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Effectiveness in Disease and Injury Prevention

Introduction

This issue of MMWR *introduces a new series, "Effectiveness in Disease and Injury Prevention." Future reports in this section will 1) highlight preventive measures that have proven effective and economical in public health and clinical practice and 2) describe how those measures can be integrated more effectively and economically within public health and clinical practice. In addition, reports will address needs, opportunities, and methods for assessing preventive measures. The following report summarizes the evaluation of a school health education curriculum developed to reduce selected health-risk behaviors among young persons.*

Effectiveness of a Health Education Curriculum for Secondary School Students — United States, 1986–1989

Risk behaviors that affect the health of young persons in the United States include drug use, alcohol consumption, tobacco use, imprudent dietary patterns, physical inactivity, unsafe sexual practices, and injury-related behaviors (*1,2*). Because these behaviors are usually established during youth, since 1977 CDC has supported the development, evaluation, and implementation of comprehensive school health education curricula to reduce these behaviors among young persons. This report describes the impact of one of these curricula (Teenage Health Teaching Modules [THTM]) on student knowledge, attitudes, and selected health-risk behaviors.

During 1979–1983, THTM was developed (*3*) for use at the secondary level initially by school systems already using the comprehensive elementary school health education curriculum, *Growing Healthy*. THTM consists of 16 instructional modules, each of which addresses a separate developmentally based health task (e.g., *Eating Well* and *Handling Stress*). Teachers are encouraged to add supplementary activities and materials to the module's core materials. All modules are intended to develop five skills: self-assessment, communication, decision-making, advocacy, and self-management (*3*).

During 1986–1989, to assess the effects of THTM on selected student health-risk behaviors, a large-scale controlled evaluation was conducted by a private research

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organization with technical oversight from an external committee of health education research experts (*4*). The evaluation employed a quasi-experimental pretest/posttest control group design (*5*) to determine whether selected modules of THTM could improve student health knowledge, attitudes, and self-reported behaviors and to suggest how to implement the curriculum more effectively. The effectiveness of THTM was assessed in two settings: 1) an "experimental" setting, involving new users recruited for the study; and 2) a "naturalistic" setting, involving users who had adopted THTM independent of the study.

Junior high/middle schools were required to use four modules (*Being Fit, Having Friends, Living with Feelings,* and *Preventing Injuries*) and senior high schools five different modules (*Eating Well, Handling Stress, Protecting Oneself and Others, Promoting Health in Families,* and *Planning a Healthy Future*). Teachers in the experimental setting were to use all four or five required modules (and no others) and were urged to implement the curriculum as prescribed. Teachers in the naturalistic setting were to use a minimum of three of the required modules and had the option of using additional modules. Students were exposed to THTM for 36–38 45-minute classes (approximately 27 hours) during a 16- to 18-week semester.

The evaluation included 4806 students from 149 schools in seven states. Pretest and posttest self-administered questionnaire responses were analyzed for 2530 students who received THTM and 2276 same-school controls. By education research convention, standardized effect sizes >0.25 were considered educationally important and further characterized as small (0.20–0.49), moderate (0.50–0.79), and large (≥0.80) (*6,7*). From pretest to posttest, students in THTM-exposed classes were more likely than those in control classes to report larger knowledge gain scores ($p<0.01$; 2-tailed t-test) and larger attitude gain scores among senior high school classes ($p<0.05$). The standardized effect sizes were moderate to large for knowledge (0.64–1.12) and moderate for attitudes (0.69–0.76) among senior high classes.

From pretest to posttest, THTM-exposed students in 39 experimental senior high school classes were more likely than those in control classes ($p<0.05$; 2-tailed t-test) to report, for the preceding 30 days, fewer cigarettes smoked (standardized effect size: 0.47) and fewer instances of illegal drug use (standardized effect size: 0.58) (Table 1).

From pretest to posttest, THTM-exposed students in 40 naturalistic senior high school classes were more likely than those in control classes ($p<0.05$; 2-tailed t-test) to report, for the preceding 30 days, abstinence from cigarettes, smokeless tobacco, and illegal drugs and fewer alcoholic drinks consumed (Table 1). The standardized effect sizes ranged from 0.49 to 0.65.

For senior high school classes in both experimental and naturalistic settings, THTM had no statistically significant effect on two other behaviors that were measured (i.e., wearing seatbelts and eating fried foods). In addition, THTM had no discernible effects on any self-reported behaviors of junior high/middle school classes.

Reported by: JG Ross, MT Errecart, Macro Systems, Inc, Silver Spring, Maryland. Office of Program Planning and Evaluation, Office of the Director, Surveillance and Evaluation Research Br, Div of Adolescent and School Health, Center for Chronic Disease Prevention and Health Promotion, CDC.

Editorial Note: The THTM evaluation confirmed that specific modules of a school health education curriculum designed for secondary school students can have

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educationally important effects on student knowledge, attitudes, and selected self-reported health-risk behaviors. However, the self-reports of tobacco, alcohol, and drug use were not physiologically verified, and the limited (4-month) follow-up period precluded determining whether THTM had a sustained impact on knowledge, attitudes, and self-reported behavior. Nonetheless, these findings support other research that suggests that carefully designed and implemented comprehensive school health education programs can reduce risks for disease and injury among young persons (*7,8*).

Several possible explanations exist for the lack of statistically significant effects on the self-reported behaviors of junior high/middle school students; possibly the most important is that the behaviors addressed in the modules to which these students were exposed did not specifically correspond with the behaviors measured in the evaluation.

Findings from the THTM evaluation can support education and health professionals, parents, and other community members in achieving the year 2000 national health objective to "increase to at least 75 percent the proportion of the nation's elementary and secondary schools that provide planned and sequential kindergarten through 12th grade quality school health education" (*9*). Because quality school health education can improve important health-related knowledge, attitudes, and behaviors for persons both during school years and in later life, health and education agencies, parents, and other concerned community members together should consider intensifying efforts to implement comprehensive school health curricula.

TABLE 1. Gain scores* and standardized effect sizes† for selected self-reported behaviors among senior high school classes — Teenage Health Teaching Modules (THTM) evaluation, 1986–1989

	Classroom type					
	Experimental§			Naturalistic¶		
Behaviors**	THTM (n=39)	Control (n=39)	Effect size	THTM (n=40)	Control (n=40)	Effect size
Mean cigarettes smoked	–1.49††	3.18††	0.47§§	0.87	1.57	0.14
Not smoking cigarettes	0.82%	–4.41%	0.32§§	–0.43%††	–5.71%††	0.50§§
Not chewing tobacco	–1.34%	–1.12%	0.04	–0.74%††	–6.06%††	0.65§§
Mean instances of illegal drug use	–0.23††	0.30††	0.58§§	0.05	0.26	0.32§§
Not using illegal drugs	–0.77%	–2.82%	0.14	0.57%††	–4.05%††	0.49§§
Mean no. alcoholic drinks consumed	0.08	0.62	0.19	0.16††	1.14††	0.50§§

*Gain score = posttest score minus pretest score.
†Standardized effect size = (THTM gain score minus control gain score) ÷ pooled standard deviation of gain scores.
§Experimental schools adopted THTM specifically for this study.
¶Naturalistic schools had adopted THTM independently of this study.
**Per 30-day period.
††Differences between gain scores were statistically significant ($p<0.05$; 2-tailed t-tests).
§§Effect sizes are educationally important (i.e., standardized effect sizes >0.25).

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References
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International Notes

Campylobacter Enteritis — New Zealand, 1990

In August–September 1990, an outbreak of *Campylobacter* enteritis occurred at a camp near Christchurch, New Zealand. This report provides a preliminary summary of the investigation of this outbreak by the New Zealand Communicable Disease Centre and the Canterbury Area Health Board.

The outbreak occurred at a modern camp and convention center (which hosts >15,000 visitors each year) located approximately 19 km (12 miles) from Christchurch. The facility caters to schools and church and youth groups and provides meals, housing, and indoor and outdoor recreation for visitors. Water at the camp, obtained from three springs on the premises, was neither chlorinated nor filtered before use. On September 4, the Canterbury Area Health Board received reports that two persons who lived at the camp had been hospitalized with *Campylobacter* enteritis and that a number of children who had visited the camp during the week of August 27–31 had become ill with vomiting and headaches.

All persons at the camp during August 27–31 (58 visiting children [age range: 9–12 years], 19 camp leaders, and 39 staff and their family members) were interviewed to identify cases of *Campylobacter* enteritis and risk factors for infection with *Campylobacter*. Because of concerns about the accuracy of information provided by children who had attended the camp, analysis of food and water consumption was limited to camp leaders and staff.

Based on completed interviews with 99 (85%) of the 116 persons, 44 (44%) had developed a gastrointestinal illness that met the case definition for *Campylobacter* enteritis,* with onset from August 9 through September 7 (Figure 1). Predominant

*The following in a person who had been at the camp: either a stool culture positive for *C. jejuni*, a history of diarrhea lasting ≥2 days, *or* four of the following signs/symptoms—diarrhea for 1 day, nausea, vomiting, abdominal pain, fever, headache, myalgia, and malaise.

Campylobacter *Enteritis — Continued*

manifestations included abdominal pain (80%), diarrhea (75%), headache (61%), nausea (60%), fever (59%), and vomiting (55%). The 44 case-patients ranged in age from 3 to 51 years (median: 11 years); 30 (68%) were male. Stool specimens from 11 of 14 symptomatic persons yielded *C. jejuni*. The pattern of clinical illness in persons with culture-confirmed *Campylobacter* enteritis was similar to that in persons whose illness was not culture-confirmed.

Investigation determined that case-patients drank more unboiled water than did persons who were not ill (median: 4 cups vs. 2 cups each day; $p = 0.03$, Kruskal-Wallis test) and were more likely to drink water obtained from one particular spring (40/44 [90%] vs. 38/55 [69%]; $p<0.01$, Fisher's exact test).† Coliform counts of water specimens from all three springs (collected at taps from staff houses and the camp kitchen) indicated fecal contamination. Water was not examined specifically for *Campylobacter*.

Private farmland adjacent to the camp is grazed by sheep and cattle. During the investigation, runoff from the surrounding pasture was noted to enter two springs through the basin covers. Torrential rains during the middle of August may have facilitated the seepage of surface contamination into the spring water.

Control efforts were initiated on September 11 and included 1) using rainwater and potable water supplied by tanker and boiling the water used in staff households until a water-treatment system was installed, 2) installing a water-treatment system, 3) conducting a complete water and sanitation survey, and 4) implementing an informal surveillance system to monitor illness among visitors and staff at the camp.

Since implementation of these control measures, no further cases of enteritis have been reported from the camp.

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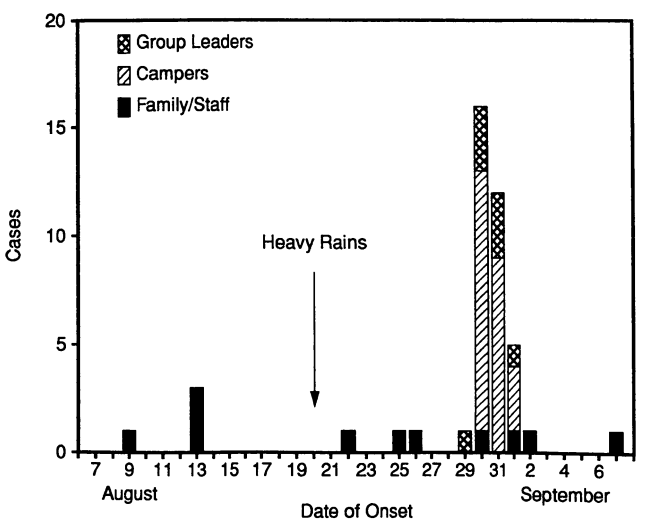
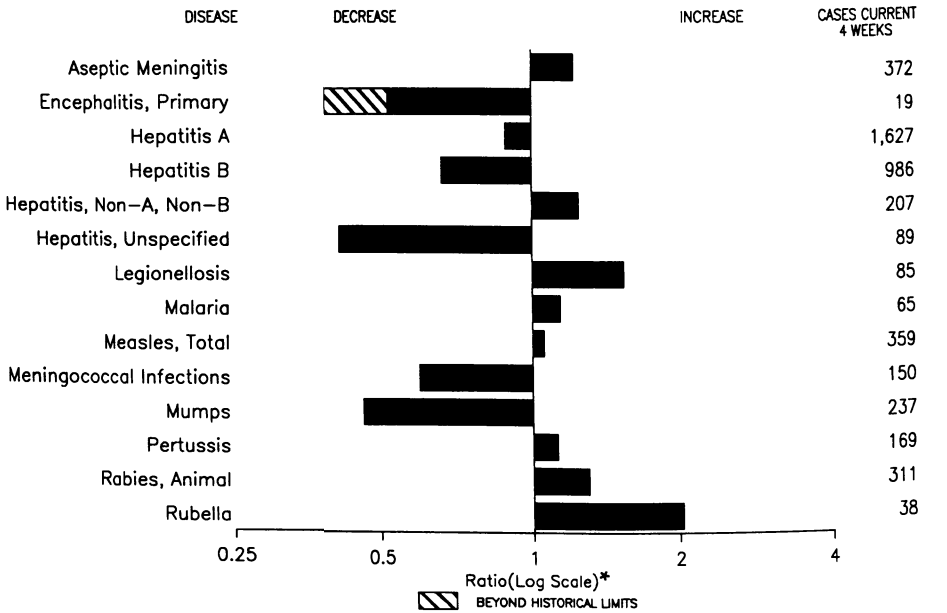
†Analysis based on total sample of 99 persons because spring source was known for all persons interviewed.

FIGURE 1. *Campylobacter* enteritis in persons at a camp, by date of onset* — Christchurch, New Zealand, August–September 1990



*For one case, date of onset was unknown and is not included.

FIGURE I. Notifiable disease reports, comparison of 4-week totals ending February 16, 1991, with historical data – United States



*Ratio of current 4-week total to the mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

TABLE I. Summary – cases of selected notifiable diseases, United States, cumulative, week ending February 16, 1991 (7th Week)

	Cum. 1991		Cum. 1991
AIDS	4,620	Measles: imported	13
Anthrax	-	indigenous	454
Botulism: Foodborne	-	Plague	-
Infant	6	Poliomyelitis, Paralytic*	-
Other	-	Psittacosis	6
Brucellosis	10	Rabies, human	-
Cholera	-	Syphilis, primary & secondary	5,309
Congenital rubella syndrome	3	Syphilis, congenital, age < 1 year	-
Diphtheria	1	Tetanus	-
Encephalitis, post-infectious	5	Toxic shock syndrome	52
Gonorrhea	71,505	Trichinosis	-
Haemophilus influenzae (invasive disease)	268	Tuberculosis	2,124
Hansen disease	12	Tularemia	2
Leptospirosis	11	Typhoid fever	42
Lyme disease	50	Typhus fever, tickborne (RMSF)	10

*No cases of suspected poliomyelitis have been reported in 1991; none of the 6 suspected cases in 1990 have been confirmed to date. Five of the 13 suspected cases in 1989 were confirmed and all were vaccine associated.

TABLE II. Cases of selected notifiable diseases, United States, weeks ending February 16, 1991, and February 17, 1990 (7th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionellosis	Lyme Disease
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991
UNITED STATES	4,620	609	47	5	71,505	92,325	2,782	1,676	393	153	141	50
NEW ENGLAND	284	33	5	-	2,653	2,690	77	123	15	4	16	9
Maine	15	2	2	-	13	37	4	1	1	-	-	-
N.H.	8	2	-	-	36	27	3	4	1	-	1	-
Vt.	4	1	-	-	11	9	4	1	-	-	-	-
Mass.	171	9	1	-	878	995	45	107	13	3	15	8
R.I.	9	18	-	-	134	135	13	6	-	1	-	1
Conn.	77	1	2	-	1,581	1,487	8	4	-	-	-	-
MID. ATLANTIC	1,144	98	1	2	5,917	10,302	203	108	11	3	35	5
Upstate N.Y.	249	36	1	2	1,465	2,007	109	53	7	-	11	-
N.Y. City	460	9	-	-	-	4,806	25	6	-	-	3	-
N.J.	285	-	-	-	1,153	2,068	11	5	1	-	1	5
Pa.	150	53	-	-	3,299	1,421	58	44	3	3	20	-
E.N. CENTRAL	378	101	9	2	12,851	19,110	243	210	95	7	25	8
Ohio	59	34	2	1	3,515	6,075	87	56	29	4	13	4
Ind.	24	12	4	1	1,620	1,434	62	39	1	-	3	-
Ill.	213	13	1	-	4,197	5,697	2	2	-	-	-	-
Mich.	54	40	2	-	3,173	4,694	41	79	14	3	8	4
Wis.	28	2	-	-	346	1,210	51	34	51	-	1	-
W.N. CENTRAL	189	40	6	-	4,119	5,296	403	44	29	2	9	1
Minn.	35	8	5	-	402	597	40	2	-	1	2	-
Iowa	14	14	-	-	286	453	12	3	1	-	-	1
Mo.	122	8	-	-	2,518	2,900	94	30	28	1	4	-
N. Dak.	-	-	-	-	-	33	3	-	-	-	-	-
S. Dak.	-	3	1	-	52	35	189	-	-	-	1	-
Nebr.	10	6	-	-	283	213	53	8	-	-	2	-
Kans.	8	1	-	-	578	1,065	12	1	-	-	-	-
S. ATLANTIC	1,028	128	7	1	23,466	26,429	183	419	67	17	17	9
Del.	5	4	-	-	267	330	4	9	1	-	-	2
Md.	100	18	3	-	2,434	2,715	51	53	17	3	6	5
D.C.	70	8	-	-	1,591	825	13	15	-	1	-	-
Va.	95	16	-	-	1,969	2,264	21	29	2	8	1	1
W. Va.	7	2	-	-	159	179	4	7	-	1	-	-
N.C.	71	27	2	-	4,672	4,961	38	119	26	-	5	1
S.C.	49	6	-	-	1,984	2,427	6	94	15	-	3	-
Ga.	221	5	1	1	5,846	6,240	17	60	1	-	1	-
Fla.	410	42	1	-	4,544	6,488	29	33	5	4	1	-
E.S. CENTRAL	98	50	3	-	5,807	7,556	24	129	40	2	10	4
Ky.	18	17	1	-	736	903	6	35	1	2	5	1
Tenn.	34	13	2	-	1,541	2,087	10	77	38	-	3	2
Ala.	29	17	-	-	1,919	2,902	8	17	1	-	2	1
Miss.	17	3	-	-	1,611	1,664	-	-	-	-	-	-
W.S. CENTRAL	394	38	5	-	7,818	8,692	269	95	9	12	4	-
Ark.	14	25	1	-	850	1,104	57	3	-	-	-	-
La.	72	3	-	-	1,649	1,622	19	31	1	-	1	-
Okla.	19	1	3	-	877	774	72	31	7	4	3	-
Tex.	289	9	1	-	4,442	5,192	121	30	1	8	-	-
MOUNTAIN	90	24	3	-	1,346	2,055	544	123	19	42	15	1
Mont.	3	1	-	-	9	18	25	16	-	2	-	-
Idaho	1	-	-	-	22	12	7	11	-	-	1	-
Wyo.	3	-	-	-	17	22	26	3	-	-	-	1
Colo.	45	3	-	-	252	662	25	17	7	5	1	-
N. Mex.	9	3	-	-	146	154	194	15	-	18	1	-
Ariz.	8	10	3	-	569	763	178	33	3	14	5	-
Utah	3	2	-	-	52	61	54	5	3	3	4	-
Nev.	18	5	-	-	279	363	35	23	6	-	3	-
PACIFIC	1,015	97	8	-	7,528	10,195	836	425	108	64	10	13
Wash.	33	-	-	-	497	985	83	60	17	1	-	-
Oreg.	22	-	-	-	270	376	55	34	17	1	-	-
Calif.	939	85	8	-	6,561	8,591	681	319	68	61	9	13
Alaska	3	2	-	-	111	173	12	4	5	1	-	-
Hawaii	18	10	-	-	89	70	5	8	1	-	1	-
Guam	-	-	-	-	-	36	-	-	-	-	-	-
P.R.	183	22	-	-	35	170	6	32	8	3	-	-
V.I.	-	-	-	-	50	69	-	1	-	-	-	-
Amer. Samoa	-	-	-	-	-	14	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	29	-	-	-	-	-	-

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of the Northern Mariana Islands

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending February 16, 1991, and February 17, 1990 (7th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1991	1991	Cum. 1991	1991	Cum. 1991	Cum. 1990	Cum. 1991	1991	Cum. 1991	1991	Cum. 1991	Cum. 1990	1991	Cum. 1991	Cum. 1990
UNITED STATES	105	133	454	2	13	1,872	228	74	357	57	269	417	6	46	41
NEW ENGLAND	8	-	-	-	-	30	23	-	7	4	22	58	-	-	1
Maine	-	-	-	-	-	6	2	-	-	-	3	1	-	-	-
N.H.	-	-	-	-	-	6	5	-	-	1	8	6	-	-	-
Vt.	1	-	-	-	-	-	2	-	-	-	-	1	-	-	-
Mass.	5	-	-	-	-	-	11	-	-	3	11	47	-	-	-
R.I.	2	-	-	-	-	-	-	-	2	-	-	-	-	-	1
Conn.	-	-	-	-	-	18	3	-	5	-	-	3	-	-	-
MID. ATLANTIC	10	53	173	-	-	194	25	3	28	4	36	101	2	2	-
Upstate N.Y.	4	-	-	-	-	144	14	2	13	2	18	84	-	-	-
N.Y. City	3	U	-	U	-	14	-	U	-	U	-	-	U	-	-
N.J.	1	U	3	U	-	10	1	U	-	U	1	8	U	-	-
Pa.	2	53	170	-	-	26	10	1	15	2	17	9	2	2	-
E.N. CENTRAL	8	-	1	-	1	1,035	31	4	38	7	51	117	-	1	3
Ohio	-	-	-	-	-	44	10	-	-	2	25	15	-	-	-
Ind.	1	-	-	-	-	34	1	-	3	2	15	27	-	1	-
Ill.	1	-	-	-	-	446	3	-	16	-	-	35	-	-	3
Mich.	6	-	1	-	-	153	13	3	16	3	9	10	-	-	-
Wis.	-	-	-	-	1	358	4	1	3	-	2	30	-	-	-
W.N. CENTRAL	1	-	-	-	-	55	5	2	10	4	19	12	-	1	-
Minn.	-	-	-	-	-	-	1	-	2	4	11	1	-	1	-
Iowa	-	-	-	-	-	20	1	2	5	-	4	1	-	-	-
Mo.	1	-	-	-	-	35	1	-	2	-	1	7	-	-	-
N. Dak.	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
S. Dak.	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-
Nebr.	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-
Kans.	-	-	-	-	-	-	1	-	1	-	-	1	-	-	-
S. ATLANTIC	26	14	15	-	1	76	45	17	128	5	13	42	-	3	1
Del.	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-
Md.	9	-	-	-	-	19	7	2	49	-	-	15	-	3	-
D.C.	2	-	-	-	-	1	-	-	3	-	-	1	-	-	-
Va.	3	-	-	-	-	5	4	1	7	-	2	4	-	-	-
W. Va.	1	-	-	-	-	-	1	-	3	3	3	5	-	-	-
N.C.	-	-	-	-	-	3	14	12	43	2	6	5	-	-	-
S.C.	4	12	12	-	-	-	4	1	15	-	-	-	-	-	-
Ga.	2	-	-	-	-	1	6	-	3	-	1	7	-	-	-
Fla.	5	2	3	-	1	46	9	1	5	-	1	3	-	-	1
E.S. CENTRAL	1	-	-	-	-	13	24	4	9	4	9	13	-	-	-
Ky.	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-
Tenn.	-	-	-	-	-	9	4	3	3	4	7	3	-	-	-
Ala.	1	-	-	-	-	-	9	-	1	-	2	10	-	-	-
Miss.	-	-	-	-	-	4	-	1	5	-	-	-	-	-	-
W.S. CENTRAL	2	-	-	-	5	42	8	22	39	-	9	2	-	-	-
Ark.	-	-	-	-	5	-	2	2	6	-	-	-	-	-	-
La.	1	-	-	-	-	-	6	-	5	-	6	1	-	-	-
Okla.	1	-	-	-	-	3	-	-	1	-	3	1	-	-	-
Tex.	-	-	-	-	-	39	-	20	27	-	-	-	-	-	-
MOUNTAIN	5	12	52	1	4	23	9	-	16	3	39	38	-	1	-
Mont.	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Idaho	-	-	-	1†	1	-	1	-	-	-	7	2	-	-	-
Wyo.	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
Colo.	1	-	-	-	1	3	2	-	3	-	10	27	-	-	-
N. Mex.	1	12	43	-	2	2	1	N	N	2	5	-	-	-	-
Ariz.	3	-	2	-	-	18	3	-	13	-	7	6	-	-	-
Utah	-	-	-	-	-	-	-	-	-	1	6	1	-	-	-
Nev.	-	-	7	-	-	-	-	-	-	-	-	2	-	1	-
PACIFIC	44	54	213	1	2	404	58	22	82	26	71	34	4	38	36
Wash.	4	-	-	-	-	12	2	2	6	1	5	4	-	-	-
Oreg.	1	-	-	-	-	6	6	N	N	1	5	5	-	-	-
Calif.	38	54	211	1†	2	377	49	20	71	21	43	22	4	37	32
Alaska	-	-	-	-	-	9	1	-	3	-	4	-	-	-	-
Hawaii	1	-	2	-	-	-	-	-	2	3	14	3	-	1	4
Guam	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-
P.R.	-	-	-	-	1	21	2	-	1	1	4	-	-	-	-
V.I.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Amer. Samoa	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-
C.N.M.I.	-	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 II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending February 16, 1991, and February 17, 1990 (7th Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991
UNITED STATES	5,309	5,583	52	2,124	2,424	2	42	10	486
NEW ENGLAND	149	245	3	51	33	-	4	2	-
Maine	-	1	2	-	-	-	-	-	-
N.H.	1	25	-	-	1	-	-	-	-
Vt.	1	-	-	-	1	-	-	-	-
Mass.	80	86	1	15	13	-	4	2	-
R.I.	6	1	-	15	7	-	-	-	-
Conn.	61	132	-	21	11	-	-	-	-
MID. ATLANTIC	824	1,065	10	399	632	-	4	-	186
Upstate N.Y.	57	48	6	21	73	-	1	-	57
N.Y. City	291	769	-	283	417	-	2	-	-
N.J.	147	208	-	73	68	-	1	-	65
Pa.	329	40	4	22	74	-	-	-	64
E.N. CENTRAL	546	362	10	237	249	-	5	-	4
Ohio	57	62	7	64	24	-	1	-	1
Ind.	13	4	-	9	17	-	-	-	-
Ill.	294	152	1	147	123	-	-	-	-
Mich.	114	92	2	-	76	-	4	-	-
Wis.	68	52	-	17	9	-	-	-	3
W.N. CENTRAL	80	51	13	63	66	-	1	-	54
Minn.	9	13	6	6	12	-	1	-	30
Iowa	9	5	4	13	6	-	-	-	10
Mo.	61	27	3	27	28	-	-	-	-
N. Dak.	-	1	-	2	4	-	-	-	8
S. Dak.	1	-	-	3	4	-	-	-	-
Nebr.	-	2	-	2	7	-	-	-	2
Kans.	-	3	-	10	5	-	-	-	4
S. ATLANTIC	1,667	1,998	2	283	363	-	8	5	140
Del.	16	30	1	5	8	-	-	-	22
Md.	175	157	-	24	31	-	4	-	59
D.C.	91	42	-	22	9	-	-	-	1
Va.	114	107	-	23	24	-	1	-	23
W. Va.	4	2	-	14	6	-	1	-	8
N.C.	232	231	1	54	53	-	-	4	-
S.C.	239	134	-	41	62	-	-	-	5
Ga.	375	536	-	46	45	-	2	1	20
Fla.	421	759	-	54	125	-	-	-	2
E.S. CENTRAL	568	398	1	160	153	-	-	2	9
Ky.	9	12	-	42	60	-	-	1	3
Tenn.	249	94	-	-	28	-	-	-	-
Ala.	153	148	1	56	54	-	-	1	6
Miss.	157	144	-	62	11	-	-	-	-
W.S. CENTRAL	875	750	1	238	314	1	-	1	40
Ark.	53	45	-	24	35	1	-	-	4
La.	308	284	-	46	83	-	-	-	3
Okla.	24	31	1	3	15	-	-	1	15
Tex.	490	390	-	165	181	-	-	-	18
MOUNTAIN	82	92	6	60	33	1	1	-	6
Mont.	1	-	-	-	-	1	-	-	3
Idaho	3	1	-	-	-	-	-	-	1
Wyo.	1	-	-	-	1	-	-	-	-
Colo.	8	12	-	6	-	-	-	-	1
N. Mex.	3	7	1	-	8	-	-	-	-
Ariz.	59	60	2	39	11	-	1	-	1
Utah	-	1	3	13	-	-	-	-	-
Nev.	7	11	-	2	13	-	-	-	-
PACIFIC	518	622	6	633	581	-	19	-	47
Wash.	20	64	-	27	29	-	-	-	-
Oreg.	15	9	-	7	16	-	1	-	1
Calif.	482	538	6	570	498	-	17	-	46
Alaska	1	4	-	2	11	-	-	-	-
Hawaii	-	7	-	27	27	-	1	-	-
Guam	-	-	-	-	7	-	-	-	-
P.R.	24	68	-	15	9	-	-	-	4
V.I.	5	-	-	1	1	-	-	-	-
Amer. Samoa	-	-	-	-	3	-	-	-	-
C.N.M.I.	-	-	-	-	6	-	-	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending February 16, 1991 (7th Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	710	507	124	53	12	14	73
Boston, Mass.	191	118	41	23	3	6	31
Bridgeport, Conn.	38	31	4	1	2	-	5
Cambridge, Mass.	32	24	5	2	-	1	1
Fall River, Mass.	39	29	6	2	2	-	-
Hartford, Conn.	67	48	12	5	1	1	5
Lowell, Mass.	29	23	5	1	-	-	-
Lynn, Mass.	16	14	2	-	-	-	-
New Bedford, Mass.	22	19	2	1	-	-	2
New Haven, Conn.	59	40	9	4	2	4	4
Providence, R.I.	69	49	13	6	-	1	8
Somerville, Mass.	4	4	-	-	-	-	1
Springfield, Mass.	45	36	7	1	1	-	6
Waterbury, Conn.	32	24	5	1	1	1	-
Worcester, Mass.	67	48	13	6	-	-	10
MID. ATLANTIC	1,426	1,012	247	98	39	30	121
Albany, N.Y.	68	49	12	3	2	2	5
Allentown, Pa.	17	15	1	1	-	-	-
Buffalo, N.Y.	110	69	29	4	6	2	9
Camden, N.J.	43	28	7	4	2	2	6
Elizabeth, N.J.	17	13	3	-	1	-	-
Erie, Pa.†	58	47	7	3	-	1	5
Jersey City, N.J.	56	42	6	5	-	3	2
N.Y. City, N.Y.§	U	U	U	U	U	U	U
Newark, N.J.	94	40	24	18	9	3	10
Paterson, N.J.	33	17	10	3	2	1	2
Philadelphia, Pa.	393	271	73	33	8	8	27
Pittsburgh, Pa.†	111	83	17	6	3	2	7
Reading, Pa.	50	39	7	3	1	-	9
Rochester, N.Y.	110	86	14	6	3	1	17
Schenectady, N.Y.	26	20	6	-	-	-	5
Scranton, Pa.†	34	28	5	1	-	-	4
Syracuse, N.Y.	110	89	10	5	1	5	6
Trenton, N.J.	46	35	10	1	-	-	2
Utica, N.Y.	19	15	4	-	-	-	1
Yonkers, N.Y.	31	26	2	2	1	-	4
E.N. CENTRAL	2,130	1,487	401	104	51	86	115
Akron, Ohio	52	34	10	6	2	-	2
Canton, Ohio	51	37	10	3	1	-	4
Chicago, Ill.	461	352	58	9	10	32	19
Cincinnati, Ohio	112	78	21	5	4	4	13
Cleveland, Ohio	155	90	40	15	5	5	4
Columbus, Ohio	158	110	38	6	2	2	3
Dayton, Ohio	122	91	23	6	-	2	15
Detroit, Mich.	234	134	48	24	9	18	5
Evansville, Ind.	35	23	11	1	-	-	-
Fort Wayne, Ind.	58	47	8	1	1	1	4
Gary, Ind.	17	12	3	2	-	-	-
Grand Rapids, Mich.	55	39	15	-	-	1	4
Indianapolis, Ind.	188	122	44	5	7	10	11
Madison, Wis.	40	25	8	2	2	3	2
Milwaukee, Wis.	138	99	23	9	3	4	13
Peoria, Ill.	51	41	8	1	1	-	7
Rockford, Ill.	42	35	6	1	-	-	4
South Bend, Ind.	42	35	6	1	-	-	1
Toledo, Ohio	119	83	21	7	4	4	4
Youngstown, Ohio§	U	U	U	U	U	U	U
W.N. CENTRAL	825	601	129	44	20	31	49
Des Moines, Iowa	65	46	8	4	2	5	8
Duluth, Minn.	33	25	5	2	1	-	2
Kansas City, Kans.	34	24	4	3	-	3	2
Kansas City, Mo.	130	87	27	10	3	3	6
Lincoln, Nebr.	29	24	4	-	1	-	-
Minneapolis, Minn.	174	131	27	9	2	5	14
Omaha, Nebr.	106	72	20	3	3	8	8
St. Louis, Mo.	130	98	18	6	6	2	4
St. Paul, Minn.	75	57	9	3	2	4	5
Wichita, Kans.	49	37	7	4	-	1	-

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
S. ATLANTIC	1,651	1,043	333	164	54	54	102
Atlanta, Ga.	182	104	39	27	4	8	4
Baltimore, Md.	460	304	97	40	12	7	36
Charlotte, N.C.	86	49	20	10	4	3	6
Jacksonville, Fla.	141	100	20	10	5	6	13
Miami, Fla.	104	53	32	16	1	2	2
Norfolk, Va.	67	37	10	7	5	6	6
Richmond, Va.	81	42	18	10	2	9	5
Savannah, Ga.	61	43	11	6	-	1	8
St. Petersburg, Fla.	102	77	14	7	2	2	3
Tampa, Fla.	163	115	30	12	3	2	15
Washington, D.C.	180	98	40	18	16	8	4
Wilmington, Del.	24	21	2	1	-	-	-
E.S. CENTRAL	809	552	139	66	19	32	58
Birmingham, Ala.	137	96	22	9	3	7	5
Chattanooga, Tenn.	71	52	12	6	-	1	6
Knoxville, Tenn.	92	57	21	8	1	5	9
Louisville, Ky.	83	56	13	9	2	3	8
Memphis, Tenn.	188	130	28	17	6	7	13
Mobile, Ala.	50	29	8	4	4	4	3
Montgomery, Ala.	31	25	2	2	1	1	3
Nashville, Tenn.	157	107	33	11	2	4	11
W.S. CENTRAL	1,439	928	281	131	53	46	90
Austin, Tex.	69	49	11	5	2	2	3
Baton Rouge, La.	34	25	6	1	1	1	2
Corpus Christi, Tex.	60	42	9	6	2	1	4
Dallas, Tex.	219	130	41	27	11	10	10
El Paso, Tex.	78	54	14	5	3	2	4
Fort Worth, Tex.	133	89	23	10	3	8	7
Houston, Tex.	333	195	78	38	15	7	39
Little Rock, Ark.	63	42	12	5	3	1	4
New Orleans, La.	103	67	26	8	2	-	-
San Antonio, Tex.	191	126	34	15	8	8	8
Shreveport, La.	56	39	11	5	-	1	4
Tulsa, Okla.	100	70	16	6	3	5	5
MOUNTAIN	666	457	112	63	21	13	40
Albuquerque, N. Mex.	101	70	17	11	2	1	7
Colo. Springs, Colo.	49	35	6	3	5	-	5
Denver, Colo.	132	93	21	8	4	6	6
Las Vegas, Nev.	147	91	35	16	4	1	5
Ogden, Utah	22	18	1	2	-	1	1
Phoenix, Ariz.§	U	U	U	U	U	U	U
Pueblo, Colo.	27	21	3	2	-	1	4
Salt Lake City, Utah	56	32	12	6	4	2	2
Tucson, Ariz.	132	97	17	15	2	1	10
PACIFIC	2,064	1,366	401	195	59	36	152
Berkeley, Calif.	15	10	4	1	-	-	-
Fresno, Calif.	112	81	18	10	2	1	13
Glendale, Calif.	23	19	3	1	-	-	1
Honolulu, Hawaii	80	54	20	4	-	2	12
Long Beach, Calif.	79	55	16	1	2	5	8
Los Angeles Calif.	591	386	103	72	18	5	37
Oakland, Calif.§	U	U	U	U	U	U	U
Pasadena, Calif.	18	14	1	1	2	-	2
Portland, Oreg.	120	80	21	14	3	2	4
Sacramento, Calif.	183	121	39	10	6	7	20
San Diego, Calif.	203	133	46	14	6	4	25
San Francisco, Calif.	163	99	28	27	7	2	4
San Jose, Calif.	200	137	36	16	7	4	17
Seattle, Wash.	126	74	31	16	2	3	1
Spokane, Wash.	55	44	8	3	-	-	5
Tacoma, Wash.	96	59	27	5	4	1	3
TOTAL	11,720††	7,953	2,167	918	328	342	800

*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.

§Report for this week is unavailable (U).

Campylobacter *Enteritis* — *Continued*

Reported by: J Stehr-Green, MD, New Zealand Communicable Disease Centre, Porirua; P Mitchell, MB BS, C Nicholls, RGON, S McEwan, Dip Home Science, A Payne, BSc (Hons), Canterbury Area Health Board, Christchurch, New Zealand. Enteric Diseases Br, Div of Bacterial Diseases, Center for Infectious Diseases, CDC.

Editorial Note: *C. jejuni* is the most common bacterial cause of gastroenteritis in the developed world (*1*). *C. jejuni* is frequently cultured from stool samples from patients with diarrhea in Africa, Australia, Europe, and North America and has been isolated from patients with diarrhea more frequently than *Salmonella* and *Shigella* combined (*2*). During 1989, in the United States, state health departments reported 7970 isolates of *C. jejuni* through CDC's *Campylobacter* Surveillance System; in New Zealand, *Campylobacter* infections accounted for 67% of reported gastrointestinal illnesses (*3*).

Most outbreaks of *C. jejuni* enteritis have been associated with consumption of raw milk or contaminated water (*4*). In the first known outbreak of waterborne campylobacteriosis, approximately 3000 persons in Bennington, Vermont, developed *C. jejuni* enteritis after the town's water system became contaminated with water from an unfiltered source (*5*). As in the New Zealand outbreak, boiling of water and other interim control measures were effective in stemming the outbreak. Waterborne outbreaks of *C. jejuni* infection reported to CDC from 1978 through 1986 were all associated with consumption of untreated surface water or inadequately chlorinated water. No reported outbreaks of *Campylobacter* enteritis have been associated with treated water.

Although other outbreaks such as that in Christchurch have been reported, most *Campylobacter* infections occur as sporadic cases (*6*). As with *Salmonella*, foods of animal origin are the most important sources of *Campylobacter*. In the United States, poultry is the most common source of sporadic infections (*7,8*). Epidemiologic investigations have also implicated raw milk (*9*), eggs, beef (*6*), contaminated water (*5*), and contact with infected animals, including cats and puppies (*7,10*).

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Current Trends

Update: Graphic Method for Presentation of Notifiable Disease Data — United States, 1990

Since April 1990, data from the National Notifiable Diseases Surveillance System for 14 diseases have been published in a graphic format in the *MMWR* (Figure I, page 118) (*1*). The bar graph compares provisional reports for a 4-week period with the mean of 15 4-week totals (from the previous, comparable, and subsequent 4-week periods for the last 5 years) (*2*). Ratios that exceed national historical limits (calculated based on two standard deviations of the historical baseline) are indicated by striping in the bars. This report summarizes an evaluation of this new method.

To evaluate the method, state health departments provided supplemental information for diseases that exceeded historical limits during the first 6 months (April–September 1990) of publication of Figure I. For each interval in which a disease exceeded historical limits, the excess cases were usually accounted for by increased reports received from six or fewer states. The only exception was measles, which exceeded historical limits every 4-week period after April 21, 1990; increased measles activity was reported from most states (*3*).

Explanations for the increased number of reported cases of a given disease were readily available from most state health departments (Table 1); in some states, increased reports from multiple counties accounted for the increase, and no epidemiologic linkage was identified. Batch reporting of endemic or epidemic disease was often identified as a contributing factor in increased reports. For diseases with relatively small numbers of cases reported nationally (i.e., pertussis, legionellosis, and rubella), small increases in reporting caused totals to exceed historical limits.

TABLE 1. Dates when historical limits for specified diseases were first exceeded for a 4-week period, by state with increased disease activity and epidemiologic findings — periods ending April 7–September 29, 1990

Date limit exceeded	Disease	State	Finding
April 7	Legionellosis	New York	Nosocomial outbreaks
		Pennsylvania	Batch reporting*
	Rubella	California	Prison, college, and community outbreaks
April 28	Measles	Multiple states	Ongoing outbreaks
May 5	Pertussis	New York	Batch reporting from outbreak in Amish community
June 30	Pertussis	Montana	Outbreak in religious community
		Massachusetts	Middle school outbreak
		Indiana	Household outbreak
August 11	Legionellosis	Maryland	Batch reporting from outbreak
		Michigan	Community cluster
		New York	Improved laboratory-based reporting
August 18	Rubella	Texas	Batch reporting

*Batch reporting occurs when disease reports accumulated over time are included in the current week's reports to CDC. No analytic method based on week of report can distinguish batch reporting from an outbreak; however, the distinction can be made by examining dates of onset.

Graphic Presentation — Continued

Many of the events reported by state health departments were small outbreaks; however, when aggregated with other nationally reported events, these outbreaks were sufficient to result in numbers exceeding historical limits. This method detected one ongoing outbreak of substantial public health importance in California; multiple outbreaks of rubella, primarily in unvaccinated adults, accounted for the increases in reporting (*4*).

Reported by: CH Woernle, MD, State Epidemiologist, Alabama Dept of Public Health. L Dales, MD, GW Rutherford, III, MD, State Epidemiologist, California Dept of Health Svcs. R Hamm, MD, W Staggs, ML Fleissner, DrPH, State Epidemiologist, Indiana State Board of Health. DM Dwyer, MD, E Israel, MD, State Epidemiologist, Maryland State Dept of Health and Mental Hygiene. T Pugliese, A DeMaria, MD, State Epidemiologist, Massachusetts Dept of Public Health. WN Hall, MD, MG Stobierski, DVM, KR Wilcox, Jr, MD, State Epidemiologist, Michigan Dept of Public Health. D Schneider, JK Gedrose, MN, State Epidemiologist, Montana State Dept of Health and Environmental Sciences. S Kondracki, DL Morse, MD, State Epidemiologist, New York State Dept of Health. E Bell, A Goodman, MD, City Epidemiologist, New York City Dept of Health. DR Tavris, MD, Pennsylvania Dept of Health. DM Simpson, MD, State Epidemiologist, Texas Dept of Health. Surveillance, Investigations, and Research Br, Div of Immunization, Center for Prevention Svcs; Respiratory Diseases Br, Div of Bacterial and Mycotic Diseases, Center for Infectious Diseases; Div of Surveillance and Epidemiology, Epidemiology Program Office, CDC.

Editorial Note: Limitations of routine national surveillance data for notifiable diseases have been described (*5,6*). However, follow-up of the graphic presentation of weekly surveillance data for 14 nationally notifiable diseases suggests that ongoing routine analysis of weekly provisional reports at the national level may detect changes from historical patterns that signal the need for public health intervention. Although the specificity of this method appears high, its sensitivity is unknown.

The method used to produce Figure I is not designed to detect all epidemics (*2*). Use of the previous 5-year average as the baseline for comparison may not detect all changes in disease reporting if large variations in disease case counts occurred during the baseline period. For example, the failure of the graphic method to demonstrate an increase in measles activity for the 4-week periods ending April 7–April 21 was due to increased measles activity during the baseline period used for comparison. In addition, outbreaks at the state or local level may be obscured when combined with other reports. The extent to which this occurred during April–September 1990 is unknown; however, preliminary information from a pilot project in progress suggests that the same analytic approach at the state level may be useful (CDC, unpublished data).

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Notice to Readers

Surgeon General's Conference on Agricultural Safety and Health

On April 30–May 3, 1991, CDC's National Institute for Occupational Safety and Health (NIOSH) will sponsor the Surgeon General's Conference on Agricultural Safety and Health in Des Moines, Iowa. Its purpose is to build coalitions, disseminate information, and encourage action to prevent injury and disease related to agriculture. The conference theme, "FarmSafe 2000: A National Coalition for Local Action," emphasizes the need to establish a national agenda that will guide local health strategies for reducing risks in agriculture through the 1990s. Topics include surveillance, research, and intervention.

Additional information and applications for a poster session are available from the Executive Secretary, Program Planning Committee, NIOSH, Mailstop D-37, CDC, 1600 Clifton Road, NE, Atlanta, GA 30333; telephone (404) 639-2376; FAX (404) 639-2196.

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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. Accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials, as well as matters pertaining to editorial or other textual considerations should be addressed to: Editor, *Morbidity and Mortality Weekly Report*, Mailstop C-08, Centers for Disease Control, Atlanta, Georgia 30333; telephone (404) 332-4555.

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