CENTERS FOR DISEASE CONTROL

April 22, 1983 / Vol. 32 / No. 15

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

Epidemiologic Notes and Reports

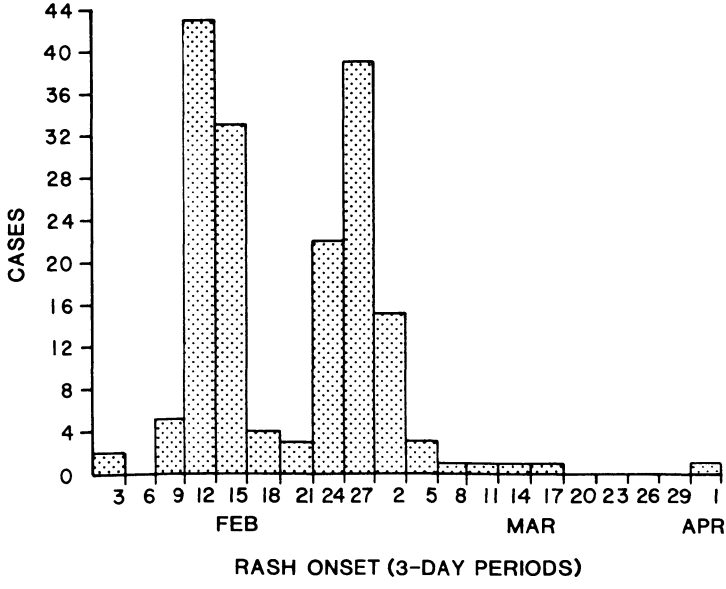
Measles Outbreaks on University Campuses — Indiana, Ohio, Texas

Indiana, Ohio: A total of 174 students with clinically diagnosed* and/or laboratory confirmed measles were reported at Indiana University (IU) — Bloomington (approximate enrollment 31,000). Rash onset occurred from February 1 to April 2, 1983 (Figure 1). The outbreak was explosive, with at least 89 second generation cases. No source was identified. The students, who ranged in age from 17 to 31 years, were residents of 17 states, New York City, and Kenya (Figure 2). Attack rates among Indiana residents were not significantly different from those among nonresidents. An additional 17 clinical measles cases from other reporting areas were epidemiologically linked to the IU outbreak, including a cluster of 13 cases among students attending Miami University, Oxford, Ohio.

The risk of measles was greater among students living on campus than off campus ($p < 0.00001$): 11.1 cases per 1,000 students living in fraternity or sorority houses on campus;

*A clinical case of measles is 1) a generalized maculopapular rash lasting 3 or more days, 2) temperature of 38.3 C (101 F) or greater, and 3) one of the following: cough, coryza, conjunctivitis.

FIGURE 1. Measles cases — Indiana University, Bloomington, Indiana, February 1 — April 2, 1983



Measles — Continued

9.3/1,000 in campus dormitories; and 2.2/1,000 in off-campus housing. Of the 174 cases at IU, 124 (71.3%) occurred among freshmen and sophomores. However, neither age nor grade level was a significant risk factor when corrected for types of local housing.

Intensive voluntary control efforts by state, county, and university health officials began on February 15. By March 6, an estimated 13,000 doses of measles-rubella (MR) vaccine were administered to students, faculty, staff, and guests on the IU campus[†]. Because of the continuing outbreak (168 cases as of March 6) and the high proportion of students who remained unvaccinated, on March 7, the State Health Commissioner announced a plan to require documentation of immunity for IU students returning to campus after spring recess (March 11-21) without documentation of immunity.[§] As a result of this announcement, approximately 8,000 additional doses were given by March 21. An estimated 7,000 students who were born before 1957 were not required to show written proof of immunity because they were more likely to have had natural exposure to measles. More than 3,100 students showed written proof of immunity on returning from spring break. By April 15, 2,000 students, 6.4% of the total enrollment, lacked documentation of immunity.

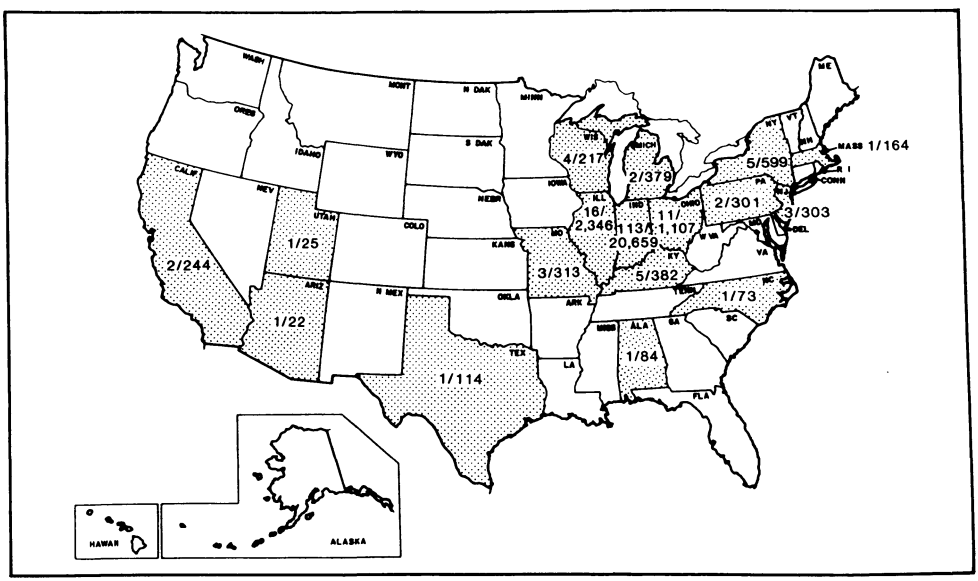
Texas: An outbreak of 32 measles cases, including 29 cases among university students, was reported at the University of Houston (UH) campus, Houston, Texas. Rash onset occurred from February 2 to March 28, 1983. Initial transmission occurred in campus dormitories where 2,603 (10.0%) of the estimated 26,000 enrolled students reside. Of the 32 cases, 20 (62.5%) occurred in Dormitory A and two cases were reported from Dormitory B. The remaining cases occurred among off-campus students (seven) and community residents (three).

To control the outbreak, the City Health Officer designated the university as an epidemic area and ordered immunization of all dormitory residents. From February 21 to March 3, vac-

[†]When vaccination for measles is to be undertaken, the ACIP recommends taking every opportunity to vaccinate persons also susceptible to rubella with MR vaccine.

[§]For persons ≥15 months of age and born after 1956, written documentation showing date of vaccination with live measles vaccine on or after the first birthday, or documentation of measles illness diagnosed by a physician.

FIGURE 2. Measles cases, by state of residence and total state enrollment — Indiana University, 1983



Measles — Continued

cination clinics were conducted in all five dormitories. Proof of measles vaccination was provided by 17.2% (448) of the entire dormitory population (2,603); 2,151 (82.6%) students were vaccinated. The four remaining students were evicted on March 7. All UH students were required to provide proof of immunity or be barred from participation in any official university function outside the city. An additional 4,686 students were vaccinated in voluntary clinics on campus.

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Editorial Note: College students accounted for 52.6% (241/458) of U.S. measles cases reported in the first 13 weeks of 1983. Although measles has previously been reported from colleges and universitites, the IU outbreak is the largest in recent times. The susceptibility level of this group is difficult to assess since very few colleges require immunization records. Nevertheless, the fact that attack rates in the IU outbreak were similar for students regardless of state of residence suggests that susceptibility to measles is not unique to Indiana colleges. Estimates of susceptibility among college students range from 1% to 20%, with most estimates at 5%-15% (*1*).

Measles outbreaks on campuses are disruptive and costly. Moreover, measles infection has a higher risk of complications when it occurs in the college age group; at IU, 16 of 174 students with measles required stays at the student health center for observation. Because no routine program exists to require that students prove immunity to measles before college entry, it was necessary to vaccinate more than 20,000 students who had no record of vaccination. Assuming at least 80% of the IU students were immune, a high proportion of the students were vaccinated unnecessarily. If records had been available before the outbreak, the number of days lost from classes and the number of unnecessary vaccine doses administered might have been substantially reduced.

The IU outbreak demonstrates that voluntary vaccination programs generally meet with only limited success. Based on these experiences, future college outbreaks should be met with immediate requirements that all students be vaccinated or show proof of immunity.

Although formal economic analysis of this outbreak has not yet been completed, known direct costs of the outbreak control activities exceeded $225,000. It is more cost-effective to prevent measles outbreaks than to attempt to control them. Colleges should consider establishing immunization requirements as a condition of registration to be confident that students born after 1956 are immune to measles.

Reference

1. CDC. Measles in universities—Indiana, 1983. MMWR 1983;32(8):113-4.

Current Trends

Antigenic Analysis of Recent Influenza Virus Isolates

Most influenza virus isolates recovered in the United States and Europe during the winter of 1982-1983 have been type A(H3N2) strains closely related to A/Bangkok/1/79. This was consistent with increased activity of such strains in the Southern Hemisphere and several tropical Asian countries during July and August 1982 (*1*). Type A(H3N2) influenza strains continued to be isolated in Asia during late 1982 and early 1983, with sporadic cases in Hong

Influenza – Continued

Kong (September), localized outbreaks or moderate epidemics in Japan (February), Korea (December), Pakistan (January), People's Republic of China (December), Taiwan, Province of China (January), Singapore (October), and Thailand (October).

Antigenic analysis of isolates from some Asian countries identified a trend toward a predominance of strains, which, in hemagglutination inhibition (HI) tests with ferret antiserum, differ from A/Bangkok/1/79 or other recent variants. Such strains, called A/Philippines/2/82, were named for the prototype of a series of strains first identified during an outbreak in the Philippines in summer 1982. As shown in Table 1, although antiserum to A/Philippines/2/82 reacts as strongly with A/Bangkok/1/79 as with its homologous antigen, A/Philippines/2/82 antigen is poorly inhibited by the A/Bangkok/1/79 serum.

Antigenic analysis of influenza viruses from Europe and North America examined during the 1982-1983 winter has confirmed the presence of A/Philippines/2/82 virus in these regions, although the predominant strains have been well inhibited by A/Bangkok/1/79 serum. By February, up to 20% of isolates in the United Kingdom were identified as similar to A/Philippines/2/82 in HI tests with ferret antiserum, although Philippines-like strains had been absent earlier in the season. They have also been identified in Belgium, Czechoslovakia, Italy, and the Netherlands. In North America, A/Philippines/2/82-like strains were first isolated in

(Continued on page 201)

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

Disease	15th Week Ending			Cumulative, 15th Week Ending		
	April 16, 1983	April 17, 1982	Median 1978-1982	April 16, 1983	April 17 1982	Median 1978-1982
Aseptic meningitis	84	60	53	1,206	1,112	935
Encephalitis: Primary (arthropod-borne & unspec.)	15	18	11	250	231	174
Post-infectious	3	1	2	21	14	45
Gonorrhea: Civilian	14,669	16,564	16,967	252,504	266,284	270,038
Military	563	355	400	6,849	7,684	7,724
Hepatitis: Type A	422	417	527	6,903	6,551	7,840
Type B	427	408	359	6,229	5,821	4,616
Non A, Non B	74	44	N	914	561	N
Unspecified	132	132	188	2,237	2,440	2,948
Legionellosis	30	8	N	176	92	N
Leprosy	9	6	4	75	56	51
Malaria	19	22	22	191	220	220
Measles: Total	11	81	458	555	324	4,506
Indigenous	4	N	N	476	N	N
Imported*	7	N	N	79	N	N
Meningococcal infections: Total	43	75	69	961	1,039	1,039
Civilian	43	75	68	949	1,035	1,032
Military	-	-	-	12	4	9
Mumps	97	136	227	1,212	2,132	4,145
Pertussis	42	24	20	452	312	312
Rubella (German measles)	32	73	124	340	725	1,441
Syphilis (Primary & Secondary): Civilian	531	554	468	9,276	9,639	7,461
Military	11	17	7	140	116	108
Toxic-shock syndrome	6	N	N	109	N	N
Tuberculosis	518	493	532	6,310	6,851	7,154
Tularemia	5	2	2	47	28	27
Typhoid fever	7	8	8	98	113	114
Typhus fever, tick-borne (RMSF)	6	4	4	28	25	22
Rabies, animal	139	175	164	1,734	1,581	1,581

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1983		Cum. 1983
Anthrax	-	Plague	
Botulism: Foodborne (Colo. 2)	8	Poliomyelitis: Total	1
Infant (Pa. 4, Ohio 1, Ky. 1)	20	Paralytic	1
Other	-	Psittacosis (Tex. 1, Calif. 1)	25
Brucellosis (Va. 4, Okla. 2, Tex. 1, Wash. 1)	31	Rabies, human	2
Cholera	-	Tetanus	13
Congenital rubella syndrome	8	Trichinosis (Tex. 1)	12
Diphtheria	-	Typhus fever, flea-borne (endemic, murine) (Ohio 1, Tex. 1, Hawaii 1)	7
Leptospirosis (Ohio 1, Mo. 1, Hawaii 1)	9		

*Seven of the 11 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 April 16, 1983 and April 17, 1982 (15th week)

Reporting Area	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy	Malaria
		Primary	Post-infectious			A	B	NA,NB	Unspecified			
	1983	Cum. 1983	Cum. 1983	Cum. 1983	Cum. 1982	1983	1983	1983	1983	1983	Cum. 1983	Cum. 1983
UNITED STATES	84	250	21	252,504	266,284	422	427	74	132	30	75	191
NEW ENGLAND	4	11	-	6,587	6,314	9	31	4	2	1	1	6
Maine	1	-	-	364	303	2	1	-	-	-	-	-
N.H.	1	1	-	182	228	2	2	-	-	-	1	-
Vt.	-	-	-	102	134	1	2	1	-	-	-	-
Mass.	1	6	-	2,873	2,888	1	5	1	2	-	-	1
R.I.	1	-	-	360	439	-	1	-	-	1	-	2
Conn.	-	4	-	2,706	2,322	3	20	2	-	-	-	3
MID ATLANTIC	8	31	4	32,257	32,039	36	73	9	19	8	8	34
Upstate N.Y.	3	9	-	4,489	5,146	9	15	4	4	-	-	11
N.Y. City	1	6	-	13,725	13,623	2	8	-	1	1	7	12
N.J.	2	6	-	6,056	5,732	2	17	-	14	4	-	8
Pa.	2	10	4	7,987	7,538	23	33	5	-	3	1	3
E.N. CENTRAL	8	49	4	32,547	37,518	31	49	6	11	12	2	8
Ohio	4	23	3	9,868	10,716	3	12	1	2	10	1	1
Ind.	1	5	1	3,849	4,156	16	9	1	5	-	-	-
Ill.	-	-	-	5,727	10,052	2	1	-	-	-	1	1
Mich.	3	20	-	9,893	9,005	10	27	4	4	2	-	6
Wis.	-	1	-	3,210	3,589	-	-	-	-	-	-	-
W.N. CENTRAL	5	35	3	12,331	12,337	14	11	5	4	2	1	7
Minn.	1	18	1	1,746	1,767	3	1	2	-	1	1	2
Iowa	-	15	-	1,322	1,369	-	2	1	-	-	-	2
Mo.	3	1	-	6,080	5,638	3	7	2	4	1	-	2
N. Dak.	-	-	-	119	172	1	-	-	-	-	-	-
S. Dak.	1	-	1	344	358	3	-	-	-	-	-	-
Nebr.	-	1	-	656	769	1	1	-	-	-	-	-
Kans.	-	-	1	2,064	2,264	3	-	-	-	-	-	1
S. ATLANTIC	19	37	4	65,628	68,384	67	90	4	6	3	2	26
Del.	-	-	-	1,183	1,057	-	1	-	-	-	-	-
Md.	1	5	-	8,224	8,742	6	14	-	-	-	-	3
D.C.	-	-	-	4,595	3,458	-	-	-	-	-	-	3
Va.	10	14	1	5,609	5,737	7	17	-	1	3	-	6
W. Va.	-	-	-	629	787	-	-	1	-	-	-	1
N.C.	2	7	-	9,281	11,142	4	3	-	1	-	-	1
S.C.	-	2	-	6,443	6,450	11	21	-	-	-	-	3
Ga.	2	1	-	14,973	11,619	7	13	-	-	-	-	1
Fla.	4	8	3	14,691	19,392	32	21	3	4	-	2	8
E.S. CENTRAL	10	9	2	21,864	21,948	32	28	4	9	-	-	3
Ky.	2	-	-	2,709	2,922	18	2	1	1	-	-	-
Tenn.	2	1	-	8,767	8,431	7	15	1	2	-	-	-
Ala.	6	8	2	6,642	6,571	4	8	2	6	-	-	1
Miss.	-	-	-	3,746	4,024	3	3	-	-	-	-	2
W.S. CENTRAL	4	25	-	35,868	37,542	73	29	3	49	1	6	18
Ark.	-	3	-	2,775	3,088	-	1	-	6	1	-	1
La.	-	2	-	5,694	6,532	16	4	1	1	-	-	-
Okla.	2	6	-	4,346	3,971	6	2	2	3	-	-	6
Tex.	2	14	-	23,053	23,951	51	22	-	39	-	6	11
MOUNTAIN	3	9	2	7,873	9,585	43	28	9	5	1	11	10
Mont.	-	-	-	384	406	-	1	-	-	-	-	-
Idaho	-	-	-	401	415	-	-	-	-	-	-	-
Wyo.	-	1	-	222	263	-	-	-	1	-	-	-
Colo.	1	2	-	2,254	2,576	8	2	2	-	-	2	4
N. Mex.	-	-	-	1,002	1,226	6	-	-	-	-	-	2
Ariz.	1	1	2	1,964	2,636	23	10	4	2	1	9	3
Utah	-	5	-	356	417	4	2	1	2	-	-	1
Nev.	1	-	-	1,290	1,646	2	13	2	-	-	-	-
PACIFIC	23	44	2	37,549	40,617	117	88	30	27	2	44	79
Wash.	1	3	-	2,667	3,446	4	3	5	-	-	4	2
Oreg.	-	-	-	1,909	2,273	7	5	3	-	-	1	4
Calif.	18	39	2	31,342	33,176	105	80	22	27	1	27	73
Alaska	-	-	-	853	1,014	1	-	-	-	-	-	-
Hawaii	4	2	-	778	708	-	-	-	-	1	12	-
Guam	U	-	-	33	35	U	U	U	U	U	-	-
P.R.	1	-	-	854	871	7	7	-	22	-	-	1
V.I.	-	-	-	82	64	-	-	-	-	-	-	-
Pac. Trust Terr.	U	-	-	-	128	U	U	U	U	U	-	-

N: Not notifiable U: Unavailable

TABLE III. (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending April 16, 1983 and April 17, 1982 (15th week)

Reporting Area	Measles (Rubeola)					Menin-gococcal Infections	Mumps			Pertussis			Rubella		
	Indigenous		Imported*		Total										
	1983	Cum. 1983	1983	Cum. 1983	Cum. 1982	Cum. 1983	1983	Cum. 1983	Cum. 1982	1983	Cum. 1983	Cum. 1982	1983	Cum. 1983	Cum. 1982
UNITED STATES	4	476	7	79	324	961	97	1,212	2,132	42	452	312	32	340	725
NEW ENGLAND	-	1	-	1	7	48	2	56	114	1	16	19	-	9	8
Maine	-	-	-	-	-	6	-	8	22	-	-	-	-	-	-
N.H.	-	-	-	-	1	4	-	12	11	-	2	4	-	2	8
Vt.	-	-	-	-	2	-	-	7	4	-	2	-	-	1	-
Mass.	-	1	-	-	1	15	-	13	59	1	11	6	-	6	-
R.I.	-	-	-	-	-	2	1	7	8	-	1	7	-	-	-
Conn.	-	-	-	1	3	21	1	9	10	-	-	2	-	-	-
MID ATLANTIC	-	3	-	8	25	142	8	97	138	11	114	46	2	19	54
Upstate N.Y.	-	-	-	2	13	50	4	41	31	1	39	30	2	13	29
N.Y. City	-	3	-	5	10	16	-	7	20	4	12	6	-	2	15
N.J.	-	-	-	1	-	21	-	15	25	-	8	4	-	1	10
Pa.	-	-	-	-	2	55	4	34	62	6	55	6	-	3	-
E.N. CENTRAL	-	278	-	38	25	158	38	588	1,246	16	114	110	5	45	85
Ohio	-	-	-	1	-	63	17	321	892	7	39	20	-	1	-
Ind.	-	216	-	-	1	24	1	15	22	2	10	9	4	6	12
Ill.	-	62	-	32	15	30	11	58	70	7	56	51	1	20	24
Mich.	-	-	-	5	9	35	9	159	191	-	6	7	-	9	32
Wis.	-	-	-	-	-	6	-	35	71	-	3	23	-	9	17
W.N. CENTRAL	-	-	-	-	1	64	4	93	141	4	28	13	4	23	21
Minn.	-	-	-	-	-	9	1	15	75	-	9	4	-	3	2
Iowa	-	-	-	-	-	8	1	30	20	-	2	-	-	-	-
Mo.	-	-	-	-	1	35	-	7	7	2	5	5	-	-	13
N. Dak.	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-
S. Dak.	-	-	-	-	-	2	-	-	-	1	1	2	-	-	1
Nebr.	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Kans.	-	-	-	-	-	9	2	41	39	1	10	1	4	20	5
S. ATLANTIC	4	107	7	11	25	221	8	60	142	4	61	33	3	33	18
Del.	-	-	-	-	-	-	1	5	3	-	-	3	-	-	-
Md.	-	2	-	-	2	25	1	12	11	-	8	-	-	1	5
D.C.	-	-	-	-	1	3	-	-	-	-	-	1	-	-	-
Va.	-	1	7†	8	14	31	5	19	21	3	24	5	-	1	7
W. Va.	1	1	-	-	1	1	1	13	64	-	2	3	-	-	1
N.C.	-	-	-	-	-	43	-	4	4	-	2	5	-	4	-
S.C.	-	-	-	3	-	24	-	2	9	1	3	4	-	-	1
Ga.	-	6	-	-	-	41	-	5	3	-	16	6	-	4	1
Fla.	3	97	-	-	7	53	-	-	27	-	6	6	3	23	3
E.S. CENTRAL	-	-	-	-	5	52	1	22	22	-	5	5	-	5	30
Ky.	-	-	-	-	1	9	-	8	8	-	2	-	-	5	15
Tenn.	-	-	-	-	4	18	1	11	8	-	2	4	-	-	-
Ala.	-	-	-	-	-	18	-	-	4	-	-	-	-	-	-
Miss.	-	-	-	-	-	7	-	3	2	-	1	1	-	-	15
W.S. CENTRAL	-	32	-	11	5	118	1	97	69	1	41	15	5	60	37
Ark.	-	-	-	11	-	5	-	2	3	-	2	-	-	-	-
La.	-	-	-	-	-	19	-	-	1	-	2	-	-	9	-
Okla.	-	-	-	-	-	15	-	-	-	1	11	2	-	-	2
Tex.	-	32	-	-	5	79	1	95	65	-	26	13	5	51	35
MOUNTAIN	-	-	-	1	-	35	21	55	40	2	55	20	-	12	23
Mont.	-	-	-	-	-	1	1	2	3	-	1	-	-	3	1
Idaho	-	-	-	-	-	3	-	1	2	-	2	1	-	2	-
Wyo.	-	-	-	-	-	1	-	-	2	-	4	1	-	1	4
Colo.	-	-	-	1	-	17	1	5	9	2	35	5	-	-	1
N. Mex.	-	-	-	-	-	5	-	-	-	-	4	3	-	-	2
Ariz.	-	-	-	-	-	5	18	39	13	-	6	10	-	4	5
Utah	-	-	-	-	-	3	-	6	9	-	3	-	-	1	8
Nev.	-	-	-	-	-	-	1	2	2	-	-	-	-	1	2
PACIFIC	-	55	-	9	231	123	14	144	220	3	18	51	13	134	449
Wash.	-	1	-	-	15	18	1	22	39	-	1	10	-	1	16
Oreg.	-	5	-	-	-	15	-	-	-	1	3	6	1	9	2
Calif.	-	48	-	9	214	87	12	105	174	2	14	35	12	124	424
Alaska	-	-	-	-	-	-	1	9	5	-	-	-	-	-	1
Hawaii	-	1	-	-	2	3	-	8	2	-	-	-	-	-	6
Guam	U	-	U	-	-	1	U	-	1	U	-	-	U	-	1
P.R.	-	26	-	-	44	7	15	56	15	-	3	6	-	1	3
V.I.	-	-	-	5	-	-	-	-	-	-	-	-	-	1	-
Pac. Trust Terr.	U	-	U	-	-	-	U	-	1	U	-	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations. U: Unavailable †International §Out-of-state

TABLE III. (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending April 16, 1983 and April 17, 1982 (15th week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1983	Cum. 1982	1983	1983	Cum. 1983	Cum. 1983	Cum. 1983	Cum. 1983	Cum. 1983
UNITED STATES	9,276	9,639	6	518	6,310	47	98	28	1,734
NEW ENGLAND	232	187	-	11	163	-	5	1	2
Maine	6	1	-	-	11	-	-	-	2
N.H.	7	-	-	-	14	-	-	-	-
Vt.	3	-	-	-	2	-	-	-	-
Mass.	151	132	-	5	79	-	5	1	-
R.I.	6	11	-	-	16	-	-	-	-
Conn.	59	43	-	6	41	-	-	-	-
MID ATLANTIC	1,141	1,280	-	96	1,177	-	20	-	40
Upstate N.Y.	59	137	-	17	194	-	3	-	24
N.Y. City	701	782	-	30	451	-	10	-	-
N.J.	218	148	-	20	252	-	6	-	-
Pa.	163	213	-	29	280	-	1	-	16
E.N. CENTRAL	377	606	1	47	861	-	14	3	131
Ohio	139	95	1	3	132	-	3	1	18
Ind.	46	64	-	-	91	-	1	-	10
Ill.	95	320	-	27	386	-	4	-	67
Mich.	73	96	-	17	213	-	6	2	-
Wis.	24	31	-	-	39	-	-	-	36
W.N. CENTRAL	111	188	2	23	215	14	1	4	252
Minn.	50	33	1	4	38	-	-	-	57
Iowa	4	7	-	-	25	-	-	-	70
Mo.	38	114	-	16	112	10	1	3	31
N. Dak.	-	4	-	-	-	-	-	1	18
S. Dak.	-	-	-	1	17	-	-	-	30
Nebr.	6	7	1	2	7	2	-	-	19
Kans.	13	23	-	-	16	2	-	-	27
S. ATLANTIC	2,390	2,635	2	102	1,241	11	14	4	627
Del.	13	7	1	-	7	-	-	-	-
Md.	151	150	-	7	117	5	4	1	270
D.C.	99	175	-	9	49	-	-	-	1
Va.	176	193	-	9	105	1	3	-	239
W. Va.	7	7	-	2	50	-	2	1	38
N.C.	221	197	-	26	143	4	1	-	3
S.C.	163	123	1	7	110	-	1	1	7
Ga.	462	567	-	10	242	1	-	-	58
Fla.	1,098	1,216	-	32	418	-	3	1	11
E.S. CENTRAL	643	711	-	32	594	6	1	3	153
Ky.	39	35	-	9	161	-	-	-	32
Tenn.	172	187	-	9	172	4	1	1	106
Ala.	266	243	-	2	156	-	-	2	15
Miss.	166	246	-	12	105	2	-	-	-
W.S. CENTRAL	2,488	2,417	-	80	684	13	4	10	358
Ark.	68	56	-	11	61	9	-	3	59
La.	492	506	-	7	106	2	-	-	9
Okla.	66	49	-	5	76	2	-	2	38
Tex.	1,862	1,806	-	57	441	-	4	5	252
MOUNTAIN	212	254	-	12	172	1	7	2	63
Mont.	4	1	-	2	16	-	1	1	48
Idaho	3	16	-	-	10	-	-	1	-
Wyo.	3	9	-	1	3	-	-	-	1
Colo.	55	83	-	1	14	-	1	-	-
N. Mex.	67	45	-	2	33	1	-	-	2
Ariz.	47	55	-	5	69	-	3	-	12
Utah	8	7	-	1	18	-	1	-	-
Nev.	25	38	-	-	9	-	1	-	-
PACIFIC	1,682	1,361	1	115	1,203	2	32	1	108
Wash.	39	43	-	4	62	1	2	-	-
Oreg.	33	38	1	2	52	-	-	-	-
Calif.	1,576	1,244	-	101	999	1	29	1	101
Alaska	8	6	-	-	13	-	-	-	7
Hawaii	26	30	-	8	77	-	1	-	-
Guam	-	1	U	U	1	-	-	-	-
P.R.	212	183	-	-	124	-	-	-	14
V.I.	7	-	-	-	1	-	-	-	-
Pac. Trust Terr.	-	-	U	U	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending April 16, 1983 (15th week)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	696	471	152	32	16	25	58
Boston, Mass.	197	120	50	11	5	11	25
Bridgeport, Conn.	32	24	7	-	-	1	2
Cambridge, Mass.	23	19	4	-	-	-	4
Fall River, Mass.	31	28	3	-	-	-	1
Hartford, Conn.	50	30	13	4	3	-	3
Lowell, Mass.	25	19	3	1	2	-	-
Lynn, Mass.	13	10	2	-	-	1	-
New Bedford, Mass.	34	27	6	1	-	-	3
New Haven, Conn.	57	36	10	2	1	8	4
Providence, R.I.	72	50	17	5	-	-	3
Somerville, Mass.	9	7	1	1	-	-	-
Springfield, Mass.	49	32	9	4	2	2	5
Waterbury, Conn.	31	20	8	2	1	-	2
Worcester, Mass.	73	49	19	1	2	2	6
MID. ATLANTIC	2,592	1,770	549	149	58	66	129
Albany, N.Y.	60	39	13	1	1	6	6
Allentown, Pa.	11	11	-	-	-	-	-
Buffalo, N.Y.	111	71	29	3	4	4	10
Camden, N.J.	41	22	14	3	-	2	1
Elizabeth, N.J.	23	20	3	-	-	-	2
Erie, Pa.†	43	34	5	4	-	-	2
Jersey City, N.J.	46	29	13	1	2	1	2
N.Y. City, N.Y.	1,376	937	282	89	35	33	60
Newark, N.J.	72	39	22	5	4	2	4
Paterson, N.J.	28	18	6	3	-	1	2
Philadelphia, Pa.†	271	172	62	24	5	8	13
Pittsburgh, Pa.†	60	38	19	-	-	3	2
Reading, Pa.	34	30	3	-	1	-	3
Rochester, N.Y.	106	80	18	5	1	2	7
Schenectady, N.Y.	29	20	7	1	1	-	-
Scranton, Pa.†	25	24	1	-	-	-	1
Syracuse, N.Y.	160	114	38	4	3	1	8
Trenton, N.J.	42	34	4	2	1	1	1
Utica, N.Y.	29	22	5	1	-	1	3
Yonkers, N.Y.	25	16	5	3	-	1	2
E.N. CENTRAL	2,245	1,438	519	150	66	72	97
Akron, Ohio	96	57	24	6	6	3	-
Canton, Ohio	44	35	7	2	-	-	7
Chicago, Ill.	449	254	122	45	16	12	11
Cincinnati, Ohio	130	84	33	1	4	8	20
Cleveland, Ohio	202	115	58	17	6	6	3
Columbus, Ohio	83	50	24	1	2	6	4
Dayton, Ohio	112	68	34	3	1	6	2
Detroit, Mich.	245	151	56	18	8	12	6
Evansville, Ind.	60	44	8	4	4	-	2
Fort Wayne, Ind.	49	35	5	4	3	2	3
Gary, Ind.	16	6	9	-	1	-	-
Grand Rapids, Mich.	50	38	10	1	-	1	5
Indianapolis, Ind.	182	113	33	21	6	9	2
Madison, Wis.	48	33	11	2	2	-	4
Milwaukee, Wis.	143	107	21	10	2	3	5
Peoria, Ill.	48	40	5	2	1	-	6
Rockford, Ill.	46	33	9	3	1	-	3
South Bend, Ind.	68	52	12	3	-	1	5
Toledo, Ohio	112	78	25	4	2	3	9
Youngstown, Ohio	62	45	13	3	1	-	-
W.N. CENTRAL	731	514	146	22	18	31	31
Des Moines, Iowa	49	32	13	-	2	2	3
Duluth, Minn.	31	23	8	-	-	-	4
Kansas City, Kans.	35	29	4	2	-	-	1
Kansas City, Mo.	132	80	37	5	4	6	7
Lincoln, Nebr.	28	19	6	1	-	2	-
Minneapolis, Minn.	84	58	13	2	3	8	5
Omaha, Nebr.	96	72	18	2	1	3	-
St. Louis, Mo.	153	115	25	4	3	6	3
St. Paul, Minn.	56	41	9	3	2	1	2
Wichita, Kans.	67	45	13	3	3	3	6
S. ATLANTIC	1,230	739	335	67	33	56	51
Atlanta, Ga.	156	92	44	3	7	10	1
Baltimore, Md.	147	87	47	7	3	3	4
Charlotte, N.C.	66	36	22	3	1	4	4
Jacksonville, Fla.	100	54	29	7	4	6	5
Miami, Fla.	109	59	32	7	4	7	2
Norfolk, Va.	60	37	15	2	3	3	11
Richmond, Va.	78	48	18	8	2	2	3
Savannah, Ga.	34	22	11	-	-	1	1
St. Petersburg, Fla.	113	96	11	5	1	-	4
Tampa, Fla.	69	41	19	2	1	6	7
Washington, D.C.	224	119	67	19	6	13	5
Wilmington, Del.	74	48	20	4	1	1	4
E.S. CENTRAL	771	497	193	41	25	15	46
Birmingham, Ala.	106	72	18	7	5	4	4
Chattanooga, Tenn.	65	43	18	2	2	-	7
Knoxville, Tenn.	47	35	11	-	1	-	2
Louisville, Ky.	160	106	37	8	4	5	10
Memphis, Tenn.	141	89	31	12	6	3	12
Mobile, Ala.	78	45	26	4	3	-	6
Montgomery, Ala.	27	20	4	1	2	-	-
Nashville, Tenn.	147	87	48	7	2	3	5
W.S. CENTRAL	1,405	836	332	124	56	57	49
Austin, Tex.	56	35	16	2	2	1	6
Baton Rouge, La.	46	25	6	7	4	4	1
Corpus Christi, Tex.	53	34	12	5	-	2	4
Dallas, Tex.	202	130	33	18	12	9	1
El Paso, Tex.	73	48	16	4	3	2	4
Fort Worth, Tex.	105	57	33	11	2	2	7
Houston, Tex.	244	122	74	27	8	13	7
Little Rock, Ark.	83	54	18	6	2	3	4
New Orleans, La.	158	90	39	14	6	9	2
San Antonio, Tex.	194	114	45	19	10	6	7
Shreveport, La.	85	52	19	5	6	3	2
Tulsa, Okla.	106	75	21	6	1	3	4
MOUNTAIN	664	426	146	45	23	24	44
Albuquerque, N.Mex.	63	39	13	8	1	2	5
Colo. Springs, Colo.	34	25	3	5	-	1	7
Denver, Colo.	145	88	43	8	2	4	7
Las Vegas, Nev.	73	43	18	3	7	2	3
Ogden, Utah	22	12	4	3	-	3	2
Phoenix, Ariz.	138	92	29	5	5	7	6
Pueblo, Colo.	19	16	2	1	-	-	-
Salt Lake City, Utah	60	35	10	6	6	3	2
Tucson, Ariz.	110	76	24	6	2	2	12
PACIFIC	1,783	1,216	378	91	49	49	90
Berkeley, Calif.	25	18	6	1	-	-	-
Fresno, Calif.	88	62	17	5	2	2	5
Glendale, Calif.	19	16	2	1	-	-	-
Honolulu, Hawaii	63	43	15	2	-	3	2
Long Beach, Calif.	90	63	18	2	1	6	5
Los Angeles, Calif.	447	306	101	24	10	6	12
Oakland, Calif.	97	64	26	1	3	3	5
Pasadena, Calif.	25	18	4	1	-	2	1
Portland, Oreg.	122	83	28	5	3	3	4
Sacramento, Calif.	75	44	15	6	2	8	7
San Diego, Calif.	143	88	30	10	7	8	15
San Francisco, Calif.	146	100	28	10	6	2	4
San Jose, Calif.	161	109	30	10	9	3	16
Seattle, Wash.	143	108	28	3	2	2	2
Spokane, Wash.	49	34	11	1	2	1	8
Tacoma, Wash.	90	60	19	9	2	-	4
TOTAL	12,117††	7,907	2,750	721	344	395	595

* 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 4 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.

Influenza – Continued

Florida and Manitoba, Canada, in January 1983, and, as of April, had been identified in Connecticut, Georgia, Missouri, New Mexico, New York, Ohio, and Oklahoma. Other H3N2 variants, such as A/Texas/1/77-like strains, A/Bangkok/2/79-like strains, and A/Shanghai/31/80-like strains (Table 1), have also been identified among recent isolates from Asia, Europe and North America.

Antigenic analysis of influenza A(H1N1) and influenza B strains isolated in recent months continues to show their close similarity to A/England/333/80 and B/Singapore/222/79 strains that have circulated in the preceeding recent influenza seasons.

Reported by Virus Disease Unit, World Health Organization, Geneva; WHO Collaborating Center for Influenza, Influenza Br, Div of Viral Diseases, Center for Infectious Diseases, CDC.

Editorial Note: One of the outstanding properties of influenza A(H3N2) virus revealed by laboratory studies of strains received through national and international surveillance programs has been the extent of antigenic heterogeneity since A/Bangkok/1/79-like strains first appeared. Although, in some previous years, two major variants (A/Victoria/3/75 and A/Texas/1/77) cocirculated, beginning in 1979 the number of simultaneously circulating variants in the world has increased to at least five.

In selecting appropriate strains for vaccine formulation, decisions have been based on the relative prevalence of different strains and the breadth of immunity induced by each variant. The A/Bangkok/1/79 virus, for example, has been demonstrated in laboratory tests and by examination of sera from vaccinated persons to be very closely related to the H3N2 strains that were primarily responsible for epidemics in the United States during 1980-1981 and 1982-1983. Appearance of A/Philippines/2/82-like viruses as an increasing percentage of strains isolated from Asian countries, as well as the detection of such viruses in North America and Europe, suggested the desirability of incorporating this strain into vaccines for use in 1983-1984. Because A/Philippines/2/82 virus induces antibodies in animals that are broadly reactive with other recent strains, while these latter strains induce antibodies that are often less reactive with A/Philippines/2/82 (Table 1), the Immunization Practices Advisory Committee (ACIP) has recommended replacing the A/Bangkok/1/79 H3N2 virus component with A/Philippines/2/82 for next winter's vaccine in the United States. Following several discussions in January and February 1983, the ACIP has further recommended that vaccine potency and other components of the vaccines (type A[H1N1] virus and type B virus) should be unchanged from last year, so the broadest possible coverage of recently prevalent strains can be provided for high-risk persons of all age groups, including young children who are most susceptible to infection with influenza A(H1N1) strains similar to current isolates.

Reference

1. CDC. Influenza—worldwide. MMWR 1982;31(36):494-5.

TABLE 1. Hemagglutination inhibition reactions of influenza A (H3N2) viruses simultaneously circulating in the world, 1982/1983*

Antigens	Ferret antisera				
	Texas/ 1	Bangkok/ 1	Bangkok/ 2	Shanghai/ 31	Philippines/ 2
A/Texas/1/77	**2,560**	240	160	320	480
A/Bangkok/1/79	480	**960**	240	2,560	640
A/Bangkok/2/79	320	120	**2,560**	120	160
A/Shanghai/31/80	80	320	80	**1,280**	320
A/Philippines/2/82	80	160	20	80	**320**

*Titers in bold type are homologous reactions. In comparing strains of viruses, differences of fourfold or greater when two strains are tested with the same antiserum suggest experimentally significant differences between the strains.

International Notes

Yellow Fever in the Americas, 1981 and 1982

For the years 1981 and 1982, five countries in the Americas (Bolivia, Brazil, Colombia, Ecuador, and Peru) reported 368 cases of jungle yellow fever, slightly more than the 324 of the preceding 2 years. Bolivia and Peru accounted for 84.8% (312) of the cases; Brazil, 12.5% (46); and Colombia, 2.2% (eight); two cases were detected in Ecuador. Deaths from yellow fever in those years totaled 183.

The highest monthly number of cases occurred in the first half of each year, with a peak in March. This may reflect increased rural and forest labor practices during the first months of the year among susceptible populations in yellow fever enzootic areas. Another factor may be higher densities of *Haemagogus* mosquitoes—the main jungle yellow fever vector in the Americas—during the rainy season.

All cases reported in 1981 and 1982 occurred in known endemic areas, except one epidemic in 1981 in Rincón del Tigre, Department of Santa Cruz, Bolivia, that accounted for approximately 50% of Bolivia's cases that year. The last confirmed outbreak in the Department of Santa Cruz occurred in the late 1940's, illustrating the virus' potential to reappear after long periods of inactivity. A 1980-1981 outbreak in Brazil involved the states of Goias, Mato Grosso, and Mato Grosso de Sul. This epidemic and previous epidemics in the State of Goias may reflect virus movement from the enzootic areas of the Amazon Region.

Age and sex data, available for 347 patients, showed that 79% (275) were male. Most patients (79%) were between 15 and 34 years of age; no patients were under 1 year; and all but one case in the 1-4-year age group occurred in the Rincón del Tigre region. All Brazilian patients were over 15 years of age. This age and sex distribution is consistent with patterns of disease acquired in the jungle.

No urban cases of yellow fever have been documented in the Americas for the past 4 decades, although several patients with jungle-acquired disease have been hospitalized in *A. aegypti*-infested towns during this period. Although surveillance in remote areas may be inadequate, a general decline in incidence of the disease in the Amazon Region appears to have resulted from intensification of vaccination programs throughout endemic areas. About three million doses of 17D vaccine are administered in Brazil annually (3,300,000 in 1981).

Because of continuing yellow fever incidence and the reinfestation of some infected areas, the Pan American Health Organization (PAHO) has recently convened several technical meetings to examine the problem. Recommendations from these meetings include: 1) improving surveillance activities; 2) strengthening direct cooperation among affected countries; 3) promptly disseminating information to member countries; 4) increasing production of 17D vaccine; and 5) promoting assistance among member countries, either directly or through PAHO, with bilateral loans and grants and the provision of equipment, materials, and technical advisory services.

Reported in PAHO Epidemiological Bulletin *1983;4(1):1-5.*

Current Trends

Chancroid Follow-Up—California

In May 1981, 71 (92%) of 77 patients who presented to the Orange County (California) Special Diseases Clinic with genital ulcers had negative darkfield examinations, compared with 135 (69%) of 197 patients during the preceding 4 months. *Haemophilus ducreyi* was

Chancroid — Continued

isolated from 30 patients with similar lesions in December 1981. Since then, 271 cultures from genital lesions in over 1,000 people have grown *H. ducreyi*, with the peak number occurring during January 1982 (Figure 3).

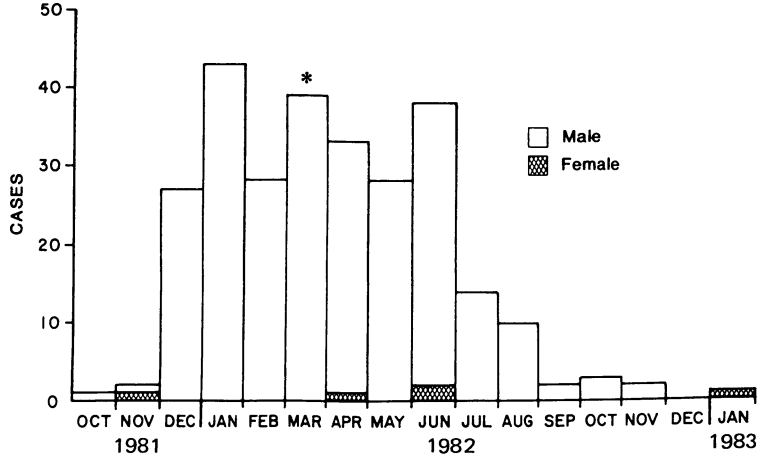
Although the CDC-recommended treatment regimen of erythromycin or sulfamethoxazole/trimethoprim had been uniformly used since January 1982, culture-confirmed chancroid cases continued to average 34 per month between December 1981 and June 1982. In an effort to reduce this number, more aggressive, nontraditional control measures were adopted in March 1982. These included offering prophylactic therapy to 287 women identified as prostitutes in the county jail, in addition to those who voluntarily requested an examination at the clinic. Prophylactic therapy was also offered to over 700 clinic patients who reported recent sexual contact with "door-to-door" prostitutes. By July, the number of positive cultures had dropped to 14; in August, 10 were reported. Thereafter, the monthly number of cases continued to decline, and only one culture-proven case has been reported in 1983, despite continued, active surveillance.

The profile of chancroid patients has remained consistent throughout this outbreak. Ninety-six percent of the culture-proven cases occurred among Hispanic males, at least 86% of whom had recent sexual contact with prostitutes. One hundred forty-two of the 271 patients offered descriptions of prostitutes to whom they had been exposed; 98 (69%) of these referred to women who solicited from door-to-door.

There were five known prostitutes among the 271 culture-proven chancroid patients. Two additional prostitutes from that area who had no chancroid symptoms were originally reported as having had *H. ducreyi* recovered from cervical specimens (*1*). However, subsequent microbiologic studies showed that these specimens were not *H. ducreyi*, but another species of *Haemophilus*. Simultaneous infection with *H. ducreyi* and *Treponema pallidum* was documented for 15 patients. In one patient, herpes simplex virus was cultured along with *H. ducreyi*.

Thirty-seven of the 41 *H. ducreyi* isolates examined between December 1981 and February 1983 shared a similar antibiogram and contained a common 3.2 megadalton plasmid, coding for β-lactamase production. This plasmid is identical to the gonococcal plasmid and is similar to one identified in a strain of *H. ducreyi* that has been epidemiologically linked to a

FIGURE 3. Culture-confirmed chancroid cases, by month of first clinic visit — Orange County, California, 1981-1983



*Prophylactic treatment of prostitutes in Orange County jail.

Chancroid – Continued

chancroid case in Brazil (2). Over 200 β-lactamase-producing *H. ducreyi* strains from other geographic areas have been shown not to contain this particular plasmid.

Reported by JR Greenwood, PhD, TJ Prendergast, MD, LR Ehling, MD, Orange County Health Dept, C Zavala, J Chin, MD, State Epidemiologist, California Dept of Health Svcs; Sexually Transmitted Diseases Laboratory Program, Center for Infectious Diseases, Field Svcs Div, Epidemiology Program Office, Div of Venereal Disease Control, Center for Prevention Svcs, CDC.

Editorial Note: In 1982, Orange County, California, reported 240 cases of culture-confirmed chancroid, over seven times the number reported by all of California the previous year. Initial efforts to control this outbreak by treating patients and their sexual partners with recommended regimens were unsuccessful. The eventual success of the control program was attributed to the policy of offering prophylactic therapy to certain high-risk groups whose members were either asymptomatic or had genital ulcers with no definitive diagnosis. These groups included: 1) prostitutes in the county jail, 2) clinic patients reporting prostitute contact, and 3) clinic patients with darkfield-negative genital ulcers. Continued surveillance and therapeutic action will be necessary if chancroid is to remain controlled.

References

1. CDC. Chancroid—California. MMWR 1982;31(14):173-5.
2. Handsfield HH, Totten PA, Fennel CL, Falkow S, Holmes KK. Molecular epidemiology of *Haemophilus ducreyi* infections. Ann Intern Med 1981;95(3):315-8.

The *Morbidity and Mortality Weekly Report* is prepared by the Centers for Disease Control, Atlanta, Georgia, and available on a paid subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, (202) 783-3238.

The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; complied data on a national basis are officially released to the public on the succeeding Friday.

The editor welcomes accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials. Such reports and any other matters pertaining to editorial or other textual considerations should be addressed to: ATTN: Editor, *Morbidity and Mortality Weekly Report*, Centers for Disease Control, Atlanta, Georgia 30333.

☆U.S. Government Printing Office: 1982-740-185/992 Region IV

HHS Publication No. (CDC) 83-8017