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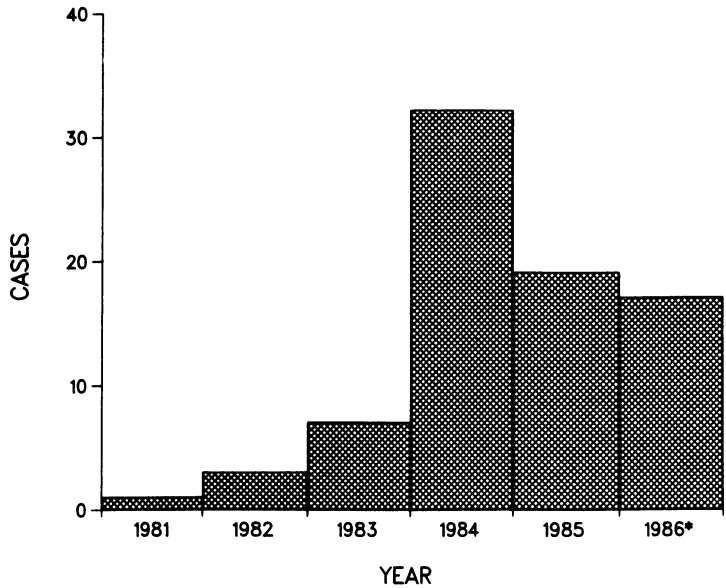
Epidemiologic Notes and Reports

Acquired Immunodeficiency Syndrome (AIDS) in Western Palm Beach County, Florida

From July 1982 through September 15, 1986, 79 persons meeting the surveillance case definition for acquired immunodeficiency syndrome (AIDS) were reported from western Palm Beach County, Florida. These patients were residents of the towns of Belle Glade (62 case-patients), Pahokee (seven case-patients), and South Bay (10 case-patients) at the time of onset of their illnesses. The number of cases is shown by year of diagnosis in Figure 1. Based upon 1980 census data, the calculated cumulative incidence for AIDS in these three towns is 295/100,000 population. In comparison, the overall cumulative incidence for AIDS in the United States is 10.8/100,000.

Selected characteristics of these 79 AIDS patients are listed in Table 1. Sixty-four patients

FIGURE 1. Acquired immunodeficiency syndrome cases, by year of diagnosis — western Palm Beach County, Florida, 1981-1986



*Cases reported through September 15, 1986.

AIDS – Continued

were male; all but three of the patients were at least 13 years of age. The three pediatric patients were born to mothers infected with human lymphotropic virus type-III/lymphadenopathy-associated virus (HTLV-III/LAV), the virus that causes AIDS.* Of the 76 adult patients, 63 (82.8%) were members of population groups known to be at increased risk for HTLV-III/LAV infection or were born in Haiti, a country in which heterosexual contact plays a major role in transmission of HTLV-III/LAV (*1,2*). The remaining 13 (11 men, two women) adult patients had no reported risk factors for AIDS, but 10 of these 13 died before epidemiologic investigations could be completed.

Compared with other adult AIDS case-patients reported from Florida in the period, adult AIDS patients from western Palm Beach County were more likely to be reported as heterosexual intravenous (IV) drug abusers (31.6% vs. 13.1%, $p < 0.05$), as sex partners of persons at increased risk of having AIDS (35.5% vs. 18.5%, $p < 0.01$), or as persons with no reported risk factors for AIDS (17.1% vs. 4.8%, $p < 0.01$).

Detailed information is available for the 62 case-patients from Belle Glade. Most of the AIDS patients lived in an area in the central part of town, comprising a population of 7,207 persons (1980 Decennial Census, Neighborhood Statistics Program). This area of Belle Glade is characterized by high rates of IV drug abuse and sexually transmitted diseases (*3*). Investigations in May 1985, May 1986, and August 1986 revealed that 19 adults with AIDS in Belle Glade could be directly linked to at least one other reported AIDS case by sexual contact, by sharing of needles during IV drug abuse, or both. These linked patients account for 32.2% of the 59 adult AIDS case-patients reported from Belle Glade between February 1982 and August 1986. Five of the 10 adult women reported as having AIDS during this time were prostitutes; four of the five were also IV drug abusers.

To evaluate the prevalence of and risk factors for HTLV-III/LAV infection in Belle Glade, a community-wide study was conducted from February through September 1986 by the Florida Department of Health and Rehabilitative Services (DHRS) and CDC. The town was divided into neighborhoods as determined by the 1980 decennial census. A proportionate-sampling scheme was used to interview and test persons living in and around the neighborhoods in

*The designation "human immunodeficiency virus" (HIV) has been accepted by a subcommittee of the International Committee for the Taxonomy of Viruses as the appropriate name for the retrovirus that has been implicated as the causative agent of AIDS (Science 1986;232:697).

Table 1. AIDS cases in western Palm Beach County, Florida, by patient characteristics, city of residence, and sex, September 15, 1986

Characteristics	Belle Glade		Pahokee/South Bay		Total (%)
	Male	Female	Male	Female	
Adult patients					
Homosexual/bisexual	9	0	1	0	10 (12.7)
Heterosexual IV drug abuser	10	4	8	2	24 (30.4)
Transfusion-associated	0	2	0	0	2 (2.5)
Heterosexual patient*	23	3	1	0	27 (34.2)
None of the above	7	1	4	1	13 (16.5)
Pediatric patients					
Mother with AIDS	1	2	0	0	3 (3.8)
Total	**50**	**12**	**14**	**3**	**79(~100.0)**

*Includes 10 persons who had heterosexual contact with a person with AIDS or at increased risk of AIDS, and 17 persons born in Haiti, where heterosexual transmission is believed to play a major role.

AIDS – Continued

which most of the AIDS patients resided. Preliminary results of this study indicate that 30 (3.1%) of 959 persons tested had detectable antibodies to HTLV-III/LAV by both enzyme immunoassay and Western-blot methods. One of the 30 persons had been diagnosed as having AIDS.

Sex-, age-, and race-specific seroprevalence rates have been calculated for the first 736 persons for whom data entry has been completed. Fourteen (3.7%) of 378 males and 12 (3.4%) of 358 females had antibodies to HTLV-III/LAV. None of 121 children ages 2-10 years had antibodies to HTLV-III/LAV. Other HTLV-III/LAV-antibody prevalence rates by age group were as follow: 14 (8.9%) of 157 persons ages 18-29; seven (4.4%) of 160 persons ages 30-39; two (1.8%) of 113 persons ages 40-49; three (3.2%) of 91 persons ages 50-59; and none of 94 persons over 60 years of age. Eighty-eight percent of seropositive adults were ages 18-49 years; 90% of adult AIDS case-patients reported in the United States are in that same age group. Twenty-six (4.2%) of 616 black-not-Hispanic persons tested had antibodies to HTLV-III/LAV, including 13 (8.7%) of 150 persons born in Haiti. None of 42 Hispanic persons and none of 60 white-not-Hispanic persons were seropositive. There was no clustering of persons infected with HTLV-III/LAV within households, except for four instances of infection involving two pairs of sexual partners. Further analyses are in progress to determine specific risk factors for infection.

Arthropods have been hypothesized as a mode of HTLV-III/LAV transmission in Belle Glade (*4*). As a measure of exposure to different mosquito vectors and antibody prevalence, samples obtained during the serosurvey were tested by the serum dilution-plaque reduction neutralization method in the Division of Vector-Borne Viral Diseases, CDC, for antibodies to five arboviruses (Tensaw, Maguari, Keystone, Saint Louis encephalitis, and dengue-2) prevalent in South Florida or the Caribbean (Table 2). There was no significant difference in prevalence of antibodies to these arboviruses between HTLV-III/LAV-infected and -noninfected persons. The lack of association between detection of antibodies to HTLV-III/LAV and antibodies to these arboviruses extends the findings of an earlier pilot study that included these and four other arboviruses (Pahayokee, Shark River, Gumbo Limbo, and Mahogany Hammock) indigenous to South Florida (*5*).

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Editorial Note: The high rate of AIDS in western Palm Beach County has focused national attention on this area. The cumulative AIDS incidence in this area (295/100,000 population) is

TABLE 2. Results of testing* for antibody to five arboviruses, by HTLV-III/LAV antibody status, community survey, Belle Glade, Florida, 1986

HTLV-III/LAV antibody status	Number of persons positive for antibody to arbovirus				
	Tensaw	Maguari	Keystone	St. Louis encephalitis	Dengue-2†
Positive (n=27)	1 (3.7%)	3 (11.1%)	1 (3.7%)	3 (11.1%)	8 (29.6%)
Negative (n=603)	81 (13.4%)	106 (17.6%)	79 (13.1%)	79 (13.1%)	91 (15.1%)

*Serum dilution-plaque reduction neutralization technique.

†This difference is not statistically significant by the Cochran-Mantel-Haenszel test for association between HTLV-III/LAV and dengue-2, after controlling for previous residence in Haiti, where dengue viruses are endemic.

AIDS – Continued

comparable to that of the City of San Francisco (316/100,000) and the borough of Manhattan (270/100,000)—areas with the highest incidence of AIDS in the United States. In western Palm Beach County, the high cumulative rate is largely the result of high rates of AIDS among IV drug abusers and their sexual partners.

Thirteen (17.1%) of 76 adult patients in western Palm Beach County with AIDS had no reported risk factors. Although this proportion is significantly higher than in other areas in Florida, 10 of the 13 case-patients died before they could be comprehensively interviewed to obtain additional epidemiologic information on risk factors. Nationally, 72.9% of AIDS case-patients who were initially reported as persons without known risk factors, and who were available for follow-up, have been reclassified (*6*). AIDS cases are not categorized as resulting from heterosexual transmission unless the index partner of the AIDS patient is known a) to be infected with HTLV-III/LAV, b) to have AIDS, or c) to belong to another risk group. Therefore, if no such information is available concerning the relevant sexual partners, a case is characterized as having no risk factors.

Thus far, findings of the community-based study demonstrate a high prevalence of HTLV-III/LAV infection among younger adults of both sexes (i.e.,.18-29 years of age), while no children and no adults over age 60 have had evidence of infection with HTLV-III/LAV. Additionally, serologic findings for household members of HTLV-III/LAV-infected persons did not show any evidence of viral transmission through casual contact. Infection with HTLV-III/LAV was not associated with arbovirus infection, suggesting that HTLV-III/LAV-infected persons were not more likely than persons without HTLV-III/LAV infection to have been exposed to mosquitoes. Thus, the hypothesis that arthropods have transmitted HTLV-III/LAV in Belle Glade is not supported by AIDS surveillance data, age-specific rates of HTLV-III/LAV infection, and the arbovirus serologic studies.

The available epidemiologic evidence suggests that HTLV-III/LAV infection in Belle Glade results predominantly from sexual transmission and the use of contaminated needles for injecting drugs intravenously. The U.S. Public Health Service has published guidelines to prevent sexual and drug-abuse-related transmission of HTLV-III/LAV (*7*). In this setting of a high cumulative rate of AIDS and a high prevalence of HTLV-III/LAV infection, programs to promote risk-reduction practices must be expanded and adopted. Additionally, voluntary serologic testing combined with health education and counseling should continue to be available to enhance reduction of HTLV-III/LAV transmission.

The ongoing analyses of the community-wide DHRS/CDC study should further clarify specific risk factors for HTLV-III/LAV infection in Belle Glade and provide a basis for additional public health recommendations for the prevention of infection with this virus.

References

1. Pape JW, Liautaud B, Thomas F, et al. The acquired immunodeficiency syndrome in Haiti. Ann Int Med 1985;103:674-8.
2. Castro KG, Fischl MA, Landesman SH, et al. Risk factors for AIDS among Haitians in the United States. Presented at the International Conference on AIDS, Atlanta, April 16, 1985.
3. Tavris D, Palm Beach County Health Department. Personal communication.
4. Whiteside ME, Withum D, Tavris D, McCleod C. Outbreak of no-identifiable-risk acquired immunodeficiency syndrome (AIDS) in Belle Glade, Florida. Presented at the International Conference on AIDS, Atlanta, April 17, 1985.
5. Castro K, Lieb S, Calisher C, et al. Seroepidemiologic studies of HTLV-III/LAV infection in Belle Glade, Florida. Presented at the Second International Conference on AIDS, Paris, June 25, 1986.
6. Lifson AR, Castro KG, White CR, Narkunas JP, Lekatsas A, Ksell TE, Ward B. "No identified risk" AIDS cases. In: Program and abstracts of the 26th Interscience Conference on Antimicrobial Agents and Chemotherapy. September 28-October 1, 1986. Abstract #1013, p. 283.
7. CDC. Additional recommendations to reduce sexual and drug abuse-related transmission of human T-lymphotropic virus type III/lymphadenopathy-associated virus. MMWR 1986;35:152-5.

Current Trends

Leading Work-Related Diseases and Injuries

The National Institute for Occupational Safety and Health (NIOSH) has developed a suggested list of 10 leading work-related diseases and injuries and has described the first nine categories on that list. A discussion of the tenth and final category, Psychological Disorders, appears below.*

PSYCHOLOGICAL DISORDERS

There is increasing evidence that an unsatisfactory work environment may contribute to psychological disorders. Studies have shown that factors contributing to an unsatisfactory work environment may include work overload, lack of control over one's work, nonsupportive supervisors or co-workers, limited job opportunities, role ambiguity or conflict, rotating shiftwork, and machine-paced work (*1-4*). Psychological disorders that can result from such factors may be classified as a) affective disturbances (e.g., anxiety, irritability), b) behavioral problems (e.g., substance abuse, sleep difficulties), c) psychiatric disorders (e.g., neuroses), and d) somatic complaints (e.g., headache, gastrointestinal symptoms). In addition to psychological disorders, stressful working conditions may have a systemic influence, possibly affecting the etiology and/or prognosis of other disease states, as suggested by recent studies of stress-related immunologic suppression (*5*).

Although data bases currently available for determining the extent of work-related psychological disorders are limited, several indicators suggest that these problems impose substantial health and financial costs in the United States. A recent study in California showed that claims for the development of "work-related neuroses" more than doubled during 1980-1982; claims for all other disabling work-related injuries during the same period actually decreased by about one-tenth (*6*). A study of representative medical claims throughout the country showed that during 1980-1982 claims for "mental stress" that developed gradually (i.e., a chronic problem unrelated to a single traumatic incident or to any physical work-related disorder) accounted for about 11% of all occupational disease claims (*7*). Average medical costs and indemnity payments in 1981-1982 for these forms of mental stress actually surpassed the average amounts for other occupational diseases (*7*). The American Psychiatric Association now lists occupational stress in its *Diagnostic and Statistical Manual* as a subcategory of the major diagnostic axis of "psychosocial stress" (*8*).

There are increasing data on the relationship between specific working conditions and psychological disorders. For example, in a questionnaire survey of over 2,000 workers in 23 different occupations, strong occupational differences were found in psychosocial job stressors and in somatic and affective complaints (*1*). Ratings of boring, repetitive job tasks and role ambiguity were more prominent among several classes of blue-collar workers (e.g., assembly-line workers, fork-lift truck drivers, and machine operators) than among white-collar professionals (e.g., professors and family physicians). The most satisfied occupational groups were physicians, professors, and white-collar supervisors. Groups experiencing the highest levels of job stressors and their resultant ill effects were assemblers and relief workers on machine-paced assembly lines.

NIOSH investigators ranked 130 occupations by rate of admission to community mental health centers in Tennessee to determine the relative risk of psychological or stress-related

*References to the previous articles are given in the most recent article: MMWR 1986;35:561.

Work-Related Diseases and Injuries – Continued

disorders by occupation (*9*). Heading the list were jobs in health care, service occupations, and blue-collar factory work—which tend to be characterized by stress-producing conditions such as a lack of control over the job by the worker, repetitive work, shift work, and a responsibility for others.† In other studies, workers on night and rotating shifts (including the health-care occupations) reported more disturbances of sleep; altered eating habits; and higher rates of visits to clinics, absences due to sickness, and on-the-job injuries than did those on fixed day shifts (*10-12*).

Work environments characterized by technological innovation have also been investigated; a major focus has been on office work influenced by the introduction of computers (*13,14*). "Adverse working conditions" (e.g., poorer physical environment, reduced job control and social support) tend to be reported more frequently by workers using new-technology office equipment such as video display terminals. Some of these conditions have been linked to chronic stress-related disorders (*4,15*).

†These results represent findings in only one state (Tennessee), and occupational groups may differ considerably in their patterns of use of community mental health centers.

(Continued on page 619)

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

Disease	39th Week Ending			Cumulative, 39th Week Ending		
	Sept. 27, 1986	Sept. 28, 1985	Median 1981-1985	Sept. 27, 1986	Sept. 28, 1985	Median 1981-1985
Acquired Immunodeficiency Syndrome (AIDS)	135	198	N	9,563	5,782	N
Aseptic meningitis	389	489	369	7,072	6,993	6,921
Encephalitis: Primary (arthropod-borne & unspec.)	48	36	65	855	896	1,099
Post-infectious	1	1	-	82	101	75
Gonorrhea: Civilian	17,716	19,095	19,242	651,029	662,548	672,604
Military	306	438	438	12,280	16,004	18,263
Hepatitis: Type A	442	564	489	16,406	16,523	16,523
Type B	423	645	482	19,101	19,241	17,834
Non A, Non B	47	97	N	2,605	3,103	N
Unspecified	66	139	162	3,374	4,266	5,399
Legionellosis	24	24	N	516	553	N
Leprosy	2	5	5	187	286	189
Malaria	41	19	26	822	780	780
Measles: Total*	39	37	23	5,471	2,508	2,338
Indigenous	39	33	N	5,201	2,083	N
Imported	-	4	N	270	425	N
Meningococcal infections: Total	34	34	34	1,901	1,813	2,113
Civilian	34	34	34	1,899	1,807	2,109
Military	-	-	-	2	6	11
Mumps	75	32	45	3,618	2,305	2,532
Pertussis	109	103	84	2,405	2,383	1,823
Rubella (German measles)	7	5	7	423	560	793
Syphilis (Primary & Secondary): Civilian	991	706	655	19,871	20,079	22,891
Military	2	9	8	126	135	286
Toxic Shock syndrome	10	2	N	265	285	N
Tuberculosis	521	417	500	16,315	15,848	17,507
Tularemia	6	4	5	112	136	205
Typhoid fever	10	14	13	221	276	297
Typhus fever, tick-borne (RMSF)	27	16	16	628	583	872
Rabies, animal	106	127	127	4,130	4,074	4,819

TABLE II. Notifiable diseases of low frequency, United States

	Cum 1986		Cum 1986
Anthrax	-	Leptospirosis (Fla. 1, Ark. 1)	27
Botulism: Foodborne (Alaska 3)	10	Plague	7
Infant	39	Poliomyelitis, Paralytic	1
Other	1	Psittacosis (Calif. 1)	76
Brucellosis (Mo. 1, S. Dak. 1, Ark. 1, Calif. 1)	61	Rabies, human	-
Cholera	2	Tetanus (Ark. 1, La. 1)	53
Congenital rubella syndrome (Calif. 1)	9	Trichinosis	30
Congenital syphilis, ages < 1 year	107	Typhus fever, flea-borne (endemic, murine)	35
Diphtheria	-		

*There were no cases of internationally imported measles reported for this week.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending September 27, 1986 and September 28, 1985 (39th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum 1986	1986	Cum 1986	Cum 1986	Cum 1986	Cum 1985	1986	1986	1986	1986	1986	Cum 1986
UNITED STATES	9,563	389	855	82	651,029	662,548	442	423	47	66	24	187
NEW ENGLAND	403	9	21	3	17,055	17,157	10	41	3	5	2	6
Maine	17	1	-	-	667	852	-	4	-	-	-	-
N H	10	1	2	-	423	419	-	2	-	-	-	-
Vt	4	-	3	2	195	253	2	-	-	-	-	-
Mass	212	3	5	-	6,649	6,824	3	24	1	5	2	6
R I	26	1	-	-	1,309	1,380	2	3	1	-	-	-
Conn	134	3	11	1	7,812	7,429	3	8	1	-	-	-
MID ATLANTIC	3,571	64	86	7	109,406	95,831	22	37	2	1	-	12
Upstate N Y	359	28	32	4	13,346	13,029	10	23	1	1	-	1
N Y City	2,418	-	18	-	62,056	47,406	-	-	-	-	-	10
N J	558	15	10	-	14,524	14,612	-	-	-	-	-	-
Pa	236	21	26	3	19,480	20,784	12	14	1	-	-	1
E N CENTRAL	592	75	251	11	83,496	88,854	10	29	-	2	5	4
Ohio	131	34	87	3	21,210	23,059	5	16	-	-	5	-
Ind	55	U	59	3	9,143	9,692	U	U	U	U	U	-
Ill	274	2	42	4	22,508	22,119	-	-	-	-	-	3
Mich	104	39	42	1	27,516	25,363	5	13	-	2	-	1
Wis	28	-	21	-	3,119	8,621	-	-	-	-	-	-
W N CENTRAL	175	8	53	9	28,232	30,761	7	26	-	-	5	3
Minn	60	-	21	-	4,048	4,598	-	7	-	-	-	1
Iowa	13	1	16	-	2,885	3,300	-	-	-	-	4	-
Mo	64	6	1	-	14,201	14,878	3	12	-	-	-	-
N Dak	2	-	1	-	247	210	-	-	-	-	-	-
S Dak	1	1	11	-	594	590	-	1	-	-	-	-
Nebr	8	-	-	1	2,142	2,524	1	1	-	-	1	-
Kans	27	-	3	8	4,115	4,661	3	5	-	-	-	2
S ATLANTIC	1,262	88	114	29	170,483	172,495	43	92	12	4	2	2
Del	19	3	6	-	2,777	3,280	4	2	-	-	-	-
Md	123	8	26	1	19,606	22,135	1	16	2	-	-	-
D C	168	1	-	1	12,647	11,630	-	1	-	-	-	-
Va	119	19	33	1	14,039	14,376	2	22	-	1	-	1
W Va	7	11	33	-	1,723	1,959	1	2	-	-	-	-
N C	56	22	14	1	26,352	26,914	2	11	1	-	1	-
S C	33	1	-	-	14,840	16,525	-	9	1	-	-	-
Ga	197	7	-	1	28,527	34,591	2	5	1	1	1	-
Fla	540	16	2	24	49,972	41,085	31	24	7	2	-	1
E S CENTRAL	112	16	53	4	52,892	56,475	6	40	5	1	1	1
Ky	25	5	27	1	5,666	6,486	-	4	-	-	-	-
Tenn	53	6	5	1	20,315	21,475	4	19	1	1	-	-
Ala	20	5	20	2	15,329	17,067	-	11	4	-	1	1
Miss	14	-	1	-	11,582	11,447	2	6	-	-	-	-
W S CENTRAL	735	69	124	6	77,676	83,720	55	30	6	10	5	19
Ark	24	-	-	2	7,277	8,159	9	5	-	-	1	1
La	119	9	6	-	13,861	16,091	3	4	-	-	-	1
Okla	27	14	19	-	8,887	9,253	11	8	4	-	1	-
Tex	565	46	99	4	47,651	50,217	32	13	2	10	3	17
MOUNTAIN	253	5	27	1	19,270	20,531	46	17	3	5	4	11
Mont	4	-	1	1	515	573	-	3	-	-	-	-
Idaho	3	-	-	-	648	659	24	1	-	1	-	-
Wyo	4	1	2	-	414	478	-	-	-	-	-	-
Colo	118	-	4	-	4,938	6,059	-	3	3	-	-	3
N Mex	20	1	3	-	1,898	2,386	8	4	-	-	1	-
Ariz	63	2	9	-	6,268	6,005	11	5	-	4	2	5
Utah	13	1	6	-	829	942	3	1	-	-	-	1
Nev	28	-	2	-	3,760	3,429	-	-	-	-	1	2
PACIFIC	2,460	55	126	12	92,519	96,724	243	111	16	38	-	129
Wash	119	5	11	-	6,953	7,464	31	14	3	7	-	15
Oreg	48	-	-	-	3,896	4,846	20	8	2	-	-	-
Calif	2,243	41	110	12	78,646	80,811	185	83	11	30	-	89
Alaska	11	1	5	-	2,055	2,249	5	1	-	-	-	-
Hawaii	39	8	-	-	969	1,354	2	5	-	1	-	25
Guam	-	1	-	-	149	156	-	-	-	-	-	1
P R	77	1	5	1	1,820	2,467	5	12	-	-	-	7
V I	3	-	-	-	188	345	-	3	-	-	-	-
Pac Trust Terr	-	-	-	-	345	706	4	-	-	-	-	39
Amer Samoa	-	-	-	-	35	-	2	-	-	-	-	2

N Not notifiable U Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending September 27, 1986 and September 28, 1985 (39th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported *		Total									
	Cum. 1986	1986	Cum. 1986	1986	Cum. 1986	Cum. 1985	Cum. 1986	1986	Cum. 1986	1986	Cum. 1986	Cum. 1985	1986	Cum. 1986	Cum. 1985
UNITED STATES	822	39	5,201	-	270	2,508	1,901	75	3,618	109	2,405	2,383	7	423	560
NEW ENGLAND	53	-	82	-	15	126	130	-	53	1	124	111	-	9	12
Maine	2	-	12	-	1	1	24	-	-	-	2	8	-	-	-
N.H.	3	-	43	-	-	-	6	-	13	-	61	40	-	1	2
Vt.	1	-	-	-	-	-	16	-	3	-	3	3	-	1	-
Mass.	30	-	24	-	12	118	29	-	9	1	29	39	-	4	6
R.I.	7	-	2	-	-	-	18	-	9	-	5	14	-	2	-
Conn.	10	-	1	-	2	7	37	-	19	-	24	7	-	1	4
MID ATLANTIC	109	9	1,672	-	29	211	307	3	168	2	158	150	1	32	219
Upstate N.Y.	40	-	77	-	23	85	103	1	56	1	104	78	1	24	17
N.Y. City	29	9	668	-	4	69	66	-	29	-	3	21	-	5	177
N.J.	20	-	905	-	-	28	30	2	40	1	15	7	-	3	11
Pa.	20	-	22	-	2	29	108	-	43	-	36	44	-	-	14
E.N. CENTRAL	51	5	1,029	-	28	528	259	38	2,434	22	302	591	3	43	29
Ohio	15	-	-	-	10	55	104	8	108	21	138	76	-	1	-
Ind.	2	U	18	U	11	57	24	U	34	U	24	188	U	-	1
Ill.	15	4	683	-	4	297	68	19	1,818	1	32	56	3	32	12
Mich.	16	1	59	-	-	60	56	11	267	-	28	41	-	8	15
Wis.	3	-	269	-	3	59	7	-	207	-	80	230	-	2	1
W.N. CENTRAL	24	-	322	-	17	11	89	1	91	47	315	150	1	12	19
Minn.	6	-	45	-	4	6	17	-	1	-	48	77	1	1	2
Iowa	1	-	133	-	1	-	11	1	27	-	18	6	-	1	1
Mo.	10	-	25	-	6	2	31	-	17	-	18	28	-	1	7
N. Dak.	-	-	25	-	1	2	-	-	3	-	4	9	-	1	2
S. Dak.	-	-	-	-	-	-	5	-	1	-	14	2	-	-	-
Nebr.	4	-	-	-	-	-	10	-	-	-	7	4	-	-	-
Kans.	3	-	94	-	5	1	15	-	42	47	206	24	-	8	7
S. ATLANTIC	101	3	558	-	56	314	344	9	185	6	656	446	-	12	51
Del.	1	-	1	-	-	-	3	-	-	-	227	1	-	-	1
Md.	13	-	26	-	9	105	44	-	17	-	139	260	-	-	6
D.C.	1	-	-	-	2	24	4	-	-	-	-	-	-	-	-
Va.	25	-	36	-	24	28	59	1	35	-	34	14	-	-	2
W. Va.	4	-	2	-	-	33	3	1	41	-	23	4	-	-	9
N.C.	5	-	3	-	1	9	58	2	16	3	63	23	-	-	1
S.C.	6	-	274	-	-	3	32	-	12	2	18	2	-	-	3
Ga.	10	-	79	-	14	8	51	-	28	-	122	85	-	-	-
Fla.	36	3	137	-	6	104	90	5	36	1	30	57	-	12	29
E.S. CENTRAL	18	-	58	-	9	7	105	2	30	-	44	42	-	4	3
Ky.	5	-	-	-	6	5	24	-	6	-	5	8	-	4	3
Tenn.	1	-	55	-	1	1	37	2	19	-	16	19	-	-	-
Ala.	8	-	1	-	1	-	32	-	4	-	23	11	-	-	-
Miss.	4	-	2	-	1	1	12	-	1	-	-	4	-	-	-
W.S. CENTRAL	86	5	604	-	38	431	169	5	162	6	195	338	-	62	33
Ark.	1	-	276	-	2	-	26	-	7	2	14	14	-	-	1
La.	15	-	4	-	-	42	23	-	3	-	13	12	-	-	-
Okla.	10	-	37	-	2	1	22	N	N	4	105	144	-	-	1
Tex.	60	5	287	-	34	388	98	5	152	-	63	168	-	62	31
MOUNTAIN	31	1	301	-	26	538	94	7	222	13	235	175	-	23	6
Mont.	-	-	-	-	8	137	8	-	5	-	14	9	-	2	-
Idaho	1	-	1	-	-	137	4	-	8	7	40	12	-	-	2
Wyo.	-	-	-	-	-	4	2	-	-	-	4	-	-	1	-
Colo.	8	-	2	-	5	13	15	-	12	-	62	65	-	1	-
N. Mex.	5	1	33	-	7	6	9	N	N	-	20	11	-	-	2
Ariz.	11	-	252	-	6	241	21	3	178	6	56	33	-	2	1
Utah	3	-	12	-	-	-	9	3	13	-	35	45	-	14	-
Nev.	3	-	1	-	-	-	26	1	6	-	4	-	-	3	1
PACIFIC	349	16	575	-	52	342	404	10	273	12	376	380	2	226	188
Wash.	23	1	159	-	25	76	56	-	8	7	114	67	-	15	14
Oreg.	15	3	7	-	4	5	31	N	N	2	12	40	-	1	1
Calif.	310	12	382	-	22	237	300	8	239	2	237	227	2	205	124
Alaska	-	-	-	-	-	-	12	-	6	-	2	29	-	-	1
Hawaii	1	-	27	-	1	24	5	2	20	1	11	17	-	5	48
Guam	1	-	4	-	1	11	-	-	4	-	-	-	-	3	2
P.R.	4	3	36	-	-	63	3	-	31	-	13	10	-	60	25
V.I.	-	-	-	-	-	10	-	1	14	-	-	-	-	-	-
Pac. Trust Terr.	-	-	-	-	-	-	1	-	10	-	-	-	-	2	-
Amer. Samoa	-	-	2	-	-	-	-	-	4	-	-	-	-	1	-

*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 September 27, 1986 and September 28, 1985 (39th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum 1986	Cum 1985	1986	Cum 1986	Cum 1985	Cum 1986	Cum 1986	Cum 1986	Cum 1986
UNITED STATES	19,871	20,079	10	16,315	15,848	112	221	628+22	4,130
NEW ENGLAND	353	447	1	522	527	1	13	12	7
Maine	15	13	1	33	39	-	-	-	-
N H	10	35	-	19	18	-	-	2	1
Vt	8	6	-	14	5	-	-	-	1
Mass	194	222	-	281	315	1	11	4	-
R I	18	14	-	40	38	-	-	3	3
Conn	108	157	-	135	112	-	2	3	2
MID ATLANTIC	2,797	2,685	-	3,281	2,902	1	19	31+1	502
Upstate N Y	142	200	-	468	517	-	3	19	65
N Y City	1,580	1,641	-	1,703	1,403	-	8	5	-
N J	496	527	-	572	393	1	7	2	16
Pa	579	317	-	538	589	-	1	5	421
E N CENTRAL	702	791	1	1,951	1,942	-	17	53-3	108
Ohio	97	114	1	333	345	-	4	48-3	9
Ind	86	71	U	204	241	-	2	-	16
Ill	351	381	-	837	840	-	2	2	33
Mich	127	175	-	484	404	-	7	3	22
Wis	41	50	-	93	112	-	2	-	28
W N CENTRAL	161	170	-	494	443	32	8	44+5	644
Minn	28	35	-	110	93	-	1	1	92
Iowa	6	17	-	40	46	1	-	1	149
Mo	87	87	-	249	216	24	6	23 3	66
N Dak	3	2	-	6	8	-	-	1	135
S Dak	5	5	-	23	22	2	-	6	126
Nebr	11	7	-	11	13	1	-	4	25
Kans	21	17	-	55	45	4	1	8 2	51
S ATLANTIC	6,255	5,906	-	3,187	3,209	9	34	289+12	1,004
Del	48	29	-	33	33	-	1	1	1
Md	331	351	-	234	278	2	11	28	489
D C	215	261	-	111	123	1	4	-	27
Va	276	224	-	264	287	2	7	44	148
W Va	18	18	-	93	83	-	3	8	35
N C	379	521	-	443	402	1	3	105 5	9
S C	504	621	-	415	396	-	-	65 3	53
Ga	1,130	1,033	-	504	541	3	-	36 4	161
Fla	3,354	2,848	-	1,090	1,066	-	5	2	81
E S CENTRAL	1,278	1,563	1	1,466	1,396	8	3	84+4	277
Ky	58	54	-	336	335	3	-	20 1	72
Tenn	471	482	-	433	400	4	1	36 1	108
Ala	419	470	1	457	421	1	1	16 1	95
Miss	330	557	-	240	240	-	1	12 1	2
W S CENTRAL	3,920	4,586	-	2,052	2,016	52	17	106+3	585
Ark	187	244	-	280	213	37	-	8	132
La	674	813	-	346	303	1	1	-	18
Okla	103	145	-	189	194	9	1	83 3	53
Tex	2,956	3,384	-	1,237	1,306	5	15	15	382
MOUNTAIN	448	551	1	388	414	7	14	8	568
Mont	6	6	-	24	46	1	1	4	178
Idaho	10	5	-	17	20	-	-	-	8
Wyo	1	7	-	-	5	-	-	1	240
Colo	105	137	-	34	50	3	1	3	29
N Mex	55	106	-	77	73	1	1	-	6
Ariz	187	248	-	183	182	-	7	-	94
Utah	14	5	1	28	12	1	3	-	5
Nev	70	37	-	25	26	1	1	-	8
PACIFIC	3,957	3,380	6	2,974	2,999	2	96	1	435
Wash	110	87	5	148	182	-	3	-	5
Oreg	85	75	-	102	98	-	-	-	-
Calif	3,736	3,164	1	2,551	2,505	1	88	1	422
Alaska	1	2	-	37	71	1	1	-	8
Hawaii	25	52	-	136	143	-	4	-	-
Guam	1	2	-	34	35	-	1	-	-
P R	680	616	-	253	288	-	5	-	35
V I	1	3	-	1	1	-	-	-	-
Pac Trust Terr	200	100	-	53	61	-	45	-	-
Amer Samoa	-	-	-	5	-	-	-	-	-

U Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending September 27, 1986 (39th Week)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	640	457	112	39	15	17	50
Boston, Mass.	176	110	39	12	6	9	23
Bridgeport, Conn.	53	34	15	4	-	-	-
Cambridge, Mass.	30	24	6	-	-	-	3
Fall River, Mass.	35	26	4	1	4	-	1
Hartford, Conn.	55	39	8	2	1	5	3
Lowell, Mass.	24	18	4	2	-	-	3
Lynn, Mass.	18	17	1	-	-	-	-
New Bedford, Mass	33	25	6	2	-	-	1
New Haven, Conn.	57	41	10	5	-	1	6
Providence, R.I.	30	23	4	3	-	-	6
Somerville, Mass.	5	2	3	-	-	-	-
Springfield, Mass.	45	39	3	-	1	2	2
Waterbury, Conn.	26	20	4	2	-	-	-
Worcester, Mass.	53	39	5	6	3	-	2
MID ATLANTIC	2,763	1,802	555	274	69	63	114
Albany, N.Y.	56	41	8	4	1	2	-
Allentown, Pa.	11	11	-	-	-	-	-
Buffalo, N.Y.	112	73	25	8	4	2	8
Camden, N.J.	38	25	9	2	-	2	3
Elizabeth, N.J.	20	12	4	4	-	-	-
Erie, Pa.†	37	25	10	2	-	-	2
Jersey City, N.J.	41	22	11	8	-	-	2
N.Y. City, N.Y.	1,495	941	299	181	39	35	45
Newark, N.J.	72	39	17	9	4	3	5
Paterson, N.J.	25	13	4	4	3	1	1
Philadelphia, Pa.	406	261	81	38	12	14	20
Pittsburgh, Pa.†	75	57	14	4	-	-	5
Reading, Pa.	19	15	3	-	-	1	4
Rochester, N.Y.	111	80	25	3	2	1	9
Schenectady, N.Y.	33	27	5	-	-	1	2
Scranton, Pa.†	27	22	3	2	-	-	-
Syracuse, N.Y.	76	58	15	1	2	-	4
Trenton, N.J.	37	26	7	3	1	-	1
Utica, N.Y.	33	25	6	1	-	1	-
Yonkers, N.Y.	39	29	9	-	1	-	3
E.N. CENTRAL	2,325	1,494	508	178	62	83	77
Akron, Ohio	52	35	8	5	2	2	-
Canton, Ohio	27	19	5	1	2	-	1
Chicago, Ill.§	564	362	125	45	10	22	16
Cincinnati, Ohio	156	100	39	11	2	4	14
Cleveland, Ohio	162	93	38	16	9	6	2
Columbus, Ohio	176	105	49	12	7	3	5
Dayton, Ohio	127	76	35	9	1	6	5
Detroit, Mich.	246	135	55	34	8	14	7
Evansville, Ind.	50	39	9	1	-	1	-
Fort Wayne, Ind.	53	38	7	2	5	1	1
Gary, Ind.	31	19	9	3	-	-	-
Grand Rapids, Mich	46	32	8	1	1	4	4
Indianapolis, Ind.	171	107	37	12	9	6	4
Madison, Wis.	36	22	6	6	-	2	3
Milwaukee, Wis.	122	79	28	4	5	6	3
Peoria, Ill.	35	23	9	1	-	2	1
Rockford, Ill.	50	36	10	3	-	1	4
South Bend, Ind.	48	36	8	4	-	-	3
Toledo, Ohio	101	81	11	6	1	2	3
Youngstown, Ohio	72	57	12	2	-	1	1
W.N. CENTRAL	719	481	141	41	23	33	36
Des Moines, Iowa	78	54	17	4	1	2	5
Duluth, Minn.	25	16	3	1	2	3	-
Kansas City, Kans.	35	20	9	5	-	1	-
Kansas City, Mo.	121	76	30	5	3	7	8
Lincoln, Nebr.	30	25	5	-	-	-	3
Minneapolis, Minn.	89	60	18	5	3	3	1
Omaha, Nebr.	72	48	14	4	5	1	3
St. Louis, Mo.	139	93	23	9	6	8	10
St. Paul, Minn.	71	51	10	6	2	2	1
Wichita, Kans.	59	38	12	2	1	6	5

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,073	648	236	115	42	32	44
Atlanta, Ga.	138	81	30	16	4	7	4
Baltimore, Md.	109	64	26	9	6	4	5
Charlotte, N.C.	72	37	18	9	4	4	7
Jacksonville, Fla.	94	53	22	10	6	3	2
Miami, Fla.	106	73	16	16	-	1	1
Norfolk, Va.	51	31	11	4	3	2	2
Richmond, Va.	78	46	18	6	6	2	3
Savannah, Ga.	41	21	9	4	4	3	2
St. Petersburg, Fla.	90	72	12	5	-	1	5
Tampa, Fla.	55	35	10	7	1	2	6
Washington, D.C.	206	116	55	26	6	3	6
Wilmington, Del.	33	19	9	3	2	-	1
E.S. CENTRAL	661	427	150	44	26	14	15
Birmingham, Ala.	76	44	18	6	4	4	1
Chattanooga, Tenn.	65	44	17	3	1	-	2
Knoxville, Tenn.	88	61	21	4	1	1	5
Louisville, Ky.	106	75	14	7	2	8	1
Memphis, Tenn.	159	97	39	13	10	-	3
Mobile, Ala.	18	15	3	-	-	-	-
Montgomery, Ala.	38	21	10	5	2	-	-
Nashville, Tenn.	111	70	28	6	6	1	3
W.S. CENTRAL	1,227	706	280	127	58	56	47
Austin, Tex.	66	41	13	4	5	3	6
Baton Rouge, La.	31	17	7	5	1	1	2
Corpus Christi, Tex.	66	35	17	6	4	4	1
Dallas, Tex.	178	94	39	20	11	14	9
El Paso, Tex.	41	29	7	2	2	1	3
Fort Worth, Tex.	89	51	17	12	5	4	2
Houston, Tex.	302	160	78	41	14	9	8
Little Rock, Ark.	66	46	12	4	3	1	5
New Orleans, La.	102	56	29	8	-	9	-
San Antonio, Tex.	166	99	33	18	10	6	6
Shreveport, La.	24	16	7	1	-	-	1
Tulsa, Okla.	96	62	21	6	3	4	4
MOUNTAIN	653	389	132	72	40	20	21
Albuquerque, N.Mex.	94	53	16	10	14	1	2
Colo. Springs, Colo.	47	23	9	7	6	2	4
Denver, Colo.	127	86	24	13	3	1	2
Las Vegas, Nev.	92	52	24	11	3	2	2
Ogden, Utah	13	6	3	4	-	-	-
Phoenix, Ariz.	109	63	17	16	5	8	3
Pueblo, Colo.	16	14	-	1	1	-	1
Salt Lake City, Utah	47	23	11	5	3	5	2
Tucson, Ariz.	108	69	28	5	5	1	5
PACIFIC	1,946	1,201	415	210	66	50	124
Berkeley, Calif.	18	11	2	2	-	3	2
Fresno, Calif.	53	42	8	-	1	2	6
Glendale, Calif.	22	16	3	3	-	-	1
Honolulu, Hawaii	77	48	14	8	4	3	10
Long Beach, Calif.	98	61	23	7	4	3	9
Los Angeles, Calif.	614	356	153	72	22	8	18
Oakland, Calif.	80	44	13	15	6	2	5
Pasadena, Calif.	38	23	7	3	3	2	2
Portland, Oreg.	102	70	15	7	3	7	7
Sacramento, Calif.	128	82	28	11	6	1	16
San Diego, Calif.	129	89	17	17	-	5	21
San Francisco, Calif.	169	88	42	34	2	3	5
San Jose, Calif.	155	102	31	13	5	4	11
Seattle, Wash.	170	106	42	11	8	3	5
Spokane, Wash.	65	41	13	6	1	4	3
Tacoma, Wash.	28	22	4	1	1	-	3
TOTAL	12,007††	7,605	2,529	1,100	401	368	528

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

** Pneumonia and influenza.

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

†† Total includes unknown ages.

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

Work-Related Diseases and Injuries – Continued

Worksite studies by NIOSH have revealed that job stresses may contribute to acute disturbances among groups of workers, including those termed "mass psychogenic illness" (*16*). The sudden appearance of symptoms, usually in response to some "trigger factor" such as a strange odor, may result in spread of the apparent "illness" throughout the plant, with symptoms such as headaches, dizziness, and nausea. Investigations often fail to detect specific physical or chemical causative agents. However, factors such as heavy work load, strained labor/management relations, and physical discomfort at work may be present and related to the reporting of symptoms.

Emerging trends in technology, the economy, and demographic characteristics of the work force may lead to increased risk for psychological disorders. For example, a 26% increase is projected for employment in the health services, an area that may be associated with elevated risk (*9, 17*). Computers and robots are expected to affect seven million factory jobs and 39 million office jobs (*18*). According to some forecasters (*18*), possible consequences may include job displacement, reduced skill requirements, and lower-paying jobs. It has been projected that in the next decade, nine of every 10 new jobs will be in the service sector (*19*). Routine service jobs may not provide the compensation and benefits associated with the more traditional industrial and manufacturing jobs (*18*). Six of 10 new jobs in the next decade will be filled by women (*19*), and dual job/home role demands and constrained occupational opportunities for women may result in an adverse impact on their mental health.

Reported by Div of Biomedical and Behavioral Science, National Institute for Occupational Safety and Health, CDC.

Editorial Note: A prevention strategy for psychological disorders should take into account both the causal mechanisms and the factors that perpetuate these disorders. Work-related psychological disturbances are known to be influenced by both the physical and psychosocial characteristics of given job situations. Moreover, these factors operate in concert with factors unrelated to the job—such as life events; familial demands and support; and the traits, capacities, and needs of the workers themselves (e.g., personality, age, sex, experience/learning). The interaction of these variables is complex, and the relative influence of each is not thoroughly understood. Nevertheless, approaches to prevent work-related psychological disorders should still be taken using the information currently available.

Stress-reduction techniques (e.g., meditation, biofeedback, muscle relaxation, cognitive restructuring, and anxiety management) have been taught to both blue- and white-collar workers in worksite training sessions. Follow-up studies have shown decreases in psychophysiologic activity (e.g., muscle tension and blood pressure levels) and reductions in subjective reports of anxiety, sleep disturbances, and other health complaints with each technique (*20*). However, improvement in all these parameters persisted less than 3 months after training ended.

Stress management treats only the symptoms of the problem—not the cause. Therefore, efforts to control risk factors at the worksite are also important. Some previously described suggestions for controlling worksite risk factors for psychological disorders are listed below (*21*). These suggestions appear to have merit for reducing work-related psychological disorders, but further evaluation and study are needed for a complete understanding of their impact.

- **Work schedule**. Design work schedules to avoid conflict with demands and responsibilities unrelated to the job. Schedules for rotating shifts should be stable and predictable, with rotation in a forward (day-to-night) direction.
- **Participation/control**. Allow workers to provide input for decisions or actions affecting their jobs.

Work-Related Diseases and Injuries — Continued

- **Workload**. Ensure assignments are compatible with the capabilities and resources of the worker, and allow for recovery from especially demanding physical or mental tasks.
- **Content**. Design tasks to provide meaning, stimulation, a sense of completeness, and an opportunity to use skills.
- **Roles**. Define work roles and responsibilities clearly.
- **Social environment**. Provide opportunities for social interaction, including emotional support and help directly related to one's job.
- **Future**. Avoid ambiguity in matters of job security and career development.

In addition to evaluation of these suggested actions, efforts are needed to advance the understanding of work-related psychological disorders and of methods appropriate for their control, including:

1. Improving the systems for surveillance of psychological disorders in the workforce as related to working conditions.
2. Improving research techniques for investigating stressful working conditions and their health consequences.
3. Improving training of occupational health professionals and workers in recognizing stressful workplace conditions and signs of worker stress and in effecting remedial measures.
4. Furthering the development of mental health components in occupational health and safety programs.

References

1. Caplan RD, Cobb S, French JR, Harrison RV, Pinneau SR. Job Demands and Worker Health: main effects and occupational differences. Cincinnati, Ohio: National Institute for Occupational Safety and Health. (DHEW [NIOSH] publication no. 75-160), 1975.
2. Holt RR. Occupational stress. In: Goldberger L, Bresnitz S, eds. Handbook of Stress. New York: The Free Press, 1982.
3. Beehr TA, Newman JE. Job stress, employee health, and organizational effectiveness: a facet analysis, model, and literature review. Personnel Psychology 1978;31:665-99.
4. Karasek RA. Job demands, job decision latitude, and mental strain. Journal of Occupational Behavior 1979;24:285-307.
5. Kiecolt-Glaser JK. Stress and the immune function. In: Measures of job stress: a research methodology workshop. Workshop sponsored by NIOSH, New Orleans, Louisiana, 1985.
6. California Workers Compensation Bulletin, April 20, 1983.
7. National Council on Compensation Insurance. Emotional stress in the workplace—new legal rights in the eighties. New York 1985.
8. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 3rd ed. Washington, DC: American Psychiatric Association, 1980.
9. Colligan MJ, Smith MJ, Hurrell JJ Jr. Occupational incidence rates of mental health disorders. J Human Stress 1977;3:34-9.
10. Smith MJ, Colligan MJ, Frockt IJ, Tasto DL. Occupational injury rates among nurses as a function of shift schedule. Journal of Safety Research 1979;11:181-7.
11. Colligan MJ, Frockt IJ, Tasto DL. Frequency of worksite clinic visits and sickness absence among nurses as a function of shift. Applied Ergonomics 1979;10:79-86.
12. Smith MJ, Colligan MJ, Tasto DL. Health and safety consequences of shift work in the food processing industry. Ergonomics 1982;25:133-44.
13. Smith MJ, Cohen BG, Stammerjohn LW. An investigation of health complaints and job stress in video display operations. Hum Factors 1981;23:387-400.
14. Sauter S, Gottlieb M, Jones C, Dodson V, Rohrer K. Job and health implications of VDT use: initial results of the Wisconsin-NIOSH study. Communications of the ACM 1983;26:784-94.
15. House JS, Wells JA. Occupational stress, social support, and health. In: McLean A, Black G, Colligan M, eds. Reducing Occupational Stress: Proceedings of a Conference. Washington, DC, 1978. (DHEW publication no. 78-140.)
16. Schmitt N, Colligan MJ, Fitzgerald M. Unexplained physical symptoms in eight organizations: individual and organizational analyses. Journal of Occupational Psychology 1980;53:305-17.

Work-Related Diseases and Injuries — Continued

17. Silvestri GT, Lukasiewicz JM. Occupational employment projections: the 1984-95 outlook. Monthly Labor Review, November 1985:42-57.
18. Bezold C, Carlson RJ, Peck JC. The future of work and health. Dover, Massachusetts: Auburn House, 1986.
19. Bureau of Labor Statistics. Bureau of Labor Statistics News. Washington, DC: Department of Labor, November 1985.
20. Murphy LR. Occupational stress management: review and appraisal. Journal of Occupational Psychology (in press).
21. Levi L. Preventing Work Stress. Reading, Massachusetts: Addison-Wesley, 1981.

Misclassification of Maternal Deaths — Washington State

To determine more accurately the number of maternal deaths in the State of Washington in the period 1977-1984, death certificates for all reproductive-age women who died in those years were linked to birth and fetal-death files. The purpose of this linkage was to identify women who had died within a year after having a live birth or fetal death. For this 8-year period, the record linkage identified 23 maternal deaths (Table 3) in addition to the 34 maternal deaths reported through the state's vital statistics system. This total of 57 represents a 68% increase in ascertainment of maternal deaths.

To establish linkage, the names of the 2,073 women, ages 15-44 years, who had died in Washington State in 1977-1984 from causes other than cancer and intentional or unintentional injuries, were compared with the names of women on birth and fetal-death files. When these names matched, birth and death certificates were compared to verify each match. The

TABLE 3. Maternal death by cause and source of information — Washington, 1977-1984

Cause of death	State vital statistics (n=34)	Record linkage only (n=23)
Direct causes		
Hypertension	13	6
Pulmonary embolism	5	1
Uterine hemorrhage	4	0
Anesthesia complication	3	1
Ectopic pregnancy	3	0
Sepsis	0	2
Air embolism (Self-induced abortion)	0	1
Other	2	2
Indirect causes		
Cerebrovascular accident (Nonhypertensive)	1	3
Congenital heart disease	2	2
Respiratory failure (Pre-existing pulmonary disease)	0	2
Hepatic failure	1	1
Pneumonia	0	1
Hypertensive heart disease (Pre-existing hypertension)	0	1

Maternal Deaths — Continued

woman's cause of death, the interval between delivery and death, and other medical information about the case were reviewed to determine whether the death should be classified as maternal (Table 3). Maternal mortality was defined as either a direct or indirect maternal death occurring within 42 days of delivery, based on the codes defined by the *International Classification of Diseases* (*1,2*).

Of the 34 maternal deaths reported through the state's vital statistics system, 20 were linked to birth or fetal-death certificates; 14 women had a maternal condition listed as the cause of death, but were not linked to birth or fetal-death certificates. In addition, death certificates for 39 other women were matched with birth or fetal-death certificates, but these deaths had not been classified by the state's vital statistics system as maternal deaths. For 16 of these 39 deaths, a causal association with pregnancy was unclear or unlikely; the other 23 were classified as maternal. Seven of the 23 maternal deaths that were originally misclassified as non-maternal were concurrent with the reported birth or fetal death.

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Editorial Note: There was a decrease in misclassified deaths in Washington State between 1977 and 1984. In the period 1977-1981, 19 (53%) of 36 maternal deaths were originally misclassified as non-maternal (*3*). In contrast, in 1982-1984, only four (19%) of 21 maternal deaths were originally misclassified. The decrease in misclassified maternal deaths in 1982-1984 probably reflects an increased number of queries by the nosologists during this period. A review of maternal death certificates in Washington showed that 60% of the maternal deaths were queried from 1982 through 1984, in contrast to 15% from 1977 through 1981.

Based on the state's vital statistics, the maternal mortality rate in Washington was 6.5 maternal deaths/100,000 live births for this 8-year period. However, the rate calculated from both vital statistics and record linkage was 10.9/100,000 live births. Underestimation of maternal mortality is a problem that has long been recognized (*4,5*). The Washington State study—as well as recent studies in Georgia, New Jersey, and Puerto Rico—suggests that the problem persists (*6,7,8*). The percentage of maternal deaths not obtainable from routine coding of death certificates ranged from 27% in Georgia to 71% in Puerto Rico. As was shown in Georgia (*6*), this study demonstrates that more complete counts of maternal deaths can be obtained from routine linkage of birth and fetal-death certificates with death certificates of reproductive-age women.

Several categories of maternal deaths may not be found through record linkage if they are misclassified on death certificates. The first category includes maternal deaths that may not generate a record of pregnancy outcome. This includes maternal deaths from ectopic pregnancy, gestational trophoblastic disease, induced abortion, and first-trimester spontaneous abortion, as well as maternal deaths that occur during pregnancy. The second category includes maternal deaths that are misclassified but are not identified by record linkage because of incorrect identifiers (e.g., name, address, and birth date) or because of unreported births or fetal deaths. Some of these maternal deaths can be identified by supplementing information from vital statistics with annual maternity service reports from hospitals and with individual reports from physicians, hospitals, and medical examiners (*7*). Furthermore, as was shown in Puerto Rico (*8*), a review of death certificates and selected medical records of reproductive-age women who died could probably identify even more of these maternal deaths.

In 1983, the reported maternal mortality rate in the United States was 8.0/100,000 live births (*9*). The U.S. Public Health Service *1990 Objective* for maternal mortality is a maternal

Maternal Deaths — Continued

death rate not to exceed 5/100,000 live births for any county or for any ethnic group. Accurate and complete data on maternal deaths may facilitate the development of strategies to reduce the maternal mortality rate. In the near future, the Center for Health Promotion and Education, CDC, plans to establish a National Maternal Mortality Surveillance System to assist in achieving this objective.

References

1. National Center for Health Statistics. Instructions for classifying the underlying cause of death, 1976-1978. Vital statistics, part 2A. Hyattsville, Maryland: Department of Health and Human Services, Public Health Service, National Center for Health Statistics, 1976.
2. National Center for Health Statistics. Instructions for classifying the underlying cause of death, 1979. Vital statistics, part 2A. Hyattsville, Maryland: Department of Health and Human Services, Public Health Service, National Center for Health Statistics, 1978.
3. Benedetti TJ, Starzyk P, Frost F. Maternal deaths in Washington State. Obstet Gynecol 1985;66: 99-101.
4. Barno A, Freeman DW, Bellville TP. Minnesota maternal mortality study; five-year general summary, 1950-1954. Obstet Gynecol 1957;9:336-44.
5. Jewett JF. Changing maternal mortality in Massachusetts. N Engl J Med 1957;256:395-400.
6. Rubin G, McCarthy B, Shelton J, Rochat RW, Terry J. The risk of childbearing re-evaluated. Am J Public Health 1981;71:712-6.
7. Ziskin LZ, Gregory M, Kreitzer M. Improved surveillance of maternal deaths. Int J Gynaecol Obstet 1979;16:281-6.
8. Speckhard ME, Comas-Urrutia AC, Rigau-Perez JG, Adamsons K. Intensive surveillance of pregnancy-related deaths, Puerto Rico, 1978-1979. Bol Asoc Med PR 1985;77:508-13.
9. National Center for Health Statistics. Advance report of final mortality statistics, 1983. Monthly Vital Statistics Report 1985;34:38.

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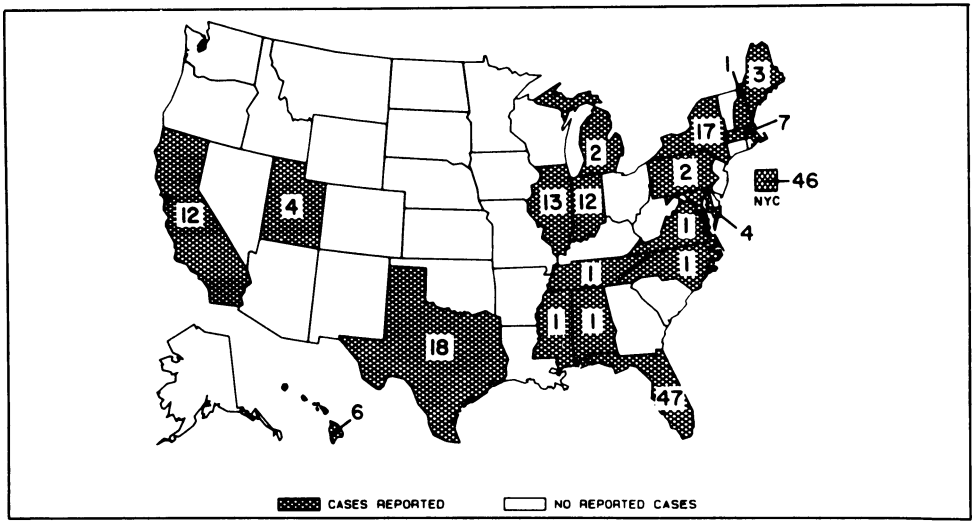
FIGURE I. Reported measles cases — United States, weeks 35-38, 1986



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The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday.

The editor welcomes accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials. Such reports and any other matters pertaining to editorial or other textual considerations should be addressed to: ATTN: Editor, *Morbidity and Mortality Weekly Report,* Centers for Disease Control, Atlanta, Georgia 30333.

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