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MORBIDITY AND MORTALITY WEEKLY REPORT

Current Trends

Measles on College Campuses — United States, 1985

In the first 26 weeks of 1985, 334 (18.5%) of the 1,802 reported cases of measles in the United States occurred on 25 college campuses in 14 states and the District of Columbia. The proportion of reported measles cases on college campuses during this period is more than six times that in 1984, and approaches that of 1983, when it reached an all-time high of 19.8% (Table 1). Among states reporting measles cases on college campuses, the proportion varied by state from 0.5% to 100% (Table 2). A recent outbreak at Villanova University (suburban Philadelphia, Pennsylvania) illustrates the problem.

From March 22 through April 27, 1985, 21 measles cases occurred on the Villanova campus. Three additional cases occurred off campus—two in Pennsylvania and one in Maryland. All cases met the CDC clinical case definition of measles: generalized rash lasting 3 or more days, fever (37.8 C [101 F] or higher, if measured), and at least one of the following symptoms: cough, coryza, conjunctivitis. Eleven of the 24 cases were serologically confirmed.

Twenty of the 21 campus cases occurred among undergraduate students. Approximately 6,200 of the 11,000 students at the university are undergraduates; thus, the estimated attack rate among undergraduates was 3/1,000. The other case occurred in a 16-year-old male who worked part-time on campus as a foodhandler. Three patients were hospitalized, two with pneumonia.

The index case was a 19-year-old male who had rash onset on March 22 (Figure 1). The source of his infection is unknown. However, he had traveled to Fort Lauderdale, Florida, during spring break (March 2-10), where infected students from an outbreak at Boston University (BU) (*1*) were known to be present. The second generation of cases (April 3-6) consisted of seven students and the part-time campus employee. After second-generation mea-

TABLE 1. Reported measles cases on college campuses — United States, 1980-1985

Year	Colleges	Total cases	Campus cases No.	(%)
1980	36	13,506	200	(1.5)
1981	19	3,124	101	(3.3)
1982	14	1,714	115	(6.7)
1983	19	1,497	296	(19.8)
1984	17	2,543*	67	(2.6)
1985†	25	1,802	334	(18.5)

*Provisional data.
†First 26 weeks, 1985.

Measles — Continued

sles patients had left campus during Easter vacation (April 2-9), three additional cases subsequently occurred in Maryland and in other areas in Pennsylvania.

To control the outbreak, surveillance was intensified, and vaccination clinics were held on campus. Expanded surveillance activities included a retrospective review of the infirmary's patient log, widespread publicity of the outbreak throughout the campus and in the student newspaper, communication with infection-control nurses at local hospitals, and contact with other colleges and universities in southeastern Pennsylvania. On April 15-17, voluntary vaccination clinics were held for students who could not recall a history of physician-diagnosed measles or measles vaccination after 1967 at 12 months of age or older. No information on measles vaccination status in student medical records was required by the university. More than 3,300 (53%) of the undergraduate students were immunized in these clinics with combined measles-rubella vaccine; only one case subsequently occurred.

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Editorial Note: The Villanova University outbreak is one of the larger college outbreaks reported in 1985. The largest occurred at Principia College, a Christian Science college in Illinois (*1*). One hundred twenty-eight cases were reported between January 15 and March 10, including 113 among students and 15 among other residents. Three deaths related to respiratory complications of measles occurred among students and residents at the college. BU was the site of another large outbreak, which began at the end of January and continued through the end of March (*1*). One hundred three students and two employees at BU were infected. Fifty-five persons were hospitalized for isolation and/or medical treatment, including one student who was admitted to the intensive-care unit with pneumonia. Thirteen persons developed otitis media.

The high mobility of college students, who may travel to countries where measles is endemic or epidemic, offers the potential for frequent introduction of measles virus onto college campuses. For example, an 18-year-old student who had traveled to Guatemala was the index case for an outbreak in 1983 involving 20 students at Louisiana State University (*2*).

TABLE 2. Reported measles cases on college campuses, by state — United States, first 26 weeks, 1985

State	Total reported cases	College cases	
		No.	(%)
North Carolina	9	9*	(100.0%)
District of Columbia	1	1	(100.0%)
Massachusetts	112	109	(97.3%)
Pennsylvania	23	21	(91.3%)
Illinois	259	128	(49.4%)
Oregon	3	1	(33.3%)
Ohio	43	13	(30.2%)
Connecticut	7	2	(28.6%)
New York	124	29	(23.4%)
Maryland	44	8	(18.2%)
Michigan	51	7	(13.7%)
Hawaii	18	1	(5.6%)
Louisiana	32	1	(3.1%)
Texas	236	2	(0.8%)
Arizona	194	1	(0.5%)

*One other North Carolina college case was reported by New Jersey.

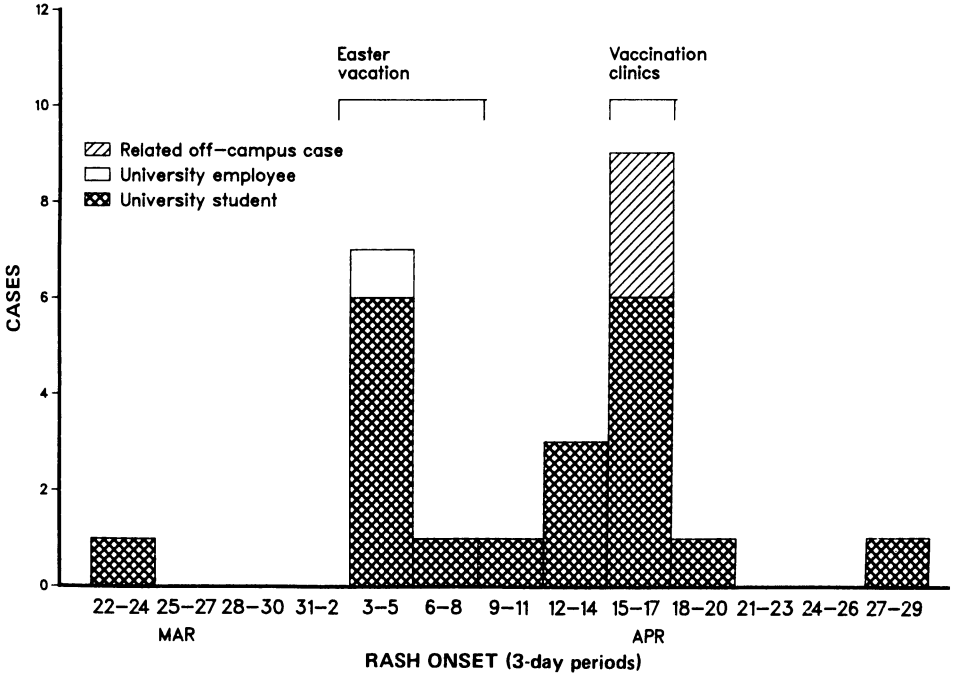
Measles – Continued

The index case for an outbreak involving 12 cases at Ohio State University in January and February 1985 was a student who had acquired measles while traveling to London and Sierra Leone. The index case for the BU outbreak was a student who had acquired measles while traveling in Venezuela (*1*).

Once measles virus is introduced onto a college campus, transmission among students may be sustained by several factors (*3*): (1) many students who grew up in the mid-1960s may have missed measles vaccination in the first years following the licensure of measles vaccine; (2) many students may not have been immunized before the adoption of comprehensive school laws now in effect in most states; (3) many students may have escaped natural measles infection because of decreasing transmission over the past 20 years; (4) some students may have been vaccinated with the killed measles virus vaccine without subsequent revaccination with live measles virus vaccine; and (5) many students may have been vaccinated with live measles virus vaccine before their first birthday, when measles vaccine is known to be less effective. These factors contribute to an estimated susceptibility level of 5%-15% among college-aged individuals in the United States (*4,5*). Since college students tend to congregate in large numbers, this susceptibility level may allow for substantial measles transmission.

Because of the likelihood for measles virus introduction onto college campuses and the increased chances for sustained transmission, effective measures to reduce the susceptibility levels of college students should be adopted and implemented as soon as possible. In May 1983, the American College Health Association adopted a Preadmission Immunization Policy, recommending that, by September 1985, colleges and universities require all students to present documentation of immunity to measles and other vaccine-preventable diseases as a pre-

FIGURE 1. Reported Vilanova University measles cases and related cases, by date of rash onset — March 22,-April 27, 1985



Measles — Continued

requisite to matriculation or registration (*6*). The Immunization Practices Advisory Committee has likewise recommended since 1980 that college and university administrations strongly consider establishing such requirements (*7*).

Massachusetts, North Carolina, the District of Columbia, and Puerto Rico have adopted statutes requiring immunization of college students. In Rhode Island, the state health and education departments jointly promulgated a regulation, which took effect January 1, 1985, requiring documentation of immunity to measles and rubella for newly entering college students. In Mississippi, the Board of Trustees of State Institutions of Higher Learning adopted a requirement for proof of immunity to measles and rubella for students registering at 4-year state-supported institutions as of fall 1984. Elsewhere, individual universities and colleges have adopted their own internal immunization policies (*8*). One of the largest of these is the University of Michigan, which recently approved a requirement for documentation of immunity to measles and rubella for all incoming students, effective September 1985.

Despite this progress, the majority of colleges still lack immunization requirements. An early 1984 survey of 1,861 of the nation's 3,600 colleges showed that only 16% had requirements for measles and/or rubella immunity as a condition of attendance. No information is available on actual enforcement of these requirements where they exist.

Measles outbreaks on college campuses are costly, disruptive to college routine, and difficult to control. Control activities alone for outbreaks at Dartmouth College in 1984 and Indiana University in 1983, for example, cost more than $30,000 and $225,000, respectively (*3*). Data from the BU outbreak show that, on the average, measles patients missed 4-5 days of classes each; those hospitalized were in the infirmary for 2 days; and outpatients required 1-2 physician visits for their illness. To limit transmission, several BU-sponsored athletic events were cancelled or restricted to allow attendance only by BU students with proof of immunity.

Voluntary vaccination clinics usually result in low turnout. For example, those held during six college rubella outbreaks in 1983 and 1984 only reached 0.1%-12.3% of the college enrollment (*9*). While more than 50% of Villanova University undergraduates were vaccinated during the outbreak, many of those vaccinated may have already been immune and some susceptible students may not have been immunized. College immunization requirements for newly admitted students result in more accurate identification and more effective vaccination of susceptible individuals.

Some colleges are reluctant to adopt immunization requirements because: (1) they believe that their implementation would be an administrative burden, and/or (2) they fear that such policies would lead to a declining enrollment. However, the administrative burden and costs of enforcing college immunization requirements are much less than those associated with attempting to control an outbreak. In addition, experience has shown that students generally cooperate quite well with immunization requirements and that school enrollments are not affected by immunization policies.

Immunization requirements have been shown to be highly successful in a comparable young adult population group: military recruits. The incidence of both rubella and measles in military personnel fell dramatically after immunization of all susceptible recruits was instituted several years ago (*10,11*). Similar progress could be achieved among college students if college and university administrators, public health and education officials, and legislators take the necessary steps to promote the adoption and enforcement of college immunization requirements (*12*).

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Measles — Continued

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Epidemiologic Notes and Reports

Gasoline Sniffing and Lead Toxicity among Siblings — Virginia

Between March 1983 and December 1984, six of seven children from a family of nine developed lead toxicity from chronic sniffing of gasoline (Table 3). The children ranged in age from 10 years to 17 years; five of the six were boys. Health officials became aware of the problem after neighbors complained that the children were stealing gasoline. Attempts to control their behavior by issuing locking gas caps and providing family and individual counseling were unsuccessful. Neither the parents nor an older sister, who denied sniffing gasoline had elevated blood lead levels.

The family lived in Virginia on an isolated lot in a rural, coastal county on the Chesapeake Bay. Despite a thorough investigation that included analyses of water, paint, and soil samples, no environmental source of lead other than gasoline could be identified. Abandoned automobiles, gardening machinery, and storage cans containing gasoline were easily accessible to the children.

One of the older boys introduced the practice to his siblings after discovering the effects of inhalation while siphoning gasoline. The children would sniff the fumes for 1-2 minutes until feeling the acute effects, which included euphoria, lethargy, loss of appetite, slurred

TABLE 3. Blood lead levels among chronic gasoline-sniffing children — Virginia, March 1983-December 1984

Sibling	Age	Blood lead, μg/dl* Mean	Range
1	10	46	19-98
2	11	33	9-66
3	13	49	30-79
4	14	45	36-64
5	15	45	29-58
6	17	43	26-65

*Five to seven samples taken per child.

Gasoline Sniffing — Continued

speech, and blurred vision. These symptoms usually lasted several hours. One child reported occasional headaches and vomiting shortly after sniffing the gasoline.

Frequency of usage varied for each child, ranging from once a month to several times weekly. All the children tended to increase the frequency of sniffing during the summer months when they were out of school, and their activities were less supervised. Blood lead values obtained for three of the children during 1984 showed an increase from February through December. A similar trend during the same period was seen in the other family members who reported sniffing gasoline.

In November 1984, a physician found signs of dysdiadochokinesia (dysfunction of ability to carry out rapidly alternating movements) in two of the children, whereas the other four had normal physical examinations. After hospitalization and treatment, their blood lead levels decreased and the children were placed in supervised foster homes. Since placement, all have reportedly stopped sniffing gasoline.

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(Continued on page 455)

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

Disease	29th Week Ending			Cumulative, 29th Week Ending		
	July 20, 1985	July 21, 1984	Median 1980-1984	July 20, 1985	July 21, 1984	Median 1980-1984
Acquired Immunodeficiency Syndrome (AIDS)	143	84	N	4,115	2,182	N
Aseptic meningitis	213	196	259	2,726	2,679	2,855
Encephalitis: Primary (arthropod-borne & unspec.)	21	27	34	505	484	527
Post-infectious	3	2	2	75	78	58
Gonorrhea: Civilian	17,851	18,653	20,606	449,702	445,956	520,949
Military	230	435	435	9,890	11,596	14,895
Hepatitis: Type A	380	439	439	11,738	11,402	12,292
Type B	519	535	409	13,922	13,792	11,636
Non A, Non B	63	71	N	2,254	2,103	N
Unspecified	119	100	185	3,138	2,658	4,704
Legionellosis	12	20	N	307	318	N
Leprosy	2	3	6	201	130	130
Malaria	20	12	16	480	460	555
Measles: Total*	38	66	61	2,025	2,059	2,059
Indigenous	36	46	N	1,648	1,834	N
Imported	2	20	N	377	225	N
Meningococcal infections: Total	38	57	43	1,508	1,797	1,803
Civilian	38	57	43	1,505	1,794	1,794
Military	-	-	-	3	3	12
Mumps	27	38	50	1,982	2,003	2,923
Pertussis	38	23	46	907	1,109	692
Rubella (German measles)	19	12	22	419	450	1,566
Syphilis (Primary & Secondary): Civilian	459	525	639	13,747	15,313	16,596
Military	3	8	8	95	188	217
Toxic Shock syndrome	3	11	N	210	280	N
Tuberculosis	500	427	531	11,540	11,630	14,020
Tularemia	3	18	12	68	145	120
Typhoid fever	3	4	9	164	168	211
Typhus fever, tick-borne (RMSF)	32	46	62	309	425	550
Rabies, animal	111	99	128	2,801	2,800	3,592

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1985		Cum. 1985
Anthrax	-	Leptospirosis	14
Botulism: Foodborne (Alaska 1)	22	Plague	5
Infant (Tex 1, Calif. 3)	28	Poliomyelitis: Total	3
Other	-	Paralytic	3
Brucellosis (Mass. 1, W.Va. 1)	62	Psittacosis (Md. 1, Fla. 1)	66
Cholera (Ill. 2)	2	Rabies, human	-
Congenital rubella syndrome	-	Tetanus	29
Congenital syphilis, ages < 1 year	74	Trichinosis	40
Diphtheria	1	Typhus fever, flea-borne (endemic, murine)	6

*Two of the 38 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 July 20, 1985 and July 21, 1984 (29th 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	4,115	213	505	75	449,702	445,956	380	519	63	119	12	201
NEW ENGLAND	147	6	13	-	13,126	12,582	3	45	1	11	-	4
Maine	5	-	-	-	574	506	1	5	-	-	-	-
N.H.	-	1	4	-	300	375	-	-	-	-	-	-
Vt.	1	-	-	-	163	214	1	-	-	-	-	-
Mass.	89	3	8	-	4,986	5,090	1	28	1	11	-	4
R.I.	7	-	-	-	1,015	854	-	-	-	-	-	-
Conn.	45	2	1	-	6,088	5,543	-	12	-	-	-	-
MID ATLANTIC	1,632	21	73	5	69,446	60,982	35	45	3	6	-	15
Upstate N.Y.	197	7	25	4	8,980	8,983	18	27	2	2	-	-
N.Y. City	1,098	5	7	-	35,676	25,712	2	2	-	-	-	15
N.J.	244	9	18	-	10,555	10,324	15	16	1	4	-	-
Pa.	93	-	23	1	14,235	15,963	-	-	-	-	-	-
E.N. CENTRAL	173	30	108	15	63,269	61,603	24	54	6	4	3	20
Ohio	33	13	43	4	16,009	15,985	9	18	2	1	-	2
Ind.	13	4	16	2	6,398	6,851	3	3	-	3	-	-
Ill.	81	-	14	6	17,446	14,414	4	4	-	-	-	16
Mich.	30	13	28	-	17,652	17,448	8	29	4	-	3	2
Wis.	16	-	7	3	5,764	6,905	-	-	-	-	-	-
W.N. CENTRAL	44	5	31	3	21,912	21,241	3	14	1	1	-	-
Minn.	10	3	15	1	3,081	3,163	-	-	1	-	-	-
Iowa	6	1	10	-	2,325	2,351	-	-	-	-	-	-
Mo.	21	1	-	-	10,453	10,272	1	7	-	1	-	-
N. Dak.	-	-	-	1	145	205	-	-	-	-	-	-
S. Dak.	-	-	-	-	406	531	2	2	-	-	-	-
Nebr.	2	-	1	-	1,999	1,499	-	5	-	-	-	-
Kans.	5	-	5	1	3,503	3,220	-	-	-	-	-	-
S. ATLANTIC	601	63	63	25	97,749	113,418	35	139	13	25	8	5
Del.	7	1	1	-	2,219	2,028	1	1	-	-	1	-
Md.	70	4	17	1	15,858	12,775	2	25	-	-	-	1
D.C.	79	2	-	-	8,184	8,108	-	5	-	4	-	-
Va.	41	17	15	4	10,025	10,780	5	32	5	8	-	-
W. Va.	4	1	7	-	1,321	1,365	-	-	-	-	-	-
N.C.	31	4	20	-	18,489	18,067	1	12	1	2	6	2
S.C.	7	2	3	-	12,093	11,113	-	16	-	1	-	-
Ga.	101	6	-	-	-	21,605	8	15	-	-	-	1
Fla.	261	26	-	20	29,560	27,577	18	33	7	10	1	1
E.S. CENTRAL	44	21	23	4	39,239	38,704	3	41	6	2	-	-
Ky.	12	5	8	-	4,466	4,675	2	8	1	-	-	-
Tenn.	14	2	4	-	15,389	15,945	1	9	2	2	-	-
Ala.	16	13	9	4	12,434	12,372	-	23	2	-	-	-
Miss.	2	1	2	-	6,950	5,712	-	1	1	-	-	-
W.S. CENTRAL	299	29	63	2	59,265	60,690	37	22	2	15	-	14
Ark.	4	-	1	1	5,707	5,477	1	1	-	1	-	1
La.	54	6	3	-	12,723	13,674	1	4	-	1	-	1
Okla.	6	3	16	1	6,428	6,584	9	1	-	2	-	-
Tex.	235	20	43	-	34,407	34,955	26	16	2	11	-	12
MOUNTAIN	63	7	23	5	14,505	14,321	68	39	7	8	-	5
Mont.	-	1	-	-	405	588	-	-	-	-	-	-
Idaho	-	-	-	-	465	734	-	-	-	-	-	-
Wyo.	-	-	1	-	371	413	-	-	-	-	-	-
Colo.	25	2	6	1	4,416	4,124	12	6	-	5	-	1
N. Mex.	6	-	3	-	1,639	1,585	12	9	1	1	-	-
Ariz.	23	1	3	-	4,275	3,924	29	17	6	2	-	1
Utah	6	1	7	4	627	700	7	2	-	-	-	2
Nev.	3	2	3	-	2,307	2,253	8	5	-	-	-	1
PACIFIC	1,112	31	108	16	71,191	62,415	172	120	24	47	1	138
Wash.	64	3	11	-	4,891	4,405	12	8	3	1	-	30
Oreg.	16	-	-	-	3,470	3,529	24	2	8	1	-	2
Calif.	1,012	26	94	16	60,163	51,899	134	108	13	45	1	92
Alaska	2	-	3	-	1,674	1,537	-	-	-	-	-	-
Hawaii	18	2	-	-	993	1,045	2	2	-	-	-	14
Guam	-	U	-	-	73	145	U	U	U	U	U	1
P.R.	48	1	4	2	1,991	1,916	1	3	-	-	-	2
V.I.	2	-	-	-	279	287	1	1	-	-	-	-
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 July 20, 1985 and July 21, 1984 (29th 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	480	36	1,648	2	377	2,059	1,508	27	1,982	38	907	1,109	19	419	450
NEW ENGLAND	26	-	33	-	86	102	69	1	41	5	50	28	-	9	17
Maine	3	-	-	-	-	-	2	-	6	-	2	-	-	-	1
N.H.	4	-	-	-	-	36	8	-	7	-	23	6	-	2	-
Vt.	-	-	-	-	-	6	9	-	2	-	2	14	-	-	-
Mass.	12	-	29	-	83	47	12	-	13	1	9	6	-	6	16
R.I.	2	-	-	-	-	-	13	1	8	3	8	1	-	-	-
Conn.	5	-	4	-	3	13	25	-	5	1	6	1	-	1	-
MID ATLANTIC	68	3	149	-	26	122	248	4	216	1	65	95	6	163	153
Upstate N.Y.	23	-	71	-	10	29	105	1	123	-	30	56	1	17	95
N.Y. City	22	1	41	-	7	82	32	-	14	-	9	3	5	125	38
N.J.	6	2	14	-	9	7	39	1	27	-	3	7	-	9	16
Pa.	17	-	23	-	-	4	72	2	52	1	23	29	-	12	4
E.N. CENTRAL	23	3	291	-	125	644	268	6	761	2	98	295	-	20	74
Ohio	6	-	-	-	43	7	90	3	232	1	22	52	-	-	2
Ind.	3	-	-	-	1	3	37	-	33	-	11	195	-	-	2
Ill.	1	3	200	-	66	161	57	2	150	-	15	19	-	5	44
Mich.	11	-	37	-	15	442	58	1	280	1	22	15	-	14	18
Wis.	2	-	54	-	-	31	26	-	66	-	28	14	-	1	8
W.N. CENTRAL	15	-	1	-	8	9	84	1	63	3	71	84	-	19	29
Minn.	6	-	-	-	4	3	21	-	1	3	19	9	-	2	2
Iowa	1	-	-	-	-	-	7	1	9	-	4	4	-	1	1
Mo.	3	-	-	-	2	2	34	-	11	-	12	15	-	7	-
N. Dak.	1	-	-	-	2	-	3	-	2	-	9	-	-	2	3
S. Dak.	1	-	-	-	-	-	2	-	-	-	1	5	-	-	-
Nebr.	1	-	-	-	-	-	7	-	2	-	4	2	-	-	-
Kans.	2	-	1	-	-	4	10	-	38	-	22	49	-	7	23
S. ATLANTIC	63	-	212	-	6	31	299	6	173	8	202	110	1	49	21
Del.	-	-	-	-	-	-	7	-	1	-	-	2	-	1	-
Md.	15	-	51	-	4	12	40	1	26	7	89	25	-	3	1
D.C.	4	-	2	-	1	5	6	-	-	-	-	-	-	-	-
Va.	14	-	21	-	1	2	39	2	31	-	5	15	-	2	-
W. Va.	1	-	31	-	-	-	8	1	55	-	1	7	-	11	-
N.C.	6	-	9	-	-	-	41	2	11	1	10	17	-	-	-
S.C.	-	-	-	-	-	1	30	-	7	-	-	2	-	3	-
Ga.	4	-	8	-	-	-	52	-	13	-	59	10	-	4	2
Fla.	19	-	90	-	-	11	76	-	29	-	38	32	1	25	18
E.S. CENTRAL	8	-	-	-	1	3	66	-	17	3	16	6	-	2	7
Ky.	2	-	-	-	-	1	5	-	4	-	3	1	-	2	3
Tenn.	-	-	-	-	-	2	23	-	11	-	5	2	-	-	-
Ala.	5	-	-	-	-	-	23	-	-	3	6	-	-	-	1
Miss.	1	-	-	-	1	-	15	-	2	-	2	3	-	-	3
W.S. CENTRAL	41	21	361	1	9	477	130	1	209	3	142	232	2	28	6
Ark.	-	-	-	-	-	6	12	-	4	-	10	14	-	1	3
La.	-	5	39	-	-	-	22	-	2	3	8	4	-	-	-
Okla.	2	-	-	1†	1	7	25	N	N	-	73	205	-	1	-
Tex.	39	16	322	-	8	464	71	1	203	-	51	9	2	26	3
MOUNTAIN	29	4	446	-	43	139	65	3	197	8	54	75	-	4	13
Mont.	-	-	122	-	17	-	4	-	7	1	4	17	-	-	-
Idaho	1	-	118	-	18	23	2	1	8	-	-	3	-	1	1
Wyo.	1	-	-	-	-	-	5	-	2	-	-	3	-	-	2
Colo.	8	-	-	-	6	1	19	-	16	6	22	26	-	-	2
N. Mex.	10	-	1	-	2	88	8	N	N	-	5	5	-	2	-
Ariz.	5	4	205	-	-	-	18	2	97	1	14	13	-	1	-
Utah	2	-	-	-	-	27	7	-	5	-	9	6	-	-	7
Nev.	2	-	-	-	-	-	2	-	62	-	-	2	-	-	1
PACIFIC	207	5	155	1	73	532	279	5	305	5	209	184	10	125	130
Wash.	16	-	9	-	32	124	50	2	28	-	27	38	-	11	1
Oreg.	8	-	3	-	-	-	26	N	N	-	21	11	-	2	-
Calif.	166	5	130	1†	36	274	192	1	261	5	135	66	4	71	125
Alaska	2	-	-	-	-	-	7	1	4	-	23	-	-	1	1
Hawaii	15	-	13	-	5	134	4	1	12	-	3	69	6	40	3
Guam	1	U	10	U	-	90	-	U	4	U	-	-	U	1	4
P.R.	-	-	48	-	-	1	9	-	113	1	6	-	-	22	6
V.I.	-	-	4	-	6	-	-	-	3	-	-	-	-	-	-
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 July 20, 1985 and July 21, 1984 (29th 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	13,747	15,313	3	11,540	11,630	68	164	309 +33	2,801
NEW ENGLAND	294	296	-	380	328	-	6	3	9
Maine	9	3	-	28	18	-	-	-	-
N.H.	6	7	-	11	20	-	-	-	1
Vt.	3	1	-	4	6	-	-	-	-
Mass.	155	174	-	230	172	-	5	3	5
R.I.	8	11	-	32	28	-	-	-	-
Conn.	113	100	-	75	84	-	1	-	3
MID ATLANTIC	1,879	2,101	-	2,134	2,124	1	22	7 +1	222
Upstate N.Y.	125	173	-	351	339	-	8	4	56
N.Y. City	1,168	1,300	-	1,063	876	1	8	1 1	-
N.J.	376	379	-	280	462	-	5	-	15
Pa.	210	249	-	440	447	-	1	2	151
E.N. CENTRAL	631	690	-	1,421	1,522	-	17	24 +1	92
Ohio	88	143	-	261	296	-	3	20 1	20
Ind.	61	76	-	170	174	-	3	2	13
Ill.	324	216	-	614	639	-	4	-	15
Mich.	122	211	-	299	316	-	5	2	11
Wis.	36	44	-	77	97	-	2	-	33
W.N. CENTRAL	128	229	-	312	345	23	8	23 +1	527
Minn.	28	67	-	63	59	1	5	-	102
Iowa	14	10	-	41	40	-	1	-	100
Mo.	62	118	-	148	169	18	1	1	23
N. Dak.	2	5	-	3	8	-	-	1	76
S. Dak.	4	-	-	16	13	3	-	2 1	170
Nebr.	5	10	-	11	17	1	1	2	24
Kans.	13	19	-	30	39	-	-	17	32
S. ATLANTIC	3,499	4,567	2	2,345	2,419	6	19	138 +20	758
Del.	17	12	-	23	29	1	-	1	-
Md.	212	284	-	215	252	-	5	11 1	388
D.C.	201	174	-	98	92	-	-	-	-
Va.	167	232	1	213	234	1	3	15 4	100
W. Va.	9	12	-	61	78	-	-	1	18
N.C.	372	456	1	296	379	4	2	55 8	4
S.C.	425	418	-	311	291	-	-	39 5	43
Ga.	-	779	-	373	340	-	1	12 2	111
Fla.	2,096	2,200	-	755	724	-	8	4	94
E.S. CENTRAL	1,118	998	1	1,018	1,090	3	4	30 +2	141
Ky.	35	57	-	228	251	-	1	1	21
Tenn.	307	281	-	304	348	3	1	18 1	28
Ala.	362	331	1	319	326	-	2	6 1	90
Miss.	414	329	-	167	165	-	-	5	2
W.S. CENTRAL	3,297	3,732	-	1,389	1,323	20	11	69 +8	526
Ark.	171	112	-	142	147	8	-	10 3	86
La.	593	672	-	195	165	-	-	-	12
Okla.	96	125	-	152	123	8	-	50 5	62
Tex.	2,437	2,823	-	900	888	4	11	9	366
MOUNTAIN	402	350	-	314	295	13	7	13	226
Mont.	2	2	-	41	14	4	-	6	113
Idaho	3	14	-	15	18	-	-	1	4
Wyo.	5	6	-	5	-	-	-	4	12
Colo.	95	82	-	36	31	2	4	1	10
N. Mex.	63	42	-	58	56	2	2	-	3
Ariz.	208	134	-	132	133	3	1	-	82
Utah	5	11	-	6	28	2	-	-	-
Nev.	21	59	-	21	15	-	-	1	2
PACIFIC	2,499	2,350	-	2,227	2,184	2	70	2	300
Wash.	64	80	-	128	110	-	-	-	4
Oreg.	48	70	-	75	88	1	-	-	1
Calif.	2,342	2,153	-	1,845	1,834	1	67	2	292
Alaska	2	3	-	67	33	-	-	-	3
Hawaii	43	44	-	112	119	-	3	-	-
Guam	2	-	U	16	32	-	-	-	-
P.R.	442	473	-	185	224	-	1	-	22
V.I.	1	8	-	1	3	-	52	-	-
Pac. Trust Terr.	13	-	U	16	-	-	-	-	-

U Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending July 20, 1985 (29th Week)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	578	389	127	41	9	12	31
Boston, Mass.	179	107	44	16	5	7	15
Bridgeport, Conn.	33	25	6	1	1	-	2
Cambridge, Mass.	24	20	3	1	-	-	-
Fall River, Mass.	26	20	5	1	-	-	-
Hartford, Conn.	49	32	9	4	1	3	2
Lowell, Mass.	25	17	8	-	-	-	1
Lynn, Mass.	16	10	4	2	-	-	-
New Bedford, Mass.	27	20	5	1	1	-	3
New Haven, Conn.	36	25	7	1	1	2	-
Providence, R.I.	26	19	5	2	-	-	-
Somerville, Mass.	9	8	1	-	-	-	1
Springfield, Mass.	49	34	11	4	-	-	3
Waterbury, Conn.	28	16	9	3	-	-	1
Worcester, Mass.	51	36	10	5	-	-	3
MID ATLANTIC	2,524	1,640	517	226	75	66	100
Albany, N.Y.	49	39	7	1	-	2	2
Allentown, Pa.	19	15	3	1	-	-	-
Buffalo, N.Y.	104	66	28	8	2	-	9
Camden, N.J.	43	26	8	2	5	2	-
Elizabeth, N.J.	20	18	2	-	-	-	1
Erie, Pa.†	45	31	6	4	3	1	3
Jersey City, N.J.	52	37	10	3	1	1	-
N.Y. City, N.Y.	1,323	829	277	154	32	31	52
Newark, N.J.	71	35	15	11	5	5	2
Paterson, N.J.	28	19	6	1	1	1	2
Philadelphia, Pa.	317	206	63	19	16	13	14
Pittsburgh, Pa.†	70	44	19	5	1	1	2
Reading, Pa.	38	32	6	-	-	-	4
Rochester, N.Y.	112	83	18	2	4	5	6
Schenectady, N.Y.	22	20	2	-	-	-	-
Scranton, Pa.†	28	22	4	1	1	-	-
Syracuse, N.Y.	83	52	16	8	3	4	2
Trenton, N.J.	48	27	17	3	1	-	-
Utica, N.Y.	20	15	4	1	-	-	-
Yonkers, N.Y.	32	24	6	2	-	-	1
E.N. CENTRAL	2,306	1,586	373	159	87	100	82
Akron, Ohio	67	46	11	5	3	2	2
Canton, Ohio	42	32	7	2	1	-	1
Chicago, Ill.§	553	462	11	26	16	37	16
Cincinnati, Ohio	98	59	25	5	6	3	8
Cleveland, Ohio	164	91	36	21	8	8	4
Columbus, Ohio	131	80	31	12	1	7	-
Dayton, Ohio	115	75	21	9	6	4	4
Detroit, Mich.	270	148	63	33	14	12	7
Evansville, Ind.	52	39	11	1	1	-	5
Fort Wayne, Ind.	50	37	8	3	1	1	-
Gary, Ind.	16	7	5	2	1	1	-
Grand Rapids, Mich.	60	38	13	2	3	4	6
Indianapolis, Ind.	175	109	48	12	3	3	4
Madison, Wis.	41	25	3	6	3	4	2
Milwaukee, Wis.	142	98	25	7	9	3	8
Peoria, Ill.	40	33	5	1	-	1	1
Rockford, Ill.	45	31	7	1	4	2	-
South Bend, Ind.	39	31	2	4	2	-	3
Toledo, Ohio	138	97	28	5	3	5	11
Youngstown, Ohio	68	48	13	2	2	3	-
W.N. CENTRAL	762	528	149	44	19	22	23
Des Moines, Iowa	68	48	16	2	1	1	2
Duluth, Minn.	27	18	5	2	1	1	2
Kansas City, Kans.	37	28	8	1	-	-	1
Kansas City, Mo.	122	81	25	10	3	3	1
Lincoln, Nebr.	25	18	6	1	-	-	1
Minneapolis, Minn.	70	48	10	9	3	-	1
Omaha, Nebr.	108	72	23	4	3	6	10
St. Louis, Mo.	169	119	32	10	4	4	1
St. Paul, Minn.	77	54	16	1	2	4	4
Wichita, Kans.	59	42	8	4	2	3	-

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,223	711	297	126	48	39	44
Atlanta, Ga.	152	102	28	13	7	2	4
Baltimore, Md.	164	96	45	14	8	1	6
Charlotte, N.C.	81	48	20	5	1	7	8
Jacksonville, Fla.	105	62	23	10	4	6	4
Miami, Fla.	113	56	35	13	5	4	1
Norfolk, Va.	66	30	14	13	3	6	3
Richmond, Va.	83	44	27	7	2	3	7
Savannah, Ga.	50	30	8	10	2	-	2
St. Petersburg, Fla.	118	89	15	7	5	2	4
Tampa, Fla.	73	39	17	7	4	4	2
Washington, D.C.	182	88	57	26	7	4	3
Wilmington, Del.	36	27	8	1	-	-	-
E.S. CENTRAL	820	531	184	59	20	26	45
Birmingham, Ala.	85	59	14	7	2	3	6
Chattanooga, Tenn.	55	34	14	3	1	3	5
Knoxville, Tenn.	103	76	19	2	5	1	9
Louisville, Ky.	123	78	30	8	2	5	3
Memphis, Tenn.	220	134	56	23	3	4	11
Mobile, Ala.	67	44	15	5	2	1	3
Montgomery, Ala.	42	26	10	4	1	1	2
Nashville, Tenn.	125	80	26	7	4	8	6
W.S. CENTRAL	1,428	797	346	148	73	64	52
Austin, Tex.	69	43	12	8	1	5	5
Baton Rouge, La.	49	31	15	-	1	2	1
Corpus Christi, Tex.	40	26	9	1	3	1	1
Dallas, Tex.	192	101	50	28	8	5	6
El Paso, Tex.	53	34	11	5	1	2	2
Fort Worth, Tex.	113	63	25	12	6	7	4
Houston, Tex.	404	196	107	51	32	18	9
Little Rock, Ark.	59	31	14	5	4	5	3
New Orleans, La.	121	68	27	11	4	11	-
San Antonio, Tex.	187	118	41	15	7	6	12
Shreveport, La.	34	17	15	1	1	-	3
Tulsa, Okla.	107	69	20	11	5	2	6
MOUNTAIN	610	373	130	47	32	27	28
Albuquerque, N.Mex.	63	42	8	4	8	1	6
Colo. Springs, Colo.	39	25	4	6	4	-	-
Denver, Colo.	103	67	15	2	4	14	10
Las Vegas, Nev.	80	35	28	11	4	2	3
Ogden, Utah	23	14	4	3	2	-	-
Phoenix, Ariz.	140	87	27	13	6	7	-
Pueblo, Colo.	26	19	5	1	1	-	1
Salt Lake City, Utah	42	25	9	3	3	2	3
Tucson, Ariz.	94	59	30	4	-	1	5
PACIFIC	2,008	1,307	408	153	69	65	96
Berkeley, Calif.	9	9	-	-	-	-	-
Fresno, Calif.	100	66	20	6	2	6	4
Glendale, Calif.	36	28	7	-	1	-	-
Honolulu, Hawaii	61	35	16	4	5	1	3
Long Beach, Calif.	104	68	24	4	5	2	10
Los Angeles, Calif.	622	399	126	54	25	15	16
Oakland, Calif.	49	35	9	3	1	1	2
Pasadena, Calif.	31	20	6	2	-	3	2
Portland, Oreg.	138	88	31	6	6	6	9
Sacramento, Calif.	120	84	18	14	3	1	12
San Diego, Calif.	160	105	39	7	4	4	12
San Francisco, Calif.	149	98	25	18	3	5	2
San Jose, Calif.	143	93	31	11	6	2	12
Seattle, Wash.	174	102	35	16	5	16	4
Spokane, Wash.	51	34	11	2	2	2	5
Tacoma, Wash.	61	43	10	6	1	1	3
TOTAL	12,259††	7,862	2,531	1,003	432	421	501

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

** Pneumonia and influenza.

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

†† Total includes unknown ages.

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

Gasoline Sniffing — Continued

Editorial Note: Lead in gasoline is present in the form of tetraethyl lead (TEL). It is an organic compound first introduced during the 1920s as a gasoline additive because of its antiknock properties (*1*). After absorption through inhalation, TEL is metabolized to triethyl lead and then converted to inorganic lead (*2*).

Gasoline additives are a significant source of lead in the environment, and reduction of the lead content of gasoline has been associated with decreases in blood lead levels in the U.S. population (*3*). Recently, the U.S. Environmental Protection Agency announced, effective January 1986, a 10-fold reduction in the standard allowable for lead in gasoline, from 1.1 g to 0.1 g per gallon of gasoline, and is currently considering a total ban on all lead additives (*4*).

Previous reports of lead toxicity from gasoline sniffing have been of American and Canadian Indians (*2,5*). The acute effects of inhaling gasoline, which may be caused by TEL or other volatile hydrocarbons found in gasoline, have reportedly been similar to those found in the Virginia children (*6*). More severe effects in those with higher blood lead levels have included seizures and acute metabolic encephalopathy (*2*).

Chronic gasoline sniffing can result in significant lead toxicity, which may go undetected until severe medical problems arise. Besides providing medical care for lead toxicity, health-care providers need to understand the social and cultural factors influencing young people to abuse chemicals and drugs (*5*).

CDC recommends that all children between 9 months and 6 years of age be screened for lead toxicity, defined as a blood lead level of 25 μg/dl or greater and an erythrocyte protoporphyrin (EP) level of 35 μg/dl or greater. The most common source of lead in lead poisoning is lead-based paint. As evidenced by this report, older children and adolescents are also at risk of lead toxicity from different sources of lead in the environment (*7*).

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Rubella Outbreak among Office Workers — New York City

In 1984, a provisional total of 745 rubella cases was reported in the United States. This is a 23.2% decrease from the 1983 total (970 cases) and a 98.7% decrease from the 1969 total of 57,686 cases, the highest number ever reported. The 1984 figure represents a new all-time low. However, rubella cases continue to occur among susceptible adults, particularly childbearing-aged women. While colleges and universities have traditionally been recognized as sources for rubella outbreaks because of pooling of susceptibles (*1*), the outbreak present-

Rubella — Continued

ed below demonstrates that rubella transmission can and does occur in the work setting if enough susceptible young adults are closely confined.

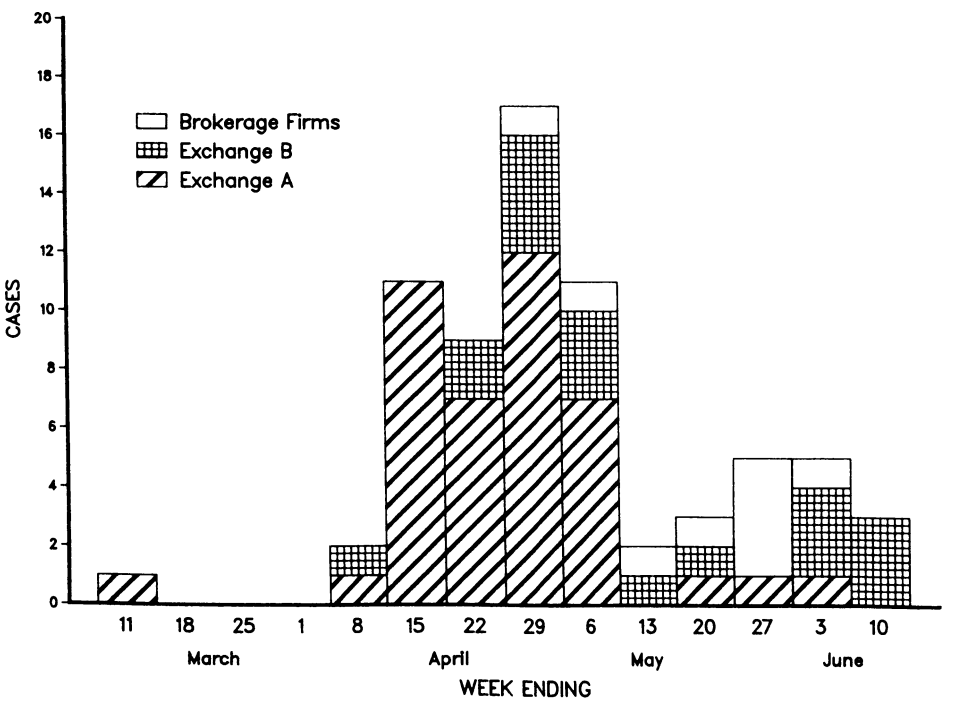
Sixty-nine cases of rubella* involving workers in two exchanges and two brokerage firms in the financial district of lower Manhattan were reported to the New York City Department of Health between March 20 and June 5, 1984 (Figure 2). Two other cases were identified in contacts who did not work in the financial district. Twenty-seven (38.0%) of these 71 cases were serologically confirmed.

Of the 69 cases in the financial district workers, 42 (60.9%) involved workers at Exchange A; 18 (26.1%) were in workers at Exchange B; and nine (13.0%) involved employees at two brokerage firms. The two other cases were in contacts of patients from Exchange A. Epidemiologic links were demonstrated between the two exchanges and between Exchange B and the two brokerage firms.

Because the work force at the two exchanges includes exchange employees, several hundred exchange members, and member firms and their employees, the total number of persons at risk at the exchanges during the outbreak and their age and sex distributions are unknown. Therefore, the denominators used in calculating attack rates are estimates by exchange officials of the total population at risk. Based on these estimates, the overall attack rate for Exchange A (21 cases per 1,000 workers) was significantly higher than that for Exchange B (6/1,000) ($p < 0.001$).

*Generalized maculopapular rash and at least one of the following: fever, conjunctivitis, coryza, joint pain or swelling, headache, or lymphadenopathy.

FIGURE 2. Rubella cases in the financial district, by week of onset — New York City, 1984



Rubella — Continued

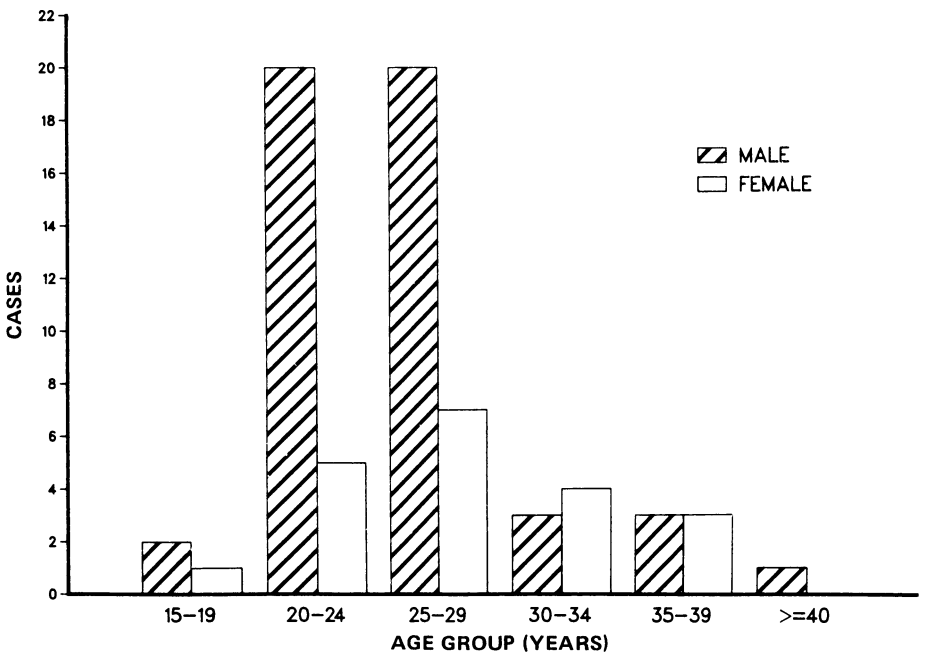
Forty-nine (71.0%) of the 69 cases occurred among men (male-to-female ratio = 2.5:1). Of these 69 primary cases, 55 (79.7%) involved patients under 30 years of age. The median age of patients was 25 years (Figure 3).

The estimated attack rates for male and female employees in the two exchanges (13.8/1,000 and 8.4/1,000, respectively) do not differ significantly, nor do the estimated attack rates for all workers by age (Table 4). However, men under 30 years of age had the highest observed attack rate (16.7/1,000), and their risk of infection was significantly higher than that for women of the same age (7.7/1,000) and that for older men (7.0/1,000) ($p < 0.05$).

No patient was known to have been previously immunized against rubella. No pregnant women were known to have contracted rubella during the outbreak.

To control the outbreak, 1,639 workers, approximately one-third of the work force, were vaccinated at the two exchanges in separate vaccination clinics sponsored by the New York City Department of Health. Separate vaccination programs sponsored by employee health units were conducted at the two brokerage firms. Women of childbearing age were counselled about the theoretical teratogenicity of live-virus vaccines and advised to avoid pregnancy for 3 months after vaccination. Additionally, serum specimens were voluntarily collected before vaccination from approximately 80% of these women and stored so that a prevaccination rubella titer could be determined for any women who subsequently became pregnant. Two women became pregnant, both 22 weeks after vaccination: one proved to be seropositive before vaccination, and the other had refused to have blood drawn. Each woman delivered a normal child. No adverse results of vaccination—including absenteeism—were reported.

FIGURE 3. Rubella cases in the financial district, by age group and sex — New York City, 1984



Rubella — Continued

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Editorial Note: This is the third reported rubella outbreak involving office workers in the United States and the second in New York City (*2,3*). The previous New York outbreak involved 86 cases among workers at a major bank in the financial district of lower Manhattan (*3*). In that outbreak, attack rates were significantly higher for women than for men and were higher for women under 45 years of age than for women 45 years old and older. In the 1984 outbreak, the overall attack rate for men was higher than that for women, although not significantly so. The difference may in part be due to the fact that the denominator data in the latest outbreak were only estimates. In both outbreaks, however, attack rates were higher for younger workers than for older workers; this finding is consistent with the estimated 10%-15% prevalence of seronegative young adults (*4*). This remaining susceptible cohort is a result, not of vaccine failure, but of failure to be vaccinated. Available data indicate no appreciable decline in vaccine-induced immunity over time, regardless of the rubella vaccine strain (*4,5*).

Outbreaks lead not only to disruption of the workplace and time lost through illness but also to potential infection of pregnant women. Although no pregnant women were infected during this outbreak, three were infected in the 1983 New York City outbreak (*3*). Two subsequently had therapeutic abortions, and one delivered an infant with congenital rubella syndrome (CRS).

Rubella outbreaks will likely continue to occur in the workplace until all workers are immune. Direct vaccination of the remaining susceptible adult population could immediately reduce the risk of outbreaks in this setting. This approach is consistent with the national goal to hasten the elimination of CRS from the United States (*6*). The Immunization Practices Advisory Committee (ACIP) recommends that ascertainment of rubella immune status and the availability of rubella immunization be components of the health-care program in places where women of childbearing age congregate or represent a significant proportion of the

TABLE 4. Rubella attack rates,* by age and sex — New York City, 1984

Group	III	Estimated total at risk	Attack rate†
Men			
< 30 yrs.	39	2,333	16.7
≥ 30 yrs.	7	1,000	7.0
Subtotal	46	3,333	13.8
Women			
< 30 yrs.	9	1,167	7.7
≥ 30 yrs.	5	500	10.0
Subtotal	14	1,667	8.4
Total	**60**	**5,000**	**12.0**

*Includes only those cases occurring in exchanges A and B.

†Estimated cases per 1,000 workers.

Rubella — Continued

work force (*4*). Since voluntary programs have generally been less successful than mandatory programs, the latter are preferable.

Introduction of rubella into a population should be prevented, since outbreak control may not lead to immediate termination of cases. Once infection is introduced into a susceptible population, prompt outbreak control is necessary (*4*). To control rubella outbreaks in the workplace, and to prevent workplace-associated CRS, active identification and confirmation of cases, exclusion of patients during the infectious period, exclusion of nonimmune pregnant women until the end of the outbreak, and vaccination of susceptibles are necessary.

While prevaccination blood specimens were obtained from women in this outbreak, this practice is not necessary, even in the nonoutbreak situation (*4*). The ACIP recommends vaccination if an individual simply lacks documentation of either prior vaccination on or after the first birthday or serologic evidence of immunity. For females without such evidence of immunity, one should simply ask the woman if she is pregnant or believes she might become pregnant in the next 3 months. If she says she is not, she should be vaccinated after discussing the need to avoid conception for the ensuing 3 months. All available data indicate that vaccination of immune individuals is not associated with any increased risk of adverse events and that the risks to the fetus following exposure to the vaccine virus are negligible (*4,5*).

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4. ACIP. Rubella prevention. MMWR 1984;33:301-10,315-18.
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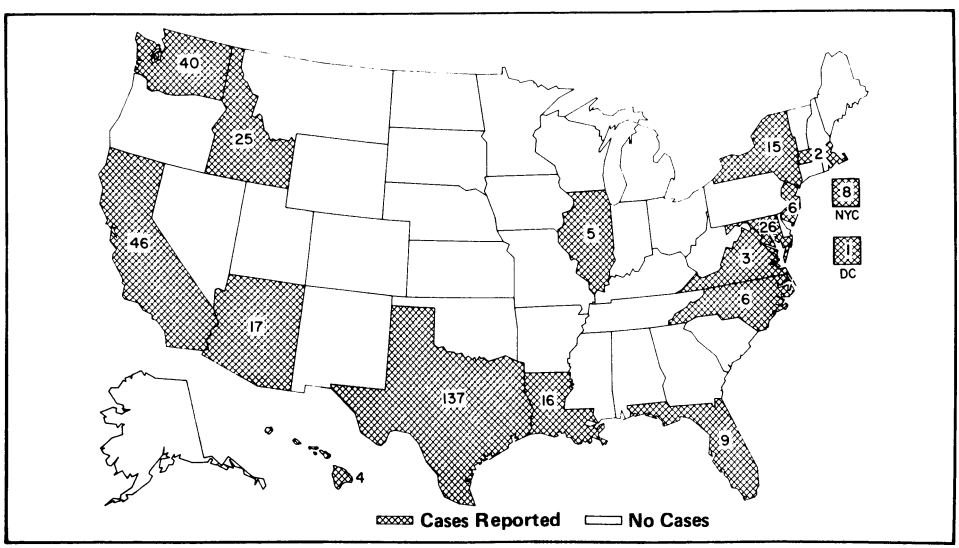
FIGURE I. Reported measles cases — United States, weeks 25-28, 1985



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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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