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Perspectives in Disease Prevention and Health Promotion

Final Results: Medicare Influenza Vaccine Demonstration — Selected States, 1988–1992

Pneumonia and influenza (P&I) are the sixth leading cause of death in the United States (*1*), and persons aged ≥65 years and persons with chronic conditions (e.g., lung or heart disease, diabetes, or cancer) are at greatest risk for P&I. During major epidemics, hospitalization rates for persons at highest risk may increase twofold to fivefold (*2*). However, only 30% of persons aged ≥65 years responding to CDC's National Health Interview Survey for 1989 reported having received the influenza vaccine during the previous year (*3*). In 1988, the Health Care Financing Administration (HCFA) and CDC began a congressionally mandated 4-year demonstration project to evaluate the cost-effectiveness to Medicare of providing influenza vaccine to Medicare beneficiaries. This report presents final results of the Medicare Influenza Vaccine Demonstration conducted during 1988–1992.

Using intervention and comparison areas in Arizona, Illinois, Massachusetts, Michigan, New York, North Carolina, Ohio, Pennsylvania, and Texas and the entire state of Oklahoma (total Medicare population: approximately 2 million), the demonstration sought to 1) increase the provision of annual influenza vaccination among Medicare beneficiaries and 2) measure the accrued benefits of vaccination in terms of reduced morbidity and mortality and the difference in the cost to Medicare of health services use. Levels of vaccination coverage were assessed at baseline and annually at all sites. The cost-effectiveness indices were calculated using morbidity and mortality data from the demonstration and published studies and compared with cost-effectiveness of other Medicare benefits.

In intervention areas, influenza vaccine was supplied without cost to Medicare providers by local health departments using computerized vaccine monitoring and distribution systems. Providers were reimbursed for administration of vaccine. Before the 1990–91 and 1991–92 influenza seasons, the HCFA sent letters to all Medicare beneficiaries living in the intervention areas urging them to be vaccinated. The letters contained specific program information and a local telephone number for obtaining information. In addition, intervention sites undertook varied activities directed to both providers and patients to promote and distribute vaccine to Medicare beneficiaries (*4*).

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Vaccination Coverage

The number of doses of vaccine administered during the 4-year demonstration and the percentage of the Medicare population vaccinated in the intervention areas increased from 477,316 (26%) during 1989–90 (the first full year of the project) to 995,884 (51%) during 1991–92. Because some Medicare beneficiaries received influenza vaccines from sources not reimbursed by Medicare, annual surveys were conducted to accurately estimate vaccine coverage in each intervention and comparison site. For 1991–92, the overall vaccine coverage estimate for the 10 intervention sites was 59%, compared with 46% overall vaccine coverage in the comparison sites with no enhanced vaccine delivery or promotion activities. Four intervention sites exceeded 60% vaccination coverage. The increase in influenza vaccination coverage in comparison sites was approximately the same as that in the rest of the United States during this period (CDC, unpublished data, 1993).

Vaccine Effectiveness

Three case-control studies of influenza vaccine effectiveness in preventing hospitalization for pneumonia were conducted during the demonstration. In aggregate, these studies estimated that influenza vaccine was 31%–45% effective in preventing hospitalization for any pneumonia during the 1989–90, 1990–91, and 1991–92 influenza seasons (*5–7;* HCFA, unpublished data, 1993).

Cost-Effectiveness

Simulation models were used to calculate Medicare hospital payment savings by incorporating a range of vaccination rates (from 35% to 60% or an increase from the 30% baseline rate of 5%–30%) and a range of influenza vaccine effectiveness estimates in reducing pneumonia hospitalizations and deaths (from 5% to 70%). Total net costs to Medicare were calculated by subtracting savings in hospital payments from vaccine program costs (i.e., vaccine purchase, distribution, and administration). A severe influenza season was defined as one with P&I morbidity and mortality substantially above expected thresholds; a mild season was defined as one in which P&I morbidity and mortality did not exceed expected thresholds. Hospital payment costs were averaged over 10 years by weighting estimates of single-year savings for severe and mild years. At a 40% vaccination rate and vaccine effectiveness rates of 40% and 20% in severe and mild years, respectively, Medicare coverage of the vaccine would increase net Medicare expenditures per beneficiary by an estimated 11¢ or approximately $3.4 million (Table 1). At a vaccination rate of 40% and vaccine effectiveness rates of 42% and 21%, an influenza vaccine benefit would incur zero net costs. At higher levels of vaccine effectiveness and/or vaccine coverage, an influenza vaccine benefit would generate savings for Medicare.

Estimated net costs per year of life gained by a Medicare influenza vaccine benefit compared favorably with other preventive services now covered by Medicare. Assuming the vaccine is 40% effective both for reducing hospitalization and for averting deaths and the vaccination rate among Medicare beneficiaries is 40%, influenza vaccine would cost $145 per year of life gained, substantially below the cost of other preventive interventions. The Office of Technology Assessment estimated that pneumococcal vaccine would cost at least $1853 per year of healthy life gained (a slightly different measure of added years of life that adjusts for disability days) (*8*). The esti-

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mated cost of a year of life gained through cervical cancer screening is $1600–$2900 (*9*).

Because of these generally favorable results, influenza vaccine was made a covered benefit for all Medicare part B beneficiaries on May 1, 1993.

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Editorial Note: The Medicare Influenza Vaccine Demonstration increased annual influenza vaccine coverage and measured both health and economic benefits of influenza vaccine for Medicare. The perspective of the payer used in this study was important in securing coverage for this benefit; however, it differs from cost-effectiveness studies of prevention strategies that usually use a societal perspective and include all direct costs, not just those of the payer. In this study, only the costs paid by Medicare were included. Other costs, such as those incurred by patients for travel or by providers for patient's visits or vaccine administration above the amount paid by Medicare, were not included.

In the last year of the demonstration, influenza vaccination levels exceeded the national health objective for the year 2000 of 60% vaccine coverage among non-institutionalized persons aged ≥65 years (objective 20.11) (*10*) in four of 10 intervention sites and overall vaccination levels in the demonstration (59%) nearly reached this objective. Vaccination rates were well beyond the rate of 40% shown to incur zero net

TABLE 1. Cost to Medicare of influenza vaccine delivery and savings to Medicare, based on severe and mild influenza seasons* — Medicare Influenza Vaccine Demonstration, 1988–1992

Category	Cost per beneficiary
Vaccine	$0.80
Administration and claims processing	1.15
Distribution	0.28
Outreach	0.20
Adverse medical outcomes	<0.01
Total	**$2.43**

Category	Basis for calculating savings per beneficiary: Severe season	Basis for calculating savings per beneficiary: Mild season
Cost per P&I[†] admission	$5308.00	$5308.00
No. P&I admissions	0.016	0.015
Effectiveness	40%	20%
Vaccination rate above baseline	10%	10%
Probability of severe/mild season	40%	60%
Total savings in hospital payments (10-year annual average)[§]	$1.37	$0.95
Total savings per beneficiary[¶]	**$2.32**	

*A severe influenza season was defined as one with pneumonia and influenza (P&I) morbidity and mortality substantially above expected thresholds; a mild season was defined as one in which P&I morbidity and mortality did not exceed expected thresholds.

[†]Pneumonia and influenza.

[§]Savings are calculated as the product of the cost per P&I admission, the number of P&I admissions per beneficiary, the effectiveness of the vaccine, the vaccination rate above baseline, and the probability of a severe or mild season.

[¶]Sum of savings based on probability of a mild or severe season.

Vaccine Demonstration — Continued

costs in the cost-effectiveness analysis and would generate savings for Medicare if achieved nationally.

The demonstration's success in vaccine delivery resulted from focused interventions to overcome common barriers to adult vaccination, including the absence of a comprehensive vaccine delivery system, limited reimbursement mechanisms, and lack of vaccination programs where adults congregate. No statutory requirements mandating vaccination of Medicare beneficiaries were necessary to implement this program (*4*). The results of the cost-effectiveness analysis varied because of the variability of influenza from season to season in causing disease outcomes and the difficulty of attributing these outcomes to influenza. Nonetheless, provision of influenza vaccine was cost-effective for Medicare and may be cost-saving, depending on the effectiveness of the vaccine and the level of vaccination coverage.

Health-care providers such as physicians, hospitals, skilled-nursing facilities, home health agencies, and public health departments can now bill Medicare for reimbursement for the cost of influenza vaccine and the cost of its administration. The procedure codes for billing are 90724 and Q0124, respectively. Additional information for health-care providers in each state is available from the state's Medicare intermediary or carrier.

Implementation of this benefit should substantially improve influenza vaccine coverage among all Medicare beneficiaries, and thus reduce the high levels of morbidity and mortality attributed to influenza. However, both the public and health-care providers need to be educated about the major health burden of influenza-related illness and the necessity of vaccination to prevent it.

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Epidemiologic Notes and Reports

Tuberculosis Among Pregnant Women — New York City, 1985–1992

From 1985 through 1992, the number of reported tuberculosis (TB) cases increased 20% in the United States (*1*). During 1985–1990, TB cases increased 44% among persons aged 25–44 years and 27% among children (aged <15 years) (*2*), indicating that TB may be an increasing problem among reproductive-aged women (*3,4*). To determine the prevalence of active TB during pregnancy, the medical records from 1985 through 1992 of two public hospitals in New York City were reviewed. This report summarizes the results of the survey.

The populations served by these two hospitals are largely inner-city, indigent, and minority populations with a high prevalence of both TB and human immunodeficiency virus (HIV) infection. Active TB was defined as a positive culture for tubercle bacilli (sputum, urine, or spinal fluid specimens), regardless of smear findings for acid-fast bacilli. Sixteen pregnant women with active TB (12 from one hospital) were identified; TB was diagnosed in five among 40,388 births (12.4 per 100,000 births) at these hospitals during 1985–1990, and in 11 among 11,595 births (94.8) during 1991–1992.

Five of the 16 women had received prenatal care before TB diagnosis: two, after a positive skin test and further evaluation, and three, after admission to the emergency department with TB-related symptoms. The 11 remaining women had received no prenatal care before TB diagnosis; these women's pregnancies were confirmed when they were admitted to the emergency department with symptoms associated with TB.

Of the 16 women, TB was diagnosed in one during the first trimester of her pregnancy; in seven, during the second trimester; and in eight, during the third trimester. A Mantoux tuberculin intradermal test was positive for six of the 15 women who were tested. Ten of the 16 women had pulmonary TB; six had extrapulmonary TB (two had tuberculous meningitis; one, mediastinal; one, renal; one, gastrointestinal; and one, pleural).

Seven of 11 women tested for HIV were HIV positive. Seven of the 16 women were drug users (defined as current use of cocaine or heroin). Six of the seven women who were HIV positive were drug users or were described by their physicians as injecting-drug users (IDUs): two women were cocaine users, three were IDUs, and one was both a cocaine user and IDU. Six of the seven women who were HIV positive and five of the six women who were drug users had received no prenatal care at the time their TB was diagnosed.

Thirteen of the 16 patients were successfully treated with isoniazid (INH), ethambutol (EMB), and rifampin (RIF). Two women with TB of the central nervous system received pyrazinamide (PZA). One woman with pulmonary TB (cavitary) received additional PZA because of persistent positive sputum cultures after 5 months of therapy with INH, EMB, and RIF. The remaining 10 women became asymptomatic on initial therapeutic regimens: eight had negative repeat cultures, and two required invasive biopsies and were not recultured.

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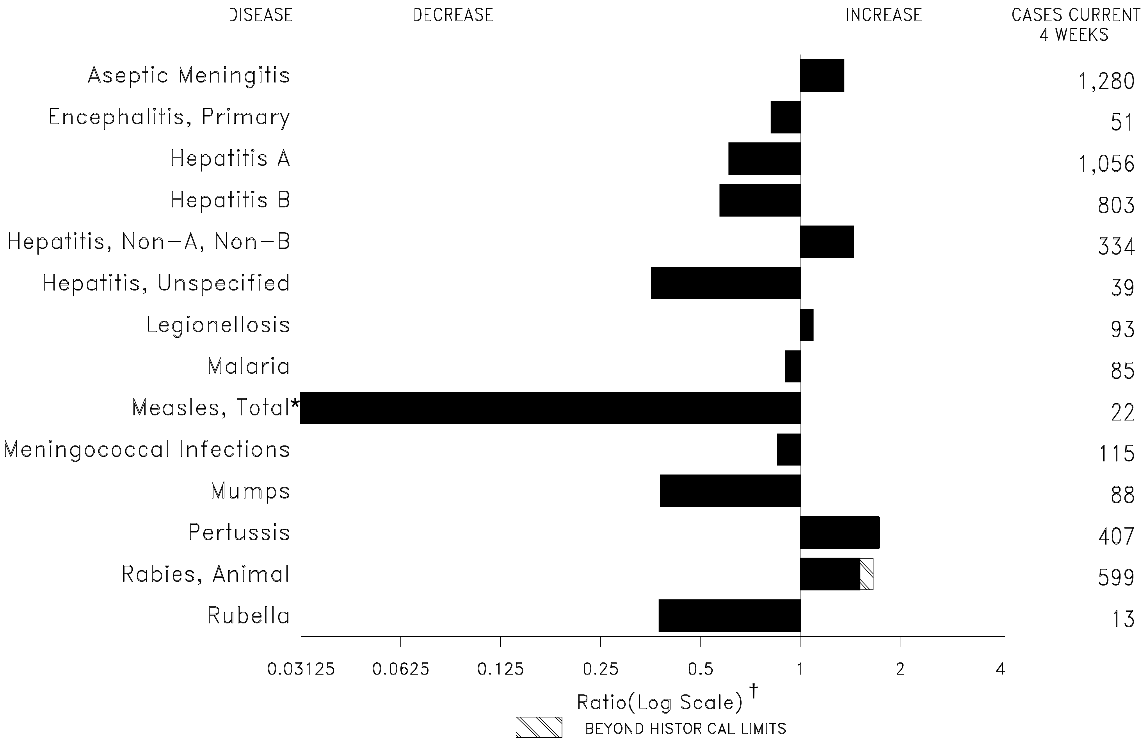
FIGURE I. Notifiable disease reports, comparison of 4-week totals ending August 7, 1993, with historical data — United States



*The large apparent decrease in reported cases of measles(total) reflects dramatic fluctuations in the historical baseline. (Ratio (log scale) for week thirty-one is 0.02966).

† 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 August 7, 1993 (31st Week)

	Cum. 1993		Cum. 1993
AIDS*	67,732	Measles: imported	29
Anthrax	-	indigenous	177
Botulism: Foodborne	8	Plague	3
Infant	15	Poliomyelitis, Paralytic§	-
Other	2	Psittacosis	32
Brucellosis	56	Rabies, human	-
Cholera	15	Syphilis, primary & secondary	15,411
Congenital rubella syndrome	6	Syphilis, congenital, age < 1 year¶	677
Diphtheria	-	Tetanus	19
Encephalitis, post-infectious	98	Toxic shock syndrome	140
Gonorrhea	223,223	Trichinosis	8
Haemophilus influenzae (invasive disease)†	754	Tuberculosis	11,670
Hansen Disease	99	Tularemia	74
Leptospirosis	21	Typhoid fever	187
Lyme Disease	3,256	Typhus fever, tickborne (RMSF)	196

*Updated monthly; last update July 31, 1993.
†Of 695 cases of known age, 228 (33%) were reported among children less than 5 years of age.
§No cases of suspected poliomyelitis have been reported in 1993; 10 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.
¶Reports through first quarter of 1993.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending August 7, 1993, and August 1, 1992 (31st 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	67,732	5,213	353	98	223,223	292,951	12,526	7,166	2,760	363	671	3,256
NEW ENGLAND	3,232	123	11	5	4,876	6,043	282	315	316	9	25	795
Maine	94	16	1	-	52	56	8	9	-	-	4	4
N.H.	67	17	-	2	43	75	13	54	250	2	2	31
Vt.	14	17	3	-	16	15	3	5	2	-	-	3
Mass.	1,818	52	5	3	1,737	2,212	154	195	57	7	15	79
R.I.	219	21	2	-	228	434	53	16	7	-	4	126
Conn.	1,020	-	-	-	2,800	3,251	51	36	-	-	-	552
MID. ATLANTIC	15,598	371	29	6	25,705	31,339	652	824	193	4	132	1,788
Upstate N.Y.	2,373	168	22	3	4,747	6,431	212	238	113	1	39	1,048
N.Y. City	8,289	104	1	-	6,768	10,640	177	121	1	-	3	3
N.J.	2,991	-	-	-	4,435	4,464	178	230	56	-	18	349
Pa.	1,945	99	6	3	9,755	9,804	85	235	23	3	72	388
E.N. CENTRAL	5,419	699	92	20	43,111	55,176	1,349	841	409	9	182	25
Ohio	938	231	31	4	12,356	16,256	183	136	31	-	95	17
Ind.	634	94	11	8	4,556	5,027	457	135	8	1	36	4
Ill.	1,939	133	18	2	12,862	18,285	323	142	34	2	8	2
Mich.	1,379	228	26	6	10,013	13,051	130	262	308	6	36	2
Wis.	529	13	6	-	3,324	2,557	256	166	28	-	7	-
W.N. CENTRAL	2,428	303	16	-	11,802	15,561	1,523	387	90	10	46	89
Minn.	511	51	7	-	1,521	1,761	271	42	3	4	1	47
Iowa	141	59	1	-	602	1,009	26	15	5	1	6	6
Mo.	1,374	76	-	-	6,706	8,571	966	279	64	5	11	7
N. Dak.	1	8	3	-	29	53	56	-	-	-	1	2
S. Dak.	22	7	3	-	164	102	12	-	-	-	-	-
Nebr.	135	7	-	-	476	982	131	11	8	-	22	4
Kans.	244	95	2	-	2,304	3,083	61	40	10	-	5	23
S. ATLANTIC	14,279	1,239	64	40	60,419	90,319	754	1,361	357	47	122	442
Del.	253	32	3	-	823	1,047	8	107	72	-	9	218
Md.	1,630	113	14	-	9,610	8,925	106	172	7	5	28	77
D.C.	896	24	-	-	3,034	3,924	5	30	-	-	13	2
Va.	1,049	118	24	4	7,192	10,587	93	91	22	20	3	32
W. Va.	46	13	10	-	369	516	9	26	16	-	1	3
N.C.	790	105	12	-	14,638	14,917	40	185	40	-	15	57
S.C.	933	17	-	-	6,191	6,692	9	25	-	1	12	4
Ga.	1,854	75	1	-	4,660	27,454	63	120	51	-	23	27
Fla.	6,828	742	-	36	13,902	16,257	421	605	149	21	18	22
E.S. CENTRAL	1,796	333	16	5	25,943	28,015	153	749	531	1	29	13
Ky.	213	121	9	4	2,726	2,846	74	52	9	-	11	3
Tenn.	731	82	5	-	7,852	9,187	31	631	508	-	13	8
Ala.	531	87	1	-	9,296	9,094	32	63	4	1	2	2
Miss.	321	43	1	1	6,069	6,888	16	3	10	-	3	-
W.S. CENTRAL	6,957	591	26	2	26,475	31,748	1,204	962	157	110	20	26
Ark.	267	30	1	-	5,128	4,689	31	35	2	2	2	1
La.	921	41	1	-	6,915	8,978	46	127	61	2	2	-
Okla.	590	1	6	-	2,120	3,214	81	168	53	7	11	13
Tex.	5,179	519	18	2	12,312	14,867	1,046	632	41	99	5	12
MOUNTAIN	2,948	318	16	4	6,448	7,294	2,446	350	186	55	48	13
Mont.	22	-	-	1	42	63	57	4	2	-	5	-
Idaho	52	7	-	-	106	65	110	29	-	1	1	1
Wyo.	31	5	-	-	55	32	11	16	55	-	5	8
Colo.	985	82	6	-	1,932	2,659	617	48	34	32	5	-
N. Mex.	240	57	3	2	559	531	219	135	58	2	3	-
Ariz.	992	110	5	-	2,440	2,556	849	54	10	8	9	-
Utah	197	15	1	-	204	161	519	33	21	11	6	2
Nev.	429	42	1	1	1,110	1,227	64	31	6	1	14	2
PACIFIC	15,075	1,236	83	16	18,444	27,456	4,163	1,377	521	118	67	65
Wash.	1,008	-	1	-	2,318	2,453	463	130	115	7	9	1
Oreg.	575	-	-	-	1,048	982	59	22	10	-	-	1
Calif.	13,233	1,158	78	16	14,417	23,312	3,111	1,201	385	108	52	62
Alaska	47	11	3	-	320	424	477	7	9	-	-	-
Hawaii	212	67	1	-	341	285	53	17	2	3	6	1
Guam	-	2	-	-	38	48	2	2	-	1	-	-
P.R.	1,950	31	-	-	296	119	53	219	34	2	-	-
V.I.	34	-	-	-	70	63	-	2	-	-	-	-
Amer. Samoa	-	-	-	-	30	26	13	-	-	-	-	-
C.N.M.I.	-	2	-	-	50	51	-	1	-	1	-	-

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

*Updated monthly; last update July 31, 1993.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending August 7, 1993, and August 1, 1992 (31st 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	608	-	177	4	29	2,072	1,558	15	1,055	118	2,060	1,211	4	134	125
NEW ENGLAND	44	-	47	-	4	54	91	-	8	9	463	95	-	1	6
Maine	1	-	-	-	-	2	5	-	-	1	9	4	-	1	1
N.H.	6	-	-	-	-	13	12	-	-	-	213	29	-	-	-
Vt.	1	-	30	-	1	-	4	-	-	3	51	3	-	-	-
Mass.	19	-	8	-	2	14	50	-	2	5	148	40	-	-	-
R.I.	2	-	-	-	1	21	1	-	2	-	3	-	-	-	4
Conn.	15	-	9	-	-	4	19	-	4	-	39	19	-	-	1
MID. ATLANTIC	96	-	7	-	3	194	192	2	80	13	245	63	3	39	10
Upstate N.Y.	35	-	-	-	1	110	88	-	27	7	97	30	2	8	7
N.Y. City	24	-	2	-	-	48	19	-	-	-	7	9	-	15	-
N.J.	27	-	5	-	2	36	30	-	8	-	26	24	-	11	3
Pa.	10	-	-	-	-	-	55	2	45	6	115	-	1	5	-
E.N. CENTRAL	31	-	12	-	1	43	238	-	147	17	315	136	-	2	9
Ohio	9	-	5	-	-	6	73	-	57	16	158	29	-	1	-
Ind.	3	-	-	-	-	20	40	-	3	-	35	17	-	-	-
Ill.	14	-	3	-	-	10	65	-	35	-	33	21	-	-	8
Mich.	5	-	4	-	1	4	41	-	49	1	21	6	-	-	1
Wis.	-	-	-	-	-	3	19	-	3	-	68	63	-	1	-
W.N. CENTRAL	18	-	1	-	2	11	100	-	31	24	162	102	-	1	7
Minn.	4	-	-	-	-	10	6	-	1	19	83	33	-	-	-
Iowa	1	-	-	-	-	1	16	-	7	1	2	3	-	-	2
Mo.	5	-	1	-	-	-	38	-	18	-	48	42	-	1	1
N. Dak.	2	-	-	-	-	-	3	-	4	-	3	10	-	-	-
S. Dak.	2	-	-	-	-	-	3	-	-	2	5	5	-	-	-
Nebr.	3	-	-	-	-	-	8	-	1	-	8	5	-	-	-
Kans.	1	-	-	-	2	-	26	-	-	2	13	4	-	-	4
S. ATLANTIC	180	-	17	-	3	119	298	7	343	25	239	81	-	8	12
Del.	2	-	-	-	-	1	11	-	4	1	7	3	-	2	-
Md.	19	-	-	-	2	16	33	4	62	5	79	14	-	2	4
D.C.	5	-	-	-	-	-	5	-	-	-	2	1	-	-	-
Va.	17	-	-	-	1	14	26	-	16	3	27	6	-	-	-
W. Va.	2	-	-	-	-	-	11	2	11	2	11	4	-	-	1
N.C.	88	-	-	-	-	24	55	-	195	3	38	14	-	-	-
S.C.	1	-	-	-	-	29	26	-	14	-	8	8	-	-	2
Ga.	9	-	-	-	-	-	65	-	14	-	12	8	-	-	-
Fla.	37	-	17	-	-	35	66	1	27	11	55	23	-	4	5
E.S. CENTRAL	19	-	1	-	-	459	96	-	36	4	93	20	-	-	1
Ky.	2	-	-	-	-	442	19	-	-	-	8	-	-	-	-
Tenn.	7	-	-	-	-	-	22	-	11	3	46	5	-	-	1
Ala.	6	-	1	-	-	-	32	-	20	1	36	13	-	-	-
Miss.	4	-	-	-	-	17	23	-	5	-	3	2	-	-	-
W.S. CENTRAL	14	-	2	-	3	1,073	131	2	153	11	67	157	-	16	6
Ark.	2	-	-	-	-	-	14	-	4	3	6	7	-	-	-
La.	1	-	1	-	-	-	25	-	12	-	6	2	-	1	-
Okla.	4	-	-	-	-	11	18	-	8	8	36	24	-	1	-
Tex.	7	-	1	-	3	1,062	74	2	129	-	19	124	-	14	6
MOUNTAIN	22	-	2	-	-	18	128	1	38	5	177	212	-	5	5
Mont.	2	-	-	-	-	-	11	-	-	-	1	3	-	-	-
Idaho	1	-	-	-	-	-	9	-	5	4	44	23	-	1	1
Wyo.	-	-	-	-	-	1	2	-	2	-	1	-	-	-	-
Colo.	13	-	2	-	-	14	21	-	9	-	61	26	-	-	-
N. Mex.	5	-	-	-	-	1	4	N	N	1	25	44	-	-	-
Ariz.	-	-	-	-	-	2	62	-	6	-	29	91	-	1	2
Utah	-	-	-	-	-	-	12	-	3	-	16	24	-	2	1
Nev.	1	-	-	-	-	-	7	1	13	-	-	1	-	1	1
PACIFIC	184	-	88	4	13	101	284	3	219	10	299	345	1	62	69
Wash.	18	-	-	-	-	10	48	-	9	-	24	98	-	-	6
Oreg.	4	-	-	-	-	3	21	N	N	1	9	21	-	2	1
Calif.	157	-	77	-	4	51	194	3	188	8	254	205	-	35	41
Alaska	1	-	-	1†	1	9	13	-	5	-	3	4	-	1	-
Hawaii	4	-	11	3†	8	28	8	-	17	1	9	17	1	24	21
Guam	1	U	2	U	-	10	1	U	6	U	-	-	U	-	1
P.R.	-	-	224	-	-	293	6	-	2	-	2	9	-	-	-
V.I.	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
Amer. Samoa	-	U	1	U	-	-	-	U	-	U	2	6	U	-	-
C.N.M.I.	-	U	-	U	1	2	-	U	12	U	-	1	U	-	-

*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 August 7, 1993, and August 1, 1992 (31st 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	15,411	20,416	140	11,670	13,002	74	187	196	4,931
NEW ENGLAND	248	393	10	270	223	-	18	2	823
Maine	3	2	2	7	17	-	-	-	-
N.H.	25	28	2	9	3	-	1	-	53
Vt.	1	1	1	3	3	-	-	-	19
Mass.	94	190	4	149	98	-	12	2	309
R.I.	9	21	1	34	23	-	-	-	-
Conn.	116	151	-	68	79	-	5	-	442
MID. ATLANTIC	1,473	2,963	26	2,805	3,168	1	43	16	1,932
Upstate N.Y.	125	225	14	299	388	1	8	1	1,433
N.Y. City	773	1,665	1	1,646	1,885	-	26	-	-
N.J.	202	386	-	454	529	-	6	10	323
Pa.	373	687	11	406	366	-	3	5	176
E.N. CENTRAL	2,320	3,098	38	1,179	1,300	3	20	9	53
Ohio	707	468	17	191	195	1	5	6	4
Ind.	196	155	1	125	101	1	1	-	4
Ill.	796	1,391	5	551	663	-	9	1	7
Mich.	374	610	15	258	289	1	4	2	7
Wis.	247	474	-	54	52	-	1	-	31
W.N. CENTRAL	962	813	9	257	306	25	2	9	221
Minn.	50	50	2	35	85	-	-	1	29
Iowa	32	33	5	36	24	-	-	3	36
Mo.	774	627	-	126	135	10	2	3	7
N. Dak.	-	1	-	5	4	-	-	-	47
S. Dak.	1	-	-	10	14	11	-	2	32
Nebr.	10	21	-	14	13	1	-	-	7
Kans.	95	81	2	31	31	3	-	-	63
S. ATLANTIC	4,158	5,631	16	2,031	2,389	2	26	95	1,204
Del.	80	134	1	29	25	-	1	2	94
Md.	238	410	-	232	172	-	5	9	354
D.C.	228	249	-	100	78	-	-	-	11
Va.	368	476	4	270	179	-	3	5	221
W. Va.	8	12	-	49	53	-	-	4	50
N.C.	1,170	1,431	3	293	305	1	-	47	51
S.C.	613	752	-	249	242	-	-	7	99
Ga.	707	1,132	2	444	535	-	1	16	282
Fla.	746	1,035	6	365	800	1	16	5	42
E.S. CENTRAL	2,295	2,612	6	797	873	4	3	20	59
Ky.	187	89	2	231	234	-	-	5	10
Tenn.	650	728	1	144	235	3	1	11	-
Ala.	510	980	2	286	233	1	2	2	49
Miss.	948	815	1	136	171	-	-	2	-
W.S. CENTRAL	3,251	3,523	2	1,385	1,302	29	2	41	348
Ark.	504	544	-	120	103	18	-	1	18
La.	1,499	1,487	-	-	107	-	1	1	4
Okla.	241	177	2	167	95	8	-	38	54
Tex.	1,007	1,315	-	1,098	997	3	1	1	272
MOUNTAIN	136	238	9	278	341	6	6	4	90
Mont.	1	7	-	15	-	2	-	-	15
Idaho	-	1	1	8	14	-	-	-	5
Wyo.	5	3	-	2	-	2	-	4	11
Colo.	36	36	2	8	30	-	5	-	9
N. Mex.	19	27	-	35	47	1	-	-	5
Ariz.	59	117	1	126	156	-	1	-	38
Utah	4	6	4	17	51	1	-	-	1
Nev.	12	41	1	67	43	-	-	-	6
PACIFIC	568	1,145	24	2,668	3,100	4	67	-	201
Wash.	34	58	4	149	176	1	4	-	-
Oreg.	50	26	-	69	78	2	-	-	-
Calif.	478	1,052	20	2,260	2,656	1	61	-	184
Alaska	4	4	-	30	41	-	-	-	17
Hawaii	2	5	-	160	149	-	2	-	-
Guam	1	3	-	28	42	-	-	-	-
P.R.	334	191	-	152	135	-	-	-	28
V.I.	31	39	-	2	3	-	-	-	-
Amer. Samoa	-	-	-	2	-	-	-	-	-
C.N.M.I.	3	5	-	19	38	-	-	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending August 7, 1993 (31st Week)

Reporting Area	All Causes, By Age (Years)						P&I[†] Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	581	399	90	58	22	12	42
Boston, Mass.	162	98	29	19	10	6	24
Bridgeport, Conn.	36	25	5	4	2	-	3
Cambridge, Mass.	11	7	4	-	-	-	-
Fall River, Mass.	21	18	2	1	-	-	-
Hartford, Conn.	54	36	10	4	3	1	4
Lowell, Mass.	21	18	1	2	-	-	-
Lynn, Mass.	17	15	1	1	-	-	-
New Bedford, Mass.	23	19	2	1	1	-	1
New Haven, Conn.	41	28	6	3	3	1	1
Providence, R.I.	43	33	5	5	-	-	3
Somerville, Mass.	9	5	3	1	-	-	-
Springfield, Mass.	55	33	9	9	3	1	1
Waterbury, Conn.	35	26	5	4	-	-	2
Worcester, Mass.	53	38	8	4	-	3	3
MID. ATLANTIC	2,446	1,516	520	291	62	57	104
Albany, N.Y.	55	35	13	2	5	-	2
Allentown, Pa.	35	26	5	3	1	-	-
Buffalo, N.Y.	100	68	25	3	3	1	2
Camden, N.J.	22	10	5	2	4	1	1
Elizabeth, N.J.	23	14	2	7	-	-	3
Erie, Pa.[§]	42	31	5	4	-	2	3
Jersey City, N.J.	37	23	6	7	1	-	3
New York City, N.Y.	1,338	795	293	181	34	35	47
Newark, N.J.	84	32	20	23	4	5	8
Paterson, N.J.	20	11	4	3	1	1	4
Philadelphia, Pa.	297	188	65	37	2	5	13
Pittsburgh, Pa.[§]	73	46	16	7	1	3	4
Reading, Pa.	7	4	3	-	-	-	-
Rochester, N.Y.	128	93	23	7	5	-	3
Schenectady, N.Y.	23	20	3	-	-	-	-
Scranton, Pa.[§]	24	22	2	-	-	-	4
Syracuse, N.Y.	93	67	19	3	1	3	5
Trenton, N.J.	24	13	9	1	-	1	1
Utica, N.Y.	21	18	2	1	-	-	1
Yonkers, N.Y.	U	U	U	U	U	U	U
E.N. CENTRAL	2,206	1,293	449	246	155	63	113
Akron, Ohio	59	42	8	4	4	1	-
Canton, Ohio	26	18	7	-	-	1	7
Chicago, Ill.	573	230	117	112	89	25	14
Cincinnati, Ohio	97	68	17	8	2	2	9
Cleveland, Ohio	148	90	25	21	6	6	3
Columbus, Ohio	171	105	45	14	5	2	10
Dayton, Ohio	103	77	19	2	4	1	7
Detroit, Mich.	212	116	41	27	19	9	10
Evansville, Ind.	46	32	11	3	-	-	4
Fort Wayne, Ind.	60	45	11	4	-	-	3
Gary, Ind.	12	5	3	3	1	-	-
Grand Rapids, Mich.	49	32	8	2	4	3	4
Indianapolis, Ind.	179	114	35	17	9	4	11
Madison, Wis.	37	22	7	3	4	1	2
Milwaukee, Wis.	114	78	25	5	1	5	10
Peoria, Ill.	46	37	7	2	-	-	1
Rockford, Ill.	52	32	16	2	1	1	1
South Bend, Ind.	44	34	6	3	1	-	6
Toledo, Ohio	108	63	32	8	4	1	9
Youngstown, Ohio	70	53	9	6	1	1	2
W.N. CENTRAL	750	533	127	46	23	21	43
Des Moines, Iowa	117	84	22	7	3	1	5
Duluth, Minn.	29	25	3	-	-	1	1
Kansas City, Kans.	34	25	7	2	-	-	1
Kansas City, Mo.	98	64	20	8	3	3	8
Lincoln, Nebr.	53	38	11	4	-	-	6
Minneapolis, Minn.	128	92	21	8	4	3	10
Omaha, Nebr.	78	56	12	5	3	2	3
St. Louis, Mo.	114	75	21	8	6	4	-
St. Paul, Minn.	61	47	4	1	3	6	8
Wichita, Kans.	38	27	6	3	1	1	1
S. ATLANTIC	1,263	734	283	159	43	43	42
Atlanta, Ga.	151	91	30	23	5	2	4
Baltimore, Md.	218	132	52	24	7	3	10
Charlotte, N.C.	77	44	21	8	-	4	2
Jacksonville, Fla.	109	76	18	9	2	4	4
Miami, Fla.	110	57	32	15	3	3	-
Norfolk, Va.	50	27	8	7	4	4	1
Richmond, Va.	63	36	17	4	-	6	3
Savannah, Ga.	57	32	12	12	-	1	4
St. Petersburg, Fla.	48	35	5	3	3	2	3
Tampa, Fla.	150	88	32	19	7	4	6
Washington, D.C.	206	95	54	34	12	10	5
Wilmington, Del.	24	21	2	1	-	-	-
E.S. CENTRAL	702	462	141	68	15	16	45
Birmingham, Ala.	89	62	14	9	1	3	3
Chattanooga, Tenn.	52	36	11	3	-	2	2
Knoxville, Tenn.	77	43	20	10	2	2	3
Lexington, Ky.	72	49	10	8	2	3	3
Memphis, Tenn.	169	111	34	18	5	1	19
Mobile, Ala.	85	53	22	8	1	1	4
Montgomery, Ala.	50	35	9	2	3	1	2
Nashville, Tenn.	108	73	21	10	1	3	9
W.S. CENTRAL	1,007	620	211	104	49	20	43
Austin, Tex.	59	31	12	9	3	4	5
Baton Rouge, La.	43	28	11	4	-	-	2
Corpus Christi, Tex.	39	26	10	3	-	-	4
Dallas, Tex.	191	106	43	27	12	3	2
El Paso, Tex.	52	36	8	5	3	-	3
Ft. Worth, Tex.	119	72	23	13	7	4	5
Houston, Tex.	U	U	U	U	U	U	U
Little Rock, Ark.	63	38	15	5	3	2	2
New Orleans, La.	117	69	22	11	7	5	-
San Antonio, Tex.	189	118	39	21	9	2	9
Shreveport, La.	43	25	14	2	2	-	4
Tulsa, Okla.	92	71	14	4	3	-	7
MOUNTAIN	731	483	135	67	28	18	34
Albuquerque, N.M.	69	45	12	7	3	2	1
Colo. Springs, Colo.	41	31	7	2	-	1	3
Denver, Colo.	98	67	16	12	1	2	5
Las Vegas, Nev.	118	78	20	16	3	1	3
Ogden, Utah	20	14	4	1	-	1	1
Phoenix, Ariz.	183	114	41	15	9	4	12
Pueblo, Colo.	17	11	4	1	1	-	-
Salt Lake City, Utah	76	45	16	6	6	3	5
Tucson, Ariz.	109	78	15	7	5	4	4
PACIFIC	2,025	1,280	367	256	79	36	94
Berkeley, Calif.	18	9	5	3	-	1	3
Fresno, Calif.	117	73	24	9	7	4	4
Glendale, Calif.	28	23	4	1	-	-	-
Honolulu, Hawaii	73	47	16	6	2	2	5
Long Beach, Calif.	91	58	13	11	6	3	12
Los Angeles, Calif.	626	371	112	100	31	8	21
Pasadena, Calif.	22	14	3	3	2	-	1
Portland, Oreg.	139	95	25	14	4	1	2
Sacramento, Calif.	152	96	32	15	6	3	4
San Diego, Calif.	132	88	20	15	6	1	7
San Francisco, Calif.	161	84	39	30	5	2	3
San Jose, Calif.	149	98	27	20	2	2	15
Santa Cruz, Calif.	35	27	4	4	-	-	2
Seattle, Wash.	149	102	22	15	5	5	4
Spokane, Wash.	50	36	7	4	1	2	6
Tacoma, Wash.	83	59	14	6	2	2	5
TOTAL	11,711[¶]	7,320	2,323	1,295	476	286	560

*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.

Tuberculosis — Continued

Women's Health and Fertility Br, Div of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, CDC.

Editorial Note: The findings in this report document an increase in active TB among pregnant inner-city women in two hospitals in New York City. Many of these women had TB diagnosed after presentation with TB-related symptoms. These findings underscore the need for TB screening in high-risk communities. Because of their high rate of TB and their inadequate use of prenatal and general health care, special attention should be given to minority urban populations and some populations of recent immigrants from countries with high prevalences of TB (*2,5*).

HIV infection is an important risk factor for the development of clinical TB in an adult coinfected with *Mycobacterium tuberculosis* (*6*). Thus, screening for TB should focus on populations at high risk for HIV infection and acquired immunodeficiency syndrome, including IDUs and persons already infected with HIV.

TB-related symptoms can mimic the physiologic changes that occur during pregnancy (i.e., increased respiratory rate and fatigue). Consequently, pregnant women in high-risk groups and women from areas with a high prevalence of both HIV infection and TB should be routinely asked about contact with infectious TB patients, and tuberculin skin testing should always be considered for these women. Because prenatal or peripartum care is often the only contact many high-risk women have with the health-care system, screening for TB and HIV counseling and testing should be offered at this time.

The most appropriate method of screening for TB infection is the tuberculin skin test (Mantoux technique). Pregnancy does not measurably alter the response to a tuberculin test; subsequent investigation of tuberculin reactors, and persons with symptoms of TB, should facilitate the diagnosis and treatment of TB in pregnant women.

Because approximately 10% of immunocompetent and 40% of HIV-infected persons with active TB are negative by the tuberculin skin test, a negative result should never rule out the possibility of active disease (*3,6–8*). Factors such as age, poor nutrition, immunosuppression by disease or drugs, viral infections, and overwhelming TB can decrease tuberculin reactivity (*3*). Anergy to tuberculin has been reported among adults with HIV infection; therefore, a thorough investigation to detect active TB should be undertaken for all persons with clinical features compatible with TB, regardless of the results of the tuberculin skin test (*7*), and for all pregnant women at risk for or with known HIV infection.

To rule out active TB, routine chest roentgenogram with proper shielding of the abdomen should be performed after the 12th week of gestation for women with a positive tuberculin skin test (*3,7*). A chest roentgenogram should be performed sooner if the woman has symptoms suggestive of pulmonary TB, even if the tuberculin skin test is negative (*3,4*). Moreover, a comprehensive and systematic diagnostic approach, including appropriate examination of specimens for mycobacteria, should be followed for all patients with HIV infection and pulmonary disease (*7*). A complete review of systems and physical examination should be conducted to exclude extrapulmonary TB.

The Advisory Council for the Elimination of Tuberculosis recommends initial treatment for nonpregnant patients with four drugs: INH, RIF, PZA, and EMB or streptomycin (SM) (*1*). For pregnant women, this regimen is modified to exclude SM be-

Tuberculosis — Continued

cause it may cause congenital ototoxicity, and PZA, because the risk for teratogenicity has not been determined (*1,3,9*). Pregnant women with drug-susceptible organisms can be treated safely with INH, RIF, and EMB (*1,3*), but treatment must be continued for 9 months (*1,3*). If resistance to other drugs is probable and susceptibility to PZA is likely, the risks and benefits of PZA should be weighed carefully, and its use should be considered.

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Emerging Infectious Diseases

Update: Hantavirus Disease — United States, 1993

Since the recognition of acute hantavirus-associated respiratory disease in the United States in May 1993, laboratory evidence of acute hantavirus infection has been confirmed in 30 persons in the southwestern United States; 20 (67%) of these persons have died. Of those 30 persons, 23 resided in the four-corners region (14 in New Mexico, six in Arizona, and three in Colorado). Previously reported cases outside the four-corners states occurred in a Nevada resident (*1*) and a Texas resident (*2*), neither of whom had traveled to the four-corners area, and a resident of another state who had traveled to and presumably was infected in the four-corners area (*3*). This report summarizes the other four confirmed cases and describes two cases under investigation; all of these cases occurred outside the four-corners area during July 1992–August 1993.

Confirmed Cases

Louisiana. During June 1993, a 58-year-old Louisiana bridge inspector who had not traveled to the four-corners area died following an illness characterized by bilateral interstitial infiltrates and hypoxemia. Polymerase chain reaction (PCR) evidence of hantavirus infection was found in lung tissue, and nucleotide sequence analysis of

Hantavirus Disease — Continued

viral genetic material PCR-amplified from the lung suggests the presence of a previously unrecognized hantavirus most closely related to but distinct from both the Prospect Hill virus and the virus circulating in the four-corners area.

Nevada. In August 1993, a 51-year-old central Nevada resident rapidly developed bilateral interstitial infiltrates and hypoxemia over 12 hours following a 6-day illness characterized initially by fever, myalgia, nausea, and vomiting, which progressed to coughing and shortness of breath. The patient, who developed high-titered immunoglobulin M (IgM) antibodies to hantavirus, had not traveled to the four-corners area. As of August 11, the patient remained hospitalized.

California. Two cases have been confirmed in California. In the first, in July 1993, a 27-year-old field biologist, who was working on the eastern slope of the California Sierra Nevada mountain range, had acute onset of an illness characterized by 2 days of fever, myalgia, and headache. The patient developed rapidly progressive bilateral interstitial infiltrates and hypoxemia and died the following day. Hantavirus infection was confirmed by IgM serology, PCR, and a positive immunohistochemical stain for hantavirus antigen on lung tissue. The second case was in a 29-year-old ranch worker on the California coast who died of rapidly progressive respiratory failure during September 1992, following 3 days of fever, myalgia, and cough. Recent immunohistochemical staining of preserved autopsy tissues revealed hantavirus antigen. Neither person had recently traveled to the four-corners area.

Other Investigations

CDC is assisting state health departments in other investigations, including 1) a California man who had serologic evidence of past hantavirus infection following recovery from a hantavirus-compatible illness during April 1993 and 2) a 16-year-old Oregon youth in whom hantavirus antigen was identified by immunohistochemical staining of lung tissue saved from autopsy in July 1992. The California man, but not the Oregon teenager, had traveled to a four-corners state during the month before onset of illness.

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Editorial Note: Newly recognized cases of acute illness with evidence of hantavirus infection in Louisiana, Nevada, and California, along with previously recognized cases in Nevada and Texas, further demonstrate that hantavirus-associated respiratory illness is not confined to the four-corners area of the southwestern United States. Distinctive hantavirus nucleotide sequences have been identified from a person with acute illness in Louisiana; this information, together with confirmation of human disease in areas of Texas (*2*) and Louisiana outside the known range of *Peromyscus*

Hantavirus Disease — Continued

maniculatus (*4*)—the implicated reservoir in the four-corners area—suggests the existence of an additional hantavirus with a different rodent reservoir in the south central United States (*3,5,6*). The continued occurrence of hantavirus disease underscores the importance of minimizing risk for exposure to rodents and their excreta. Interim recommendations for hantavirus infection risk reduction have been developed (*7*). This document contains specific recommendations for reducing rodent shelter and food sources in and around the home, recommendations for eliminating rodents inside the home and preventing them from entering the home, precautions for preventing hantavirus infection while rodent-contaminated areas are being cleaned up, prevention measures for persons who have occupational exposure to wild rodents, and precautions for campers and hikers. Investigations of cases of recognized and suspected human hantavirus disease and potential rodent reservoirs are ongoing.

References

1. CDC. Update: hantavirus disease—southwestern United States, 1993. MMWR 1993;42:570–2.
2. CDC. Update: hantavirus infection—United States, 1993. MMWR 1993;42:517–9.
3. CDC. Update: outbreak of hantavirus infection—southwestern United States, 1993. MMWR 1993;42:495–6.
4. Kirkland GL Jr, Layne JN, eds. Advances in the study of *Peromyscus* (Rodentia). Lubbock, Texas: Texas Tech University Press, 1989.
5. CDC. Update: outbreak of hantavirus infection—southwestern United States, 1993. MMWR 1993;42:441–3.
6. CDC. Update: outbreak of hantavirus infection—southwestern United States, 1993. MMWR 1993;42:477–9.
7. CDC. Hantavirus infection—southwestern United States: interim recommendations for risk reduction. MMWR 1993;42(no. RR-11).

Notice to Readers

Announcement of Meeting on Research Case Definition for Chronic Fatigue Syndrome

CDC will sponsor a meeting to address the research case definition for chronic fatigue syndrome (CFS) on September 27, 1993, in Atlanta. The meeting will be open to public health officials, researchers, and the public. The purpose of the meeting is to review data from population and clinical studies related to use of the CFS research case definition.

Additional information is available from CDC's CFS Research Program, Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases, Mailstop A-15, 1600 Clifton Road, NE, Atlanta, GA 30333; telephone (404) 639-1338; fax (404) 639-3163.

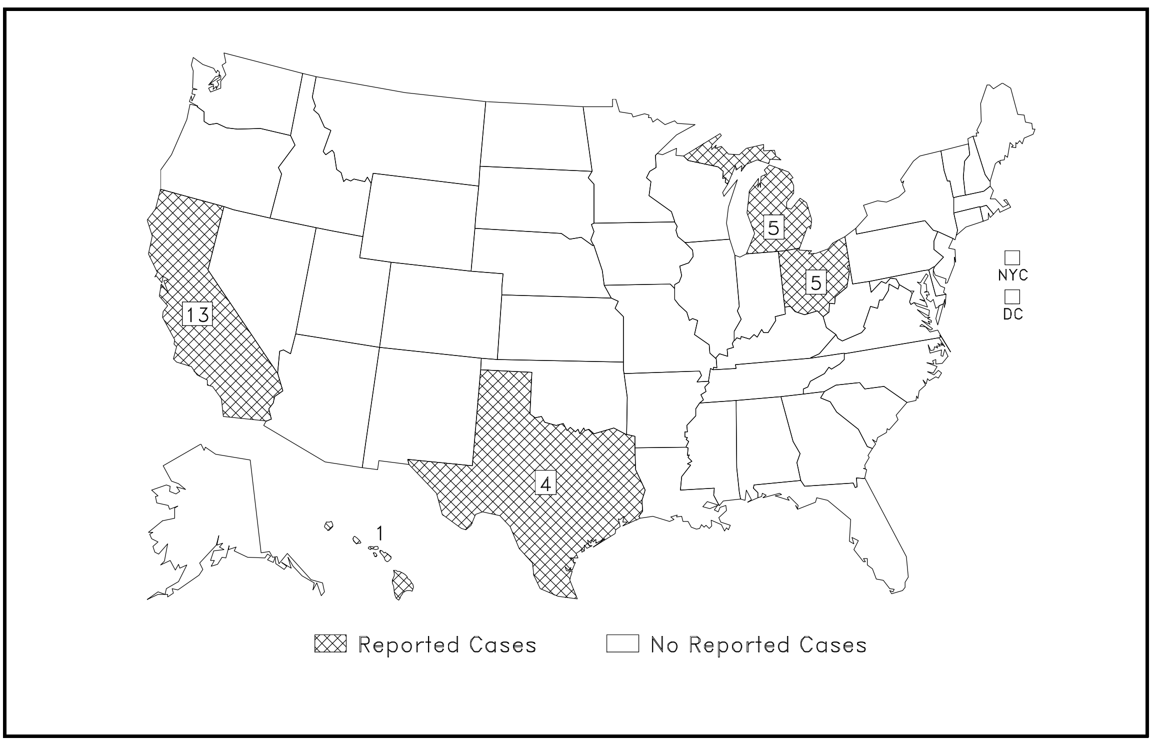
Erratum: Vol. 42, No. 29

In the article "Schistosomiasis in U.S. Peace Corps Volunteers—Malawi, 1992," on page 567 in the editorial note, the first paragraph, second sentence, should read "*S. mansoni* and *S. japonicum* primarily affect the *gastrointestinal* tract; chronic infection can lead to hepatosplenomegaly, variceal bleeding, and cirrhosis."

Erratum: Vol. 42, No. 23

In the article "Mortality Trends and Leading Causes of Death Among Adolescents and Young Adults—United States, 1979–1988," in Table 1 on page 460, the percentage change in other injury death rates for 15–19-year-olds should be *–36.5*, and the percentage change in other injury death rates for 20–24-year-olds should be *–35.1*.

Reported cases of measles, by state — United States, weeks 26–30, 1993



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