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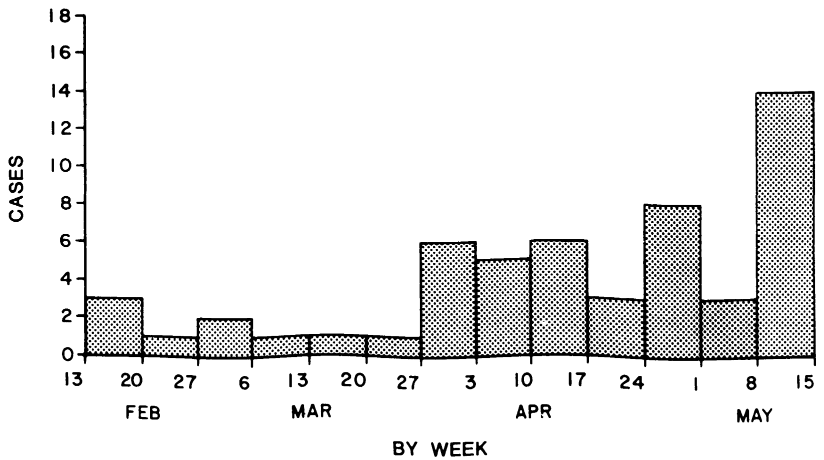
Penicillin-Resistant Gonorrhea — North Carolina

Between February 14 and May 15, 1983, 56 cases of penicillin-resistant gonococcal infection, occurring in 55 persons, were reported in Durham County, North Carolina (Figure 1). These cases represent the first reported outbreak of gonorrhea caused by strains that are resistant to penicillin but that do not produce penicillinase. Thirty (55%) of the 55 affected patients were men. Ages ranged from 15 to 50 years (median 24 years). All patients were reported to be heterosexual.

The first case involved a 31-year-old man who reported to the local health department on February 14 with a 1-day history of urethral discharge. Intracellular, gram-negative diplococci were demonstrated in a urethral smear. The patient was initially treated with 4.8 million units of aqueous procaine penicillin G (APPG) but returned on February 23 because of persistent urethral discharge. He was re-treated with 4.8 million units of APPG along with 1 g probenecid. A urethral culture subsequently grew *Neisseria gonorrhoeae* resistant to penicillin by disc susceptibility testing and negative for penicillinase by the rapid paper-strip method. On March 8, the patient was treated with spectinomycin 2 g intramuscularly (IM).

The second recognized case involved a 22-year-old prostitute; she was a partner of a patient with gonorrhea. She was first treated on February 17 with 4.8 million units APPG. She returned on February 23 as an asymptomatic contact of the same patient with presumtive non-gonococcal urethritis (NGU) and was given a 7-day course of tetracycline. Her pretreatment cultures at both visits grew *N. gonorrhoeae* resistant to penicillin but non-penicillinase producing. This patient, her asymptomatic male partner, and his female partner (a prostitute)

FIGURE 1. Reported penicillin-resistant gonorrhea cases, by week — Durham County, North Carolina, 1983



Penicillin-Resistant Gonorrhea — Continued

were treated on February 28 with spectinomycin 2 g IM. Cultures from the latter two persons (the third and fourth cases) also grew non-penicillinase-producing gonococci resistant to penicillin. Interviewers determined the female prostitute (the fourth case) had also had sexual contact on February 10 with the first patient who had presented on February 14.

Sporadic cases continued to occur through April, with three or more cases being reported each week. Intensive screening measures implemented on May 2 led to increased recognition and reporting of cases. All gonococcal isolates from Durham County were tested for penicillin susceptibility using both the disc diffusion test and gonococcal agar base containing 1 μg/ml penicillin. Hospital and commercial laboratories in Durham County were notified of the outbreak and encouraged to perform similar laboratory tests for gonococcal isolates.

Isolates from all 55 patients were studied and confirmed as penicillin-resistant and non-penicillinase-producing at the Department of Microbiology and Immunology, University of North Carolina—Chapel Hill. Thirty-six of these isolates were further studied. All 36 were prototrophic auxotypes. They were highly resistant to penicillin (minimal inhibitory concentration [MIC] 2-4 μg/ml) and moderately resistant to erythromycin (MIC 2-4 μg/ml) and tetracycline (MIC 2-4 μg/ml), but all were susceptible to spectinomycin. The principal outer membrane protein I (POMPI) was identical in all 20 isolates tested.

Control measures have included obtaining specimens for culture and then treating all men whose urethral smears show gram-negative intracellular diplococci with spectinomycin 2 g IM; sexual partners are treated similarly. Efforts will be made in Durham County to promptly refer and treat sexual partners of patients, obtain specimens for gonorrhea cultures from prostitutes approximately every week, and promptly identify and treat those from whom gonococci are cultured.

Reported by JD Fletcher, MD, JD Stratton, MD, CS Chandler, Durham County Health Dept, PF Sparling, MD, Dept of Microbiology and Immunology, University of North Carolina School of Medicine—Chapel Hill, Venereal Disease Control Br, North Carolina Div of Health Svcs, MP Hines, DVM, State Epidemiologist, North Carolina State Dept of Human Resources; Div of Venereal Disease Control, Center for Prevention Svcs, Div of Field Svcs, Epidemiology Program Office, CDC.

Editorial Note: Non-penicillinase-producing strains of *N. gonorrhoeae* that are highly resistant to penicillin are apparently uncommon in the United States. Among 11,103 isolates tested at CDC between 1972 and 1979, 38 (0.3%) had MICs to penicillin of 2 μg/ml or greater (*1*). This outbreak, therefore, represents an unusual event due to transmission of a single resistant strain, as demonstrated by the antibiotic resistance pattern, auxotyping data, and outer membrane protein studies. Such transmission of a single strain of gonococcus once introduced into a community has previously been described (*2*).

The importance of this type of penicillin resistance is still undetermined. Treatment failures increase as the MICs of gonococci increase (*3*). Several tests can be used to detect penicillinase-producing gonococci (PPNG); however, procedures to identify non-PPNG penicillin-resistant strains have yet to be standardized and adopted for routine laboratory use. Reports of these strains may rapidly increase as screening procedures are employed. In Southeast Asia, more than 20% of gonococcal isolates are non-PPNG strains resistant to penicillin. Some countries have already identified these strains (*4*), and it is possible that similar strains are already widely distributed but unrecognized in the United States.

Non-PPNG penicillin-resistant strains should be suspected when increases in treatment failures not due to PPNG are noted. Screening for these strains may be accomplished by disc diffusion tests (10 μg penicillin disc) on post-treatment isolates. Isolates with a zone size less than 25 mm can be considered resistant to penicillin and should be forwarded to a reference laboratory for confirmation by MIC studies. When necessary, CDC can perform these MIC studies. To avoid continued transmission of these resistant strains, control measures similar to those for PPNG outbreaks should be employed (*5*).

References

1. CDC. Unpublished data.

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2. Handsfield HH, Sandstrom EG, Knapp JS, et al. Epidemiology of penicillinase-producing *Neisseria gonorrhoeae* infections: analysis by auxotyping and serogrouping. N Engl J Med 1982;306:950-4.
3. Jaffe HW, Biddle JW, Thornsberry C, et al. National gonorrhea therapy monitoring study. In vitro antibiotic susceptibility and its correlation with treatment results. N Engl J Med 1976;294:5-9.
4. Brown S, Biddle J, Warnnisorn T, Panikabutra K, Traisupa A. Antimicrobial resistance of *Neisseria gonorrhoeae* in Bangkok: is single-drug treatment passe. Lancet 1982;2:1366-8.
5. CDC. Penicillinase-producing *Neisseria gonorrhoeae*—Los Angeles. MMWR 1983;32:181-3.

Surveillance of Acute Respiratory Infections: Meeting of the Technical Advisory Group

The first meeting of the Technical Advisory Group on Acute Respiratory Infections (ARI) was held in Geneva, Switzerland, March 7-11, 1983. In keeping with the targets of the Seventh General Program of Work, the Group discussed the feasibility and guiding principles of controlling ARI based on information now available and advised on priorities and strategies for the program.

The Group concluded that, during the past few years, considerable progress had been made in understanding the ARI problem and its susceptibility to intervention. In particular, the importance of bacteria rather than viruses as the principal cause of mortality from severe acute lower respiratory infections in developing countries is now clear; the effectiveness of antimicrobial and supportive treatment may avert these deaths; existing clinical experience has been consolidated into simple case-management plans; and the primary health care (PHC) infrastructure required to utilize these plans is being strengthened rapidly. The Group concluded that sufficient knowledge and technology were already available for countries to phase in an ARI control program.

The ARI control program, consisting of both a service and a research component, should be started by introducing simple measures at the PHC level and should progressively provide technical support at higher levels.

The Group recommended that the service component of the ARI program comprise three control measures that offer immediate potential benefits for children in developing countries:

1. Improved and standardized case-management at both the PHC and referral levels, which includes early discrimination of mild and severe ARI by families and PHC workers, supportive measures, and antimicrobial treatment.

2. Health education of families and community involvement in child-care practices related to ARI and, in particular, strengthening of the ability of mothers to recognize early the severe forms of ARI and to provide appropriate supportive care for sick children.

3. Immunization against measles, diphtheria, pertussis, and tuberculosis, which is already part of the Expanded Program on Immunization (EPI) but which should combine with the ARI control program, as these diseases contribute heavily to ARI childhood mortality in many developing countries.

Research in the ARI program is considered essential for strengthening the service component and particularly its further development, implementation, and evaluation. Health systems research, considered a priority, should emphasize the following: 1) improved PHC through case-management of ARI; 2) development and evaluation of a simple management-oriented classification of ARI; 3) development of procedures for providing case-management at different levels of health care; 4) generation of community involvement; 5) improvement in child-care practices.

Institution-based studies relating to detailed clinical classification; development of new, and evaluation of available, rapid laboratory techniques for diagnosis; controlled treatment trials; and studies on immunology and pathophysiology of ARI should precede and comple-

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ment epidemiologic studies relating to clinical and microbiologic aspects, determinants of morbidity and mortality, identification of high-risk groups, and social and behavioral determinants of ARI.

The Group recognized that, although the development of an ARI control program is a national responsibility, bilateral and multilateral international cooperation will initially be needed to overcome obstacles to program development. In addition, national seminars will be required for health administrators and trainers to provide them with the knowledge and skills necessary to initiate the ARI control program. Provisions should be made for the training of PHC workers in the case-management of ARI, and for the education of community leaders, schoolteachers, and families in the recognition and home care of children with ARI. The development of suitable manuals should be considered a priority. Within PHC, the ARI control program should develop linkages with other relevant programs, particularly with the EPI, the Diarrheal Diseases Control Program, and Maternal and Child Health programs because they share common objectives, address the same target population, can be of benefit to each other, and produce a multiplier effect. Common needs in service delivery, research and service component evaluation, supervision of PHC workers, and training should be identified.

Surveillance should constitute an integral part of the program. In selected areas a program-oriented surveillance system containing epidemiologic and laboratory components should be

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

Disease	21st Week Ending			Cumulative, 21st Week Ending		
	May 28, 1983	May 29, 1982	Median 1978-1982	May 28, 1983	May 29, 1982	Median 1978-1982
Aseptic meningitis	71	71	58	1,625	1,592	1,293
Encephalitis: Primary (arthropod-borne & unspec.)	17	17	10	327	336	244
Post-infectious	5	1	4	36	27	81
Gonorrhea: Civilian	13,031	18,416	18,416	351,051	374,545	378,065
Military	378	361	361	9,733	11,001	11,001
Hepatitis: Type A	315	432	474	9,143	9,092	10,862
Type B	346	412	288	8,704	8,405	6,515
Non A, Non B	37	52	N	1,297	880	N
Unspecified	111	151	188	3,137	3,370	4,071
Legionellosis	21	19	N	283	170	N
Leprosy	4	6	6	108	82	71
Malaria	8	17	20	257	338	338
Measles: Total	27	82	496	777	660	8,546
Indigenous	22	N	N	634	N	N
Imported*	5	N	N	143	N	N
Meningococcal infections: Total	45	65	60	1,355	1,476	1,384
Civilian	44	64	58	1,341	1,470	1,374
Military	1	1	1	14	6	10
Mumps	33	214	230	1,740	3,182	5,668
Pertussis	33	29	29	683	444	444
Rubella (German measles)	11	75	110	489	1,358	2,237
Syphilis (Primary & Secondary): Civilian	524	691	519	12,926	13,351	10,404
Military	14	9	9	195	165	137
Toxic-shock syndrome	7	N	N	165	N	N
Tuberculosis	418	509	509	8,876	9,992	10,418
Tularemia	8	3	5	73	49	49
Typhoid fever	6	3	11	139	145	160
Typhus fever, tick-borne (RMSF)	17	30	32	119	145	144
Rabies, animal	94	122	122	2,572	2,440	2,440

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1983		Cum. 1983
Anthrax	-	Plague	2
Botulism: Foodborne	9	Poliomyelitis: Total	1
Infant (Pa. 1)	25	Paralytic	1
Other	-	Psittacosis	36
Brucellosis (S. Dak. 1, Ala. 2, Ark. 1, Okla. 1, Tex. 1)	53	Rabies, human	2
Cholera	-	Tetanus	18
Congenital rubella syndrome	9	Trichinosis (N.Y. City 1, Pa. 1)	17
Diphtheria	-	Typhus fever, flea-borne (endemic, murine) (Hawaii 2)	13
Leptospirosis (Ark. 1)	12		

*Three of the 27 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 May 28, 1983 and May 29, 1982 (21st 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	71	327	36	351,051	374,545	315	346	37	111	21	108	257
NEW ENGLAND	2	16	-	9,043	8,968	6	17	1	10	1	3	9
Maine	-	-	-	476	399	-	-	-	-	-	-	-
N.H.	-	1	-	246	303	-	1	-	-	-	2	-
Vt.	-	1	-	161	188	1	1	1	-	-	-	-
Mass.	2	8	-	4,000	4,207	3	10	-	10	1	-	3
R.I.	-	-	-	498	596	-	-	-	-	-	-	2
Conn.	-	6	-	3,662	3,275	2	5	-	-	-	1	4
MID ATLANTIC	7	39	4	44,222	44,717	61	57	5	14	4	18	39
Upstate N.Y.	1	12	-	6,487	7,149	10	16	2	-	-	-	13
N.Y. City	1	7	-	19,074	18,838	28	9	-	4	-	17	13
N.J.	5	10	-	8,570	8,102	14	19	2	8	-	-	10
Pa.	-	10	4	10,091	10,628	9	13	1	2	4	1	3
E.N. CENTRAL	6	59	7	47,991	54,150	23	35	3	3	5	4	11
Ohio	3	23	5	13,376	14,924	7	15	1	1	4	1	2
Ind.	1	8	1	5,821	6,116	5	6	1	1	-	-	-
Ill.	-	-	-	11,010	15,668	2	1	-	1	-	2	2
Mich.	2	26	-	13,456	12,532	9	13	1	-	1	1	7
Wis.	-	2	1	4,328	4,910	-	-	-	-	-	-	-
W.N. CENTRAL	1	41	4	16,514	17,461	12	9	5	2	4	3	9
Minn.	-	18	1	2,409	2,605	3	2	2	-	-	2	3
Iowa	1	18	-	1,838	1,917	-	1	-	-	-	-	2
Mo.	-	2	-	7,905	7,968	2	2	1	2	4	-	2
N. Dak.	-	-	-	160	242	-	-	-	-	-	-	1
S. Dak.	-	-	1	466	498	4	-	-	-	-	-	-
Nebr.	-	3	-	973	1,119	1	-	1	-	-	-	-
Kans.	-	-	2	2,763	3,112	2	4	1	-	-	1	1
S. ATLANTIC	21	55	12	91,165	96,485	37	125	13	12	3	3	36
Del.	-	-	-	1,673	1,484	1	24	1	-	-	-	-
Md.	2	10	-	11,460	12,210	6	19	2	3	1	-	5
D.C.	-	-	-	6,310	5,089	-	7	-	-	-	-	3
Va.	1	17	1	7,709	8,186	4	15	5	3	-	-	6
W. Va.	-	-	-	959	1,103	2	2	-	-	-	-	1
N.C.	11	12	-	13,329	15,392	2	2	-	1	-	-	1
S.C.	-	2	-	8,660	9,048	7	12	-	-	1	-	4
Ga.	1	3	-	19,741	18,263	4	22	-	1	-	1	3
Fla.	6	11	11	21,324	25,710	11	22	5	4	1	2	13
E.S. CENTRAL	1	9	2	29,650	31,200	30	38	3	4	-	-	3
Ky.	-	-	-	3,597	4,200	18	6	-	2	-	-	-
Tenn.	1	1	-	11,940	12,127	6	13	1	1	-	-	-
Ala.	-	8	2	9,170	9,290	6	18	2	1	-	-	1
Miss.	-	-	-	4,943	5,583	-	1	-	-	-	-	2
W.S. CENTRAL	26	33	1	50,944	52,123	79	36	-	57	2	11	31
Ark.	-	4	-	3,778	4,299	-	1	-	8	2	-	1
La.	8	3	-	9,543	9,120	14	9	-	2	-	-	2
Okla.	16	7	1	5,934	5,624	15	1	-	6	-	-	7
Tex.	2	19	-	31,689	33,080	50	25	-	41	-	11	21
MOUNTAIN	3	19	3	11,035	13,111	41	13	2	5	1	11	13
Mont.	-	-	-	475	538	-	-	-	-	-	-	-
Idaho	-	-	-	514	619	5	-	-	-	-	-	2
Wyo.	-	2	-	276	361	1	-	-	1	-	-	1
Colo.	3	8	-	3,100	3,457	4	3	-	1	-	2	4
N. Mex.	-	1	-	1,355	1,667	2	-	-	1	-	-	2
Ariz.	-	1	3	3,061	3,611	25	6	2	1	1	9	3
Utah	-	7	-	541	603	3	1	-	1	-	-	1
Nev.	-	-	-	1,713	2,255	1	3	-	-	-	-	-
PACIFIC	4	56	3	50,487	56,330	26	16	5	4	1	55	106
Wash.	1	4	-	3,765	4,716	10	5	3	4	1	6	2
Oreg.	-	-	1	2,653	3,177	10	10	2	-	-	1	4
Calif.	U	48	2	41,720	46,070	U	U	U	U	U	34	100
Alaska	-	-	-	1,287	1,384	6	-	-	-	-	-	-
Hawaii	3	4	-	1,062	983	-	1	-	-	-	14	-
Guam	U	-	-	54	55	U	U	U	U	U	-	2
P.R.	14	-	1	1,268	1,154	8	14	-	12	-	-	1
V.I.	-	-	-	110	94	-	-	-	-	-	-	-
Pac. Trust Terr.	U	-	-	-	187	U	U	U	U	U	-	-

N: Not notifiable U: Unavailable

TABLE III. (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending May 28, 1983 and May 29, 1982 (21st week)

Reporting Area	Measles (Rubeola) Indigenous		Imported*		Total	Meningococcal Infections	Mumps			Pertussis			Rubella		
	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	22	634	5	143	660	1,355	33	1,740	3,182	33	683	444	11	489	1,358
NEW ENGLAND	-	2	-	3	9	68	3	71	135	1	20	29	-	7	10
Maine	-	-	-	-	-	6	1	13	32	-	-	3	-	-	-
N.H.	-	-	-	1	1	2	-	14	13	-	2	4	-	2	8
Vt.	-	-	-	-	2	3	1	8	4	-	2	1	-	3	-
Mass.	-	2	-	-	2	25	1	17	63	1	14	10	-	2	-
R.I.	-	-	-	-	-	4	-	9	11	-	2	9	-	-	1
Conn.	-	-	-	2	4	28	-	10	12	-	-	2	-	-	1
MID ATLANTIC	3	11	-	15	74	203	5	127	213	6	208	74	4	38	73
Upstate N.Y.	-	-	-	2	53	78	3	51	39	1	61	44	-	18	34
N.Y. City	3	11	-	9	15	32	2	10	33	2	26	16	2	6	26
N.J.	-	-	-	1	2	33	-	25	30	-	11	7	-	3	13
Pa.	-	-	-	3	4	60	-	41	111	3	110	7	2	11	-
E.N. CENTRAL	6	362	-	51	32	226	14	878	1,836	4	155	133	1	75	126
Ohio	6	11	-	13	-	84	-	423	1,355	-	50	23	-	1	-
Ind.	-	270	-	-	2	24	-	18	28	-	13	11	-	13	19
Ill.	-	81	-	33	15	55	11	101	135	3	74	68	1	36	48
Mich.	-	-	-	5	15	46	3	284	247	1	11	8	-	12	39
Wis.	-	-	-	-	-	17	-	52	71	-	7	23	-	13	20
W.N. CENTRAL	-	2	-	-	19	84	2	118	303	4	47	22	-	33	49
Minn.	-	-	-	-	-	12	-	17	197	-	17	8	-	5	2
Iowa	-	-	-	-	-	9	-	35	27	-	4	3	-	-	-
Mo.	-	2	-	-	2	45	2	18	7	3	8	5	-	4	38
N. Dak.	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-
S. Dak.	-	-	-	-	-	3	-	-	1	-	2	3	-	-	1
Nebr.	-	-	-	-	-	1	-	2	-	-	-	1	-	-	-
Kans.	-	-	-	-	17	13	-	46	71	1	15	2	-	24	8
S. ATLANTIC	11	144	3	21	32	301	2	109	188	14	92	47	1	63	46
Del.	-	-	-	-	-	-	-	5	5	-	-	3	-	-	1
Md.	-	-	-	2	2	32	1	18	15	-	8	1	-	1	22
D.C.	-	-	-	-	1	4	-	-	-	-	-	1	-	-	-
Va.	9	10	-	11	14	42	-	20	29	11	39	7	-	1	8
W. Va.	-	-	-	-	2	2	1	21	78	-	3	3	-	-	1
N.C.	-	-	-	-	-	58	-	4	7	-	5	8	-	6	1
S.C.	-	-	1§	4	-	35	-	6	11	1	6	6	-	-	1
Ga.	-	6	-	-	-	50	-	35	9	-	21	9	-	8	4
Fla.	2	128	2†	4	13	78	-	-	34	2	10	9	1	47	8
E.S. CENTRAL	-	-	-	5	5	84	2	32	27	-	5	13	1	7	36
Ky.	-	-	-	1	1	17	1	14	9	-	2	2	1	6	20
Tenn.	-	-	-	-	4	32	1	15	11	-	2	4	-	-	-
Ala.	-	-	-	4	-	23	-	-	4	-	-	-	-	1	-
Miss.	-	-	-	-	-	12	-	3	3	-	1	7	-	-	16
W.S. CENTRAL	1	34	-	24	7	155	1	125	120	1	67	24	4	82	61
Ark.	-	-	-	11	-	12	-	2	6	-	3	2	-	-	-
La.	-	-	-	12	-	27	-	-	3	-	2	1	-	9	-
Okla.	1	1	-	-	-	19	-	-	-	-	34	2	-	-	2
Tex.	-	33	-	1	7	97	1	123	111	1	28	19	4	73	59
MOUNTAIN	1	1	-	2	-	50	-	79	52	2	67	23	-	16	45
Mont.	-	-	-	-	-	5	-	2	3	-	1	-	-	3	3
Idaho	-	-	-	-	-	4	-	4	2	-	2	1	-	5	1
Wyo.	-	-	-	-	-	1	-	-	2	-	4	1	-	1	5
Colo.	-	-	-	2	-	22	-	10	10	1	42	7	-	-	5
N. Mex.	-	-	-	-	-	5	-	-	-	-	5	3	-	-	3
Ariz.	-	-	-	-	-	8	-	55	22	-	9	10	-	4	7
Utah	-	-	-	-	-	5	-	6	11	1	4	1	-	2	12
Nev.	1	1	-	-	-	-	-	2	2	-	-	-	-	1	9
PACIFIC	-	78	2	22	482	184	4	201	308	1	22	79	-	168	912
Wash.	-	1	-	3	24	26	4	32	48	1	2	14	-	6	23
Oreg.	-	5	2†§	2	-	32	-	-	-	-	5	16	-	9	3
Calif.	U	71	U	17	456	120	U	148	248	U	15	49	U	153	879
Alaska	-	-	-	-	-	-	-	9	6	-	-	-	-	-	1
Hawaii	-	1	-	-	2	6	-	12	6	-	-	-	-	-	6
Guam	U	-	U	-	5	1	U	-	3	U	-	-	U	-	2
P.R.	-	77	-	-	62	8	8	85	35	1	7	12	1	3	4
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 May 28, 1983 and May 29, 1982 (21st 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	12,926	13,351	7	418	8,876	73	139	119	2,572
NEW ENGLAND	293	241	1	18	242	-	5	1	4
Maine	8	1	-	1	15	-	-	-	2
N.H.	9	1	-	2	20	-	-	-	1
Vt.	2	-	-	-	2	-	-	-	-
Mass.	184	169	-	12	131	-	5	1	-
R.I.	10	12	-	1	18	-	-	-	-
Conn.	80	58	1	2	56	-	-	-	1
MID ATLANTIC	1,623	1,820	-	47	1,593	-	27	-	70
Upstate N.Y.	89	206	-	7	267	-	4	-	31
N.Y. City	977	1,089	-	31	678	-	13	-	-
N.J.	345	229	-	9	332	-	9	-	-
Pa.	212	296	-	-	316	-	1	-	39
E.N. CENTRAL	631	859	1	74	1,194	1	22	12	198
Ohio	189	133	1	17	187	-	6	5	25
Ind.	66	91	-	-	91	-	1	-	13
Ill.	248	463	-	38	536	-	9	2	108
Mich.	96	127	-	19	325	1	6	3	-
Wis.	32	45	-	-	55	-	-	2	52
W.N. CENTRAL	156	256	3	9	297	21	6	8	381
Minn.	68	46	-	4	52	-	-	-	76
Iowa	4	14	3	-	27	-	-	-	103
Mo.	56	157	-	-	164	15	1	6	46
N. Dak.	1	4	-	-	-	-	-	1	27
S. Dak.	3	-	-	2	21	-	-	-	58
Nebr.	10	8	-	-	8	2	-	-	35
Kans.	14	27	-	3	25	4	5	1	36
S. ATLANTIC	3,380	3,634	1	127	1,780	13	19	33	921
Del.	15	7	-	2	14	-	-	-	1
Md.	206	212	-	19	135	5	4	3	383
D.C.	145	225	-	9	76	-	-	-	1
Va.	246	251	1	16	169	1	4	8	341
W. Va.	11	11	-	-	66	-	2	1	66
N.C.	311	254	-	28	234	6	1	13	7
S.C.	218	173	-	12	160	-	1	5	11
Ga.	622	757	-	12	368	1	-	2	94
Fla.	1,606	1,744	-	29	558	-	7	1	17
E.S. CENTRAL	892	934	-	49	858	7	2	6	215
Ky.	53	48	-	15	225	-	-	1	46
Tenn.	250	257	-	7	255	5	1	2	143
Ala.	362	327	-	18	217	-	-	2	26
Miss.	227	302	-	9	161	2	1	1	-
W.S. CENTRAL	3,483	3,326	-	66	1,013	26	13	55	552
Ark.	89	89	-	11	112	17	2	4	98
La.	743	718	-	10	158	2	3	-	16
Okla.	101	73	-	5	125	6	-	36	56
Tex.	2,550	2,446	-	40	618	1	8	15	382
MOUNTAIN	307	348	1	11	243	2	7	3	85
Mont.	4	1	-	-	22	-	1	1	64
Idaho	6	17	-	-	13	1	-	1	-
Wyo.	6	10	1	-	4	-	-	1	1
Colo.	70	98	-	1	21	-	1	-	-
N. Mex.	106	77	-	2	47	1	-	-	3
Ariz.	68	79	-	8	110	-	3	-	17
Utah	9	11	-	-	17	-	1	-	-
Nev.	38	55	-	-	9	-	1	-	-
PACIFIC	2,161	1,933	-	17	1,656	3	38	1	146
Wash.	60	65	-	8	99	2	2	-	-
Oreg.	42	53	-	4	77	-	-	-	-
Calif.	2,024	1,757	U	U	1,353	1	35	1	139
Alaska	7	7	-	-	13	-	-	-	7
Hawaii	28	51	-	5	114	-	1	-	-
Guam	-	1	U	U	2	-	-	-	-
P.R.	377	247	-	-	182	-	-	-	25
V.I.	8	4	-	-	1	-	-	-	-
Pac. Trust Terr.	-	-	U	U	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending May 28, 1983 (21st week)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	677	459	146	42	17	12	46
Boston, Mass.	197	117	56	14	4	6	22
Bridgeport, Conn.	38	24	8	3	2	1	6
Cambridge, Mass.	29	21	6	2	-	-	1
Fall River, Mass.	27	22	3	2	-	-	-
Hartford, Conn.	47	27	14	3	3	-	-
Lowell, Mass.	29	20	8	-	1	-	3
Lynn, Mass.	20	15	3	2	-	-	-
New Bedford, Mass.	27	23	4	-	-	-	-
New Haven, Conn.	44	28	10	3	2	1	1
Providence, R.I.	68	47	15	4	2	-	4
Somerville, Mass.	13	11	-	2	-	-	1
Springfield, Mass.	44	37	3	1	-	2	4
Waterbury, Conn.	33	27	4	1	1	-	2
Worcester, Mass.	61	40	12	5	2	2	2
MID. ATLANTIC	2,574	1,655	596	208	55	60	89
Albany, N.Y.	60	41	14	2	1	2	1
Allentown, Pa.	18	14	4	-	-	-	-
Buffalo, N.Y.	132	90	29	9	2	2	6
Camden, N.J.	35	23	8	1	-	3	1
Elizabeth, N.J.	25	19	5	1	-	-	1
Erie, Pa.†	50	40	8	1	-	1	3
Jersey City, N.J.	38	27	8	2	-	1	1
N.Y. City, N.Y.	1,370	874	308	128	37	23	39
Newark, N.J.	64	27	25	9	1	2	6
Paterson, N.J.	37	21	6	3	3	4	1
Philadelphia, Pa.†	292	182	72	28	3	7	15
Pittsburgh, Pa.†	73	40	24	5	1	3	3
Reading, Pa.	30	21	7	1	1	-	-
Rochester, N.Y.	120	85	26	6	-	3	3
Schenectady, N.Y.	23	14	7	2	-	-	-
Scranton, Pa.†	27	18	9	-	-	-	-
Syracuse, N.Y.	97	65	14	8	4	6	4
Trenton, N.J.	30	17	9	-	1	3	-
Utica, N.Y.	28	18	8	1	1	-	5
Yonkers, N.Y.	25	19	5	1	-	-	-
E.N. CENTRAL	2,342	1,484	579	153	60	66	81
Akron, Ohio	81	50	21	6	1	3	-
Canton, Ohio	52	36	11	3	2	-	1
Chicago, Ill.	532	317	148	43	14	10	11
Cincinnati, Ohio	154	102	39	5	4	4	17
Cleveland, Ohio	195	116	52	17	2	8	6
Columbus, Ohio	132	82	29	9	4	8	2
Dayton, Ohio	105	76	23	3	-	3	2
Detroit, Mich.	269	159	72	26	4	8	6
Evansville, Ind.	40	24	12	2	-	2	-
Fort Wayne, Ind.	56	39	8	4	3	2	3
Gary, Ind.	11	6	4	1	-	-	-
Grand Rapids, Mich.	47	32	8	4	2	1	1
Indianapolis, Ind.	136	90	33	3	6	4	4
Madison, Wis.	38	28	7	2	1	-	4
Milwaukee, Wis.	143	101	32	6	2	2	4
Peoria, Ill.	83	55	22	4	1	1	10
Rockford, Ill.	45	24	15	2	2	2	-
South Bend, Ind.	35	24	5	3	3	-	2
Toledo, Ohio	131	83	26	6	8	8	7
Youngstown, Ohio	57	40	12	4	1	-	1
W.N. CENTRAL	741	494	157	40	24	26	36
Des Moines, Iowa	80	52	17	7	1	3	5
Duluth, Minn.	35	26	6	1	-	2	1
Kansas City, Kans.	33	20	8	3	1	1	1
Kansas City, Mo.	96	57	24	5	2	8	5
Lincoln, Nebr.	33	21	9	-	3	-	1
Minneapolis, Minn.	79	54	15	5	-	5	4
Omaha, Nebr.	78	59	13	3	2	1	3
St. Louis, Mo.	155	106	29	9	9	2	7
St. Paul, Minn.	63	45	14	2	2	-	1
Wichita, Kans.	89	54	22	5	4	4	8

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,196	742	257	103	35	58	41
Atlanta, Ga.	169	88	40	25	6	10	5
Baltimore, Md.	214	125	53	13	11	12	4
Charlotte, N.C.	56	33	18	2	-	3	-
Jacksonville, Fla.	85	54	19	8	3	1	4
Miami, Fla.§	110	98	1	3	3	4	1
Norfolk, Va.	46	25	11	5	2	3	3
Richmond, Va.	80	51	21	1	1	6	8
Savannah, Ga.	42	23	15	4	-	-	1
St. Petersburg, Fla.	110	91	11	4	-	4	3
Tampa, Fla.	71	45	18	2	1	5	1
Washington, D.C.	166	74	40	35	7	10	7
Wilmington, Del.	47	35	10	1	1	-	4
E.S. CENTRAL	727	468	162	36	26	35	36
Birmingham, Ala.	143	86	37	6	4	10	5
Chattanooga, Tenn.	53	38	11	3	-	1	4
Knoxville, Tenn.	43	28	9	2	1	3	-
Louisville, Ky.	133	86	28	7	4	8	13
Memphis, Tenn.	141	97	25	8	9	2	5
Mobile, Ala.	56	33	15	2	3	3	3
Montgomery, Ala.	40	27	10	1	1	1	-
Nashville, Tenn.	118	73	27	7	4	7	6
W.S. CENTRAL	1,127	654	283	85	58	47	39
Austin, Tex.	48	25	13	3	7	-	2
Baton Rouge, La.	60	39	13	5	3	-	4
Corpus Christi, Tex.	31	20	6	-	2	3	-
Dallas, Tex.	169	99	41	14	5	10	1
El Paso, Tex.	49	35	11	3	-	-	3
Fort Worth, Tex.	90	58	19	2	6	5	5
Houston, Tex.	201	86	62	27	12	14	6
Little Rock, Ark.	66	38	16	4	2	6	2
New Orleans, La.	102	52	36	8	4	2	-
San Antonio, Tex.	162	100	38	8	12	4	7
Shreveport, La.	57	37	10	5	4	1	-
Tulsa, Okla.	92	65	18	6	1	2	9
MOUNTAIN	675	405	159	55	30	26	22
Albuquerque, N.Mex.	67	37	18	7	3	2	3
Colo. Springs, Colo.	46	23	13	5	3	2	7
Denver, Colo.	130	77	29	16	4	4	2
Las Vegas, Nev.	68	37	21	5	3	2	4
Ogden, Utah	9	6	2	1	-	-	-
Phoenix, Ariz.	173	111	40	10	5	7	3
Pueblo, Colo.	26	17	7	-	2	-	-
Salt Lake City, Utah	57	33	10	3	2	9	-
Tucson, Ariz.	99	64	19	8	8	-	3
PACIFIC	1,773	1,153	398	112	52	57	90
Berkeley, Calif.	24	12	9	1	-	2	1
Fresno, Calif.	70	53	12	2	-	3	5
Glendale, Calif.	23	19	2	1	-	1	-
Honolulu, Hawaii	71	41	20	6	3	1	3
Long Beach, Calif.	99	65	18	10	2	4	1
Los Angeles, Calif.	508	316	124	28	25	14	18
Oakland, Calif.	53	31	14	2	3	3	5
Pasadena, Calif.	29	19	4	4	-	2	3
Portland, Oreg.	113	79	22	7	-	5	6
Sacramento, Calif.	91	53	24	5	4	5	6
San Diego, Calif.	119	72	28	10	4	5	7
San Francisco, Calif.	143	98	32	8	2	3	2
San Jose, Calif.	182	108	51	17	4	2	19
Seattle, Wash.	159	110	34	7	5	3	5
Spokane, Wash.	47	40	3	3	-	1	6
Tacoma, Wash.	42	37	1	1	-	3	3
TOTAL	11,832††	7,514	2,737	834	357	387	480

* 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.

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

Acute Respiratory Infections – Continued

established. Surveillance and monitoring should be used as management tools in strengthening the national ARI control program.

Reported by WHO Weekly Epidemiologicai Record *1983;58:117-8.*

Annual Mussel Quarantine — California, 1983

California's annual 6-month mussel quarantine went into effect May 1. This quarantine prohibits the sports harvesting, except for use as fish bait, of any species of mussel from anywhere along the California seacoast, including San Francisco Bay and all other bays, inlets, and harbors. The quarantine will remain in effect through October 31. During this time, bivalve mollusks, such as mussels, clams, and scallops, may concentrate a toxin highly poisonous to humans and animals. The California quarantine restrictions and recommendations apply only to mollusks collected locally by sports harvesters. Mollusks sold commercially in California markets or restaurants should pose no risk of paralytic shellfish poisoning (PSP).

PSP toxin can lead to acute disturbance of central nervous system functions within a few minutes to a few hours after ingestion. Symptoms begin with tingling and numbness of the lips, tongue, and fingertips, followed by disturbed balance, lack of muscular coordination, slurred speech, and difficulty swallowing. In severe poisonings, complete muscular paralysis and death from asphyxiation can occur if breathing is not artificially maintained. There is no known antidote to the poison.

The source of the toxin that causes PSP is the dinoflagellate, *Gonyaulax catenella*, a form of plankton that mollusks feed on. During warm weather, this organism may proliferate rapidly; thus bivalve mollusks can develop extremely hazardous levels of toxin within a few days without any visible warning. Abalone, crab, and shrimp do not feed on Gonyaulax plankton and pose no danger of PSP.

Mussels present the greatest hazard of PSP poisoning; toxic ones cannot be distinguished from harmless ones, and cooking does not destroy the toxin. Therefore, mussels should not be eaten at any time during the quarantine. Clams and scallops can also develop hazardous levels of PSP toxin, but not as rapidly as mussels. For this reason, clams and scallops usually are not placed under quarantine until toxic mussels are discovered nearby. If placed under quarantine, no part of mussels should be eaten. In clams and scallops, the toxin is concentrated primarily in the digestive organs (dark meat). Therefore, the dark meat should always be discarded and only the white meat eaten.

From 1927 through 1982, California recorded 508 cases of PSP with 32 deaths. The most recent outbreak affecting humans occurred in 1980 in Marin and Sonoma counties (98 cases, two deaths). While no cases of PSP were reported in 1982, it was the third consecutive year with elevated toxin levels in coastal mollusks. Humboldt, Mendocino, Marin, San Francisco, San Mateo, Sonoma, and Ventura counties showed PSP elevations above the hazard alert level in 1982 . While PSP activity is difficult to predict, a possible added factor in 1983 may be the current massive climatological event ("El Nino"), which has been associated with ocean temperatures considerably above normal in the Pacific basin and along the California coast. *G. catenella* is always more prolific in the summer months, but how the unusual elevation in ocean temperature will affect Gonyaulax populations this season is uncertain.

The only significant change in the 1983 quarantine order is removal of the Washington clam (*Saxidomus nuttalli*) from quarantine along the entire coast. Washington clams had been kept on quarantine in Marin and Sonoma counties following the 1980 outbreak of PSP because toxin was retained in the siphon (neck) portion. Laboratory tests during the 1982-83 inter-quarantine period (November1-May1) show that Washington clams are no longer toxic for PSP.

Reported in California Morbidity *April 29, 1983 (16).*

Chains of Measles Transmission — United States, 1982

In 1982, a provisional total of 1,697 cases of measles was reported to CDC, a record low incidence rate of 0.7 cases per 100,000 population for all ages. Fifteen states reported no measles cases all year, and an additional seven states reported only imported cases. Ninety-four percent of the nation's 3,138 counties reported no measles all year.

October 1, 1982, was the target date for eliminating indigenous transmission of measles. To investigate the remaining chains of transmission, CDC has reviewed reporting forms from 556 measles cases, 33% of the 1982 total, submitted by 11 of the 28 states reporting cases. Each form was reviewed for patient age, immunity status, and day-care-center attendance. Cases were grouped using CDC's measles classification system (Table 1) (*1*). Of 556 persons with measles, 209 (37.6%) were preschoolers (less than 5 years old), and 281 (50.5%) were school-aged (5-19 years old). Overall, 337 (60.6%) cases were not preventable because the patients were either too young or too old for routine vaccination or because they had evidence of immunity. Of the 219 (39.4%) preventable cases, 109 occurred among children who attended schools or day-care centers and were thus readily accessible to control measures. The other 110 were not readily accessible—not school-aged and not known to attend a day-care center.

CDC has also reviewed detailed, written reports of the 14 major outbreaks in 1982. Of 1,697 measles cases, 63% occurred in 14 separate outbreaks or chains of transmission (defined as consisting of two or more generations).* The other 37% occurred sporadically. The 14 outbreaks were reported from nine states and ranged in size from nine to 419 cases in two to 16 generations (Figure 2). Most were of short duration. Sources were identified for 11 of the 14 outbreaks: eight were foreign importations, two were out-of-state importations, and one was indigenous from a child with a medical exemption. In eight outbreaks for which data were available, 42% of subsequent first-generation cases were preventable. At least six of the 14 chains of transmission could have been prevented because the index cases were imported in persons who had not been appropriately vaccinated. In contrast, none of the outbreaks had an indigenous, preventable source. In eight outbreaks for which data were

*In this study, a generation was defined as 14 days.

TABLE 1. Characteristics of measles cases* — United States, 1982

Age group	Preventable	Not preventable	Total	Percent
Preschool				
0-15 mo	0	16	16	2.9
16 mo-4 yr	84	109	193	34.7
Subtotal:	84	125	209	37.6
School-age				
5-9 yr	34	75	109	19.6
10-14 yr	38	62	100	18.0
15-19 yr	37	35	72	12.9
Subtotal:	109	172	281	50.5
Adults				
20-24 yr	26	0	26	4.7
≥25 yr	0	40	40	7.2
Subtotal	26	40	66	11.9
Total	219	337	556	100.0
(percent)	39.4	60.6	100.0	

*32.8% of 1,697 cases reported provisionally to CDC.

Measles — Continued

available, the duration of the outbreak was directly related to the proportion of preventable first-generation cases (r=0.95) (Figure 3).

Provisional data for the first quarter of 1983 show a 2-fold increase in measles morbidity over the same period in 1982; however, the chains of transmission have been limited. Approximately 85% of the cases reported have occurred in nine discrete outbreaks, and 53% of the cases reported have occurred among college and university students. Ninety-nine percent of counties reported no measles during the first quarter of 1983.

Reported by Div of Immunization, Center for Prevention Services, CDC.

Editorial Note: Failure to vaccinate—rather than vaccine failure—was the major risk factor for sustained transmission in 1982 (*2*). Unvaccinated susceptibles were important in sustaining measles transmission. The outbreaks with the greatest proportion of preventable cases in the first generation after the index case continued for the longest period of time, suggesting that the overall immunity levels were lower in areas with high proportions of preventable first-generation cases. The outbreaks were sustained because enough preventable cases, in unvaccinated susceptibles, joined with vaccine failures to increase the total supply of susceptibles.

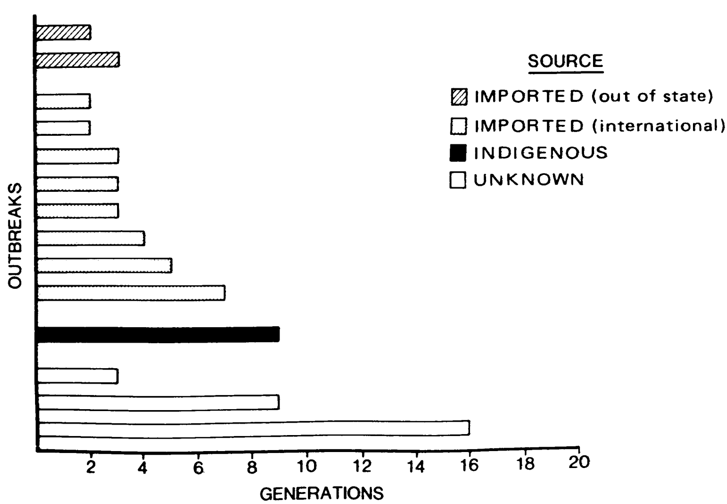
Although measles in 1983 has affected less than three per 100,000 college students and less than 1% of college campuses, campus outbreaks have focused attention on susceptibility among college students (*3*). Colleges can help remedy this situation by establishing vaccination requirements for all students born after 1956. In addition, efforts should be made to identify and immunize remaining susceptibles in high schools, especially those in eleventh and twelfth grades.

Indigenous measles has been eliminated from most of the United States. The remaining chains of transmission are limited in size and extent. Analysis of the chains demonstrates that the measles elimination strategy is valid. The major emphasis must now be placed on improving vaccination among preschoolers and college students, while continually enforcing school requirements, and on aggressively responding to the remaining chains of transmission.

References

1. CDC. Classification of measles cases and categorization of measles elimination programs. MMWR 1983;31:707-11.

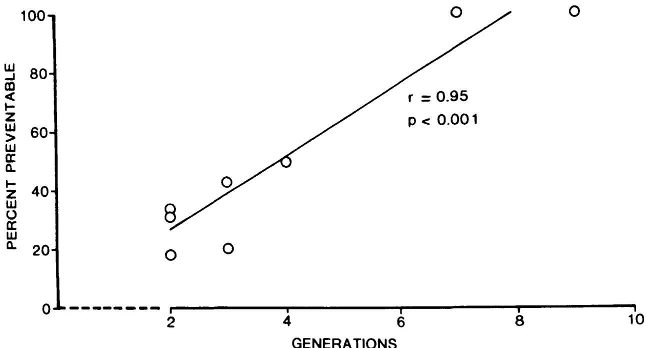
FIGURE 2. Source and duration of 14 measles outbreaks—United States, 1982



Measles — Continued

2. Amler RW, Bloch AB, Orenstein WA, et al. Measles in the United States: chains of transmission. Proceedings of the 18th Immunization Conference, May 16-19, 1982. Atlanta: CDC (in press).
3. CDC. Measles outbreaks on university campuses—Indiana, Ohio, Texas. MMWR 1983;32:193-5.

FIGURE 3. Duration of measles outbreaks, by percentage of preventable, first generation cases — United States, 1982



*Minimum 2 generations.

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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; compiled 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.

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