CENTER FOR DISEASE CONTROL

September 9, 1977 / Vol. 26 / No. 36

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

Current Trends

Increased Risk of Hepatocellular Adenoma in Women with Long-Term Use of Oral Contraception

Women with long-term use of oral contraceptives (-tion) (OC) are at increased risk of developing a serious, though rare, non-malignant liver tumor—hepatocellular adenoma (HCA) —according to a case-control study conducted by CDC in collaboration with the Armed Forces Institute of Pathology (AFIP). The absolute incidence of this disease in women with no OC use or in women with long use is not known; only about 500 cases of HCA have been reported in the United States, most in the last decade. The tumor is sometimes fatal, deaths usually being due to sudden rupture and hemorrhage.

This study suggests that, in addition to long-term use, a woman's age and the hormonal potency of the OC she uses affect her chances of developing HCA. Women 27 years and older who have used OC with high hormonal potency for 7 or more years are at the greatest risk.

Eighty-eight women who had an HCA diagnosed by the AFIP from 1960 through 1976 were included in the study. Nine of the women were deceased. Three age-matched neighborhood women were selected as controls for each of the 79 living women who were cases. Each woman was interviewed at length about her medical and obstetric history, exposure to known hepatotoxins, and use of drugs, cigarettes, alcohol, and contraception. Where possible, medical records were obtained to verify the women's OC histories. The case and control groups were similar in age, race, education, marital status, and religion.

Cases and controls were compared by months of OC use prior to the date of the case's HCA surgery. Seven of 79 cases (9%), compared to 121 of 220 controls (55%) had used OC for less than 13 months; 41 cases (52%) and 27 controls (12%) had used OC for more than 5 years. From these data the risk of developing HCA was calculated for women with varying durations of OC use relative to the baseline risk experienced by women who used little or no OC. Compared to the risk in women with no more than a year's use, the risk of developing HCA was estimated to be 9, 120, and 500 times higher, respectively, for women with less than 4, 4 to 7, and 8 or more years of OC use.

Analysis by specific brands was not possible; however, OC formulations with high hormonal potency were associated with higher HCA risk than lower potency formulations for comparable durations of use. Women less than 27 years of age, regardless of how long they used OC, had no more than 20-fold increases in risk of HCA compared to women of the same age who used OC for less than one year.

Four women who continued using OC after their tumors were removed developed another HCA—a recurrence rate of 12.5% among those who continued to use OC.

Women whose tumors bled prior to diagnosis were more likely to die as a result of the tumor (21% mortality compared to 2% for those without bleeding) and to be hospitalized longer following surgery if they survived. Women who were pregnant or post partum at the time their tumors were diagnosed were more likely than any other group to have serious bleeding. Of OC users, women who had used contraception for only 1 to 3 years were less likely than those with longer OC use to have tumors which bled.

The 7 women who developed HCA even though they had never used OC or had used it for less than a year were found to be different from OC-using cases. They were older, more likely to be black, and more likely to be nulliparous.

Reported by the Hepatic Br, Armed Forces Institute of Pathology; and the Family Planning Evaluation Div, Bur of Epidemiology, CDC.

Editorial Note: The results suggest that most of the excess risk of this disease associated with OC use can be avoided if women nearing the age of 30 avoid long-term OC use and women use OC having the minimal hormonal potency necessary to give protection from pregnancy.

Mortality and extended morbidity associated with this tumor can be reduced by diagnosing the tumor before it hemorrhages. One-sixth of the cases in this study went to their physicians solely because they were aware of an abdominal mass. Increased physician and patient awareness of the possibility of this tumor in women with long histories of OC use and careful palpation of the abdomen in such women could improve detection of these rare tumors when they are small, thereby preventing rupture.

When calculating relative risks (RRs) from studies where controls are individually matched to cases, the matching must be maintained to avoid spuriously low estimates (*1, 2, 3*). In this study, there were 2 other contingencies to consider when calculating RRs: 1) multiple controls per case, and 2) multiple durations and dosages of OC use. To account simultaneously for both these contingencies while

still maintaining the matching, this study employed a recently developed method of calculating RRs proposed by Hill, Pike, and Smith (*4*). This is a modification of a previously described method of Pike, *et al* (*1*).

References

1. Pike MC, Casagrande J, Smith PG: Statistical analysis of individually matched case-control studies in epidemiology: Factor under study a discrete variable taking multiple values. Br J Prev Soc Med 29:196-201, 1975
2. Rothman KJ: Computer analysis for case-control studies with individual matching. Int J Biomed Comput 5:241-247, 1974
3. Pike MC, Morrow RH: Statistical analysis of patient-control studies in epidemiology. Br J Prev Soc Med 24:42-44, 1970
4. Hill AP, Pike MC, Smith PG: Stratified analysis of case-control studies with the factor under study taking multiple values. (manuscript in preparation)

Recommendation of the Public Health Service Advisory Committee on Immunization Practices

Measles Outbreak Control

INTRODUCTION

The number of measles cases reported in 1976 and 1977 increased to the highest levels since 1971. Much of the increase resulted from localized measles outbreaks, many of which occurred in school populations, particularly among the 10- to 19-year-olds, in communities believed to have high immunity levels. The recommendations of the Advisory Committee on Immunization Practices (ACIP) on measles vaccine, published in November 1976 (*1*), deal with both routine immunization against measles and epidemic control. However, since outbreaks have become increasingly common, there is reason to emphasize and extend certain aspects of the recommendations relevant to outbreak control.

All official health jurisdictions should take whatever steps are necessary to assure that all children entering school are protected against measles. Thereafter, if measles occurs in the community, it is strongly recommended that prompt action be taken to assure that all susceptible school children and others at risk are immunized.

Susceptibles to measles should be defined as persons who lack:

(1) physician's certification or other acceptable evidence of having had measles, or
(2) certification of adequate immunization with live measles vaccine when 12 or more months of age.

The following persons cannot be considered adequately protected and should be revaccinated:

(1) children previously vaccinated with live measles vaccine before they were 12 months of age
(2) children who received live, further attenuated vac-

(Continued on page 299)

Table I. Summary—Cases of Specified Notifiable Diseases: United States

[Cumulative totals include revised and delayed reports through previous weeks]

DISEASE	35th WEEK ENDING		MEDIAN 1972–1976	CUMULATIVE, FIRST 35 WEEKS		MEDIAN 1972–1976
	September 3, 1977	September 4, 1976		September 3, 1977	September 4, 1976	
Aseptic meningitis	140	112	127	2,555	1,775	2,058
Brucellosis	1	12	2	152	221	130
Chickenpox	399	265	---	157,868	146,301	---
Diphtheria	–	–	5	58	126	126
Encephalitis, Primary	30	59	59	545	833	741
Encephalitis, Post-Infectious	–	5	5	146	201	208
Hepatitis, Viral, Type B	235	282	198	10,860	10,007	6,388
Hepatitis, Viral, Type A	378	598	726	20,589	23,072	28,418
Hepatitis, Viral, Type unspecified	111	115		6,128	5,658	
Malaria	10	12	9	357	299	277
Measles (rubeola)	82	109	99	52,972	34,230	24,072
Meningococcal infections, total	23	18	18	1,260	1,125	1,035
Civilian	23	18	18	1,252	1,108	1,010
Military	–	–	–	8	17	25
Mumps	111	127	254	15,505	31,976	46,476
Pertussis	56	12	---	734	657	---
Rubella (German measles)	53	33	63	18,428	10,520	14,705
Tetanus	5	1	2	43	40	60
Tuberculosis	524	573	---	20,464	22,547	---
Tularemia	4	3	5	106	95	96
Typhoid fever	3	16	11	242	272	263
Typhus, tick-borne (Rky. Mt. spotted fever)	28	36	26	911	679	638
Venereal Diseases:						
Gonorrhea, Civilian	17,863	21,597	---	653,241	673,209	---
Gonorrhea, Military	398	656	---	17,911	20,160	---
Syphilis, primary and secondary, Civilian	263	449	---	13,805	16,322	---
Syphilis, primary and secondary, Military	3	6	---	198	235	---
Rabies in animals	53	74	65	1,971	1,990	1,990

Table II. Notifiable Diseases of Low Frequency: United States

	CUM.		CUM.
Anthrax:	–	Poliomyelitis, total:	7
Botulism:	72	Paralytic:	6
Congenital rubella syndrome:	11	Psittacosis:	47
Leprosy: Hawaii +2	85	Rabies in man:	1
Leptospirosis:	29	Trichinosis: * Mo. +1, Wash. +1	61
Plague: N. Mex. +1	7	Typhus, murine:*	58

*Delayed reports: Trichinosis: Wash. –1; Typhus, murine: Fla. –2

Table III

Cases of Specified Notifiable Diseases: United States

Weeks Ending September 3, 1977 and September 4, 1976 – 35th Week

AREA REPORTING	ASEPTIC MENINGITIS	BRUCELLOSIS	CHICKENPOX	DIPHTHERIA		ENCEPHALITIS			HEPATITIS, VIRAL			MALARIA	
						Primary: Arthropod-borne and Unspecified		Post Infectious	Type B	Type A	Type Unspecified		
	1976	1976	1976	1976	CUM. 1976	1976	1975	1976	1976	1976	1976	1976	CUM. 1976
UNITED STATES	140	1	399	–	58	30	59	–	235	378	111	10	357
NEW ENGLAND	21	–	19	–	–	2	2	–	15	11	13	–	21
Maine	–	–	1	–	–	–	–	–	–	–	–	–	–
New Hampshire	–	–	–	–	–	–	–	–	–	2	–	–	3
Vermont	2	–	–	–	–	–	–	–	–	–	–	–	2
Massachusetts	7	–	12	–	–	2	1	–	1	2	12	–	3
Rhode Island	–	–	4	–	–	–	–	–	1	3	–	–	5
Connecticut	12	–	2	–	–	–	1	–	13	4	1	–	8
MIDDLE ATLANTIC	16	–	41	–	5	4	3	–	46	47	16	4	80
Upstate New York	6	–	9	–	–	–	–	–	10	11	2	–	19
New York City	1	–	31	–	5	–	2	–	6	6	4	4	38
New Jersey	3	–	NN	–	–	2	–	–	11	16	9	–	9
Pennsylvania	6	–	1	–	–	2	1	–	19	14	1	–	14
EAST NORTH CENTRAL	32	–	236	–	–	9	4	–	66	106	14	1	28
Ohio*	17	–	3	–	–	7	2	–	7	31	–	–	10
Indiana	2	–	6	–	–	–	–	–	23	3	5	–	2
Illinois	2	–	4	–	–	–	1	–	11	32	3	–	2
Michigan	11	–	181	–	–	2	1	–	21	28	6	1	11
Wisconsin	–	–	42	–	–	–	–	–	4	12	–	–	3
WEST NORTH CENTRAL	9	1	11	–	1	3	3	–	18	25	8	1	33
Minnesota	–	–	–	–	–	2	–	–	5	6	–	–	9
Iowa	1	–	1	–	–	–	–	–	4	1	–	–	1
Missouri*	6	–	7	–	1	–	3	–	3	6	5	1	18
North Dakota*	–	–	–	–	–	–	–	–	–	4	–	–	1
South Dakota	–	–	–	–	–	–	–	–	–	–	–	–	1
Nebraska	2	1	3	–	–	1	–	–	3	7	3	–	–
Kansas	–	–	–	–	–	–	–	–	3	1	–	–	3
SOUTH ATLANTIC	21	–	26	–	–	3	2	–	38	63	18	3	56
Delaware	–	–	–	–	–	–	–	–	1	2	–	–	–
Maryland	3	–	1	–	–	–	–	–	7	12	5	–	12
District of Columbia	1	–	–	–	–	–	–	–	2	3	–	–	3
Virginia	14	–	2	–	–	1	1	–	5	7	4	3	15
West Virginia	–	–	12	–	–	–	–	–	1	3	2	–	1
North Carolina	3	–	NN	–	–	2	1	–	4	13	2	–	5
South Carolina	–	–	–	–	–	–	–	–	7	6	4	–	–
Georgia	–	–	–	–	–	–	–	–	–	–	–	–	8
Florida*	–	–	11	–	–	–	–	–	11	17	1	–	12
EAST SOUTH CENTRAL	12	–	4	–	–	3	25	–	7	24	1	–	9
Kentucky	8	–	3	–	–	–	–	–	2	4	1	–	4
Tennessee	1	–	NN	–	–	2	6	–	4	15	–	–	1
Alabama	2	–	–	–	–	1	5	–	–	–	–	–	4
Mississippi	1	–	1	–	–	–	14	–	1	5	–	–	–
WEST SOUTH CENTRAL	16	–	18	–	2	3	18	–	17	63	25	1	18
Arkansas*	2	–	–	–	–	–	2	–	3	11	–	–	–
Louisiana	–	–	NN	–	–	–	–	–	–	10	4	–	2
Oklahoma	–	–	–	–	–	–	–	–	3	7	–	–	–
Texas	14	–	18	–	2	3	16	–	11	35	21	1	16
MOUNTAIN	3	–	19	–	4	1	–	–	13	21	10	–	11
Montana	1	–	4	–	–	–	–	–	–	2	1	–	1
Idaho	–	–	–	–	–	–	–	–	–	1	–	–	–
Wyoming	–	–	–	–	–	–	–	–	–	–	–	–	1
Colorado	–	–	13	–	–	–	–	–	7	5	2	–	6
New Mexico	–	–	2	–	3	–	–	–	5	1	3	–	1
Arizona	–	–	NN	–	1	–	–	–	1	9	4	–	2
Utah	2	–	–	–	–	1	–	–	–	3	–	–	–
Nevada	–	–	–	–	–	–	–	–	–	–	–	–	–
PACIFIC	10	–	25	–	46	2	2	–	15	18	6	–	101
Washington*	4	–	8	–	43	1	–	–	2	2	–	–	4
Oregon	5	–	–	–	–	–	–	–	4	9	6	–	1
California	NA	NA	NA	NA	1	NA	2	–	–	NA	NA	NA	90
Alaska	–	–	7	–	2	1	–	–	3	3	–	–	2
Hawaii	1	–	10	–	–	–	–	–	6	4	–	–	4
Guam*	NA	NA	NA	NA	–	NA	–	–	–	NA	NA	NA	–
Puerto Rico	–	–	6	–	–	–	–	–	–	10	2	–	2
Virgin Islands	–	–	–	–	–	–	–	–	–	–	–	–	–

NN: Not notifiable
NA: Not available
*Delayed reports: Asep. meng.: Guam +1; Chickenpox: Guam +1; Enceph.: Mo. +1, N. Dak. +1; Hep. B: Ohio –1, Fla. –3, Ark. +1, Wash. –1, Guam +1; Hep. A: Ohio +1, Fla. –2, Ark. +1, Wash. –2, Guam +3

Table III-Continued
Cases of Specified Notifiable Diseases: United States
Weeks Ending September 3, 1977 and September 4, 1976 — 35th Week

REPORTING AREA	MEASLES (Rubeola)			MENINGOCOCCAL INFECTIONS TOTAL			MUMPS		PERTUSSIS	RUBELLA		TETANUS
	1977	CUMULATIVE		1977	CUMULATIVE		1977	CUM. 1977	1977	1977	CUM. 1977	CUM. 1977
		1977	1976		1977	1976						
UNITED STATES	82	52,972	34,230	23	1,260	1,125	111	15,505	56	53	18,428	43
NEW ENGLAND	1	2,470	384	–	51	53	1	636	–	5	1,187	1
Maine	–	170	7	–	3	1	–	51	–	–	69	–
New Hampshire*	–	510	9	–	3	5	–	91	–	–	240	–
Vermont	–	292	41	–	5	3	1	8	–	–	64	–
Massachusetts*	–	633	35	–	16	16	–	118	–	1	374	–
Rhode Island	–	64	14	–	1	5	–	54	–	–	134	–
Connecticut	1	801	278	–	23	23	–	314	–	4	306	1
MIDDLE ATLANTIC	9	8,317	6,977	4	179	160	7	1,265	4	3	5,997	4
Upstate New York	–	3,791	2,930	2	44	62	1	280	–	2	3,362	1
New York City	9	719	451	2	46	43	4	468	3	1	312	1
New Jersey	–	195	595	–	37	20	–	346	–	–	1,779	2
Pennsylvania*	–	3,612	3,001	–	52	35	2	171	1	–	544	–
EAST NORTH CENTRAL	46	11,176	14,578	9	130	142	46	5,302	13	14	3,648	5
Ohio	3	1,847	572	8	52	60	4	651	1	–	1,115	1
Indiana	14	4,316	3,264	–	9	6	2	301	–	8	922	1
Illinois	19	1,679	1,561	1	22	17	10	913	5	2	313	1
Michigan	6	931	5,835	–	35	50	14	1,804	6	2	907	2
Wisconsin	4	2,403	3,346	–	12	9	16	1,633	1	2	391	–
WEST NORTH CENTRAL	2	9,750	1,199	2	69	72	15	3,530	2	1	493	7
Minnesota	–	2,620	415	–	25	14	–	6	1	–	16	2
Iowa	–	4,287	41	–	6	9	2	1,253	–	–	159	1
Missouri*	2	989	18	2	27	24	13	1,219	1	–	35	2
North Dakota	–	23	3	–	1	3	–	16	–	–	11	–
South Dakota	–	67	4	–	4	3	–	59	–	1	18	–
Nebraska	–	209	55	–	1	6	–	68	–	–	3	–
Kansas	–	1,555	663	–	5	13	–	909	–	–	251	2
SOUTH ATLANTIC	10	4,509	2,159	4	276	217	9	720	20	25	1,619	10
Delaware	–	22	128	–	3	6	–	125	–	–	26	–
Maryland	–	371	715	–	18	17	2	62	–	–	5	–
District of Columbia	–	4	12	–	–	2	–	5	–	–	–	–
Virginia*	5	2,701	759	1	19	35	3	92	1	1	575	1
West Virginia	4	226	186	–	9	7	1	152	–	21	129	–
North Carolina	1	63	16	–	62	39	–	51	4	2	444	–
South Carolina	–	148	4	–	28	36	–	10	–	–	209	–
Georgia	–	764	2	–	49	20	–	23	–	–	52	1
Florida*	–	210	337	3	88	55	3	200	15	1	179	8
EAST SOUTH CENTRAL	5	1,957	825	1	136	104	13	855	5	2	1,914	3
Kentucky	5	1,187	745	–	26	19	–	87	1	1	78	1
Tennessee	–	654	64	–	36	43	7	528	3	1	1,718	1
Alabama	–	77	–	–	49	31	6	210	1	–	109	1
Mississippi	–	39	16	1	25	11	–	30	–	–	9	–
WEST SOUTH CENTRAL	9	2,078	682	1	221	175	14	1,389	5	3	796	5
Arkansas*	–	39	–	–	14	10	2	62	–	–	3	1
Louisiana	–	74	194	1	84	33	1	37	1	–	27	1
Oklahoma	–	55	289	–	10	20	–	471	2	–	29	–
Texas	9	1,910	199	–	113	112	11	819	2	3	737	3
MOUNTAIN	–	2,521	5,007	–	43	32	4	596	6	–	353	2
Montana	–	1,160	204	–	2	4	–	10	–	–	14	1
Idaho	–	162	2,020	–	4	3	–	121	–	–	12	–
Wyoming	–	19	3	–	1	–	–	3	–	–	4	1
Colorado	–	499	245	–	1	5	4	262	–	–	232	–
New Mexico*	–	270	15	–	21	4	–	107	6	–	12	–
Arizona	–	300	226	–	10	10	–	–	–	–	12	–
Utah	–	18	2,231	–	3	4	–	78	–	–	58	–
Nevada	–	93	63	–	1	2	–	15	–	–	9	–
PACIFIC	–	10,194	2,419	2	155	170	2	1,212	1	–	2,421	6
Washington	–	532	334	–	18	29	2	262	1	–	436	–
Oregon	–	368	159	–	11	15	–	221	–	–	109	–
California	NA	9,201	1,919	–	96	106	NA	682	NA	NA	1,472	6
Alaska	–	58	4	2	28	17	–	25	–	–	1	–
Hawaii	–	35	3	–	2	3	–	22	–	–	403	–
Guam*	NA	4	13	–	–	–	NA	5	NA	NA	8	–
Puerto Rico	8	857	356	–	1	3	14	650	7	1	30	9
Virgin Islands	–	14	11	–	–	–	–	186	–	–	2	–

NA: Not available
*Delayed reports: Measles: Mass. –2; Men. inf.: Pa. –1, Mo. +1, N. Mex. –3; Pertussis: N. Hamp. +1, Va. –1, Fla. +2, Ark. –1; Rubella: Guam +1; Tetanus: Fla. +1

Table III-Continued
Cases of Specified Notifiable Diseases: United States
Weeks Ending September 3, 1977 and September 4, 1976 — 35th Week

REPORTING AREA	TUBERCULOSIS		TULAREMIA	TYPHOID FEVER		TYPHUS FEVER TICK-BORNE (RMSF)		VENEREAL DISEASES (Civilian Cases Only)						RABIES IN ANIMALS
								GONORRHEA			SYPHILIS (Pri. & Sec.)			
									CUMULATIVE			CUMULATIVE		
	1977	CUM. 1977	CUM. 1977	1977	CUM. 1977	1977	CUM. 1977	1977	1977	1976	1977	1977	1976	CUM. 1977
UNITED STATES	524	20,464	106	3	242	28	911	17,863	653,241	673,209	263	13,805	16,322	1,971
NEW ENGLAND	19	774	1	1	15	1	8	726	17,536	18,394	12	563	527	36
Maine	1	60	–	–	–	–	–	53	1,290	1,568	–	16	14	27
New Hampshire	–	18	–	–	1	–	–	34	695	528	–	3	8	1
Vermont	–	25	–	–	–	–	–	15	455	465	–	6	8	–
Massachusetts*	13	446	1	–	10	1	3	318	7,468	8,808	7	400	367	5
Rhode Island	2	63	–	–	2	–	3	47	1,416	1,231	–	7	17	–
Connecticut	3	162	–	1	2	–	2	259	6,212	5,794	5	131	113	3
MIDDLE ATLANTIC	83	3,211	1	–	56	1	57	2,220	66,835	78,698	51	1,922	2,748	56
Upstate New York*	11	526	1	–	7	1	27	313	11,389	12,448	3	182	161	29
New York City	15	1,020	–	–	22	–	–	832	26,212	35,671	34	1,211	1,733	–
New Jersey*	37	809	–	–	17	–	10	392	11,512	11,799	7	251	384	22
Pennsylvania	20	856	–	–	10	–	20	683	17,722	18,780	7	278	470	5
EAST NORTH CENTRAL	111	3,265	3	1	22	6	23	4,011	103,471	105,003	30	1,454	1,374	81
Ohio	12	552	1	1	8	3	11	1,562	27,482	25,836	5	339	330	–
Indiana	11	379	–	–	1	–	2	136	9,059	10,272	2	109	74	8
Illinois	71	1,301	–	–	4	3	14	1,192	33,826	36,628	17	762	718	23
Michigan*	17	895	–	–	9	–	1	847	23,748	22,796	1	168	179	4
Wisconsin	–	138	2	–	–	–	–	274	9,356	9,471	5	76	73	46
WEST NORTH CENTRAL	36	699	17	1	14	–	25	1,266	34,850	34,893	5	309	299	502
Minnesota	10	155	–	–	4	–	–	191	6,297	6,241	–	88	67	182
Iowa	3	66	–	–	–	–	–	143	3,995	4,439	–	37	33	81
Missouri	19	291	15	1	5	–	14	551	14,583	13,915	3	117	118	37
North Dakota	–	19	–	–	1	–	–	17	659	512	–	–	–	73
South Dakota*	–	35	2	–	–	–	2	23	1,013	988	1	4	4	94
Nebraska	1	28	–	–	1	–	1	118	3,032	3,006	1	25	23	1
Kansas*	3	105	–	–	3	–	9	223	5,271	5,792	–	38	54	34
SOUTH ATLANTIC	138	4,568	10	–	43	16	498	4,585	162,726	165,554	87	3,890	4,951	232
Delaware	–	36	–	–	–	1	3	36	2,180	2,175	–	18	51	2
Maryland*	30	658	2	–	3	2	65	551	20,390	21,749	1	249	413	–
District of Columbia	18	225	–	–	1	–	–	353	10,669	11,358	12	408	389	–
Virginia	15	532	1	–	9	1	142	490	16,990	17,847	9	381	452	4
West Virginia	7	177	–	–	3	–	5	55	2,196	2,102	–	3	19	6
North Carolina*	15	751	2	–	3	11	185	591	23,929	23,458	13	537	892	10
South Carolina	14	405	2	–	–	1	45	655	15,156	15,586	5	166	268	14
Georgia	14	556	3	–	12	–	52	1,045	31,770	31,394	26	831	730	143
Florida	25	1,228	–	–	12	–	1	809	39,446	39,885	21	1,297	1,737	53
EAST SOUTH CENTRAL	52	1,866	7	–	4	1	145	1,416	57,555	59,308	21	503	634	58
Kentucky	14	489	2	–	–	–	38	279	7,867	7,619	4	62	91	21
Tennessee	19	573	5	–	1	1	88	806	23,181	23,596	8	156	219	30
Alabama	10	486	–	–	1	–	15	272	15,729	16,804	7	104	135	7
Mississippi	9	318	–	–	2	–	3	59	10,778	11,289	2	181	189	–
WEST SOUTH CENTRAL	53	2,412	55	–	15	3	134	2,444	82,530	86,641	40	2,029	1,938	583
Arkansas*	6	274	37	–	5	2	38	120	6,471	8,110	1	47	62	89
Louisiana	2	452	1	–	–	–	4	49	11,766	12,602	1	471	400	16
Oklahoma	–	209	8	–	1	1	65	142	7,773	8,228	1	54	72	184
Texas*	45	1,477	9	–	9	–	26	2,133	56,520	57,701	37	1,457	1,404	294
MOUNTAIN	15	573	8	–	17	–	12	754	26,598	27,135	11	306	437	120
Montana	2	35	1	–	–	–	5	23	1,348	1,350	–	4	7	40
Idaho	2	27	–	–	–	–	4	31	1,246	1,450	1	11	17	–
Wyoming	–	10	1	–	–	–	2	6	648	528	–	4	3	1
Colorado*	1	75	3	–	8	–	1	214	6,972	6,812	5	92	97	40
New Mexico*	6	109	–	–	–	–	–	94	3,871	5,071	2	67	111	–
Arizona	3	251	2	–	4	–	–	232	7,514	8,038	2	110	155	33
Utah	–	29	1	–	4	–	–	65	1,524	1,376	–	6	18	6
Nevada	1	37	–	–	1	–	–	89	3,475	2,510	1	12	29	–
PACIFIC	17	3,096	4	–	56	–	3	441	101,140	97,583	6	2,829	3,414	303
Washington	NA	189	–	–	1	–	–	240	7,839	8,235	NA	134	101	2
Oregon	–	131	–	–	3	–	–	88	7,030	7,471	5	90	71	4
California	NA	2,331	4	NA	51	NA	3	NA	80,776	77,235	NA	2,561	3,164	282
Alaska*	12	47	–	–	–	–	–	56	3,327	2,811	1	19	13	15
Hawaii	5	398	–	–	1	–	–	57	2,168	1,831	–	25	65	–
Guam*	NA	43	–	NA	1	NA	–	NA	135	232	NA	1	2	–
Puerto Rico	13	248	–	–	5	–	–	74	2,201	1,944	2	371	411	42
Virgin Islands	–	1	–	–	–	–	–	5	142	178	–	7	47	–

NA: Not available
*Delayed reports: TB: N.J. +51, Mich. –1, Md. –3, N. Car. –3, Ark. –2, N. Mex. –1; GC: Mass. –1, NY St. –85, S. Dak. –1, Guam +2; Am. rabies: Colo. +2, Alaska +21

Table IV
Deaths in 121 United States Cities*
Week Ending September 3, 1977 – 35th Week

REPORTING AREA	ALL CAUSES					Pneumonia and Influenza
	ALL AGES	65 Years and Over	45-64 Years	25-44 Years	Under 1 Year	ALL AGES
NEW ENGLAND	655	431	160	30	18	28
Boston, Mass.	188	112	48	13	6	7
Bridgeport, Conn.	37	20	14	1	–	1
Cambridge, Mass.	22	16	5	1	–	5
Fall River, Mass.	33	26	7	–	–	2
Hartford, Conn.	40	29	7	2	2	1
Lowell, Mass.	29	21	6	1	1	–
Lynn, Mass.	25	16	6	1	2	–
New Bedford, Mass.	23	17	6	–	–	–
New Haven, Conn.	47	30	12	4	1	2
Providence, R.I.	78	50	25	2	–	2
Somerville, Mass.	7	5	2	–	–	–
Springfield, Mass.	41	26	7	3	4	2
Waterbury, Conn.	33	21	7	2	–	2
Worcester, Mass.	52	42	8	–	2	4
MIDDLE ATLANTIC	2,549	1,600	625	165	72	134
Albany, N. Y.	47	30	11	3	1	1
Allentown, Pa.	23	15	5	2	–	1
Buffalo, N. Y.	104	65	25	7	2	9
Camden, N. J.	35	27	8	–	–	2
Elizabeth, N. J.	26	11	12	2	–	–
Erie, Pa.	31	16	10	1	–	2
Jersey City, N. J.	37	28	3	2	2	1
Newark, N. J.	56	22	23	4	5	2
New York City, N. Y.	1,287	818	310	86	36	62
Paterson, N. J.	43	29	6	3	4	5
Philadelphia, Pa.	282	159	87	22	5	16
Pittsburgh, Pa.	163	89	37	19	10	10
Reading, Pa.	36	26	7	1	–	2
Rochester, N. Y.	132	85	32	7	2	8
Schenectady, N. Y.	13	10	1	1	–	–
Scranton, Pa.	60	41	14	1	1	1
Syracuse, N. Y.	81	61	11	3	3	1
Trenton, N. J.	35	25	10	–	–	–
Utica, N. Y.	27	21	5	1	–	2
Yonkers, N. Y.	31	22	8	–	1	9
EAST NORTH CENTRAL	2,147	1,248	582	166	74	54
Akron, Ohio	35	19	12	2	2	–
Canton, Ohio	41	27	10	1	3	1
Chicago, Ill.	518	292	143	49	16	8
Cincinnati, Ohio	139	78	42	11	5	3
Cleveland, Ohio	178	98	61	12	2	4
Columbus, Ohio	96	61	21	8	2	4
Dayton, Ohio	97	57	29	8	1	4
Detroit, Mich.	278	151	76	30	9	6
Evansville, Ind.	52	30	10	4	5	5
Fort Wayne, Ind.	28	21	3	1	1	–
Gary, Ind.	20	9	7	3	–	1
Grand Rapids, Mich.	57	32	17	1	6	5
Indianapolis, Ind.	146	84	38	11	6	1
Madison, Wis.	27	11	11	3	2	1
Milwaukee, Wis.	129	77	36	9	5	5
Peoria, Ill.	40	26	7	2	3	–
Rockford, Ill.	26	18	5	1	–	2
South Bend, Ind.	40	21	16	–	2	3
Toledo, Ohio	132	89	23	7	3	–
Youngstown, Ohio	68	47	15	3	1	1
WEST NORTH CENTRAL	686	453	147	29	33	23
Des Moines, Iowa	60	50	8	–	–	–
Duluth, Minn.	23	16	3	1	3	3
Kansas City, Kans.	28	17	8	1	1	–
Kansas City, Mo.	112	70	25	2	9	1
Lincoln, Nebr.	43	30	7	3	1	5
Minneapolis, Minn.	84	60	13	5	3	1
Omaha, Nebr.	70	40	17	2	8	1
St. Louis, Mo.	142	95	30	8	5	4
St. Paul, Minn.	52	39	5	5	–	1
Wichita, Kans.	72	36	31	2	3	7

REPORTING AREA	ALL CAUSES					Pneumonia and Influenza
	ALL AGES	65 Years and Over	45-64 Years	25-44 Years	Under 1 Year	ALL AGES
SOUTH ATLANTIC	1,055	594	264	85	69	40
Atlanta, Ga.	125	61	32	17	7	5
Baltimore, Md.	206	117	56	14	9	4
Charlotte, N. C.	63	28	21	6	3	2
Jacksonville, Fla.	64	37	17	5	2	–
Miami, Fla.	105	59	27	6	9	5
Norfolk, Va.	52	28	12	5	7	6
Richmond, Va.	61	35	18	3	2	2
Savannah, Ga.	32	22	6	2	1	1
St. Petersburg, Fla.	90	68	11	4	5	6
Tampa, Fla.	84	62	15	5	1	6
Washington, D. C.	143	67	41	16	14	3
Wilmington, Del.	30	10	8	2	9	–
EAST SOUTH CENTRAL	645	345	187	49	30	30
Birmingham, Ala.	113	53	40	10	6	1
Chattanooga, Tenn.	29	21	4	2	1	4
Knoxville, Tenn.	46	32	9	2	–	–
Louisville, Ky.	119	55	42	13	4	8
Memphis, Tenn.	146	70	47	12	8	4
Mobile, Ala.	59	39	9	4	1	1
Montgomery, Ala.	46	25	8	3	8	4
Nashville, Tenn.	87	50	28	3	2	8
WEST SOUTH CENTRAL	1,076	609	277	96	36	40
Austin, Tex.	87	59	18	6	–	11
Baton Rouge, La.	46	30	11	2	–	–
Corpus Christi, Tex.	33	20	12	1	–	–
Dallas, Tex.	128	55	44	17	–	1
El Paso, Tex.	62	34	13	3	6	6
Fort Worth, Tex.	73	41	18	8	4	1
Houston, Tex.	216	113	60	27	2	4
Little Rock, Ark.	59	40	13	2	1	3
New Orleans, La.	127	79	28	10	6	–
San Antonio, Tex.	138	72	35	14	10	6
Shreveport, La.	56	35	14	1	5	3
Tulsa, Okla.	51	31	11	5	2	5
MOUNTAIN	522	300	129	48	18	15
Albuquerque, N. Mex.	67	35	19	11	–	7
Colorado Springs, Colo.	35	21	7	4	–	1
Denver, Colo.	110	59	26	12	5	1
Las Vegas, Nev.	22	9	9	1	1	2
Ogden, Utah	24	18	3	–	1	1
Phoenix, Ariz.	133	85	27	9	5	2
Pueblo, Colo.	19	12	6	1	–	1
Salt Lake City, Utah	47	25	12	3	4	–
Tucson, Ariz.	65	36	20	7	2	–
PACIFIC	1,560	1,018	337	105	40	44
Berkeley, Calif.	15	10	4	–	1	1
Fresno, Calif.	55	32	15	2	1	–
Glendale, Calif.	30	24	3	–	–	11
Honolulu, Hawaii	61	41	14	3	2	2
Long Beach, Calif.	108	66	31	5	3	1
Los Angeles, Calif.	486	318	103	39	10	8
Oakland, Calif.	68	43	11	6	3	1
Pasadena, Calif.	26	18	3	–	3	1
Portland, Oreg.	131	88	24	13	2	2
Sacramento, Calif.	64	45	9	3	4	4
San Diego, Calif.	137	86	30	9	3	1
San Francisco, Calif.	130	82	31	10	3	–
San Jose, Calif.	46	31	10	3	1	1
Seattle, Wash.	127	87	25	10	2	1
Spokane, Wash.	40	27	11	1	1	6
Tacoma, Wash.	36	20	13	1	1	4
TOTAL	10,895	6,598	2,708	773	390	408
Expected Number	11,170	6,711	2,882	751	384	371

*By place of occurrence and week of filing certificate. Excludes fetal deaths.

The Morbidity and Mortality Weekly Report, circulation 67,500, is published by the Center for Disease Control, Atlanta, Georgia. The data in this report are provisional, based on weekly telegraphs 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. Send reports to: Center for Disease Control, Attn.: Editor, Morbidity and Mortality Weekly Report, Atlanta, Georgia 30333.

Send mailing list additions, deletions, and address changes to: Center for Disease Control, Attn.: Distribution Services, GSO, 1-SB-36, Atlanta, Georgia 30333. When requesting changes be sure to give your former address, including zip code and mailing list code number, or send an old address label.

Measles—Continued

cine (Schwarz^R or Moraten^R strains), along with immune serum globulin (ISG), regardless of age at time of vaccination

(3) persons previously vaccinated with killed measles vaccine

(4) persons previously vaccinated with live measles vaccine within 3 months after receiving killed measles vaccine.

Speed in implementing measles control programs is essential to prevent measles spread. In some situations, vaccination records might be retrievable only with extensive time delays. In such cases, it is better to revaccinate children whose immunity status is in doubt than to delay while record searches are being made.

One effective means of achieving high immunity levels quickly that has been used in controlling measles outbreaks is to exclude from school all children who cannot present valid evidence of vaccination or prior disease. This practice has been continued until 2-3 weeks after the last case of measles occurs in the community.

Vaccination Age

Infants as young as 6 months old should be vaccinated when there is likelihood of exposure to natural measles. However, all children vaccinated when 6-11 months of age should be revaccinated at about 15 months to ensure solid and lasting immunity.

With the recent shift in age distribution of reported measles cases to older age groups, effective epidemic control may require vaccination of susceptible high school and college-age persons as well as preschool and younger school-age children.

Children Previously Vaccinated at 12 Months of Age

There has been confusion concerning the immunity of children vaccinated against measles at 12 months of age. Although some recent evidence has indicated that there may be a slightly lower rate of seroconversion among children vaccinated at 12 months of age than in those vaccinated at 13 months or later, the difference is not enough to warrant routinely revaccinating persons in the former group in community programs. The vast majority of those vaccinated when 12 months old are fully protected against measles.

Revaccination Risks

There is no enhanced risk from giving live measles vaccine to children who have previously received live measles vaccines or who have had measles. Specifically, there does not appear to be any enhanced risk of subacute sclerosing panencephalitis (SSPE), a recognized complication of natural measles. Preliminary results from a recent CDC case-control study showed no association between SSPE and either receiving live measles vaccine more than once or receiving it after having had measles.

Reactions such as local induration, edema, and fever have been observed when live measles vaccine has been administered to persons who previously received inactivated measles vaccine. Despite this risk of reaction, children previously vaccinated with inactivated vaccine should be reimmunized with live vaccine.

Passive Immunization Against Measles

ISG should *not* be used to control measles outbreaks. ISG should be used for susceptible household contacts of measles patients (particularly those under 1 year of age), for exposed susceptible pregnant females, or for persons in whom measles vaccine is contraindicated, such as the immune deficient.

Where the extent of measles exposure is not clear, such as in school-focused outbreaks persisting for many generations of cases, it is better to give measles vaccine, which can offer permanent immunity, than to rely on ISG. There is no evidence that measles vaccine given to persons already incubating measles results in more severe illness or complications.

Measles in Pregnancy

It is recognized that measles disease in pregnancy increases fetal risk. Most commonly this involves precipitation of labor and moderately increased rates of spontaneous abortion and prematurity. One retrospective study in an isolated population suggests that measles infection during the first trimester of pregnancy was associated with an increased rate of congenital malformations (*2*). Another study shows that mothers contracting measles during pregnancy had a 5-fold greater risk of delivering low birth weight infants than matched controls (*3*).

In contrast with measles disease in pregnancy, there is no evidence that live measles vaccine in pregnancy constitutes a risk of harmful effects for the mother or the developing fetus. Nevertheless, it is reasonable on theoretical grounds to avoid giving live measles vaccine or other live virus vaccines to females known to be pregnant. For susceptible pregnant women exposed to measles, passive immunization with ISG offers preferable protection.

Immunization of Females of Childbearing Age

In measles epidemic control programs, precautions against giving live virus vaccines in pregnancy, based on theoretical risks, do not justify laboratory screening for pregnancy among females of childbearing age. Of far greater importance is protection of all susceptibles at risk by vaccination against measles. Theoretical risks from inadvertently vaccinating females who are unaware they are pregnant are greatly outweighed by the known risks of measles disease to which these women might be exposed.

References

1. MMWR 25: 359-365, 1976
2. Jespersen CS, Littauer J, Sagild U: Measles as a cause of fetal defects. Acta Paediatr Scand 66:367-372, 1977
3. Siegel M, Fuerst HT: Low birth weight and maternal virus diseases: A prospective study of rubella, measles, mumps, chickenpox, and hepatitis. JAMA 197: 680-684, 1966

Epidemiologic Notes and Reports

Outbreak of Suspected Giardiasis Among Travelers to Madeira , 1976

During the month of October 1976, a group of approximately 1,400 Americans vacationed at the Portuguese island of Madeira. Unconfirmed reports of a high incidence of diarrhea in these travelers on their return to the United States prompted CDC to conduct a mail questionnaire survey with the help of State Epidemiologists from 49 states

and the District of Columbia. The survey results suggest waterborne giardiasis as the etiology of the outbreak.

Of 859 questionnaire respondents, 37.6% had diarrhea during or shortly after their vacation. The diarrhea lasted for longer than 1 week in 42% of those ill. The most frequent accompanying symptoms were abdominal cramps (75%), abdominal distention (72%), nausea (70%), and weight loss (40%). Twenty-seven percent developed an illness resembling giardiasis (that is, diarrhea of 1-week duration or longer or diarrhea of shorter duration but accompanied by abdominal distention). The median incubation period was 4 days.

Calls to physicians of ill patients revealed that of 35 patients who had a stool culture for bacteria, enteric pathogens were recovered from 4 (1 *Salmonella* and 3 *Shigella* isolates). On the other hand, of 58 ill patients who had a stool examination for parasites, *Giardia lamblia* was recovered from 27 (47%). *Entamoeba histolytica* was isolated from 3 (5%) persons.

Analysis of the data on drinking and eating preferences showed that drinking tap water on the island was associated with illness ($p<0.001$) (Table 1). Although water on Madiera is reportedly chlorinated, additional information on treatment and on the source of the water was not available. Consumption of ice cream ($p=0.014$) and of raw vegetables ($p=0.012$) were also significantly associated with illness independent of drinking tap water. Neither fruits nor ice-containing beverages were implicated.

To assess whether giardiasis might be an ongoing risk to travelers to Madeira, another survey of 90 Americans traveling to Madeira in the spring of 1977 was conducted. Only 4.5% developed an illness fitting the giardiasis case definition, suggesting that the outbreak of October 1976 was an isolated event rather than a reflection of an ongoing problem.

Reported by MP Hines, DVM, State Epidemiologist, N MacCormack, MD, North Carolina Division of Health Services; and Parasitic Diseases Div, Bur of Epidemiology, CDC.

TABLE 1. Suspected giardiasis, Madeira, 1976*

Items From Food Histories	Consumed			Did Not Consume		
	Ill	Not ill	Attack Rate	Ill	Not ill	Attack Rate
Tap Water	217**	395	35.4%	12	67	15.2%
Ice Cream	138†	238	36.7%	74	198	26.5%
Raw Vegetables	169†	316	34.8%	32	107	23.0%

*Giardiasis case definition includes all patients with diarrhea of longer than 1-week duration or diarrhea of shorter duration but accompanied by abdominal distention.
**Chi square analysis $p<0.001$ †Chi square analysis $p<0.05$

Editorial Note: Outbreaks of giardiasis among international travelers have been described before, predominantly among visitors to Leningrad (*1,2*). This is the first reported evidence suggesting that giardiasis may occur among travelers to Madeira. Similar to previous outbreaks of giardiasis, the illness in this one was most likely acquired through the consumption of tap water. Although there was a statistical correlation between illness and eating raw vegetables and ice cream, contamination of these food items with tap water cannot be ruled out.

Routine chlorination does not appear to affect the viability of *G. lamblia* cysts in water (*3*). On the other hand, a properly working water treatment system that includes sand filtration will remove particles of the size of *Giardia* cysts (8-13 microns) from water (*4*).

References

1. Walzer PD, Wolfe MS, Schultz MG: Giardiasis in travelers. J Infect Dis 124:235-237, 1971
2. Brodsky RE, Spencer HC, Schultz MG: Giardiasis in American travelers to the Soviet Union. J Infect Dis 130:319-323,1974
3. Shaw PK, Brodksy RE, Lyman DO, Wood BT, Hibler CD, et al.: A community-wide outbreak of giardiasis with documented transmission by municipal water. Ann Intern Med (in press)
4. Fair GM, Geyer JC, Okun DA: Elements of Water Supply and Wastewater Disposal. New York, John Wiley and Sons, Inc., 1971

Legionnaires' Disease — Ohio

Four confirmed and 1 suspect case of Legionnaires' disease with onset between July 29 and August 28, 1977, have been recognized in women from central Ohio. Ages of the women range from 39 to 65 years. Two women died, 1 has recovered, and 2 are still hospitalized. The women live in different parts of the city and are not acquainted with each other. Four of the women had been patients in one hospital for some of the 10 days before becoming ill, and the fifth had visited her son who was a patient in the hospital during that interval. Diagnosis was made in 3 cases by 4-fold or greater rise in fluorescent antibody titer in paired serum specimens and in 1 case by demonstration of bacteria in a postmortem lung specimen by direct fluorescent antibody staining. Investigation into the possibility of a common-source outbreak includes review of recent pneumonia cases at 4 Columbus hospitals, survey of employees for illness and seropositivity, and examination of air-handling systems.

Reported by I Baird, MD, Riverside Methodist Hospital, Columbus; T Halpin, MD, State Epidemiologist, Ohio State Dept of Health; Viral and Rickettsial Br, Virology Div, Bur of Laboratories, Field Services Div, and Epidemiologic Investigations Laboratory Br, Bacterial Zoonoses Br, Special Pathogens Br, Bur of Epidemiology, CDC.

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE / CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333

Director, Center for Disease Control, William H. Foege, M.D.
Director, Bureau of Epidemiology, Philip S. Brachman, M.D.
Editor, Michael B. Gregg, M.D.
Managing Editor, Anne D. Mather, M.A.
Chief, MMWR Statistical Activity, Dennis J. Bregman, M.S.

OFFICIAL BUSINESS FIRST CLASS

Redistribution using indicia is illegal.

HEW Publication No. (CDC) 77-8017