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Rubella Vaccination during Pregnancy — United States, 1971-1983

From January 1971 to December 1983, 1,096 pregnant women who received rubella vaccine either within 3 months before or 3 months after their presumed dates of conception were reported to CDC. These women were followed prospectively to determine the risk of fetal abnormalities following exposure to the vaccine.

Cendehill and HPV-77 Vaccines: Before April 1979, data were collected on 538 women vaccinated during pregnancy with either Cendehill or HPV-77 rubella vaccines (*1*). The outcomes of conception—live birth, stillbirth, or spontaneous or induced abortion—were known for 143 (96%) of the 149 women known to be susceptible at the time of vaccination. Ninety-four (66%) of these 143 women carried their infants to term. All gave birth to infants free of defects compatible with congenital rubella syndrome (CRS) (*2*), although eight infants had serologic evidence of intrauterine infection (*1,3*). These eight children were all followed for at least 2 years, at which time all were growing and developing normally. The longest follow-up is for a child who is now 8½ years old who had both an elevated rubella-specific immunoglobulin M (IgM) titer at birth and persistence of hemagglutination inhibition (HI) antibodies. Although he is still HI-antibody positive (he has not been vaccinated), he continues to grow and develop normally.

An additional 196 infants born to women who either were immune (22) or of unknown immune status (174) at the time of vaccination were also free of CRS-associated defects. Three other women (one susceptible, one immune, and one of unknown immune status) received unknown strains of rubella vaccine. All three delivered normal-appearing, healthy infants.

RA 27/3 Vaccine: Since licensure of the RA 27/3 rubella vaccine in 1979, 555 women who received this vaccine during pregnancy have been reported to CDC (Table 1). One hundred fifty-seven of these 555 women were known to be susceptible at the time of vaccination. Outcomes of pregnancy are known for 147 (94%) of these women. Of the 147 women, 119 (81%) delivered 121 living infants. An additional 28 immune women and 309 women of unknown immune status delivered 338 living infants. All of these 459 infants were free of defects compatible with CRS.

TABLE 1. Pregnancy outcomes for 555 recipients of RA 27/3 vaccine — United States, January 1979 through December 1983

Prevaccination immunity status	Total women	Live births	Spontaneous abortions and stillbirths	Induced abortions	Outcome unknown
Susceptible	157	121*	3	25	10
Immune	30	28	1	0	1
Unknown	368	310†	8	23	28
Total	555	459	12	48	39

*Includes two twin births.

†Includes one twin birth.

Rubella Vaccination — Continued

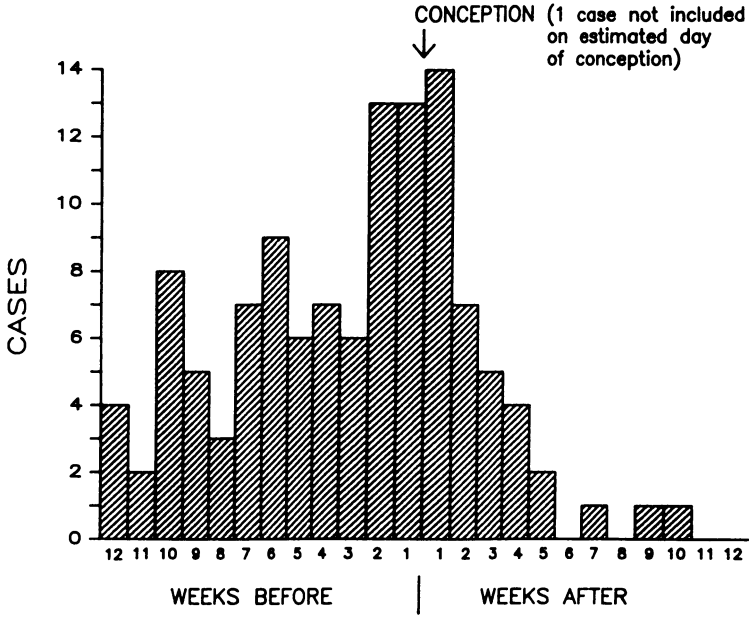
The dates of vaccination and estimated dates of confinement were known for all of the 119 susceptible women who had full-term pregnancies (Figure 1). Forty-four women (37%) were vaccinated within 1 week before to 4 weeks after conception, the period of presumed highest risk.

Serologic evaluations (rubella HI titers and specific IgM on cord or neonatal blood specimens) were performed on 104 (86%) of the 121 infants whose mothers were susceptible. One normal-appearing infant had a rubella-specific IgM antibody titer of 1:8 in cord blood and a corresponding HI titer of 1:128. The maternal titer was also 1:128. Retesting of cord blood and testing of a 2-month follow-up specimen run simultaneously showed an expected decrease in maternally derived HI antibody over the 2-month period from a titer of 1:64 to 1:16, suggesting that subclinical infection may not have occurred. The infant had no evidence of defects compatible with CRS at birth or at the 18-month and 29-month follow-up examinations. Further follow-up sera could not be obtained to document persistence or disappearance of HI antibodies.

Blood studies were also obtained on 150 of the 241 infants born to mothers whose immune statuses were unknown at the time of vaccination. Subclinical infection was documented in two infants. One infant had a rubella-specific IgM antibody titer of 1:16 in cord blood. Both mother and infant had HI titers of 1:32 at the time of birth; the infant had a persistent HI titer of 1:32 at 4 months of age. This infant had no evidence of defects compatible with CRS at birth or at the 10-month and 17-month examinations. A serum specimen was not obtained at the follow-up visits. The second infant had a persistent HI titer of 1:8 at 3 months of age, suggesting that there had been subclinical infection. This infant was diagnosed as normal at the 3-month follow-up visit.

While none of the 121 infants born to susceptible women had defects compatible with CRS, two infants did have asymptomatic glandular hypospadias. However, both had negative

FIGURE 1. Interval between receipt of rubella RA 27/3 vaccine and estimated date of conception, in weeks, among susceptible women with live births — United States, January 1979 through December 1983



Rubella Vaccination — Continued

rubella-specific IgM titers (less than 1:4) in cord blood at birth. A 6-month follow-up serum was available for one of the infants; he had a rubella HI antibody titer of less than 1:8.

Twenty-five susceptible women elected to have induced abortions (Table 1). Thus, rubella virus has now been isolated from the products of conception in one (3%) of 32 cases involving susceptible women (19 cases reported to CDC and 13 from the literature) (*4-6*).

Reported by Surveillance and Investigations Section, Surveillance, Investigations, and Research Br, Div of Immunization, Center for Prevention Svcs, CDC.

Editorial Note: Since 1971, CDC has maintained a register to monitor and quantitate the risks to the fetus following exposure to attenuated rubella vaccine virus. Data are obtained through reports from physicians and from state and local health departments, as well as directly from women vaccinated either within 3 months before or 3 months after conception. The patients are followed prospectively to determine the outcome of pregnancy. In 1979, when RA 27/3 rubella vaccine replaced the other rubella vaccines, concern was raised that it might have greater fetotropic and teratogenic potential than earlier vaccines. As with the other vaccines, data collected so far show no evidence that the RA 27/3 rubella vaccine can cause defects compatible with CRS.

Forty-four (37%) of the 119 susceptible mothers were vaccinated with RA 27/3 vaccine during the highest risk period for viremia and fetal defects (1 week before to 4 weeks after conception) (*7,8*). Neither those infants nor any others were born with CRS; therefore, the observed risk of CRS following rubella vaccination continues to be zero. The theoretical maximum risk for the occurrence of CRS in this group of 121 children, however, based on the 95% confidence limits of the binomial distribution, may be as high as 3.0%. (If the 95 infants exposed to other rubella vaccines are included, the maximum theoretical risk is 1.7%.) This overall maximum risk remains far less than the 20% or greater risk of CRS associated with maternal infection with wild rubella virus during the first trimester of pregnancy (*3*) and is no greater than the 4%-5% rate of birth defects in the absence of exposure to rubella vaccine (*9,10*).

These favorable data are consistent with the German experience cited at the International Symposium on the Prevention of Congenital Rubella Infection recently held at the Pan American Health Organization.* A total of 91 susceptible women vaccinated with either the Cendehill or RA 27/3 strain of vaccine gave birth to normal-appearing infants. Limited data presented at the symposium from the United Kingdom also support the CDC observations.

The occurrence of any congenital defect following maternal vaccination deserves careful analysis and follow-up. Two infants born to susceptible mothers had asymptomatic glandular hypospadias. While hypospadias has been noted in CRS cases (*11,12*), there are no data to suggest that glandular hypospadias should be considered a CRS-associated defect. In any case, neither of the two infants in question had serologic evidence of rubella virus infection. Ten other infants born to mothers of unknown immune status (eight) or known to be immune (two) at the time of vaccination had some type of defect (*13*). However, none of the defects were compatible with CRS and serologic testing, when done, did not confirm rubella virus infection.

While no CRS-like defects have been noted, it is clear that rubella vaccine viruses, including the RA 27/3 strain, can cross the placenta and infect the fetus. Approximately 1%-2% of infants born to susceptible vaccinees had serologic evidence of subclinical infection, regardless of vaccine strain (*3*). On the other hand, while the rubella virus isolation rate from the products of conception for the RA 27/3 vaccine is only 3% (1/32), the rate of virus isolation for Cendehill and HPV-77 vaccines is 20% (17/85) (*3*). These data indicate that the risk of placental or fetal infection from RA 27/3 vaccine is minimal.

In view of the data collected through 1983, the Immunization Practices Advisory Commit-

*These proceedings are to be published in *Reviews of Infectious Diseases.*

Rubella Vaccination — Continued

tee (ACIP) continues to state that: (1) pregnancy remains a contraindication to rubella vaccination because of the theoretical, albeit small, risk of CRS; (2) reasonable precautions should be taken to preclude vaccination of pregnant women, including asking women if they are pregnant, excluding those who say they are, and explaining the theoretical risks to the others; and (3) if vaccination does occur within 3 months of conception, the risk of CRS is so small as to be negligible; thus, rubella vaccination of a pregnant woman should not ordinarily be a reason to consider interruption of pregnancy. The patient and her physician, however, should make the final decision (*14*).

Since the inception of its vaccine-in-pregnancy register, CDC has encouraged reporting of all such cases. Because of the increasing number of cases reported to CDC, the experience with known susceptibles is becoming well defined. Therefore, CDC now encourages reporting only cases involving women known to have been susceptible at the time of vaccination. Laboratory services for serologic determination and culture of placental and fetal tissue will continue to be available at CDC for susceptible cases that are reported.

References

1. CDC. Rubella vaccination during pregnancy—United States, 1971-1981. MMWR 1982:31: 477-81.
2. CDC. Rubella and congenital rubella—United States, 1983. MMWR 1984;33:237-42, 247.
3. Preblud SR, Stetler HC, Frank JA Jr, Greaves WL, Hinman AR, Herrmann KL. Fetal risk associated with rubella vaccine JAMA 1981:246:1413-7.

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

Disease	26th Week Ending			Cumulative, 26th Week Ending		
	June 30, 1984	July 2, 1983	Median 1979-1983	June 30, 1984	July 2, 1983	Median 1979-1983
Acquired Immunodeficiency Syndrome (AIDS)	94	N	N	1,956	N	N
Aseptic meningitis	134	143	143	2,093	2,400	2,085
Encephalitis: Primary (arthropod-borne & unspec.)	21	26	16	417	466	409
Post-infectious	2	1	3	49	53	53
Gonorrhea: Civilian	14,876	15,499	18,213	396,241	437,841	471,737
Military	369	400	443	9,956	11,879	13,493
Hepatitis: Type A	359	297	505	10,324	10,674	12,717
Type B	449	487	401	12,285	11,614	9,894
Non A, Non B	68	60	N	1,812	1,680	N
Unspecified	123	104	176	2,963	3,599	4,973
Legionellosis	10	16	N	277	351	N
Leprosy	6	-	6	115	126	97
Malaria	28	12	25	386	343	472
Measles: Total*	104	59	59	1,759	1,095	2,246
Indigenous	98	58	N	1,584	921	N
Imported	6	1	N	175	174	N
Meningococcal infections: Total	53	59	54	1,608	1,692	1,692
Civilian	53	59	54	1,604	1,676	1,676
Military	-	-	-	4	16	11
Mumps	43	33	66	1,905	2,074	3,890
Pertussis	33	56	29	976	937	563
Rubella (German measles)	10	14	86	429	667	1,694
Syphilis (Primary & Secondary): Civilian	555	588	521	13,784	16,140	14,905
Military	5	-	4	172	218	183
Toxic Shock syndrome	11	9	N	210	242	N
Tuberculosis	432	544	544	10,509	11,347	13,141
Tularemia	11	6	6	76	113	89
Typhoid fever	5	6	11	153	171	194
Typhus fever, tick-borne (RMSF)	50	50	50	283	355	372
Rabies, animal	84	98	112	2,510	3,304	3,304

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1984		Cum. 1984
Anthrax	1	Plague	11
Botulism: Foodborne	6	Poliomyelitis: Total	2
Infant (Calif. 3)	47	Paralytic	2
Other	3	Psittacosis (N.Y. City 1, Utah 1)	41
Brucellosis (Kans. 1, Miss. 1, Tex. 1, Colo. 1, Calif. 1)	49	Rabies, human	-
Cholera	-	Tetanus (Upstate N.Y. 1)	22
Congenital rubella syndrome	3	Trichinosis (Pa. 1)	39
Diphtheria	-	Typhus fever, flea-borne (endemic, murine) (Tex. 1, Calif. 1)	9
Leptospirosis	8		

*Four of the 104 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 June 30, 1984 and July 2, 1983 (26th Week)

Reporting Area	AIDS	Aseptic Menin-gitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionel-losis	Leprosy
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1984	1984	Cum. 1984	Cum. 1984	Cum. 1984	Cum. 1983	1984	1984	1984	1984	1984	Cum. 1984
UNITED STATES	1,956	134	417	49	396,241	437,841	359	449	68	123	10	115
NEW ENGLAND	67	5	25	1	11,417	10,882	8	18	1	14	-	5
Maine	-	-	-	-	456	572	-	-	-	-	-	-
N.H.	1	-	4	-	309	331	-	1	-	-	-	-
Vt.	-	1	2	-	188	203	-	-	-	-	-	-
Mass.	36	3	12	-	4,443	4,742	3	3	-	13	-	4
R.I.	4	1	-	-	748	587	2	10	-	-	-	1
Conn.	26	-	7	1	5,273	4,447	3	4	1	1	-	-
MID ATLANTIC	889	14	55	5	54,575	56,226	27	81	2	7	1	21
Upstate N.Y.	81	4	19	4	8,332	8,917	-	11	-	-	-	2
N.Y. City	641	3	3	-	23,123	22,899	13	36	-	3	-	19
N.J.	130	3	18	-	9,059	10,570	14	34	2	4	1	-
Pa.	37	4	15	1	14,061	13,840	U	-	-	-	-	-
E.N. CENTRAL	96	11	89	12	53,883	62,379	34	42	2	7	4	6
Ohio	14	5	32	5	14,137	16,240	16	13	-	2	4	2
Ind.	16	3	17	-	6,413	6,667	-	4	1	4	-	-
Ill.	49	-	13	6	11,658	17,770	6	8	1	1	-	2
Mich.	11	3	22	-	15,493	16,423	12	17	-	-	-	2
Wis.	6	-	5	1	6,182	5,279	-	-	-	-	-	-
W.N. CENTRAL	20	2	15	-	18,757	20,450	16	16	2	-	1	1
Minn.	5	1	5	-	2,766	2,897	-	-	-	-	-	-
Iowa	1	-	7	-	2,116	2,267	1	4	-	-	-	1
Mo.	9	1	1	-	8,955	10,001	5	9	1	-	-	-
N. Dak.	-	-	-	-	191	197	-	-	-	-	-	-
S. Dak.	-	-	-	-	492	569	10	1	-	-	1	-
Nebr.	2	-	1	-	1,272	1,213	-	1	-	-	-	-
Kans.	3	-	1	-	2,965	3,306	-	1	1	-	-	-
S. ATLANTIC	271	39	79	11	100,522	112,269	32	91	12	11	1	5
Del.	3	-	1	-	1,815	1,998	1	1	-	-	-	-
Md.	19	-	19	-	11,288	14,161	2	10	1	-	-	-
D.C.	37	-	-	-	7,330	7,659	-	-	-	-	-	1
Va.	17	2	19	5	9,615	9,622	4	12	4	4	-	3
W. Va.	4	2	4	-	1,205	1,196	-	4	-	-	-	-
N.C.	5	2	16	5	15,929	16,459	8	11	2	2	-	-
S.C.	5	4	2	-	9,691	10,667	-	10	-	-	-	-
Ga.	24	7	2	-	19,391	23,885	3	23	2	2	1	-
Fla.	157	22	16	1	24,258	26,622	14	20	3	3	-	1
E.S. CENTRAL	14	7	21	6	33,219	36,940	16	34	6	2	-	-
Ky.	7	1	3	-	4,193	4,336	5	7	-	2	-	-
Tenn.	3	4	5	1	14,156	15,011	4	17	4	-	-	-
Ala.	3	-	12	5	10,835	11,451	5	6	2	-	-	-
Miss.	1	2	1	-	4,035	6,142	2	4	-	-	-	-
W.S. CENTRAL	104	27	31	4	54,238	61,008	53	46	9	41	-	7
Ark.	-	2	-	2	4,559	4,723	-	-	-	2	-	-
La.	18	2	4	-	12,424	10,317	7	6	1	-	-	-
Okla.	4	3	9	1	5,863	7,311	5	13	4	2	-	-
Tex.	82	20	18	1	31,392	38,657	41	27	4	37	-	7
MOUNTAIN	26	4	16	4	12,826	13,441	42	14	6	5	-	7
Mont.	-	-	-	-	551	590	7	-	-	-	-	-
Idaho	-	-	-	-	635	597	6	-	-	-	-	-
Wyo.	1	-	-	-	374	352	-	-	-	-	-	-
Colo.	15	1	7	-	3,710	3,835	4	3	1	1	-	-
N. Mex.	-	-	-	-	1,439	1,622	10	-	-	-	-	-
Ariz.	6	-	3	1	3,487	3,676	4	7	4	1	-	5
Utah	1	2	6	3	624	671	10	-	1	2	-	1
Nev.	3	1	-	-	2,006	2,098	1	4	-	1	-	1
PACIFIC	469	25	86	6	56,804	64,246	131	107	28	36	3	63
Wash.	24	3	3	-	3,845	4,905	6	8	3	1	1	3
Oreg.	3	-	-	-	3,370	3,247	11	4	1	-	1	1
Calif.	438	22	81	6	47,239	53,154	114	95	24	34	1	44
Alaska	-	-	-	-	1,406	1,594	-	-	-	1	-	-
Hawaii	4	-	2	-	944	1,346	-	-	-	-	-	15
Guam	-	U	-	-	95	88	U	U	U	U	U	-
P.R.	26	1	-	1	1,709	1,480	1	23	-	7	-	1
V.I.	-	U	-	-	198	142	U	U	U	U	U	-
Pac. Trust Terr.	-	U	-	-	-	-	U	U	U	U	U	-

N: Not notifiable U: Unavailable

TABLE III. (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending June 30, 1984 and July 2, 1983 (26th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported *		Total									
	Cum. 1984	1984	Cum. 1984	1984	Cum. 1984	Cum. 1983	Cum. 1984	1984	Cum. 1984	1984	Cum. 1984	Cum. 1983	1984	Cum. 1984	Cum. 1983
UNITED STATES	386	98	1,584	6	175	1,095	1,608	43	1,905	33	976	937	10	429	667
NEW ENGLAND	28	14	97	1	9	15	100	1	59	-	17	32	-	29	9
Maine	-	-	-	-	-	-	1	-	16	-	-	3	-	1	-
N.H.	-	-	33	-	3	3	6	-	13	-	4	6	-	-	2
Vt.	2	-	2	1 §	3	-	23	-	3	-	11	4	-	-	3
Mass.	15	14	52	-	-	4	35	1	14	-	1	16	-	28	4
R.I.	4	-	-	-	-	-	9	-	4	-	1	3	-	-	-
Conn.	7	-	10	-	3	8	26	-	9	-	-	-	-	-	-
MID ATLANTIC	64	8	86	-	20	76	272	4	222	3	74	237	2	137	121
Upstate N.Y.	18	-	16	-	7	6	99	2	50	3	51	73	1	97	19
N.Y. City	14	8	66	-	7	40	43	-	12	-	3	34	1	32	85
N.J.	18	-	4	-	2	27	57	2	125	-	5	15	-	7	3
Pa.	14	-	-	-	4	3	73	-	35	-	15	115	-	1	14
E.N. CENTRAL	30	9	548	-	66	603	257	18	791	2	264	230	4	64	103
Ohio	7	-	2	-	5	78	89	7	395	2	49	70	-	2	1
Ind.	-	-	2	-	1	385	36	7	40	-	176	16	-	2	20
Ill.	6	-	159	-	1	135	53	3	154	-	15	104	4	35	44
Mich.	6	9	376	-	54	5	49	1	152	-	12	11	-	18	14
Wis.	11	-	9	-	5	-	30	-	50	-	12	29	-	7	24
W.N. CENTRAL	12	-	2	1	3	1	105	2	79	1	77	61	-	27	30
Minn.	2	-	-	1 †	3	1	20	-	3	-	8	20	-	2	6
Iowa	1	-	-	-	-	-	18	-	17	-	3	5	-	-	-
Mo.	6	-	2	-	-	-	30	-	7	-	12	11	-	-	-
N. Dak.	1	-	-	-	-	-	1	-	1	-	-	1	-	3	-
S. Dak.	-	-	-	-	-	-	7	-	-	1	4	3	-	-	-
Nebr.	1	-	-	-	-	-	8	-	3	-	2	-	-	-	-
Kans.	1	-	-	-	-	-	21	2	48	-	48	21	-	22	24
S. ATLANTIC	70	-	10	-	17	177	348	4	134	7	73	131	-	20	74
Del.	3	-	-	-	-	-	3	-	2	1	2	2	-	-	-
Md.	17	-	4	-	5	5	28	1	27	-	4	17	-	1	1
D.C.	1	-	-	-	5	-	4	-	-	-	-	-	-	-	-
Va.	18	-	1	-	1	22	41	-	12	-	9	40	-	-	1
W. Va.	1	-	-	-	-	-	5	-	27	-	7	4	-	-	-
N.C.	5	-	-	-	-	-	48	1	15	-	17	12	-	-	9
S.C.	1	-	-	-	-	4	34	-	2	-	1	8	-	-	-
Ga.	6	-	-	-	-	8	71	-	17	1	4	29	-	2	10
Fla.	18	-	5	-	6	138	114	2	32	5	29	19	-	17	53
E.S. CENTRAL	3	-	1	-	2	6	61	1	37	1	6	7	-	7	10
Ky.	-	-	1	-	-	1	4	-	8	-	1	2	-	3	9
Tenn.	-	-	-	-	2	-	22	-	12	-	2	2	-	-	-
Ala.	3	-	-	-	-	5	24	-	5	-	-	1	-	1	1
Miss.	-	-	-	-	-	-	11	1	12	1	3	2	-	3	-
W.S. CENTRAL	33	36	362	3	22	70	182	3	105	2	228	114	-	13	87
Ark.	-	-	-	-	-	10	25	1	5	-	11	6	-	3	-
La.	5	-	-	-	-	25	35	-	-	-	3	2	-	-	9
Okla.	4	-	-	2 †	7	1	23	N	N	2	203	84	-	-	-
Tex.	24	36	362	1 §	15	34	99	2	100	-	11	22	-	10	78
MOUNTAIN	15	-	90	-	10	3	55	-	191	3	71	83	-	11	23
Mont.	1	-	-	-	-	-	1	-	4	-	17	1	-	-	2
Idaho	2	-	-	-	-	-	5	-	8	1	3	2	-	1	8
Wyo.	-	-	-	-	-	-	2	-	1	-	3	4	-	2	1
Colo.	1	-	-	-	-	2	19	-	13	-	25	53	-	2	-
N. Mex.	1	-	67	-	8	-	7	N	N	-	5	6	-	-	-
Ariz.	7	-	-	-	-	1	14	-	159	2	11	9	-	-	6
Utah	3	-	23	-	2	-	4	-	5	-	5	8	-	6	5
Nev.	-	-	-	-	-	-	3	-	1	-	2	-	-	-	1
PACIFIC	131	31	388	1	26	144	228	10	287	14	166	42	4	121	210
Wash.	4	18	107	-	-	4	30	2	32	5	30	6	-	1	7
Oreg.	7	-	-	-	-	7	36	N	N	2	11	6	-	-	12
Calif.	117	9	244	1 †	23	132	153	7	238	5	57	30	3	116	191
Alaska	-	-	-	-	-	-	8	-	4	-	-	-	-	1	-
Hawaii	3	4	37	-	3	1	1	1	13	2	68	-	1	3	-
Guam	1	U	83	U	2	2	1	U	5	U	-	-	U	2	-
P.R.	2	-	-	-	-	81	3	4	90	-	-	8	-	5	3
V.I.	-	U	-	U	-	5	-	U	3	U	-	-	U	-	1
Pac. Trust Terr.	-	U	-	U	-	-	-	U	-	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 June 30, 1984 and July 2, 1983 (26th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1984	Cum. 1983	1984	Cum. 1984	Cum. 1983	Cum. 1984	Cum. 1984	Cum. 1984	Cum. 1984
UNITED STATES	13,784	16,140	11	10,509	11,347	76	153	283	2,510
NEW ENGLAND	282	354	-	291	315	2	7	1	16
Maine	2	10	-	14	19	-	-	-	9
N.H.	7	16	-	21	24	-	-	-	1
Vt.	1	1	-	3	4	-	-	-	-
Mass.	167	216	-	154	167	2	5	1	5
R.I.	9	13	-	25	25	-	-	-	-
Conn.	96	98	-	74	76	-	2	-	1
MID ATLANTIC	1,881	2,039	1	1,909	2,033	-	20	3	148
Upstate N.Y.	124	173	-	310	320	-	9	2	13
N.Y. City	1,179	1,191	-	776	827	-	4	1	-
N.J.	349	395	-	412	430	-	3	-	4
Pa.	229	280	1	411	456	-	4	-	131
E.N. CENTRAL	616	901	3	1,412	1,436	1	22	9	107
Ohio	122	225	-	273	230	-	4	8	9
Ind.	69	73	-	153	138	-	2	-	12
Ill.	177	451	3	587	622	1	8	-	45
Mich.	208	112	-	311	369	-	2	1	11
Wis.	40	40	-	88	77	-	6	-	30
W.N. CENTRAL	214	201	-	306	369	19	5	24	398
Minn.	65	84	-	52	76	-	2	-	39
Iowa	10	8	-	34	37	-	-	-	77
Mo.	106	71	-	148	189	16	2	3	35
N. Dak.	5	1	-	8	3	-	-	-	85
S. Dak.	2	8	-	9	25	3	-	3	95
Nebr.	10	11	-	16	11	-	-	2	28
Kans.	16	18	-	39	28	-	1	16	39
S. ATLANTIC	4,123	4,245	1	2,211	2,216	4	17	123	755
Del.	13	18	-	29	19	-	-	-	2
Md.	255	267	-	260	173	-	-	10	438
D.C.	161	184	-	83	84	-	6	-	-
Va.	218	297	-	217	214	-	4	16	126
W. Va.	10	15	-	74	75	-	-	5	20
N.C.	419	395	-	324	317	1	1	44	10
S.C.	375	272	-	246	190	-	1	36	26
Ga.	692	795	-	305	400	3	1	11	85
Fla.	1,980	2,002	1	673	744	-	4	1	48
E.S. CENTRAL	871	1,100	-	976	1,083	1	5	26	126
Ky.	55	64	-	228	270	-	2	3	29
Tenn.	257	308	-	310	328	1	2	14	55
Ala.	290	452	-	296	270	-	1	5	42
Miss.	269	276	-	142	215	-	-	4	-
W.S. CENTRAL	3,302	4,217	1	1,180	1,383	31	9	92	543
Ark.	89	103	-	127	152	22	-	12	60
La.	615	846	-	157	238	3	1	1	23
Okla.	90	115	1	126	126	6	2	60	65
Tex.	2,508	3,153	-	770	867	-	6	19	395
MOUNTAIN	325	357	5	269	319	14	10	3	109
Mont.	2	5	-	13	34	-	1	3	57
Idaho	14	6	1	15	14	4	-	-	-
Wyo.	3	7	-	-	7	-	-	-	-
Colo.	72	79	-	25	33	4	2	-	18
N. Mex.	44	111	-	54	61	1	3	-	9
Ariz.	128	84	4	128	132	2	3	-	21
Utah	10	11	-	18	23	2	-	-	-
Nev.	52	54	-	16	15	1	1	-	4
PACIFIC	2,170	2,726	-	1,955	2,193	4	58	2	308
Wash.	60	98	-	102	105	-	1	-	1
Oreg.	69	51	-	79	94	2	1	1	1
Calif.	2,001	2,535	-	1,637	1,830	2	52	-	300
Alaska	3	7	-	28	33	-	1	1	6
Hawaii	37	35	-	109	131	-	3	-	-
Guam	-	-	U	5	4	-	-	-	-
P.R.	419	499	-	217	260	-	3	-	32
V.I.	7	9	U	2	1	-	-	-	-
Pac. Trust Terr.	-	-	U	-	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending June 30, 1984 (26th Week Ending)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	667	442	165	26	13	21	39
Boston, Mass.	160	95	42	7	7	9	16
Bridgeport, Conn.	36	21	14	-	-	1	1
Cambridge, Mass.	23	21	1	1	-	-	-
Fall River, Mass.	45	31	9	3	2	-	-
Hartford, Conn.	40	21	14	3	-	2	2
Lowell, Mass.	24	18	6	-	-	-	-
Lynn, Mass.	20	13	6	1	-	-	-
New Bedford, Mass.	27	17	8	1	1	-	1
New Haven, Conn.	53	29	17	4	1	2	4
Providence, R.I.	85	61	17	3	-	4	6
Somerville, Mass.	11	8	3	-	-	-	1
Springfield, Mass.	42	27	14	-	-	1	5
Waterbury, Conn.	37	30	5	2	-	-	1
Worcester, Mass.	64	50	9	1	2	2	2
MID. ATLANTIC	2,389	1,579	526	154	64	62	95
Albany, N.Y.	49	38	5	3	2	1	-
Allentown, Pa.	23	17	6	-	-	-	-
Buffalo, N.Y.	103	66	24	7	3	3	5
Camden, N.J.	28	18	7	1	1	1	2
Elizabeth, N.J.	18	13	4	1	-	-	-
Erie, Pa.†	38	20	13	3	2	-	-
Jersey City, N.J.	61	39	14	5	2	1	2
N.Y. City, N.Y.	1,421	940	302	103	40	36	52
Newark, N.J.	95	61	17	6	3	4	3
Paterson, N.J.	24	11	8	3	-	2	1
Philadelphia, Pa.†	117	67	39	5	1	5	7
Pittsburgh, Pa.†	56	37	12	4	-	3	-
Reading, Pa.	27	20	6	-	1	-	2
Rochester, N.Y.	110	73	25	6	3	3	7
Schenectady, N.Y.	24	20	2	1	1	-	-
Scranton, Pa.†	32	23	9	-	-	-	3
Syracuse, N.Y.	77	51	15	5	3	3	4
Trenton, N.J.	28	20	7	-	1	-	2
Utica, N.Y.	21	15	6	-	-	-	2
Yonkers, N.Y.	37	30	5	1	1	-	3
E.N. CENTRAL	2,230	1,404	522	144	66	94	72
Akron, Ohio	85	52	17	5	4	7	-
Canton, Ohio	23	19	2	2	-	-	2
Chicago, Ill	515	299	128	44	20	24	13
Cincinnati, Ohio	146	88	38	9	4	7	10
Cleveland, Ohio	172	102	46	9	7	8	5
Columbus, Ohio	140	81	35	8	7	9	1
Dayton, Ohio	81	52	19	5	1	4	2
Detroit, Mich.	261	155	66	25	9	6	7
Evansville, Ind.	58	50	5	2	-	1	1
Fort Wayne, Ind.	51	37	9	1	3	1	5
Gary, Ind.	27	17	7	1	2	-	-
Grand Rapids, Mich	56	39	13	2	-	2	4
Indianapolis, Ind.	172	93	53	15	3	8	-
Madison, Wis.	38	25	8	1	2	2	2
Milwaukee, Wis.	124	95	19	4	-	6	5
Peoria, Ill.	46	38	5	2	-	1	7
Rockford, Ill.	40	27	7	2	-	4	2
South Bend, Ind.	37	27	5	2	1	2	1
Toledo, Ohio	89	58	25	2	2	2	4
Youngstown, Ohio	69	50	15	3	1	-	1
W.N. CENTRAL	606	407	128	33	17	21	22
Des Moines, Iowa	34	26	6	1	-	1	-
Duluth, Minn.	20	13	4	1	1	1	1
Kansas City, Kans.	31	21	5	3	-	2	1
Kansas City, Mo.	71	43	18	6	-	4	2
Lincoln, Nebr.	21	13	6	-	1	1	1
Minneapolis, Minn.	78	50	16	3	4	5	3
Omaha, Nebr.	99	75	11	7	4	2	7
St. Louis, Mo.	133	88	32	6	5	2	5
St. Paul, Minn.	69	49	14	5	-	1	-
Wichita, Kans.	50	29	16	1	2	2	2

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,096	692	245	87	33	35	36
Atlanta, Ga.	128	73	30	16	5	4	-
Baltimore, Md.	150	96	34	12	5	3	1
Charlotte, N.C.	86	50	20	10	2	4	3
Jacksonville, Fla.	92	53	25	7	4	3	3
Miami, Fla.	121	74	26	13	3	5	2
Norfolk, Va.	32	15	9	6	2	-	1
Richmond, Va.	68	42	16	5	2	3	5
Savannah, Ga.	42	30	10	1	-	1	4
St. Petersburg, Fla.	119	102	11	1	4	1	9
Tampa, Fla.	70	48	14	1	3	4	3
Washington, D.C.	137	73	38	15	2	5	3
Wilmington, Del.	51	36	12	-	1	2	2
E.S. CENTRAL	746	457	184	44	30	31	34
Birmingham, Ala.	155	93	32	12	7	11	3
Chattanooga, Tenn.	45	29	11	3	1	1	2
Knoxville, Tenn.	89	56	20	8	3	2	5
Louisville, Ky.	81	37	32	4	4	4	3
Memphis, Tenn.	124	84	28	6	3	3	8
Mobile, Ala.	101	72	20	4	5	-	6
Montgomery, Ala.	48	22	19	-	2	5	1
Nashville, Tenn.	103	64	22	7	5	5	6
W.S. CENTRAL	1,269	751	288	110	67	53	38
Austin, Tex.	37	25	5	2	5	-	3
Baton Rouge, La.	31	20	4	3	2	2	-
Corpus Christi, Tex.	54	30	16	4	2	2	-
Dallas, Tex.	161	92	36	16	11	6	2
El Paso, Tex.	37	21	8	1	4	3	2
Fort Worth, Tex.	107	67	19	10	5	6	6
Houston, Tex.	354	188	84	40	23	19	7
Little Rock, Ark.	69	40	16	6	2	5	5
New Orleans, La.	113	63	38	6	5	1	-
San Antonio, Tex.	179	107	43	17	6	6	9
Shreveport, La.	36	32	3	-	-	1	-
Tulsa, Okla.	91	66	16	5	2	2	4
MOUNTAIN	649	395	165	41	26	22	21
Albuquerque, N.Mex.	84	53	14	10	2	5	3
Colo. Springs, Colo.	47	27	13	1	5	1	5
Denver, Colo.	96	59	23	8	-	6	3
Las Vegas, Nev.	82	46	29	4	2	1	2
Ogden, Utah	24	13	8	-	3	-	-
Phoenix, Ariz.	153	97	32	10	8	6	1
Pueblo, Colo.	23	15	7	1	-	-	1
Salt Lake City, Utah	52	34	12	2	3	1	1
Tucson, Ariz.	88	51	27	5	3	2	5
PACIFIC	1,684	1,222	251	85	60	51	74
Berkeley, Calif.	20	17	2	-	1	-	2
Fresno, Calif.	68	46	10	5	3	4	5
Glendale, Calif. §	24	24	-	-	-	-	1
Honolulu, Hawaii	66	37	19	5	3	2	3
Long Beach, Calif.	80	57	14	3	3	3	1
Los Angeles, Calif §	457	409	6	2	18	8	11
Oakland, Calif.	69	44	16	2	5	2	6
Pasadena, Calif.	20	17	1	1	-	1	1
Portland, Oreg.	104	72	22	5	5	-	4
Sacramento, Calif.	120	72	31	10	5	2	8
San Diego, Calif.	130	78	22	15	8	7	8
San Francisco, Calif.	116	74	22	17	-	2	6
San Jose, Calif.	149	97	31	6	5	10	10
Seattle, Wash.	148	104	28	9	1	6	1
Spokane, Wash.	53	34	13	4	-	2	3
Tacoma, Wash.	60	40	14	1	3	2	4
TOTAL	11,336††	7,349	2,474	724	376	390	431

* 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.

Rubella Vaccination — Continued

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Abortion Surveillance: Preliminary Analysis — United States, 1981

A total of 1,300,760 legal abortions were reported to CDC for 1981 from 50 states and the District of Columbia. This is less than a 1% increase over the number reported for 1980 (Table 2). The national abortion ratio decreased slightly from 359 legal abortions per 1,000 live births in 1980 to 358/1,000 in 1981. Since 1980, the national abortion rate decreased from 25 legal abortions/1,000 women aged 15-44 years in 1980 to 24/1,000 in 1981.

As in previous years, women obtaining abortions in 1981 tended to be young, white, and unmarried and to have had no live births (Table 2). Sixty-three percent were under 25 years of age; approximately 70% were white; and 78% were unmarried at the time of abortion. Fifty-eight percent of the abortions were obtained by women who had had no live births.

Curettage (suction curettage, sharp curettage, and dilatation and evacuation) accounted for 96% of abortion procedures in 1981. Slightly less than 3% were performed by intrauterine instillation, and less than 1% were performed by hysterotomy and hysterectomy. In 1981, more than half of all reported legal abortions were performed in the first 8 weeks of gestation; and 90%, in the first 12 weeks of gestation.

Eleven deaths associated with abortion were reported for 1981. Of these, three were associated with spontaneous abortion; one, with illegal abortion; and seven, with legal abortion. The death-to-case rate for legal abortions in 1981 was 0.5 per 100,000 procedures, compared with 0.6/100,000 for 1980.

Reported by Pregnancy Epidemiology Br, Research and Statistics Br, Div of Reproductive Health, Center for Health Promotion and Education, CDC.

Editorial Note: This report presents a preliminary analysis; a more in-depth analysis of 1981 abortion data is forthcoming. Because of annual variation in the number of states reporting data on the specific abortion characteristics (Table 2), temporal trends based on these summary data should be viewed with caution. An analysis of temporal changes for areas that have reported specific abortion characteristics for each year since 1974 is under way.

Since 1969, when CDC began collecting information on legal abortions, the reported number of women obtaining abortions has increased yearly. Part of the increase from 1969 to 1973 is attributable to an expanded surveillance system. It is noteworthy that the annual percentage increase in numbers of abortions has continuously declined since 1976, with the lowest percentage increase being reported for 1981.

Age										
≤ 19	32.6	32.7	32.7	33.1	32.1	30.8	30.0	30.0	29.2	28.0
20-24	32.5	32.0	31.8	31.9	33.3	34.5	35.0	35.4	35.5	35.3
≥ 25	34.9	35.3	35.6	35.0	34.6	34.7	34.9	34.6	35.3	36.7
Race										
White	77.0	72.5	69.7	67.8	66.6	66.4	67.0	68.9	69.9	69.9
Black and other	23.0	27.5	30.3	32.2	33.4	33.6	33.0	31.1	30.1	30.1
Marital status										
Married	29.7	27.4	27.4	26.1	24.6	24.3	26.4	24.7	23.1	22.1
Unmarried	70.3	72.6	72.6	73.9	75.4	75.7	73.6	75.3	76.9	77.9
Number of live births†										
0	49.4	48.6	47.8	47.1	47.7	53.4	56.6	58.1	58.4	58.3
1	18.2	18.8	19.6	20.2	20.7	19.1	19.2	19.1	19.5	19.7
2	13.3	14.2	14.8	15.5	15.4	14.4	14.1	13.8	13.7	13.7
3	8.7	8.7	8.7	8.7	8.3	7.0	5.9	5.5	5.3	5.3
≥4	10.4	9.7	9.0	8.6	7.9	6.2	4.2	3.5	3.2	3.0
Type of procedure										
Curettage	88.6	88.4	89.7	90.9	92.8	93.8	94.6	95.0	95.5	96.1
Intrauterine instillation	10.4	10.4	7.8	6.2	6.0	5.4	3.9	3.3	3.1	2.8
Hysterotomy/ hysterectomy	0.6	0.7	0.6	0.4	0.2	0.2	0.1	0.1	0.1	0.1
Other	0.5	0.6	1.9	2.4	0.9	0.7	1.4	1.6	1.3	1.0
Weeks of gestation										
≤ 8	34.0	36.1	42.6	44.6	47.0	51.2	52.2	52.1	51.7	51.2
9-10	30.7	29.4	28.7	28.4	28.0	27.2	26.9	27.0	26.2	26.8
11-12	17.5	17.9	15.4	14.9	14.4	13.1	12.3	12.5	12.2	12.1
13-15	8.4	6.9	5.5	5.0	4.5	3.4	4.0	4.2	5.2	5.2
16-20	8.2	8.0	6.5	6.1	5.1	4.3	3.7	3.4	3.9	3.7
≥21	1.3	1.7	1.2	1.0	0.9	0.9	0.9	0.9	0.9	1.0

*Excludes unknowns. Since the number of states reporting each characteristic varies from year to year, temporal comparisons should be made with caution.

Abortion Surveillance — Continued

In 1981, for the first year since CDC began abortion surveillance, there was virtually no increase in the number of abortions reported, and for the first time, the abortion rate and abortion ratio declined. Examination of the national abortion surveillance system for 1981 suggests that the lower abortion rate and abortion ratio are real rather than an artifact of changes in completeness of reporting. In 28 reporting areas, the number of abortions reported for 1980 exceeded the number reported for 1981; in 24 reporting areas, more abortions were reported for 1981 than for 1980. Differences in the reported number of abortions between 1980 and 1981 exceeded 3,000 in only six reporting areas, and for these, there was a net increase of 6,725 abortions. Moreover, the sources of abortion data were identical in both years, with the exception of two states; for one, 2,746 more abortions were reported for 1981 than for 1980; for the other, 4,435 fewer abortions were reported for 1980 than for 1981.

Through the 1970s and into the 1980s, curettage steadily increased as the primary method of abortion. In 1981, virtually all first-trimester procedures were performed by curettage; moreover, in the 13- to 15-week interval, more procedures were performed by curettage than by all instillation and other procedures performed at any gestational week during the second trimester.

The 11 abortion-related deaths (legal, illegal, and spontaneous) reported in 1981 are the fewest reported since CDC's surveillance of abortion deaths began in 1972. Previous experience shows that 64% of abortion deaths are reported to CDC during the 12 months after the death and 96% within 3 years of the death. CDC investigates all reports of abortion-related deaths and uses late reports of confirmed abortion-related deaths to update data for previous years.

Possible Rabies Exposure from Bats — Texas

On December 28, 1983, a group of 11 children in Corpus Christi, Texas, were exposed to dead bats. Due to extremely cold weather, 29 Mexican Free-Tail bats roosting under a bridge had frozen and fallen to the ground in the early morning. They were discovered by the children, ages 4-14 years, about noon. The bats were partially thawed, and several had blood draining from their mouths. One or more of the children, emulating a popular singer, put a bat in the mouth and pretended to bite it. There ensued a free-for-all in which the children threw bats at each other. All 11 children were hit by bats.

Later that day, the Corpus Christi-Nueces County Department of Public Health was notified of the incident, and by that evening, the Director of Public Health had discussed the situation with the nine families involved. It was not possible to determine which children were exposed to the blood and/or saliva of bats. Because of the possibility that all the children had some exposure of mucous membranes or scratches in the skin, the health director recommended complete postexposure rabies prophylaxis for all 11 children; all 11 received it, and all have remained well. Only four of the 29 bats were examined by the fluorescent antibody technique, and they were negative. However, a 1983 sampling of approximately 600 south Texas bats had revealed a positive test rate of 15%.

Reported by CMG Buttery, MD, RM Rodriguez, MD, G McLerran, T Villarreal, J Green, Corpus Christi-Nueces County Dept of Public Health; O Sieber, MD, Driscoll Foundation Children's Hospital, TL Gustafson, MD, CE Alexander, MD, State Epidemiologist, Texas Dept of Health; Viral and Rickettsial Zoonoses Br, Div of Viral Diseases, Center for Infectious Diseases, CDC.

Editorial Note: This episode illustrates two issues frequently faced by public health professionals with regard to bat rabies: (1) the persons involved often cannot agree about the actual sequence of events in such episodes; (2) the bats involved are frequently unavailable for laboratory study. Thus, in this case, the critical decisions regarding prophylaxis rested on questionable histories provided by children and incomplete or unsatisfactory laboratory speci-

Rabies Exposure – Continued

mens. News media events that show people playing with bats may not imply any danger; however, the national news media attention given this incident was beneficial in educating the public to potential risks. Locally, it resulted in the identification of an additional group of children in Corpus Christi that had played with dead bats and required rabies prophylaxis.

The risk to most of these children would appear to be minimal—nonbite exposure to animals already dead, probably for several hours. Exposure, if it occurred, would seem most likely through bat saliva in direct contact with children's oral mucous membranes when they mouthed the bats and/or by salivary contamination of fresh scratches and which, in this case, could have been made by the bats' teeth and claws during play. Prevention of episodes such as this are probably impossible, but proper education of the public to the health risks should reduce their occurrence.

Errata: Vol. 33, No. 25

p. 353. In the article, "Oral Contraceptive Use and the Risk of Breast Cancer in Young Women," the 95% confidence limits in Table 1 are incorrect (although the odds ratios are correct). The correct confidence limits are (reading down): (REF); (0.8, 1.3); (0.8, 1.5); (0.5, 1.3); (0.4, 2.0). Also, the second-to-last sentence of the Editorial Note on page 354 should read: Results were presented in 1983 (*1*) from the first 6 months of data collected.

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p. 339. In the article, "Human Arboviral Encephalitis—United States, 1983," the last sentence of the third paragraph under St. Louis encephalitis should read: "The increased number of cases among adults may reflect a decline in endemic transmission with age during the past 30 years, resulting in an increase in susceptibility."

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