nd annual conference. Atlanta: US Department of Health and Human Services, Public Health Service, CDC, 1993:60.
6. Huebner RE, Good RC, Tokars JI. Current practices in mycobacteriology: results of a survey of state public health laboratories. J Clin Microbiol 1993;31:771–5.
7. CDC. Management of persons exposed to multidrug-resistant tuberculosis. MMWR 1992;41 (no. RR-11):61–71.
8. American Thoracic Society. Control of tuberculosis in the United States. Am Rev Respir Dis 1992;146:1623–33.

Epidemiologic Notes and Reports

Comprehensive Assessment of Health Needs 2 Months After Hurricane Andrew — Dade County, Florida, 1992

On August 24, 1992, Hurricane Andrew struck southern Florida. More than 28,000 houses, mobile homes, and apartment buildings were destroyed, and approximately 107,000 additional dwellings sustained major damage (*1*). An estimated 180,000 persons were left homeless; insured damages were estimated at $15.5 billion and total damages at more than $30 billion. During the recovery period, many private and pub-

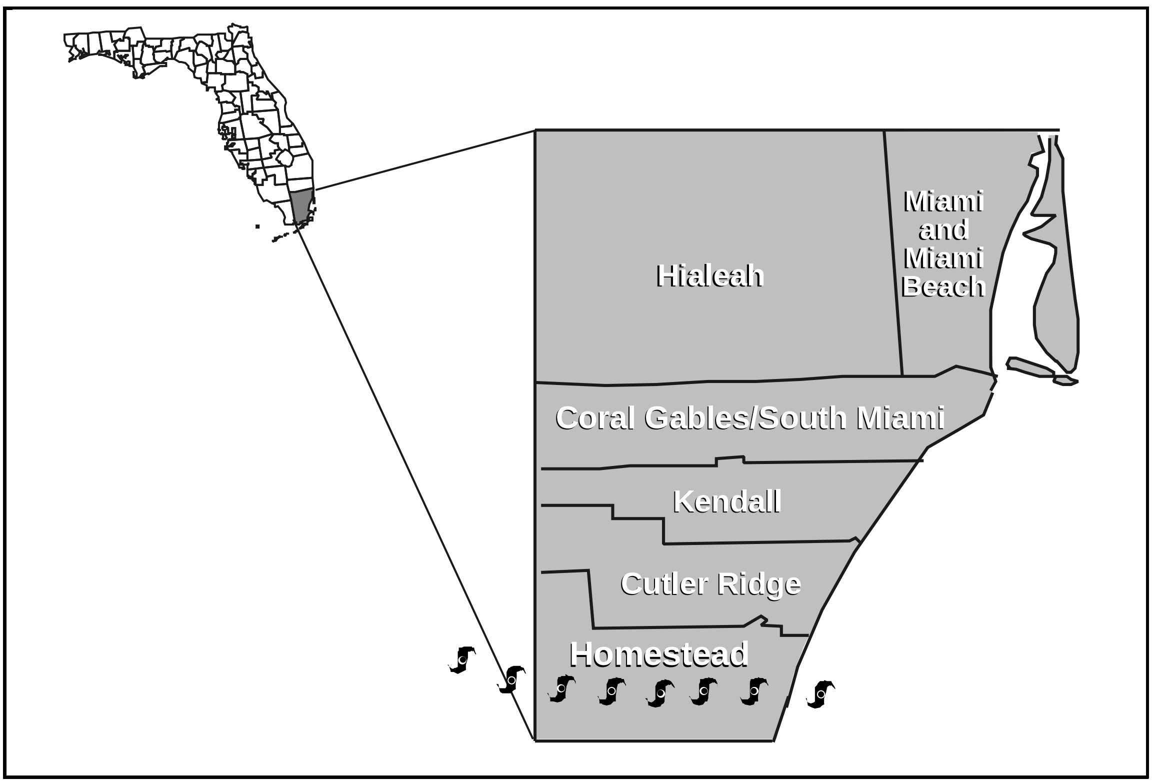
Hurricane Andrew — Continued

lic health-care facilities damaged or destroyed in the storm were not functional. During November 3–13, to help prioritize health needs and direct public health resources, the Dade County Public Health Unit of the Florida Department of Health and Rehabilitative Services conducted a survey to assess health needs and the availability of health-care services during the recovery phase with funds provided by the Federal Emergency Management Agency (FEMA). This report summarizes the results of the survey.

For this survey, the county was divided into six zones according to the extent of hurricane damage (Figure 1)—Hialeah and Miami/Miami Beach (the northernmost zones) sustained the least damage and Homestead (the southernmost zone) was affected most severely. Within each zone, a two-stage cluster design was used to randomly select households for interview. Information was obtained by interviewing one member of each selected household who was considered capable of understanding the questions. Respondents were asked about demographic characteristics, transportation, environmental problems, food supplies, health insurance status, sources of health care (primary medical, dental, mental, and emergency care), barriers to adequate care, indicators of mental health status, and evacuation behaviors.

Questionnaires were completed by 1353 (75%) of the 1800 selected households. Overcrowding (i.e., at least one new person living in the household since the storm) was greatest in the Homestead zone (38%) and decreased progressively with distance from the storm track (Table 1). The proportion of households in which at least one person had symptoms of stress or anxiety also was highest in the Homestead zone (53%) and decreased progressively to 18% in the northernmost zones. The proportion

FIGURE 1. Six zones that were established to assess health service needs following Hurricane Andrew — Dade County, Florida, 1992



Hurricane Andrew — Continued

of households reporting that at least one person needed counseling services ranged from 5% in the northernmost zone to 13% in the Homestead zone.

In the Homestead zone, 12% of households reported that at least one person had lost health insurance because of the hurricane, compared with 5%–6% for other zones in the county (Table 1). More than twice the number of households in the Homestead zone (14%) had at least one person who needed unemployment compensation than in other zones (3%–7%). Twenty-eight percent of households in the Homestead zone reported they used community or neighborhood health centers for primary health care, including preventive care, compared with 11% of households in the entire county. Use of public programs for dental care was also greatest in the Homestead zone.

Reported by: C Carmichael, MD, A Neasman, MS, L Rivera, G Wurm, MD, Dade County Public Health Unit, Miami; L Elliott, WG Hlady, MD, K Mason, EdD, J Sims, PhD, RS Hopkins, MD, State Epidemiologist, Florida Dept of Health and Rehabilitative Svcs. Applications Br, and Statistics and Analytic Methods Br, Div of Surveillance and Epidemiology, Epidemiology Program Office; Women's Health and Fertility Br, Div of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion; Disaster Assessment and Epidemiology Section, Health Studies Br, Div of Environmental Hazards and Health Effects, and Emergency Response and Coordination Group, National Center for Environmental Health, CDC.

Editorial Note: Approximately every 5 years, a hurricane with catastrophic potential makes landfall in the United States (*3*). Hurricane Andrew was one of the most devastating in 25 years. Although hurricane warning systems in the United States are well developed, the population density in hurricane-vulnerable areas has increased substantially during the past 20 years (*4*). Adequate means of evacuation and safe refuge are necessary for residents in communities on barrier islands and other vulnerable coastal communities to minimize injury and death associated with future hurricanes. However, as the findings in this report indicate, even if effective evacuation procedures are in place, the long-term health and economic impact of hurricanes may be substantial.

This assessment indicates that 2 months after Hurricane Andrew, unmet health needs—particularly mental health—persisted in Dade County. This information has

TABLE 1. Key findings* from comprehensive assessment of health needs 2 months after Hurricane Andrew, by zone — Dade County, Florida, 1992

Zone	Households with new member(s) since storm		Households in which at least one person had indicators of stress or anxiety		Households in which one person lost health insurance because of storm	
	%	(95% CI†)	%	(95% CI)	%	(95% CI)
Hialeah	17	(11–23)	18	(12–25)	5	(2– 8)
Miami/Miami Beach	15	(10–20)	18	(14–22)	5	(3– 8)
Coral Gables/South Miami	23	(17–28)	22	(16–27)	5	(2– 8)
Kendall	23	(18–28)	39	(32–46)	6	(3– 9)
Cutler Ridge	26	(20–32)	46	(39–53)	6	(3– 9)
Homestead	38	(30–45)	53	(46–60)	12	(8–16)
Entire county	**19**	**(17–22)**	**24**	**(21–26)**	**6**	**(4– 7)**

*Data were entered and analyzed using a module in Epi Info (*2*) for analyzing complex sample survey data to adjust variance estimates and allow weighting of the results using 1990 census information.

†Confidence interval.

Hurricane Andrew — Continued

been used to target health services more effectively, particularly in areas with a high degree of dependence on public programs. Based in part on these findings, community health centers in southernmost zones were rebuilt and enlarged. Health and social services also were expanded through community health teams that provided vaccinations, counseling, information on financial assistance and health and social services.

Health needs assessments during the early part of the recovery phase are effective in ensuring that decisions regarding the allocation of resources are based on actual needs (*5*). In both Florida and Louisiana, rapid needs assessments conducted 3–10 days after the storm were used to direct relief efforts in the early part of the recovery phase (*6*). This survey is the first for which FEMA has allocated relief funds for evaluating health-care needs and resources in the latter part of a recovery phase of a disaster. A second survey to further guide continued recovery efforts is planned.

References

1. Governor's Disaster Planning and Response Review Committee. Final report, Hurricane Andrew. Tallahassee, Florida: State of Florida, January 15, 1993.
2. Dean AD, Dean JA, Burton JH, Dicker RC. Epi Info, version 5: a word processing, database, and statistics program for epidemiology on microcomputers. Atlanta: US Department of Health and Human Services, Public Health Service, CDC, 1990.
3. Herbert P, Taylor G, Case R. Hurricane experience levels of coastal county population—Texas to Maine. Miami: US Department of Commerce, National Oceanographic and Atmospheric Administration, 1984; technical memorandum NWS NHC 25.
4. French JG. Hurricanes. In: Gregg MB, ed. The public health consequences of disasters, 1989. Atlanta: US Department of Health and Human Services, Public Health Service, CDC, 1989:33–7.
5. CDC. Famine-affected, refugee, and displaced populations: recommendations for public health issues. MMWR 1992;41(no. RR-13).
6. CDC. Rapid health needs assessment following Hurricane Andrew—Florida and Louisiana, 1992. MMWR 1992;41:685–8.

Current Trends

Adult Blood Lead Epidemiology and Surveillance — United States, First Quarter, 1993

The Adult Blood Lead Epidemiology and Surveillance (ABLES) program of CDC's National Institute for Occupational Safety and Health (NIOSH) monitors elevated blood lead levels (BLLs) in adults through laboratory reports received by state-based surveillance programs and summarizes these results quarterly in *MMWR* (Table 1). The goals of ABLES are to 1) describe the magnitude of occupational lead poisoning, 2) monitor trends in the incidence and prevalence of this condition, 3) identify new or unrecognized sources of lead exposure, 4) focus public health attention on this ongoing problem, and 5) effectively target worksites for intervention to reduce excessive lead exposure.

Reported by: B Harrell, MPA, Div of Epidemiology; CH Woernle, MD, State Epidemiologist, Alabama Dept of Public Health. J McCammon, MS, Epidemiology Div, Colorado Dept of Health. CJ Dupuy, BJ Jung, MPH, Connecticut State Dept of Health Svcs. M Lehnherr, Occupational Disease Registry; H Howe, PhD, Div of Epidemiologic Studies, Illinois Dept of Public Health. S Jones, R Gergely, Iowa Dept of Public Health. E Coe, MPH, E Keyvan, MD, Health Registries Div, Maryland Dept of the Environment. R Rabin, MSPH, Div of Occupational Hygiene, Massachusetts Dept of Labor and Industries. P Dunbar, MPH, Alethia Carr, Bur of Child and Family

Lead Epidemiology and Surveillance — Continued

TABLE 1. Reports of elevated blood lead levels (BLLs) in adults — 16 states,* first quarter, 1993

Reported BLL (μg/dL)	First quarter, 1993	Cumulative, 1993	Cumulative, 1992†
25–39	3,360	3,360	15,279
40–49	846	846	4,288
50–59	162	162	1,089
≥60	79	79	585
Total	**4,447**	**4,447**	**21,241**

*Alabama, Connecticut, Illinois, Iowa, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Oregon, South Carolina, Texas, Utah, Vermont, and Wisconsin.
†Cumulative totals for 1992 include data from Colorado and Pennsylvania, which provide only annual reports.

Svcs, Michigan Dept of Public Health. D Solet, PhD, Karen Royce, Occupational Health Program, Bur of Risk Assessment, Div of Public Health Svcs, New Hampshire State Dept of Health and Human Svcs. B Gerwel, MD, Occupational Disease Prevention Program, New Jersey Dept of Health. R Stone, PhD, New York State Dept of Health. M Barnett, MS, State Health Div, Oregon Dept of Human Resources. J Gostin, MS, Occupational Health Program, Div of Environmental Health, Pennsylvania Dept of Health. R Marino, MD, A Gardiner, Div of Health Hazard Evaluations, South Carolina Dept of Health and Environmental Control. T Willis, DM Perrotta, PhD, Environmental Epidemiologist, Texas Dept of Health. D Beaudoin, MD, Bur of Epidemiology, Utah Dept of Health. L Paulozzi, MD, L Toof, Bur of Chronic Disease Epidemiology, Vermont Dept of Health. L Hanrahan, MS, Div of Health, Wisconsin Dept of Health and Social Svcs. Div of Surveillance, Hazard Evaluations, and Field Studies, National Institute for Occupational Safety and Health, CDC.

Editorial Note: State-based ABLES programs recognize that parents' exposure to lead at the workplace can be a source of "take-home" exposure (e.g., contaminated clothing, automobiles, and other items brought home from the worksite) for their children (*1*). During case follow-up of lead-poisoned workers, states participating in the ABLES program gather information on the children and/or other at-risk family members living in the household; when appropriate, children are referred for blood lead monitoring.

Conversely, cases of lead poisoning in children detected through community lead screening efforts may provide important information regarding parental occupational exposure to lead. For example, in 1991, the first year of the Alabama lead surveillance program, follow-up reports for 46 children aged 6 months–16 years with BLLs >15 μg/dL revealed that 11 (24%) had a potential parental occupational source for their lead exposure (C. Woernle, Alabama Department of Public Health, personal communication, 1993). Similarly, follow-up investigation of two siblings (aged 3 and 7 years) in Colorado with BLLs of 38 and 36 μg/dL, respectively, found that the children received day care at their parents' radiator repair shop. In addition, the parents regularly wore lead-contaminated clothing home (J. McCammon, Colorado Department of Health, personal communication, 1993). The father's BLL was 52 μg/dL, and the mother's, 20 μg/dL; a co-worker at the shop had a level of 79 μg/dL. The overall magnitude of take-home lead exposure and the frequency at which children are exposed to lead through parental contact with lead at work or at home remain unknown.

Compliance with current Occupational Safety and Health Administration (OSHA) standards mandates the removal of lead-contaminated protective clothing and shoes before leaving the workplace, which should substantially reduce or eliminate these

Lead Epidemiology and Surveillance — Continued

take-home exposures (*2*). Furthermore, a new interim final OSHA standard on "Lead Exposure in Construction" (effective June 3, 1993) extends regulatory coverage to workers in the construction trades, providing health and safety provisions similar to those required under the OSHA lead standard for general industry (*3*).

References

1. CDC. Lead poisoning among battery reclamation workers—Alabama, 1991. MMWR 1992; 41:301–4.
2. Office of the Federal Register. Code of federalregulations: occupational safety and health standards. Subpart Z: toxic and hazardous substances—lead. Washington, DC: Office of the Federal Register, National Archives and Records Administration, 1985. (29 CFR § 1910.1025).
3. US Department of Labor, Occupational Safety and Health Administration. Lead exposure in construction: interim final rule. Federal Register 1993;58:26590–649. (29 CFR § 1926).

The *Morbidity and Mortality Weekly Report (MMWR)* Series is prepared by the Centers for Disease Control and Prevention (CDC) and is available on a paid subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202) 783-3238.

The 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 succeeding Friday. Inquiries about the *MMWR* Series, including material to be considered for publication, should be directed to: Editor, *MMWR* Series, Mailstop C-08, Centers for Disease Control and Prevention, Atlanta, GA 30333; telephone (404) 332-4555.

☆U.S. Government Printing Office: 1993-733-131/83009 Region IV