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MORBIDITY AND MORTALITY WEEKLY REPORT

Maternal Mortality: Pilot Surveillance in Seven States

As part of a collaborative effort to improve the quality of maternal mortality data, maternal mortality committees in seven states* and CDC have jointly developed a confidential pilot surveillance system. For 1983, this system reported 39 maternal deaths among residents of the participating states, compared to 28 maternal deaths reported through state vital statistics systems; this is a 39% increase in ascertainment of maternal deaths. One state committee reported one less maternal death than did the vital statistics system.

The estimated rate was 9.6 maternal deaths per 100,000 live births, compared to 6.9/100,000 when vital records data alone were used. The surveillance system revealed a maternal mortality rate for blacks and others of 16.6/100,000, compared to 7.6/100,000 for whites (RR = 2.2; 95% confidence limits = 1.2-4.1). Embolism, peripartum cardiomyopathy, and cerebrovascular accident together accounted for 49% of the maternal deaths (Table 1). In four (10%) of 39 cases, data were insufficient to arrive at a cause of death more specific than "cardiopulmonary arrest." This degree of specificity of cause of death was in part attributable to the fact that 60% of the reports were supplemented by information not available from death certificates (e.g., clinical summaries and autopsy reports).

Reported by State Maternal Mortality Committees represented by SB Berry, Shreveport, Louisiana, SR DePersio, MD, Oklahoma City, Oklahoma, WH Deschner, MD, Billings, Montana, EM Gold, MD, Providence, Rhode Island, JF Jewett, MD, Boston, Massachusetts, WJ May, MD, Winston-Salem, North Carolina, WD Ragan, MD, Indianapolis, Indiana; RW Rochat, MD, Emory University, Atlanta, Georgia; Pregnancy Epidemiology Br, Research and Statistics Br, Div of Reproductive Health, Center for Health Promotion and Education, CDC.

*Indiana, Louisiana, Massachusetts, Montana, North Carolina, Oklahoma, and Rhode Island.

TABLE 1. Causes of maternal mortality in seven states* participating in a pilot surveillance system — 1983

Cause	Deaths No.	Deaths (%)	Deaths/100,000 live births
Embolus	10	(26)	2.5
Peripartum cardiomyopathy	5	(13)	1.2
Cerebrovascular accident	4	(10)	1.0
Hypertensive disease of pregnancy	3	(8)	0.7
Ectopic pregnancy	3	(8)	0.7
Hemorrhage	3	(8)	0.7
Infection	3	(8)	0.7
Anesthesia complications	2	(5)	0.5
Other and unspecified	6	(15)	1.5
Total	**39**	**(100)**	**9.6**

*Indiana, Louisiana, Massachusetts, Montana, North Carolina, Oklahoma, and Rhode Island.

Maternal Mortality — Continued

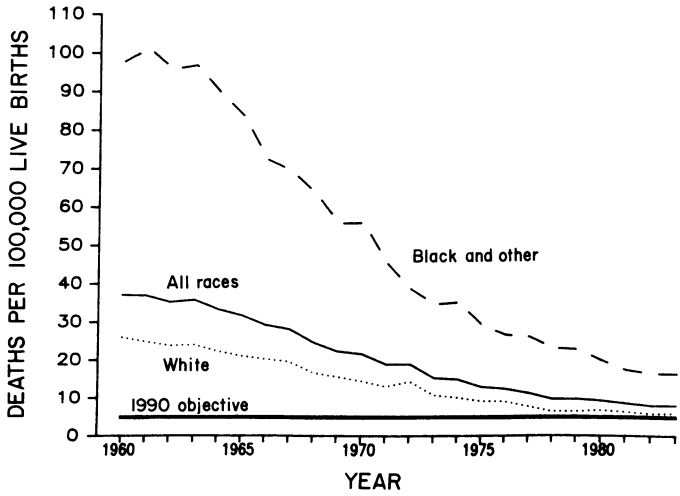
Editorial Note: The U.S. Public Health Service 1990 objective for maternal mortality is a maternal death rate not to exceed 5/100,000 live births for any county or for any ethnic group (e.g., black, Hispanic, American Indian) (*1*). The relatively slow decline in the maternal mortality rate for blacks and others suggests that the 1990 objective may not be met for this group (Figure 1). The development of strategies to reduce the maternal mortality rate may be facilitated by the availability of timely, complete, and accurate data on maternal deaths.

To identify maternal deaths, the participating maternal mortality committees generally augment reviews of death certificates with clinical information obtained from an informal network of participating obstetricians. By contrast, vital statistics depend on death certificates alone for identification of maternal deaths. Four special investigations have found that vital records classify 17%-73% of maternal deaths as nonmaternal deaths (*2,3*). The discrepancy between the committees' counts and those of state vital records probably has two sources. First, some deaths may not be classified as maternal deaths because information on the death certificate may not indicate that the death was related to pregnancy. Second, classification rules that determine the underlying cause of death from the "causes of death" and "other significant conditions" listed on the death certificate do not necessarily identify deaths related to pregnancy as maternal deaths. For example, preliminary evidence suggests that two of five cases of peripartum cardiomyopathy (*4*) reported through the surveillance system were not classified as maternal deaths by the state vital statistics system.

Because the maternal mortality committees provided clinical descriptions, it was possible to determine the underlying cause of death according to a previously described method (*5*). The finding that embolism was the most common cause of maternal death is consistent with a recent review of causes of maternal mortality during 1974-1978 (*5*). In addition, clinical summaries were used to identify lack of prenatal care, extreme obesity, multiparity, and maternal age over 35 years as possible risk factors. In addition to demographic data (96%-100% complete), the surveillance system collected data on the woman's prior reproductive history (62% complete) and on the current pregnancy's gestational age (65% complete) and outcome (77% complete); data on education were not routinely available (20% complete).

Results from this voluntary pilot surveillance system suggest that active maternal mortality surveillance can yield timely data and that counts of maternal deaths may be more complete than those available from vital records alone. Moreover, the surveillance data were more

FIGURE 1. Maternal mortality rates, by race — United States, 1960-1983



Maternal Mortality — Continued

detailed, allowing a more precise determination of the cause of death. Even more complete counts of maternal deaths could be obtained from the routine linkage of birth and fetal death certificates to the death certificates of women of reproductive age (*6*). State or local maternal mortality committees, and others who wish to participate in this confidential surveillance system for 1983 and subsequent years should contact J. F. Jewett, M.D., Committee on Maternal Welfare, Massachusetts Medical Society, 319 Longwood Avenue, Boston, Massachusetts, 02115; Emory University MPH Program, 735 Gatewood Road, Atlanta, Georgia, 30322; or the Division of Reproductive Health, Center for Health Promotion and Education, CDC.

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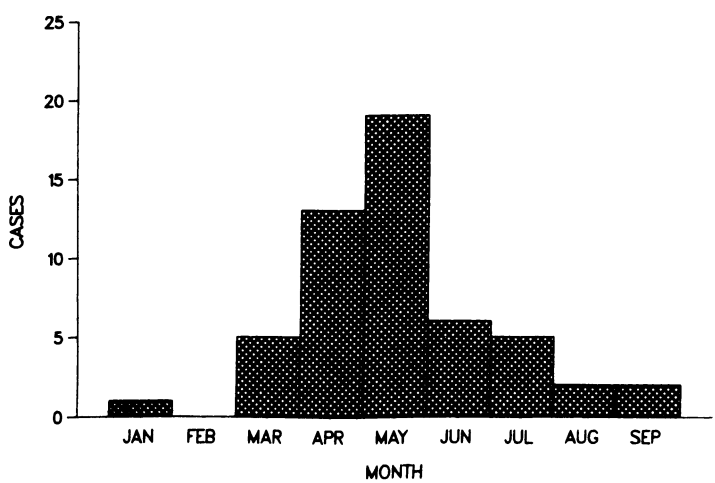
Chancroid — Massachusetts

From January 8, to September 30, 1985, 53 patients with culture-confirmed or clinically suspected chancroid were treated in Boston-area sexually transmitted diseases (STD) clinics (Figure 2). In the previous 2 years, only two chancroid cases had been diagnosed in Massachusetts. The outbreak was terminated by intensive surveillance efforts, contact tracing, and antimicrobial treatment of both symptomatic and asymptomatic sex partners.

The first presumed case of chancroid occurred in a man who had recently arrived from Florida and who denied having had sexual intercourse while in Massachusetts. He presented to the Boston City Hospital STD Clinic on January 8 with a tender penile ulcer on the foreskin that had been present for 2 weeks, accompanied by swollen, tender, right-sided inguinal lymph nodes. He was treated for presumed syphilis with 2.4 million units of benzathine peni-

FIGURE 2. Chancroid cases, by date of diagnosis — Massachusetts, January-September 1985



Chancroid – Continued

cillin, administered intramuscularly. On follow-up examination 1 week later, the ulcer was unchanged, but he had developed swollen, tender, left-sided inguinal lymph nodes. Chancroid was suspected, but the patient failed to respond to oral tetracycline, 500 mg four times a day. On January 24, therapy was changed to oral erythromycin, 500 mg four times a day, with subsequent improvement.

In March, five additional males with soft, penile ulcers and tender inguinal adenopathy were seen at the Boston City Hospital and New England Medical Center STD clinics. In these cases, serologic tests for syphilis were negative, as were cultures, direct fluorescent-antibody tests, and/or Tzanck smears for herpes simplex virus. The cases were presumptively diagnosed as chancroid and responded positively to erythromycin. In early April, the Division of Communicable and Venereal Diseases, Massachusetts Department of Public Health began enhanced surveillance and case investigation after four additional similar patients were seen. By September 30, 53 patients with presumed or culture-confirmed chancroid were identified. The epidemic peaked in April/May, when 32 (60%) of the 53 chancroid patients were seen. Only four cases have been diagnosed since August 1, and three of these appear to have been contracted outside Massachusetts.

Thirty-nine (74%) of the 53 cases were in males. All the males had one or more tender

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TABLE I. Summary—cases of specified notifiable diseases, United States

Disease	47th Week Ending			Cumulative, 47th Week Ending		
	Nov. 23, 1985	Nov. 24, 1984	Median 1980-1984	Nov. 23, 1985	Nov. 24, 1984	Median 1980-1984
Acquired Immunodeficiency Syndrome (AIDS)	193	42	N	7,205	3,773	N
Aseptic meningitis	146	155	174	9,309	7,428	8,724
Encephalitis: Primary (arthropod-borne & unspec.)	31	15	27	1,165	1,076	1,412
Post-infectious	1	-	1	108	103	82
Gonorrhea: Civilian	17,726	16,898	16,090	763,981	762,091	864,896
Military	372	347	382	16,594	19,305	23,735
Hepatitis: Type A	401	468	468	20,547	19,452	20,669
Type B	539	543	447	23,674	23,443	19,686
Non A, Non B	57	88	N	3,662	3,440	N
Unspecified	101	117	158	5,181	4,643	7,818
Legionellosis	10	14	N	589	624	N
Leprosy	5	10	2	328	210	210
Malaria	16	17	13	922	911	961
Measles: Total*	6	58	36	2,614	2,501	2,501
Indigenous	3	57	N	2,177	2,210	N
Imported	3	1	N	437	291	N
Meningococcal infections: Total	47	29	51	2,127	2,406	2,461
Civilian	47	29	51	2,123	2,402	2,446
Military	-	-	-	4	4	14
Mumps	40	42	59	2,616	2,655	4,084
Pertussis	51	17	21	2,968	2,114	1,568
Rubella (German measles)	1	13	13	586	696	1,937
Syphilis (Primary & Secondary): Civilian	533	500	547	23,165	25,198	27,997
Military	2	5	8	129	268	346
Toxic Shock syndrome	5	9	N	318	431	N
Tuberculosis	533	333	428	19,306	19,059	22,911
Tularemia	1	4	2	153	272	251
Typhoid fever	8	5	5	344	341	415
Typhus fever, tick-borne (RMSF)	3	4	4	671	812	1,079
Rabies, animal	103	72	83	4,838	4,919	5,709

TABLE II. Notifiable diseases of low frequency, United States

	Cum 1985		Cum 1985
Anthrax	-	Leptospirosis	33
Botulism: Foodborne	43	Plague	16
Infant (Calif. 1)	59	Poliomyelitis: Total	5
Other	1	Paralytic	5
Brucellosis (Mo. 1, Tex. 3)	125	Psittacosis (N.Mex. 1, Calif. 1)	101
Cholera	3	Rabies, human	1
Congenital rubella syndrome	-	Tetanus (Tex. 1)	65
Congenital syphilis, ages < 1 year	149	Trichinosis (N.Y. City 1)	55
Diphtheria	1	Typhus fever, flea-borne (endemic, murine) (Calif. 3)	25

*Three of the 6 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending November 23, 1985 and November 24, 1984 (47th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1985	1985	Cum. 1985	Cum. 1985	Cum. 1985	Cum. 1984	1985	1985	1985	1985	1985	Cum. 1985
UNITED STATES	7,205	146	1,165	108	763,981	762,091	401	539	57	101	10	328
NEW ENGLAND	241	11	32	-	20,530	20,542	9	37	5	5	2	7
Maine	11	-	-	-	1,048	904	-	-	-	-	-	-
N.H.	3	1	7	-	520	667	-	4	-	-	-	-
Vt.	2	-	-	-	304	344	-	1	1	-	-	-
Mass.	143	4	18	-	8,517	8,692	6	19	2	5	2	7
R.I.	12	3	-	-	1,660	1,490	1	3	-	-	-	-
Conn.	70	3	7	-	8,481	8,445	2	10	2	-	-	-
MID ATLANTIC	2,790	26	144	11	115,974	101,952	18	51	2	2	-	36
Upstate N.Y.	299	16	45	4	16,465	16,401	10	17	-	1	-	1
N.Y. City	1,923	2	16	-	56,466	39,477	-	-	-	-	-	31
N.J.	407	-	28	-	17,300	18,239	3	14	-	1	-	-
Pa.	161	8	55	7	25,743	27,835	5	20	2	-	-	4
E.N. CENTRAL	333	28	337	20	105,890	109,033	14	44	5	2	7	21
Ohio	52	8	138	4	29,102	28,619	3	16	1	-	4	3
Ind.	24	4	65	2	11,425	11,386	2	3	-	1	-	-
Ill.	177	2	53	8	24,758	25,749	2	2	1	-	-	16
Mich.	56	14	61	-	30,405	31,374	7	23	3	1	3	2
Wis.	24	-	20	6	10,200	11,905	-	-	-	-	-	-
W.N. CENTRAL	104	6	75	4	37,794	37,550	15	13	3	1	-	2
Minn.	35	4	36	1	5,557	5,618	1	2	-	-	-	1
Iowa	11	1	28	-	4,021	4,142	2	3	1	-	-	-
Mo.	43	1	-	-	18,281	18,065	2	2	-	-	-	1
N. Dak.	1	-	-	1	252	353	-	-	-	-	-	-
S. Dak.	1	-	-	-	725	888	7	-	1	-	-	-
Nebr.	3	-	5	-	3,258	2,752	-	3	-	-	-	-
Kans.	10	-	6	2	5,700	5,732	3	3	1	1	-	-
S. ATLANTIC	1,119	37	134	43	169,092	192,861	41	128	17	12	-	8
Del.	10	1	8	-	4,054	3,639	2	2	-	1	-	-
Md.	120	6	28	1	26,648	21,898	2	23	2	-	-	1
D.C.	160	1	-	-	14,483	13,698	-	2	-	-	-	-
Va.	94	10	27	6	17,606	18,204	5	6	5	3	-	-
W. Va.	6	2	38	-	2,388	2,426	-	5	-	-	-	-
N.C.	59	4	27	1	33,341	31,187	8	15	1	-	-	2
S.C.	26	-	6	-	19,669	19,631	-	23	-	-	-	-
Ga.	171	1	-	-	-	35,822	3	11	2	2	-	1
Fla.	473	12	-	35	50,903	46,356	21	41	7	6	-	4
E.S. CENTRAL	66	7	37	4	69,805	68,317	7	52	1	1	-	-
Ky.	17	4	17	-	8,023	8,141	3	13	-	-	-	-
Tenn.	16	2	6	-	26,710	27,827	1	22	-	-	-	-
Ala.	26	-	11	4	21,056	20,760	-	15	1	-	-	-
Miss.	7	1	3	-	14,016	11,589	3	2	-	1	-	-
W.S. CENTRAL	519	10	137	2	101,978	103,203	52	39	5	21	-	27
Ark.	9	-	7	1	9,569	9,455	3	2	-	-	-	1
La.	86	1	9	-	19,364	22,361	3	1	1	-	-	7
Okla.	15	1	24	1	11,332	11,276	2	1	-	2	-	-
Tex.	409	8	97	-	61,713	60,111	44	35	4	19	-	19
MOUNTAIN	132	5	57	6	25,503	24,992	40	28	3	15	1	9
Mont.	1	-	-	-	729	955	1	-	-	-	-	-
Idaho	1	-	-	-	887	1,186	7	-	-	-	1	-
Wyo.	-	-	1	-	586	662	-	1	-	-	-	-
Colo.	45	2	23	2	7,374	7,155	11	3	1	8	-	2
N. Mex.	13	1	3	-	2,846	2,996	3	5	-	-	-	-
Ariz.	50	-	17	-	7,731	6,970	11	8	2	5	-	1
Utah	12	-	10	4	1,234	1,187	1	1	-	2	-	4
Nev.	10	2	3	-	4,116	3,881	6	10	-	-	-	2
PACIFIC	1,901	16	212	18	117,415	103,641	205	147	16	42	-	218
Wash.	107	-	13	1	8,996	8,142	12	5	1	-	-	37
Oreg.	30	-	1	-	5,884	5,983	35	8	2	-	-	4
Calif.	1,743	13	158	17	98,176	85,214	151	133	13	42	-	156
Alaska	3	-	40	-	2,811	2,555	-	-	-	-	-	-
Hawaii	18	3	-	-	1,548	1,747	7	1	-	-	-	21
Guam	1	U	-	-	156	218	U	U	U	U	U	3
P.R.	88	3	7	2	2,871	3,018	5	7	-	4	-	2
V.I.	2	U	-	-	369	476	U	U	U	U	U	-
Pac. Trust Terr.	-	U	-	-	146	-	U	U	U	U	U	20

N: Not notifiable U: Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending November 23, 1985 and November 24, 1984 (47th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported *		Total									
	Cum. 1985	1985	Cum. 1985	1985	Cum. 1985	Cum. 1984	Cum. 1985	1985	Cum. 1985	1985	Cum. 1985	Cum. 1984	1985	Cum. 1985	Cum. 1984
UNITED STATES	922	3	2,177	3	437	2,501	2,127	40	2,616	51	2,968	2,114	1	586	696
NEW ENGLAND	52	-	38	-	88	106	102	1	59	4	203	70	-	12	19
Maine	4	-	-	-	1	-	4	-	6	-	10	4	-	-	1
N.H.	4	-	-	-	-	36	14	1	11	4	111	17	-	2	1
Vt.	1	-	-	-	-	7	10	-	3	-	3	23	-	-	-
Mass.	25	-	34	-	84	49	19	-	17	-	46	18	-	6	16
R.I.	6	-	-	-	-	-	17	-	15	-	22	4	-	-	-
Conn.	12	-	4	-	3	14	38	-	7	-	11	4	-	4	1
MID ATLANTIC	144	-	193	-	38	166	373	7	307	7	237	183	-	226	224
Upstate N.Y.	49	-	72	-	13	45	147	-	161	6	113	102	-	18	99
N.Y. City	53	-	67	-	12	109	63	3	33	-	27	9	-	185	103
N.J.	18	-	17	-	10	7	59	2	48	-	11	13	-	9	21
Pa.	24	-	37	-	3	5	104	2	65	1	86	59	-	14	1
E.N. CENTRAL	60	-	443	-	90	697	368	4	911	23	689	487	-	33	100
Ohio	11	-	-	-	54	9	116	4	277	4	113	75	-	-	2
Ind.	4	-	55	-	2	3	47	-	37	13	201	231	-	1	5
Ill.	21	-	293	-	10	181	84	-	201	1	50	27	-	16	63
Mich.	18	-	37	-	23	464	93	-	310	-	47	31	-	15	22
Wis.	6	-	58	-	1	40	28	-	86	5	278	123	-	1	8
W.N. CENTRAL	31	-	2	-	10	58	106	5	83	7	229	124	-	19	39
Minn.	14	-	-	-	6	47	27	-	1	4	117	16	-	2	4
Iowa	2	-	-	-	-	-	10	-	16	1	31	13	-	1	1
Mo.	5	-	1	-	2	6	41	1	15	-	30	20	-	7	-
N. Dak.	2	-	-	-	2	-	5	-	4	-	10	-	-	2	3
S. Dak.	1	-	-	-	-	-	3	-	-	1	4	9	-	-	-
Nebr.	1	-	-	-	-	-	9	-	3	-	8	12	-	-	-
Kans.	6	-	1	-	-	5	11	4	44	1	29	54	-	7	31
S. ATLANTIC	105	2	281	-	30	66	410	6	260	3	379	214	-	56	27
Del.	-	-	-	-	-	-	11	-	1	-	2	2	-	2	2
Md.	26	2	106	-	9	22	56	-	33	1	157	61	-	6	1
D.C.	8	-	9	-	1	8	7	-	-	-	1	-	-	-	-
Va.	20	-	21	-	7	5	50	1	47	-	19	19	-	2	-
W. Va.	2	-	31	-	2	-	8	2	72	-	4	11	-	9	-
N.C.	9	-	9	-	-	1	56	-	19	1	33	35	-	1	-
S.C.	-	-	-	-	3	1	34	-	11	-	2	2	-	3	-
Ga.	10	-	8	-	-	2	73	-	28	-	93	17	-	4	2
Fla.	30	-	97	-	8	27	115	3	49	1	68	67	-	29	22
E.S. CENTRAL	11	-	-	-	7	6	96	-	30	1	64	14	-	3	12
Ky.	4	-	-	-	5	1	9	-	8	-	8	2	-	3	6
Tenn.	-	-	-	-	1	2	37	-	18	-	25	7	-	-	-
Ala.	6	-	-	-	-	3	26	-	1	1	24	1	-	-	3
Miss.	1	-	-	-	1	-	24	-	3	-	7	4	-	-	3
W.S. CENTRAL	92	-	421	-	15	616	180	5	294	-	518	324	-	39	63
Ark.	3	-	-	-	-	8	19	-	7	-	14	22	-	1	3
La.	1	-	42	-	-	8	25	-	2	-	17	8	-	-	-
Okla.	7	-	-	-	1	8	32	N	N	-	160	243	-	1	-
Tex.	81	-	379	-	14	592	104	5	285	-	327	51	-	37	60
MOUNTAIN	51	-	497	-	51	145	96	4	234	6	213	122	-	5	21
Mont.	-	-	122	-	17	-	11	1	12	-	9	19	-	-	-
Idaho	3	-	126	-	18	23	5	-	9	1	8	7	-	1	1
Wyo.	1	-	5	-	-	-	6	-	2	1	1	6	-	-	2
Colo.	15	-	6	-	7	6	25	1	25	4	89	45	-	-	2
N. Mex.	15	-	1	-	5	88	12	N	N	-	13	12	-	2	1
Ariz.	11	-	237	-	4	1	22	2	115	-	40	24	-	1	4
Utah	2	-	-	-	-	27	9	-	6	-	53	7	-	-	7
Nev.	4	-	-	-	-	-	6	-	65	-	-	2	-	1	4
PACIFIC	376	1	302	3	108	641	396	8	438	-	436	576	1	193	191
Wash.	23	-	90	-	39	154	65	-	35	-	80	320	-	14	1
Oreg.	13	-	4	-	1	-	35	N	N	-	49	30	-	2	2
Calif.	321	1	190	3 †	63	324	275	8	375	-	260	150	1	134	182
Alaska	2	-	-	-	-	-	9	-	9	-	30	1	-	1	1
Hawaii	17	-	18	-	5	163	12	-	19	-	17	75	-	42	5
Guam	1	U	10	U	1	90	-	U	5	U	-	-	U	2	4
P.R.	-	-	67	-	-	137	14	3	152	1	13	1	-	27	19
V.I.	-	U	4	U	6	-	-	U	3	U	-	-	U	-	-
Pac. Trust Terr.	-	U	-	U	-	-	-	U	3	U	-	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable †International §Out-of-state

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending November 23, 1985 and November 24, 1984 (47th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1985	Cum. 1984	1985	Cum. 1985	Cum. 1984	Cum. 1985	Cum. 1985	Cum. 1985	Cum. 1985
UNITED STATES	23,165	25,198	5	19,306	19,059	153	344	671+2	4,838
NEW ENGLAND	540	486	-	660	572	4	14	9+1	20
Maine	14	10	-	43	28	-	-	-	-
N.H.	38	14	-	20	26	-	1	1	1
Vt.	5	1	-	8	7	-	-	-	1
Mass.	267	272	-	390	317	4	10	6	11
R.I.	17	20	-	50	48	-	-	1	-
Conn.	199	169	-	149	146	-	3	1 1	7
MID ATLANTIC	3,284	3,358	-	3,468	3,460	2	50	37+3	581
Upstate N.Y.	242	297	-	600	538	-	13	9	139
N.Y. City	2,004	2,014	-	1,694	1,420	1	25	5	-
N.J.	623	603	-	476	770	1	11	4	39
Pa.	415	444	-	698	732	-	1	19 3	403
E.N. CENTRAL	907	1,252	1	2,365	2,488	3	43	39-4	169
Ohio	135	218	-	409	445	-	11	23-4	28
Ind.	74	125	-	302	305	-	3	5	23
Ill.	414	502	-	1,022	1,029	2	19	9	38
Mich.	224	337	1	498	562	-	8	2	25
Wis.	60	70	-	134	147	1	2	-	55
W.N. CENTRAL	216	333	2	540	580	47	13	42	865
Minn.	42	86	2	115	101	1	6	-	175
Iowa	18	11	-	53	58	-	3	1	141
Mo.	120	169	-	257	291	31	3	7	48
N. Dak.	2	9	-	9	13	-	-	1	127
S. Dak.	6	1	-	28	22	8	-	2	294
Nebr.	6	15	-	12	29	2	1	4	34
Kans.	22	42	-	66	66	5	-	27	46
S. ATLANTIC	5,726	7,373	-	3,975	3,958	6	41	318	1,220
Del.	36	19	-	41	51	1	-	3	1
Md.	403	443	-	362	370	-	11	26	615
D.C.	302	300	-	140	157	-	-	-	-
Va.	281	384	-	402	376	1	3	25	167
W. Va.	25	18	-	101	125	-	1	2	28
N.C.	620	785	-	529	616	4	4	131	12
S.C.	720	690	-	480	469	-	3	71	59
Ga.	-	1,283	-	660	609	-	3	48	195
Fla.	3,339	3,451	-	1,260	1,185	-	16	12	143
E.S. CENTRAL	1,974	1,819	-	1,670	1,787	9	5	76+2	232
Ky.	63	88	-	405	419	-	1	15 2	34
Tenn.	592	469	-	494	518	7	2	32	72
Ala.	611	612	-	492	526	1	2	15	119
Miss.	708	650	-	279	324	1	-	14	7
W.S. CENTRAL	5,643	6,148	-	2,451	2,261	59	30	133	793
Ark.	303	198	-	286	260	35	-	16	134
La.	986	1,080	-	352	322	-	1	4	19
Okla.	175	190	-	232	215	18	2	90	101
Tex.	4,179	4,680	-	1,581	1,464	6	27	23	539
MOUNTAIN	693	584	1	512	516	15	13	14	431
Mont.	6	3	-	46	17	4	-	6	223
Idaho	7	23	-	25	27	-	-	-	10
Wyo.	13	7	-	5	4	-	-	4	31
Colo.	194	158	-	76	64	2	5	2	25
N. Mex.	121	77	-	82	96	2	4	-	12
Ariz.	290	218	-	228	238	4	3	-	115
Utah	8	18	1	17	35	3	1	-	4
Nev.	54	80	-	33	35	-	-	2	11
PACIFIC	4,182	3,845	1	3,665	3,437	8	135	3	527
Wash.	97	138	-	211	180	-	1	-	4
Oreg.	99	106	-	122	137	1	5	-	4
Calif.	3,917	3,522	1	3,070	2,858	4	123	3	516
Alaska	4	6	-	89	64	3	2	-	3
Hawaii	65	73	-	173	198	-	4	-	-
Guam	2	-	U	35	48	-	3	-	-
P.R.	796	704	-	320	348	-	4	-	34
V.I.	3	11	U	1	4	-	52	-	-
Pac. Trust Terr.	13	-	U	16	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending November 23, 1985 (47th Week)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	654	460	125	35	14	19	54
Boston, Mass.	157	98	30	9	5	14	24
Bridgeport, Conn.	57	38	14	3	1	1	4
Cambridge, Mass.	21	15	6	-	-	-	2
Fall River, Mass.	34	29	5	-	-	-	1
Hartford, Conn.	51	35	7	5	3	1	2
Lowell, Mass.	28	23	3	2	-	-	-
Lynn, Mass.	23	20	1	2	-	-	-
New Bedford, Mass.	20	17	3	-	-	-	3
New Haven, Conn.	44	26	10	3	2	3	4
Providence, R.I.	64	47	15	1	1	-	1
Somerville, Mass.	8	6	2	-	-	-	1
Springfield, Mass.	56	41	9	5	1	-	5
Waterbury, Conn.	36	24	10	2	-	-	4
Worcester, Mass.	55	41	10	3	1	-	3
MID ATLANTIC	2,787	2,249	321	97	59	61	124
Albany, N.Y.	57	39	12	2	1	3	-
Allentown, Pa.	20	16	4	-	-	-	-
Buffalo, N.Y.	143	97	32	6	4	4	6
Camden, N.J.	30	19	8	2	1	-	1
Elizabeth, N.J.	45	34	8	3	-	-	2
Erie, Pa.†	34	25	6	1	2	-	3
Jersey City, N.J.	51	39	7	3	-	2	-
N.Y. City, N.Y. §	1,444	1,354	9	22	28	31	53
Newark, N.J.	77	35	26	10	4	2	4
Paterson, N.J.	31	22	6	-	1	2	3
Philadelphia, Pa.	399	256	97	27	11	8	20
Pittsburgh, Pa.†	70	39	21	7	-	3	1
Reading, Pa.	41	33	3	4	-	1	5
Rochester, N.Y.	123	80	33	5	4	1	13
Schenectady, N.Y.	20	16	1	1	-	2	4
Scranton, Pa.†	31	24	5	1	-	1	2
Syracuse, N.Y.	82	59	20	2	-	1	3
Trenton, N.J.	29	20	7	-	2	-	-
Utica, N.Y.	23	14	9	-	-	-	1
Yonkers, N.Y.	37	28	7	1	1	-	3
E.N. CENTRAL	2,386	1,665	424	129	60	107	114
Akron, Ohio	71	55	11	2	2	1	4
Canton, Ohio	32	24	7	-	-	1	2
Chicago, Ill.§	553	462	11	26	16	37	16
Cincinnati, Ohio	165	103	41	9	5	7	20
Cleveland, Ohio	176	107	45	14	4	6	5
Columbus, Ohio	128	82	29	9	1	7	3
Dayton, Ohio	118	71	37	7	2	1	2
Detroit, Mich.	258	151	60	30	7	10	7
Evansville, Ind.	38	30	6	-	1	1	2
Fort Wayne, Ind.	75	54	14	4	3	-	1
Gary, Ind.	23	11	5	3	-	4	-
Grand Rapids, Mich.	57	43	9	1	2	2	7
Indianapolis, Ind.	193	115	53	11	4	10	5
Madison, Wis.	30	19	4	2	-	5	3
Milwaukee, Wis.	154	113	33	2	2	4	9
Peoria, Ill.	70	48	10	4	4	4	4
Rockford, Ill.	43	33	6	1	1	2	5
South Bend, Ind.	44	34	8	1	1	-	7
Toledo, Ohio	93	66	21	2	3	1	8
Youngstown, Ohio	65	44	14	1	2	4	4
W.N. CENTRAL	770	561	137	33	17	22	41
Des Moines, Iowa	64	46	14	-	2	2	4
Duluth, Minn.	34	27	6	-	1	-	5
Kansas City, Kans.	22	11	7	1	1	2	3
Kansas City, Mo.	115	79	28	4	1	3	6
Lincoln, Nebr.	43	34	7	1	-	1	1
Minneapolis, Minn.	108	78	15	5	2	8	2
Omaha, Nebr.	73	50	15	4	2	2	4
St. Louis, Mo.	158	126	19	9	1	3	4
St. Paul, Minn.	64	48	9	3	4	-	3
Wichita, Kans.	89	62	17	6	3	1	9

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,278	813	277	103	46	38	52
Atlanta, Ga.	172	106	32	23	5	6	4
Baltimore, Md.	242	152	60	14	10	6	7
Charlotte, N.C.	75	45	20	4	5	1	4
Jacksonville, Fla.	103	69	21	8	1	4	10
Miami, Fla.	116	73	23	15	2	3	1
Norfolk, Va.	65	40	13	2	6	4	7
Richmond, Va.	77	48	18	8	3	-	4
Savannah, Ga.	42	29	6	2	3	2	4
St. Petersburg, Fla.	115	93	16	4	1	1	5
Tampa, Fla.	68	38	16	6	3	5	2
Washington, D.C.	168	93	44	17	7	6	4
Wilmington, Del.	35	27	8	-	-	-	-
E.S. CENTRAL	843	540	215	42	24	22	54
Birmingham, Ala.	116	73	29	2	7	5	-
Chattanooga, Tenn.	47	27	16	3	-	1	3
Knoxville, Tenn.	82	55	12	9	3	3	7
Louisville, Ky.	115	70	37	2	3	3	6
Memphis, Tenn.	227	157	48	15	4	3	20
Mobile, Ala.	91	60	20	5	1	5	5
Montgomery, Ala.	41	27	11	3	-	-	2
Nashville, Tenn.	124	71	42	3	6	2	11
W.S. CENTRAL	1,438	847	344	142	53	52	66
Austin, Tex.	74	48	15	8	3	-	6
Baton Rouge, La.	38	24	7	5	1	1	3
Corpus Christi, Tex.	33	21	9	2	-	1	-
Dallas, Tex.	242	120	68	27	18	9	7
El Paso, Tex.	61	43	12	3	2	1	4
Fort Worth, Tex.	119	72	23	11	2	11	10
Houston, Tex.	290	171	57	43	10	9	5
Little Rock, Ark.	75	54	15	2	1	3	5
New Orleans, La.	164	97	49	9	7	2	1
San Antonio, Tex.	193	107	50	19	6	11	13
Shreveport, La.	43	25	6	8	1	3	2
Tulsa, Okla.	106	65	33	5	2	1	10
MOUNTAIN	663	416	142	49	22	33	41
Albuquerque, N.Mex.	75	48	14	6	2	4	6
Colo. Springs, Colo.	34	24	6	-	4	-	5
Denver, Colo.	131	79	31	10	3	8	3
Las Vegas, Nev.	84	51	21	10	1	1	5
Ogden, Utah	35	19	9	3	1	3	5
Phoenix, Ariz.	120	70	26	7	6	11	5
Pueblo, Colo.	33	25	4	4	-	-	4
Salt Lake City, Utah	50	28	13	4	1	4	1
Tucson, Ariz.	101	72	18	5	4	2	7
PACIFIC	1,947	1,435	298	97	60	49	103
Berkeley, Calif.	19	17	2	-	-	-	1
Fresno, Calif.	85	52	22	4	3	4	2
Glendale, Calif. §	19	19	-	-	-	-	-
Honolulu, Hawaii	68	41	19	6	1	1	6
Long Beach, Calif.	86	53	27	4	-	2	16
Los Angeles, Calif. §	517	478	5	1	22	6	14
Oakland, Calif.	93	66	12	7	1	7	6
Pasadena, Calif.	17	12	3	1	1	-	1
Portland, Oreg.	137	96	30	6	1	4	3
Sacramento, Calif.	110	74	22	5	6	3	5
San Diego, Calif.	176	106	43	14	8	2	11
San Francisco, Calif.	187	121	35	24	3	4	10
San Jose, Calif.	170	116	31	11	4	8	12
Seattle, Wash.	173	111	32	14	10	6	3
Spokane, Wash.	55	44	10	-	-	1	8
Tacoma, Wash.	35	29	5	-	-	1	5
TOTAL	12,766	8,986	2,283	727	355	403	649

†† Total includes unknown ages.

* 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.

§ Data not available. Figures are estimates based on average of past 4 weeks.

Chancroid – Continued

penile ulcers, often with ragged edges. Tender unilateral or bilateral inguinal adenopathy occurred in 33 (85%) men, and five men developed fluctuant buboes. All 14 women had ulcers; two (14%) had asymptomatic cervical ulcers that were found only on examination; six (43%) had only perianal ulcers; and the remaining six (43%) had symptomatic vulvar ulcers. Six of the women had tender inguinal adenopathy. Before chancroid was suspected, several patients underwent surgical procedures because of inguinal adenopathy (herniorrhaphy) and erosive anal lesions (hemorrhoidectomy).

The etiology was confirmed by isolation of *Haemophilus ducreyi*, serology, and exclusion by laboratory evidence of other recognized causes of genital ulcers. Of 28 patients whose ulcers were cultured for *H. ducreyi*, four (14%) were positive. However, indirect immunofluorescence of ulcer smears using a monoclonal antibody directed against *H. ducreyi*, identified rod-shaped organisms typical of *H. ducreyi* in 15 (54%) of 28 specimens, including three of four culture-positive cases. A dot-immunobinding serologic test for *H. ducreyi* antibody, using an *H. ducreyi* outer membrane preparation as antigen, yielded positive results in nine (32%) of 28 cases. All patients were serologically negative for syphilis. No patient tested for herpes simplex virus (by culture, direct fluorescent-antibody test, or Tzanck smear) or lymphogranuloma venereum (by serology) was positive.

Prostitution appeared important in transmitting the disease. Two-thirds of the male patients had recent sexual exposure to prostitutes. Of the 14 females, eight were prostitutes, and all frequented a distinct geographic area of the city. An additional three women had sexual exposure to men known to be sexually active with prostitutes in the same geographic area.

Control measures began in mid-April, immediately after the initial recognition of cases. The sexual partners of the chancroid patients and their sexual contacts were identified, interviewed, examined, and treated (whether lesions were present or not) with oral erythromycin, 500 mg four times a day, or trimethoprim/sulfamethoxazole, two tablets twice a day, each for 10 days. Intensive efforts were made to locate, examine, and treat all prostitutes from the identified Boston area. All were treated with prophylactic antimicrobial therapy. All Massachusetts STD clinics were notified of the outbreak, and all implemented clinical protocols. A medical advisory memorandum outlining the clinical and laboratory characteristics of chancroid were distributed to neighborhood health centers, infection-control nurses, hospital emergency rooms, and private physicians in the Boston area.

Reported by LM Mofenson, MD, RS Cremo, TJ Rheaume, M Ed, CW Duncan, FR Meyers, E West, Div of Communicable and Venereal Diseases, B Carlson, State Diagnostic Laboratory, Massachusetts Dept of Public Health; Sexually Transmitted Diseases Laboratory Program, Center for Infectious Diseases, Div of Sexually Transmitted Diseases, Center for Prevention Svcs, CDC.

Editorial Note: Chancroid is an uncommon disease in the United States. In 1983, 847 cases were reported, an incidence of 0.4/100,000 (*1*). Ninety percent of cases were reported by four states—Florida, New York, Georgia, and California—and CDC has investigated outbreaks in three of these states (Florida, New York, and California) during the last 3 years. Nevertheless, this episode demonstrates that outbreaks may occur elsewhere. Although the origin of this outbreak is unclear, it seems likely that an individual infected outside Massachusetts was the source. The fact that three of the four patients whose chancroid occurred after August 1 became infected outside Massachusetts reinforces this suspicion.

Chancroid must be differentiated from other sexually transmitted infectious diseases with genital ulceration (syphilis, genital herpes, lymphogranuloma venereum, granuloma inguinale), but differentiation on clinical grounds can be difficult. The culture of *H. ducreyi* is also difficult and requires special media and personnel experienced with growing *H. ducreyi*. Although laboratories experienced with growing *H. ducreyi* have reported isolation rates as high as 80% from clinically suspected cases (*2*), isolation rates far less than this are generally reported. Both the recent description of a dot-immunobinding serologic test and a means to detect

Chancroid — Continued

H. ducreyi in ulcer material by immunofluorescence offer promising aids to diagnose chancroid where culture has been unsuccessful or impossible to perform (*3*).

Tetracycline was formerly a preferred treatment for chancroid. However, many strains of *H. ducreyi* are now tetracycline resistant (*4*). Similarly, in some areas of the world, including the United States, increased resistance to trimethoprim has recently been described (*5,6*), making treatment with the synergistic combination of trimethoprim/sulfamethoxazole less reliable than before (*5-7*). Yet, trimethoprim/sulfamethoxazole remains reliable in areas where such resistance has not been documented. As a consequence, oral erythromycin, 500 mg four times a day, or intramuscular ceftriaxone, 250 mg, once, have recently been recommended as the preferred drugs for the treatment of chancroid (*8*).

The apparent successful termination of this outbreak demonstrates how promptly implemented surveillance and intervention measures can be effective in controlling outbreaks of sexually transmitted diseases. With chancroid, because asymptomatic carriage of *H. ducreyi* in males and females has been described (*5,9,10*), aggressive tracing and treatment of sex partners, whether symptomatic or not, was an integral part of this strategy.

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Measles in a Population with Religious Exemption to Vaccination — Colorado

On July 24, 1985, a 17-year-old camper at a Colorado camp attended by Christian Scientists developed measles. She had become infected while traveling in California during the 2 weeks before her arrival at the camp. Twenty-five counsellors and 110 campers, aged 14-25 years, attended the camp; all were unvaccinated, and all were exposed to the index patient. At the time the index patient was diagnosed with measles, the exposed campers and counsellors were not yet infectious. After discussions with state health officials, it was decided that quarantining the campers and staff at the facility would be impractical for medical and logistical reasons, since the camp is located in a remote part of Colorado with minimal nearby medical facilities. Therefore, the camp was closed July 27, before any secondary cases occurred.

The campers and staff were from 24 different states. All were placed under quarantine orders in their home states, and vaccination of family contacts was offered through state health departments. Few of the families accepted immunization.

A total of 50 associated cases occurred. In the second generation, 31 campers and three

Measles — Continued

counsellors residing in 15 states developed measles, an attack rate of 25.2% (Figure 3). The mean age of these patients was 14.6 years. In the third generation, 16 cases were reported from eight states. All were in unimmunized household contacts. No spread to the general community was documented. No serious complications, hospitalizations, or deaths were reported. Overall, California reported the largest number of cases (16 [31.4%]); Colorado reported six (11.8%).

Reported by Immunization Program, S Ferguson, PhD, State Epidemiologist, Colorado Dept of Health; Div of Field Svcs, Epidemiology Program Office, Div of Immunization, Center for Prevention Svcs, CDC.

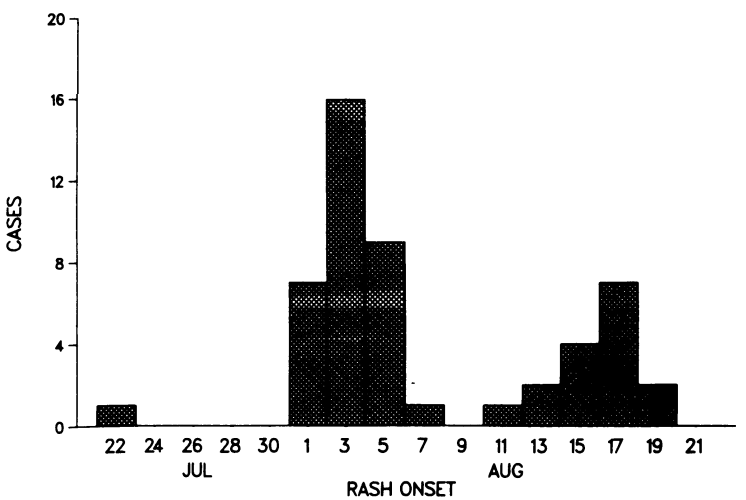
Editorial Note: The high attack rate (25.2%) in this camp population reflects the rapidity of transmission and high susceptibility of unimmunized persons. Usual control methods consisting of timely immunization of susceptible contacts were not possible in this situation because of the religious beliefs of the campers and their families. Quarantine efforts by individual state health departments and cooperation by families of campers were apparently successful in limiting spread of disease into the community. In an outbreak among Christian Scientists at Principia College earlier this year, quarantine at the school was used as a control measure. Although transmission was sustained for at least 4 generations, there was no spread to the community (*1*).

The cost of controlling the camp outbreak was borne primarily by the camp, which lost approximately $106,000 in income from cancellation of an entire session, and by parents, who in many cases had to cancel other summer plans to accommodate the quarantine. Furthermore, state health departments in 16 states had to implement control measures to ensure that the measles cases imported into their states did not become foci of other outbreaks.

Although persons unvaccinated because of religious exemptions comprise a small proportion of the total population, such persons are at increased risk of acquiring vaccine-preventable diseases and may account for a large proportion of serious measles-associated complications. For example, all three reported measles-related deaths in 1985 occurred during the measles outbreak at Principia College.

Persons with religious exemptions have accounted for a small percentage of the total number of reported measles cases in the United States (*2*). However, they may play important roles in sustaining or initiating transmission of measles. Although no spread occurred outside the religious groups in the Principia College and Colorado outbreaks, persons with religious

FIGURE 3. Measles in a Christian Science camp, by date of rash onset — Colorado, 1985



Measles — Continued

exemptions to vaccination have developed disease that has spread to the general community. In one such outbreak this year in Montana, a person with a religious exemption was the index patient for an outbreak that involved 137 persons (*3*).

While most state school immunization laws allow exemptions on the basis of religious convictions, the data presented here illustrate the necessity of excluding persons with religious exemptions (as well as other unvaccinated individuals) from school and other environments in epidemic settings where contact with other susceptibles may occur. This serves both to protect their own health and to minimize transmission in the community.

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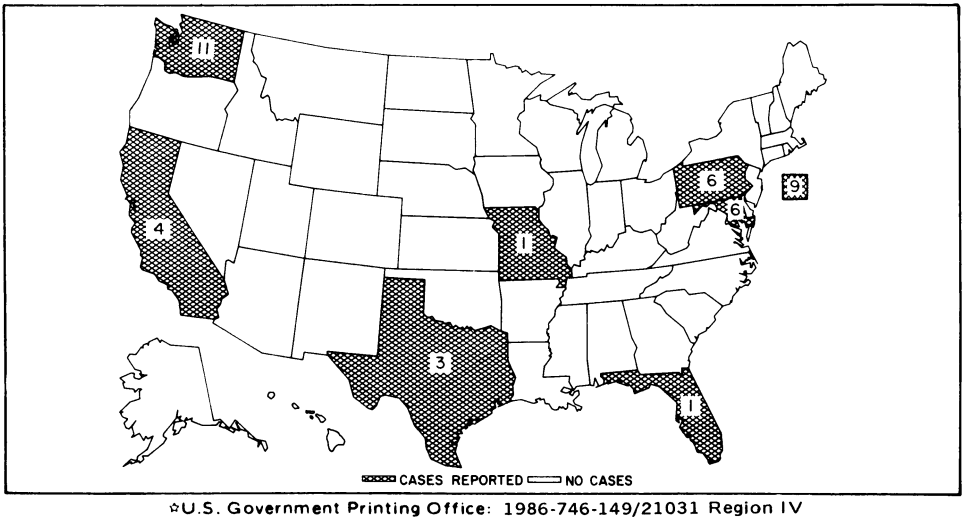
FIGURE I. Reported measles cases — United States, weeks 43-46, 1985



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