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Imported Dengue — United States, 1993–1994

Dengue is a mosquito-transmitted acute disease caused by any of four virus serotypes (DEN-1, DEN-2, DEN-3, and DEN-4) and characterized by the sudden onset of fever, headache, myalgia, rash, nausea, and vomiting. The disease is endemic in most tropical areas of the world and has occurred in U.S. residents returning from travel to such areas. This report summarizes information about cases of imported dengue among U.S. residents during 1993 and 1994.

Serum samples from 148 U.S. residents who had suspected dengue with onset in 1993 (57 cases) and 1994 (91 cases) were submitted to CDC for diagnostic testing from 33 states (Table 1). Of these, 46 (31%) cases from 17 states were serologically or virologically diagnosed as dengue (*1*) by isolation of dengue virus, detection of dengue-specific IgM, single high titers of IgG antibodies in acute serum samples, or a fourfold or greater rise in dengue-specific antibodies between acute- and convalescent-phase serum samples. Dengue serotype (DEN-2 and DEN-3) was identified for two cases.

Of the 46 persons with laboratory-diagnosed dengue, 25 (54%) were males. Age was reported for 32 and ranged from 1 year to 87 years (median: 27 years). Travel histories were available for 43 persons (Table 1); infections probably were acquired in the Caribbean islands (21 cases), Mexico and Central America (10), and Asia (10). Two patients reported possible exposure in two locations: Australia and Asia, and Asia and Africa.

Clinical information was available for 40 of 46 laboratory-confirmed cases. The most commonly reported symptoms were consistent with classic dengue fever (e.g., fever [92%], myalgia [48%], rash [48%], and headache [42%]). Other manifestations included petechiae or purpura (four patients); low white blood cell count (1000–2700/mm^3 [normal: 3200–9800/mm^3]) (13 patients); low platelet count (20,000-134,000/mm^3 [normal: 150,000–450,000/mm^3]) (13 patients); and elevated liver enzymes (seven patients).

Six patients were hospitalized. One patient (aged 12 years) with secondary dengue infection developed fever, thrombocytopenia, epistaxis, right pleural effusion, ascites, and hypotension—signs compatible with dengue shock syndrome (DSS). One patient (aged 11 years), who also had a secondary infection, developed mild disseminated intravascular coagulation. One patient (aged 49 years) with an unspecified serologic

Imported Dengue — Continued

TABLE 1. Suspected and laboratory-diagnosed cases of imported dengue, by state — United States, 1993–1994

State	Cases: Suspected	Cases: Laboratory-diagnosed	Travel history, if known, of persons with laboratory-diagnosed dengue (serotype, if known)
Alabama	1	0	
Arizona	3	1	Puerto Rico
California	5	1	India
Colorado	3	2	Mexico, Nicaragua
District of Columbia	4	2	Sri Lanka, Mexico
Florida	12	3	Costa Rica, Puerto Rico, Bali
Georgia	5	1	Puerto Rico, French West Indies
Hawaii	4	0	
Illinois	3	2	Dominican Republic, Guatemala
Iowa	3	0	
Kansas	1	0	
Louisiana	2	0	
Maine	1	0	
Maryland	4	0	
Massachusetts	22	9	Philippines and Thailand, Haiti, Bangladesh, four from Puerto Rico
Minnesota	4	3	Somalia, Kenya, Cambodia; Thailand; Mexico
Mississippi	5	0	
Montana	1	0	
New York	24	12	Philippines, Thailand, Myanmar, Dominican Republic, Grenada, two from Jamaica, five from Puerto Rico
North Carolina	6	1	Philippines and India
North Dakota	1	1	Puerto Rico and Dominican Republic
Ohio	5	4	Australia and Southeast Asia (DEN-3), El Salvador, two from British Virgin Islands
Oklahoma	2	0	
Oregon	4	0	
Pennsylvania	3	0	
South Carolina	1	0	
Tennessee	2	0	
Texas	3	1	Honduras
Utah	1	1	Mexico (DEN-2)
Vermont	1	0	
Virginia	3	1	
Washington	6	1	Belize
Wisconsin	3	0	
Total	**148**	**46**	

Imported Dengue — Continued

response had fever, myalgias, thrombocytopenia, leukopenia, elevated liver function test results, and hypotension (blood pressure 90/48 mmHg).

Reported by: State and territorial health depts. Dengue Br, Div of Vector-Borne Infectious Diseases, National Center for Infectious Diseases, CDC.

Editorial Note: Dengue is not endemic in the United States. However, because the incubation period is 3–14 days, U.S. residents who become infected during travel to tropical areas may have onset of illness after returning to the United States (*2*). Although most dengue infections are associated with mild illness, the risk for dengue hemorrhagic fever (DHF) is greater in some persons—particularly those with repeat (secondary) infection. DHF is characterized by fever, platelet count $\leq 100{,}000/mm^3$, hemorrhagic manifestations, and leaky capillary syndrome (hemoconcentration, hypoalbuminemia, or pleural or abdominal effusions). DSS includes DHF and hypotension or narrow pulse pressure (≤20 mmHg) (*3,4*) and is associated with a high fatality rate (*5*).

The incidence of DHF is increasing in the Americas: since 1982, dengue epidemics with associated DHF have occurred in Aruba, Brazil, Colombia, Curacao, Dominican Republic, El Salvador, French Guiana, Honduras, Mexico, Nicaragua, Puerto Rico, St. Lucia, Suriname, and Venezuela. In addition, dengue is endemic in many islands in the Caribbean, in Mexico, and in most countries in Central and South America (*6*). In 1994, outbreaks of dengue were reported from Brazil, Costa Rica, Dominican Republic, Haiti, Mexico, Nicaragua, Panama, Puerto Rico, and Venezuela. Nicaragua and Panama recently confirmed infections attributable to DEN-3 (*7*), a serotype that was last isolated in the Americas in 1977 (*8*).

In the Americas, dengue is transmitted by *Aedes aegypti* mosquitoes. Although nearly eradicated from the region during the 1960s, this species is now present in most tropical areas of the Americas. In the United States, *A. aegypti* is present year-round in the southernmost Gulf of Mexico coast states from Texas to Florida; a small focus also exists on the island of Molokai in Hawaii. Autochthonous transmission of dengue has not occurred in the United States since 1986 (*6*); however, introduction of the virus by persons who have acquired infections in other countries could result in local transmission.

The 37 laboratory-confirmed cases identified in 1994 represent almost twice the average number of similar cases identified annually during 1987–1993 (n=20) and the highest number of positives identified since 1982 (n=45) (*6*). However, these totals do not include cases that may have been reported to state health departments but for which specimens were not submitted for testing at CDC. In addition, in 1994, the California Department of Health Services received reports of five cases of suspected dengue that were documented at the state's Viral and Rickettsial Disease Laboratory (*9*).

Compared with previous years, a higher proportion of cases reported in 1994 were characterized by severe disease. The three persons with life-threatening illness underscore the importance of early recognition and treatment of the severe manifestations of dengue infection.

The prevention of dengue infection in tropical locations requires avoiding exposure to mosquitoes (*10*) and includes the continuous use of mosquito repellent and protective clothing. Although the *Aedes* species that transmits dengue may bite at any time during the day, peak activity occurs during the early morning and late afternoon.

Imported Dengue — Continued

Ae. aegypti usually is present in peridomestic settings and is found most often in dark areas such as closets and bathrooms, behind curtains, and under beds. For tourists, the risk for exposure to dengue may be lower in some settings, including beaches, hotels with well-kept grounds, and heavily forested areas and jungles.

Health-care providers should consider dengue in the differential diagnosis for all patients who have compatible manifestations and a recent history of travel to tropical areas. When dengue is suspected, patients should be monitored for evidence of hypotension, hemoconcentration, and thrombocytopenia. Because of the anticoagulant properties of acetylsalicylic acid (i.e., aspirin), only acetaminophen products are recommended for management of fever. Acute- and convalescent-phase serum samples should be obtained for viral isolation and serodiagnosis and sent for confirmation through state or territorial health department to CDC's Dengue Branch, Division of Vector-Borne Infectious Diseases, National Center for Infectious Diseases, 2 Calle Casia, San Juan, PR 00921-3200; telephone (809) 766-5181; fax (809) 766-6596. Serum specimens should be accompanied by a summary of clinical and epidemiologic information, including a detailed travel history with dates and location of travel and dates of onset of illness and blood collection.

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Carbon Monoxide Poisoning from Use of Gasoline-Fueled Power Washers in an Underground Parking Garage — District of Columbia, 1994

On June 17, 1994, five workers in the District of Columbia were treated in an emergency department for carbon monoxide (CO) poisoning following exposure to the exhaust from two gasoline-fueled power washers (i.e., pressure washers), which they had used in an empty underground parking garage. These cases were identified by The George Washington University (GWU) Division of Occupational and

Carbon Monoxide Poisoning — Continued

Environmental Medicine (DOEM) through ongoing surveillance for work-related injuries among construction workers treated in the GWU emergency department (*1*). This report summarizes the results of an investigation by DOEM of this incident.

At 11 p.m. on June 16, four laborers and a foreman (age range: 22–39 years) began preparing to resurface the floor of an underground parking garage that had been closed for business when the crew began work. At approximately 12:30 a.m., the workers started two power washers equipped with 8-horsepower, gasoline-fueled engines. A pedestal fan used previously in such situations was not operable. In addition, the garage exhaust fan was not in operation, and the main door of the garage (located approximately two levels above the work site) was closed.

At approximately 3:30 a.m., a worker collapsed. His three co-workers and the foreman assisted him out of the garage and remained outside with him for a few minutes before they returned to the garage and resumed work. A second worker then collapsed; the co-workers immediately turned off the washers, evacuated the garage, and contacted the District of Columbia Fire Department. Onsite evaluation by fire department officials indicated that all five men had acute symptoms including dizziness, confusion, headache, and nervousness. The two workers who had collapsed were transported by ambulance to a local emergency department. At the hospital, carboxyhemoglobin (COHb) levels, obtained from the workers at 5:10 a.m., were 20% and 17%, respectively (normal: ≤5%–10% for smokers and ≤1% for nonsmokers [*2*]). Carbon monoxide poisoning was diagnosed, and they were treated with hyperbaric oxygen and released later that day. The three other workers were transported to the hospital where their COHb levels, obtained at 7:15 a.m., were 10.3%, 13.4%, and 7.9%, respectively. They were administered 100% oxygen and released.

At 4:14 a.m., the fire department's hazardous materials team responded to investigate the incident. Based on measurements using a hand-operated air pump and indicator tube approximately 1 hour after the washers had been turned off, the concentration of CO was 648 parts per million (ppm).* The only identified source of CO was the exhaust from the gasoline-powered washers.

Reported by: L Nessel-Stephens, MSS, LS Welch, MD, JL Weeks, ScD, KL Hunting, PhD, J Càrdenas-Amaya, MD, Div of Occupational and Environmental Medicine, The George Washington Univ, Washington, DC. Div of Surveillance, Hazard Evaluations, and Field Studies, National Institute for Occupational Safety and Health, CDC.

Editorial Note: CO is a potentially lethal gas with nonspecific warning properties. Levels of CO uptake vary among persons and are a function of air concentration, level of exertion and ventilatory rate, and duration of exposure. For example, among workers engaged in light work and who were exposed to a CO concentration of 700 ppm, COHb levels were 20% after 35 minutes and 40% after approximately 1 hour (*4*). In general, COHb levels >20% are associated with symptoms; dizziness and unsteady gait may result from levels >30% (*5*).

Based on estimates of the Bureau of Labor Statistics (BLS), in 1992 CO exposure accounted for 867 nonfatal work-related CO poisonings in private industry in the United States that resulted in days away from work (BLS, Survey of Occupational Injuries and Illnesses, unpublished data, 1992) and for 32 fatal work-related CO poisonings (BLS, Census of Fatal Occupational Injuries, unpublished data, 1992). The

*The NIOSH recommended exposure limit for CO is 35 ppm (as an 8-hour time-weighted average), and the recommended ceiling limit is 200 ppm (*3*).

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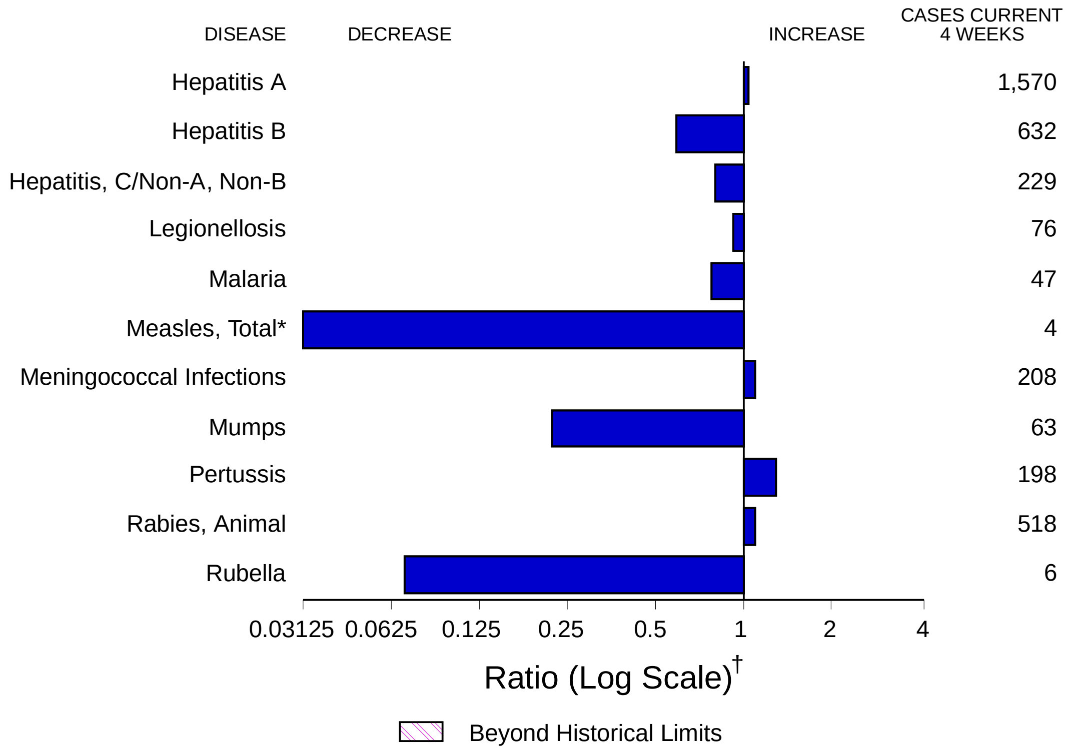
FIGURE I. Notifiable disease reports, comparison of 4-week totals ending May 6, 1995, with historical data — United States



*The large apparent decrease in the number of reported cases of measles (total) reflects dramatic fluctuations in the historical baseline.

†Ratio of current 4-week total to 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 specified notifiable diseases, United States, cumulative, week ending May 6, 1995 (18th Week)

	Cum. 1995		Cum. 1995
Anthrax	-	Psittacosis	19
Brucellosis	19	Rabies, human	1
Cholera	3	Rocky Mountain Spotted Fever	35
Congenital rubella syndrome	3	Syphilis, congenital, age < 1 year†	-
Diphtheria	-	Tetanus	8
*Haemophilus influenzae**	473	Toxic shock syndrome	68
Hansen Disease	42	Trichinosis	18
Plague	2	Typhoid fever	98
Poliomyelitis, Paralytic	-		

*Of 460 cases of known age, 110 (24%) were reported among children less than 5 years of age.

†Updated quarterly from reports to the Division of Sexually Transmitted Diseases and HIV Prevention, National Center for Prevention Services. First quarter data not yet available.

-: no reported cases

TABLE II. Cases of selected notifiable diseases, United States, weeks ending May 6, 1995, and May 7, 1994 (18th Week)

Reporting Area	AIDS*	Gonorrhea		Hepatitis (Viral), by type						Legionellosis	
				A		B		C/NA,NB			
	Cum. 1995	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994
UNITED STATES	19,652	125,381	126,613	8,306	7,493	3,020	4,183	1,349	1,535	429	495
NEW ENGLAND	842	1,836	2,808	64	121	63	150	30	53	5	6
Maine	23	23	24	13	11	2	6	-	-	-	-
N.H.	38	35	25	3	4	8	9	2	5	-	-
Vt.	7	17	11	3	1	1	4	-	6	-	-
Mass.	457	1,027	1,018	20	57	19	101	27	31	4	2
R.I.	59	189	153	9	12	7	3	1	11	1	4
Conn.	258	545	1,577	16	36	26	27	-	-	N	N
MID. ATLANTIC	4,550	12,591	15,787	432	514	337	501	113	188	46	55
Upstate N.Y.	521	2,640	3,431	112	170	122	132	64	85	12	14
N.Y. City	2,342	3,932	6,289	207	179	81	104	1	1	-	-
N.J.	1,112	1,185	1,803	54	113	74	131	37	88	7	10
Pa.	575	4,834	4,264	59	52	60	134	11	14	27	31
E.N. CENTRAL	1,622	26,295	24,100	1,105	680	327	425	89	136	113	174
Ohio	409	8,137	8,064	699	187	35	65	4	4	55	65
Ind.	106	2,480	2,712	53	123	80	77	-	3	24	56
Ill.	737	7,511	5,269	160	218	64	123	17	40	7	10
Mich.	278	6,532	5,696	137	90	135	127	68	89	14	28
Wis.	92	1,635	2,359	56	62	13	33	-	-	13	15
W.N. CENTRAL	427	6,714	7,092	412	331	184	218	33	26	42	35
Minn.	93	1,040	1,119	51	66	16	23	1	5	-	-
Iowa	20	532	437	24	11	13	12	3	7	8	20
Mo.	148	4,047	3,839	270	161	128	159	20	5	27	7
N. Dak.	1	10	12	11	1	2	-	-	-	3	3
S. Dak.	1	65	63	11	15	1	-	1	-	-	-
Nebr.	43	-	334	9	40	8	12	3	4	2	3
Kans.	121	1,020	1,288	36	37	16	12	5	5	2	2
S. ATLANTIC	5,708	36,515	34,439	381	438	457	912	113	281	67	131
Del.	113	703	620	6	13	2	6	1	1	-	-
Md.	978	4,257	6,466	71	57	79	126	4	13	13	28
D.C.	373	1,703	2,307	2	9	9	16	-	-	3	4
Va.	374	3,778	4,411	70	42	34	36	2	15	4	2
W. Va.	21	224	243	10	4	21	9	20	11	3	1
N.C.	248	8,642	8,253	43	37	116	101	23	24	11	8
S.C.	280	4,016	4,258	12	11	19	14	3	2	14	3
Ga.	594	5,871	U	39	21	47	370	11	145	8	63
Fla.	2,727	7,321	7,881	128	244	130	234	49	70	11	22
E.S. CENTRAL	612	17,246	11,607	461	151	249	437	385	288	10	21
Ky.	63	2,913	1,527	16	79	26	40	6	10	1	3
Tenn.	269	4,605	4,612	377	51	181	371	377	273	5	13
Ala.	159	6,696	5,468	44	21	42	26	2	5	3	5
Miss.	121	3,032	U	24	U	-	U	-	U	1	U
W.S. CENTRAL	1,404	11,830	14,973	875	917	427	419	184	125	4	11
Ark.	64	1,325	2,277	62	20	11	7	1	3	-	4
La.	299	4,197	4,313	32	35	64	66	43	34	2	-
Okla.	84	809	1,364	168	84	132	117	128	64	2	7
Tex.	957	5,499	7,019	613	778	220	229	12	24	-	-
MOUNTAIN	637	2,683	3,363	1,514	1,444	253	200	161	141	89	33
Mont.	8	30	32	23	10	8	6	7	2	2	11
Idaho	17	45	30	160	126	34	31	21	40	1	-
Wyo.	4	18	32	60	6	6	7	63	34	2	1
Colo.	214	1,037	1,151	199	167	46	38	29	23	26	4
N. Mex.	69	300	367	277	370	83	66	19	25	3	1
Ariz.	133	1,002	1,045	430	552	42	19	14	4	44	1
Utah	37	39	115	316	136	24	13	3	9	2	1
Nev.	155	212	591	49	77	10	20	5	4	9	14
PACIFIC	3,850	9,671	12,444	3,062	2,897	723	921	241	297	53	29
Wash.	360	883	1,032	199	421	57	88	67	104	4	7
Oreg.	122	18	337	527	254	32	53	13	12	-	-
Calif.	3,261	8,265	10,537	2,261	2,132	624	755	151	177	44	20
Alaska	29	291	292	15	76	4	5	1	-	-	-
Hawaii	78	214	246	60	14	6	20	9	4	5	2
Guam	-	23	50	1	3	-	-	-	-	-	2
P.R.	649	180	192	17	30	236	128	164	53	-	-
V.I.	14	4	9	-	-	1	1	-	-	-	-
Amer. Samoa	-	8	14	5	4	-	-	-	-	-	-
C.N.M.I.	-	9	21	9	2	5	-	-	-	-	-

N: Not notifiable U: Unavailable -: no reported cases C.N.M.I.: Commonwealth of Northern Mariana Islands
*Updated monthly to the Division of HIV/AIDS, National Center for Infectious Diseases; last update March 30, 1995.

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending May 6, 1995, and May 7, 1994 (18th Week)

Reporting Area	Lyme Disease		Malaria		Measles (Rubeola) Indigenous		Measles (Rubeola) Imported*		Measles (Rubeola) Total		Meningococcal Infections		Mumps	
	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	1995	Cum. 1995	1995	Cum. 1995	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994
UNITED STATES	1,340	1,511	287	342	2	146	-	5	151	507	1,188	1,164	281	531
NEW ENGLAND	122	147	15	24	-	3	-	1	4	14	65	54	3	10
Maine	1	-	1	1	-	-	-	-	-	2	3	10	2	3
N.H.	8	5	1	3	-	-	-	-	-	-	13	4	-	4
Vt.	1	1	-	1	-	-	-	-	-	1	6	1	-	-
Mass.	37	24	4	9	-	1	-	1	2	3	23	23	-	-
R.I.	10	20	2	4	-	2	-	-	2	5	-	-	-	1
Conn.	65	97	7	6	-	-	-	-	-	3	20	16	1	2
MID. ATLANTIC	998	1,113	64	51	-	1	-	-	1	143	123	112	35	46
Upstate N.Y.	608	937	12	15	-	-	-	-	-	11	46	39	12	11
N.Y. City	7	1	30	12	-	1	-	-	1	1	11	15	5	-
N.J.	87	108	13	15	-	-	-	-	-	129	26	27	-	9
Pa.	296	67	9	9	-	-	-	-	-	2	40	31	18	26
E.N. CENTRAL	18	14	23	40	-	2	-	-	2	54	152	179	52	137
Ohio	14	6	2	5	-	-	-	-	-	10	51	45	18	19
Ind.	3	2	2	9	-	-	-	-	-	1	25	36	1	5
Ill.	-	5	14	15	-	-	-	-	-	34	42	60	16	88
Mich.	1	1	4	10	-	-	-	-	-	6	30	18	17	22
Wis.	-	-	1	1	-	2	-	-	2	3	4	20	-	3
W.N. CENTRAL	18	22	7	18	-	1	-	-	1	139	69	80	17	24
Minn.	-	-	3	5	-	-	-	-	-	-	14	8	2	4
Iowa	1	1	-	3	-	-	-	-	-	-	14	8	3	6
Mo.	4	18	3	7	-	1	-	-	1	138	23	40	10	12
N. Dak.	-	-	-	-	-	-	-	-	-	-	-	-	-	1
S. Dak.	-	-	-	-	-	-	-	-	-	-	3	6	-	-
Nebr.	-	-	1	2	U	-	U	-	-	1	6	7	2	1
Kans.	13	3	-	1	-	-	-	-	-	-	9	11	-	-
S. ATLANTIC	132	157	69	74	1	1	-	-	1	5	218	185	40	81
Del.	7	17	1	3	-	-	-	-	-	-	2	2	-	-
Md.	91	51	19	30	-	-	-	-	-	-	12	11	-	21
D.C.	-	1	7	7	-	-	-	-	-	-	1	1	-	-
Va.	8	13	12	8	-	-	-	-	-	1	27	26	12	19
W. Va.	7	5	-	-	-	-	-	-	-	-	3	8	-	3
N.C.	9	22	6	2	-	-	-	-	-	-	37	31	16	23
S.C.	5	-	-	2	-	-	-	-	-	-	29	6	5	5
Ga.	4	44	10	10	-	-	-	-	-	1	53	39	-	6
Fla.	1	4	14	12	1	1	-	-	1	3	54	61	7	4
E.S. CENTRAL	7	12	6	7	-	-	-	-	-	28	72	72	13	-
Ky.	1	8	-	2	-	-	-	-	-	-	30	17	-	-
Tenn.	3	3	1	4	-	-	-	-	-	28	11	21	4	-
Ala.	1	1	5	1	-	-	-	-	-	-	16	34	3	-
Miss.	2	U	-	U	-	-	-	-	-	U	15	U	6	U
W.S. CENTRAL	24	21	6	7	-	2	-	-	2	11	146	138	16	122
Ark.	2	-	2	-	-	2	-	-	2	-	15	20	2	3
La.	-	-	1	-	-	-	-	-	-	1	20	20	6	10
Okla.	12	12	-	2	-	-	-	-	-	-	14	11	-	21
Tex.	10	9	3	5	-	-	-	-	-	10	97	87	8	88
MOUNTAIN	2	1	22	14	-	39	-	1	40	86	96	91	15	15
Mont.	-	-	2	-	-	-	-	-	-	-	2	2	-	-
Idaho	-	1	1	2	-	-	-	-	-	-	3	12	2	3
Wyo.	-	-	-	-	-	-	-	-	-	-	5	2	-	-
Colo.	1	-	12	5	-	-	-	-	-	16	20	12	1	1
N. Mex.	-	-	3	2	-	28	-	-	28	-	21	8	N	N
Ariz.	-	-	2	1	-	10	-	-	10	-	36	37	4	2
Utah	-	-	1	3	U	-	U	1	1	70	2	14	1	5
Nev.	1	-	1	1	-	1	-	-	1	-	7	4	6	3
PACIFIC	19	24	75	107	1	97	-	3	100	27	247	253	90	96
Wash.	-	-	8	11	-	13	-	1	14	-	38	44	6	7
Oreg.	1	2	4	9	-	1	-	-	1	-	46	57	N	N
Calif.	18	22	55	79	1	83	-	1	84	26	158	146	75	80
Alaska	-	-	1	-	-	-	-	-	-	-	3	1	8	2
Hawaii	-	-	7	8	-	-	-	1	1	1	2	5	1	7
Guam	-	-	-	-	U	-	U	-	-	171	1	-	2	2
P.R.	-	-	-	-	-	3	-	-	3	22	12	5	-	2
V.I.	-	-	-	-	U	-	U	-	-	-	-	-	1	-
Amer. Samoa	-	-	-	-	-	-	-	-	-	-	-	-	-	1
C.N.M.I.	-	-	-	1	-	-	-	-	-	26	-	-	-	-

*For imported measles, cases include only those resulting from importation from other countries.
N: Not notifiable U: Unavailable -: no reported cases

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending May 6, 1995, and May 7, 1994 (18th Week)

Reporting Area	Pertussis			Rubella			Syphilis (Primary & Secondary)		Tuberculosis		Rabies, Animal	
	1995	Cum. 1995	Cum. 1994	1995	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994	Cum. 1995	Cum. 1994
UNITED STATES	69	1,065	1,280	1	26	141	5,808	6,548	5,583	6,208	2,225	2,454
NEW ENGLAND	4	127	133	-	2	96	70	70	110	125	616	653
Maine	4	17	2	-	-	-	2	4	-	-	-	-
N.H.	-	8	31	-	1	-	1	1	4	6	75	78
Vt.	-	2	15	-	-	-	-	-	1	1	83	64
Mass.	-	94	76	-	1	96	25	22	60	60	236	248
R.I.	-	-	2	-	-	-	1	6	15	11	86	5
Conn.	-	6	7	-	-	-	41	37	30	47	136	258
MID. ATLANTIC	5	80	228	-	2	5	322	491	1,092	1,166	527	584
Upstate N.Y.	1	46	90	-	1	5	24	63	94	171	213	420
N.Y. City	-	18	39	-	1	-	170	251	599	689	-	-
N.J.	-	-	9	-	-	-	67	82	218	221	116	117
Pa.	4	16	90	-	-	-	61	95	181	85	198	47
E.N. CENTRAL	26	106	266	-	-	11	953	896	591	676	2	11
Ohio	4	37	59	-	-	-	320	380	93	86	1	-
Ind.	1	5	31	-	-	-	81	89	21	63	-	1
Ill.	20	20	94	-	-	6	384	210	332	362	1	3
Mich.	1	32	20	-	-	5	113	115	127	150	-	4
Wis.	-	12	62	-	-	-	55	102	18	15	-	3
W.N. CENTRAL	-	52	42	-	-	-	273	459	198	152	94	60
Minn.	-	22	16	-	-	-	17	16	31	32	2	5
Iowa	-	1	3	-	-	-	25	16	28	12	34	23
Mo.	-	5	12	-	-	-	222	392	78	71	12	6
N. Dak.	-	5	2	-	-	-	-	-	1	2	9	2
S. Dak.	-	6	-	-	-	-	-	-	16	9	15	9
Nebr.	U	3	3	U	-	-	-	5	6	2	-	-
Kans.	-	10	6	-	-	-	9	30	38	24	22	15
S. ATLANTIC	2	101	140	-	5	5	1,297	1,995	1,056	850	745	674
Del.	-	5	-	-	-	-	7	9	-	9	33	14
Md.	-	7	49	-	-	-	24	90	152	115	143	210
D.C.	-	2	3	-	-	-	46	97	37	40	5	2
Va.	-	7	13	-	-	-	251	257	61	119	129	150
W. Va.	-	-	2	-	-	-	1	8	35	33	35	28
N.C.	-	49	40	-	-	-	400	644	90	140	150	66
S.C.	-	11	8	-	-	-	248	253	103	146	47	60
Ga.	-	1	10	-	-	-	172	314	196	248	105	139
Fla.	2	19	15	-	5	5	148	323	382	-	98	5
E.S. CENTRAL	-	21	72	-	-	-	1,793	681	413	377	67	73
Ky.	-	-	52	-	-	-	151	89	54	109	7	5
Tenn.	-	2	13	-	-	-	321	337	148	133	11	33
Ala.	-	19	7	-	-	-	226	255	146	135	49	35
Miss.	-	-	U	-	-	U	1,095	U	65	U	-	U
W.S. CENTRAL	11	44	33	1	2	7	813	1,449	666	738	39	259
Ark.	-	-	1	-	-	-	177	184	62	63	11	11
La.	-	1	5	-	-	-	397	663	-	-	9	41
Okla.	6	9	20	-	-	4	21	51	1	79	19	17
Tex.	5	34	7	1	2	3	218	551	603	596	-	190
MOUNTAIN	13	384	108	-	3	1	92	111	192	163	34	37
Mont.	-	3	3	-	-	-	3	-	3	-	15	6
Idaho	4	70	22	-	-	-	-	1	6	6	-	-
Wyo.	-	-	-	-	-	-	2	-	1	1	9	6
Colo.	-	1	62	-	-	-	59	57	4	13	-	-
N. Mex.	-	16	5	-	-	-	2	5	22	26	-	-
Ariz.	9	286	11	-	3	-	15	29	87	77	9	24
Utah	U	5	5	U	-	1	4	5	10	-	-	-
Nev.	-	3	-	-	-	-	7	14	59	40	1	1
PACIFIC	8	150	258	-	12	16	195	396	1,265	1,961	101	103
Wash.	6	27	35	-	1	-	6	15	89	76	-	-
Oreg.	-	6	39	-	1	-	-	12	3	45	-	-
Calif.	-	108	180	-	9	15	188	367	1,091	1,737	97	77
Alaska	-	-	-	-	-	-	1	1	24	26	4	26
Hawaii	2	9	4	-	1	1	-	1	58	77	-	-
Guam	U	-	-	U	-	1	1	1	4	18	-	-
P.R.	-	5	3	-	-	-	98	114	23	71	18	30
V.I.	U	-	-	U	-	-	1	19	-	-	-	-
Amer. Samoa	-	-	1	-	-	-	-	-	2	2	-	-
C.N.M.I.	-	-	-	-	-	-	-	1	5	14	-	-

U: Unavailable -: no reported cases

TABLE III. Deaths in 121 U.S. cities,* week ending May 6, 1995 (18th Week)

Reporting Area	All Causes, By Age (Years)						P&I† Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	630	452	101	47	18	12	61
Boston, Mass.	155	94	36	18	2	5	6
Bridgeport, Conn.	34	25	6	1	2	-	3
Cambridge, Mass.	21	14	4	3	-	-	2
Fall River, Mass.	26	20	4	-	2	-	2
Hartford, Conn.	79	55	14	5	3	2	11
Lowell, Mass.	25	19	3	3	-	-	3
Lynn, Mass.	13	13	-	-	-	-	-
New Bedford, Mass.	23	19	-	4	-	-	4
New Haven, Conn.	34	25	6	-	1	2	2
Providence, R.I.	68	52	10	2	2	2	6
Somerville, Mass.	6	6	-	-	-	-	-
Springfield, Mass.	50	38	4	6	1	1	5
Waterbury, Conn.	28	23	4	1	-	-	1
Worcester, Mass.	68	49	10	4	5	-	16
MID. ATLANTIC	2,492	1,649	472	258	45	68	118
Albany, N.Y.	53	37	8	3	1	4	4
Allentown, Pa.	28	24	3	1	-	-	-
Buffalo, N.Y.	91	76	14	-	-	1	1
Camden, N.J.	40	18	8	9	2	3	-
Elizabeth, N.J.	23	14	5	3	-	1	-
Erie, Pa.§	42	29	10	2	-	1	4
Jersey City, N.J.	42	21	9	10	-	2	-
New York City, N.Y.	1,284	824	250	154	22	34	34
Newark, N.J.	62	26	14	16	4	2	5
Paterson, N.J.	17	8	7	2	-	-	-
Philadelphia, Pa.	327	199	65	41	12	10	31
Pittsburgh, Pa.§	97	67	23	4	-	3	10
Reading, Pa.	15	11	4	-	-	-	2
Rochester, N.Y.	135	102	20	8	2	3	12
Schenectady, N.Y.	26	22	2	2	-	-	1
Scranton, Pa.§	36	32	3	1	-	-	-
Syracuse, N.Y.	100	80	15	2	1	2	11
Trenton, N.J.	21	14	4	-	1	2	2
Utica, N.Y.	19	18	1	-	-	-	-
Yonkers, N.Y.	34	27	7	-	-	-	1
E.N. CENTRAL	2,169	1,318	443	230	112	66	132
Akron, Ohio	44	35	7	2	-	-	-
Canton, Ohio	25	23	-	2	-	-	5
Chicago, Ill.	499	190	109	109	66	25	15
Cincinnati, Ohio	111	76	24	6	1	4	16
Cleveland, Ohio	200	117	45	21	12	5	-
Columbus, Ohio	197	140	36	12	4	5	15
Dayton, Ohio	141	95	36	4	2	4	11
Detroit, Mich.	208	126	46	25	5	6	10
Evansville, Ind.	28	16	8	2	2	-	-
Fort Wayne, Ind.	57	41	9	6	1	-	7
Gary, Ind.	27	17	7	2	1	-	-
Grand Rapids, Mich.	79	55	14	5	3	2	11
Indianapolis, Ind.	164	107	33	12	4	8	10
Madison, Wis.	43	30	5	4	2	2	7
Milwaukee, Wis.	114	76	26	8	3	1	8
Peoria, Ill.	38	27	9	1	-	1	-
Rockford, Ill.	42	31	6	3	2	-	4
South Bend, Ind.	42	33	6	2	1	-	6
Toledo, Ohio	110	83	17	4	3	3	7
Youngstown, Ohio	U	U	U	U	U	U	U
W.N. CENTRAL	677	479	108	37	17	21	38
Des Moines, Iowa	136	106	19	9	1	1	9
Duluth, Minn.	21	18	1	2	-	-	-
Kansas City, Kans.	U	U	U	U	U	U	U
Kansas City, Mo.	114	59	28	8	2	2	3
Lincoln, Nebr.	35	29	5	-	-	1	3
Minneapolis, Minn.	134	92	19	8	8	7	7
Omaha, Nebr.	79	59	10	2	1	7	4
St. Louis, Mo.	103	73	18	7	2	3	9
St. Paul, Minn.	55	43	8	1	3	-	3
Wichita, Kans.	U	U	U	U	U	U	U
S. ATLANTIC	1,351	824	260	167	58	38	63
Atlanta, Ga.	184	117	34	22	6	5	6
Baltimore, Md.	145	87	30	16	7	5	10
Charlotte, N.C.	95	63	16	9	2	5	4
Jacksonville, Fla.	137	76	34	20	2	5	6
Miami, Fla.	127	74	26	18	8	1	1
Norfolk, Va.	70	46	16	6	1	1	3
Richmond, Va.	119	74	22	14	5	2	5
Savannah, Ga.	51	33	-	8	10	-	8
St. Petersburg, Fla.	58	46	8	2	2	-	4
Tampa, Fla.	156	102	33	15	2	4	8
Washington, D.C.	205	106	40	36	13	10	8
Wilmington, Del.	4	-	1	1	-	-	-
E.S. CENTRAL	796	510	171	74	19	14	62
Birmingham, Ala.	113	66	31	12	3	1	3
Chattanooga, Tenn.	60	42	12	4	2	-	6
Knoxville, Tenn.	97	65	23	8	-	1	15
Lexington, Ky.	54	32	10	5	1	-	7
Memphis, Tenn.	68	42	13	7	-	6	9
Mobile, Ala.	197	132	42	13	6	4	5
Montgomery, Ala.	53	30	11	8	2	-	4
Nashville, Tenn.	154	101	29	17	5	2	13
W.S. CENTRAL	1,332	875	259	128	46	24	101
Austin, Tex.	76	52	10	10	2	2	6
Baton Rouge, La.	43	30	7	4	1	1	2
Corpus Christi, Tex.	47	29	12	5	1	-	4
Dallas, Tex.	192	112	39	24	12	5	3
El Paso, Tex.	83	65	10	5	2	1	6
Ft. Worth, Tex.	89	61	11	13	2	2	12
Houston, Tex.	319	208	66	29	12	4	29
Little Rock, Ark.	74	49	13	9	1	2	3
New Orleans, La.	U	U	U	U	U	U	U
San Antonio, Tex.	230	157	47	15	6	5	22
Shreveport, La.	70	41	18	8	2	1	4
Tulsa, Okla.	109	71	26	6	5	1	10
MOUNTAIN	929	660	158	72	24	13	65
Albuquerque, N.M.	100	68	20	9	2	1	7
Colo. Springs, Colo.	52	39	8	4	-	1	7
Denver, Colo.	112	71	22	15	1	3	11
Las Vegas, Nev.	204	153	34	12	4	1	12
Ogden, Utah	25	20	2	2	1	-	-
Phoenix, Ariz.	152	101	27	11	9	2	9
Pueblo, Colo.	37	26	7	3	1	-	3
Salt Lake City, Utah	95	65	14	9	3	4	5
Tucson, Ariz.	152	117	24	7	3	1	11
PACIFIC	1,355	919	225	130	37	24	100
Berkeley, Calif.	16	13	2	-	-	1	2
Fresno, Calif.	97	66	17	4	4	6	10
Glendale, Calif.	30	20	4	5	-	-	1
Honolulu, Hawaii	42	29	7	4	2	-	4
Long Beach, Calif.	85	53	19	8	3	2	6
Los Angeles, Calif.	435	274	75	57	17	3	17
Pasadena, Calif.	35	27	3	3	-	2	2
Portland, Oreg.	U	U	U	U	U	U	U
Sacramento, Calif.	U	U	U	U	U	U	U
San Diego, Calif.	145	101	20	15	5	3	22
San Francisco, Calif.	121	77	23	11	1	1	8
San Jose, Calif.	178	134	27	10	3	3	19
Santa Cruz, Calif.	33	27	3	2	1	-	5
Seattle, Wash.	U	U	U	U	U	U	U
Spokane, Wash.	53	41	7	3	-	2	4
Tacoma, Wash.	85	57	18	8	1	1	-
TOTAL	11,731¶	7,686	2,197	1,143	376	280	740

*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.
U: Unavailable -: no reported cases

Carbon Monoxide Poisoning — Continued

occurrence of nonfatal work-related CO poisonings probably is underestimated because workers with mild symptoms may not seek treatment, medical providers may not recognize nonspecific symptoms as manifestations of CO poisoning, and some correctly diagnosed cases may not be reported as work-related.

Since November 1990, DOEM has identified four other cases of CO poisoning among construction workers; all required emergency medical treatment (*1*). Two cases involved use of gasoline-powered forklifts in an enclosed warehouse, and two involved use of gasoline-fueled saws. Similar incidents have been reported among workers in other industries, including farmers using gasoline-fueled pressure washers to clean structures housing animals (*6*; NIOSH, unpublished data, 1993) and workers using liquid propane-powered floor burnishers to clean floors in a retail establishment (*7*). During January 1985–February 1995, the Colorado Department of Public Health and Environment (CDPHE) received reports of 147 cases of occupational CO poisoning related to the use of gasoline-powered equipment; of these, 13 (9%) were associated with use of pressure washers (CDPHE, unpublished data, 1995).

The investigation described in this report and other incidents indicate that many workers may not be aware of the risks of CO poisoning associated with gasoline-fueled engines and may not be able to assess accurately whether ventilation is adequate for their safe use. For example, in 1993, to characterize risk awareness and behavior related to the indoor use of small engines, NIOSH surveyed 416 persons involved in flood-cleanup activities in Missouri. Of those who had ever used a gasoline-powered pressure washer, 38% reported bringing the engine component of the washer inside a building (NIOSH, unpublished data, 1993).

For many construction projects, CO exposure cannot be consistently controlled because of the involvement of multiple contractors. The employer of the laborers involved in the incident described in this report has discontinued use of the gasoline-powered pressure washers in underground parking garages and now uses electric- or diesel-powered washers. However, other contractors routinely use gasoline-powered equipment in maintaining and resurfacing parking garage floors—often without additional ventilation. Alternatives to gasoline-powered equipment (i.e., electric and diesel equipment) are associated with other potential hazards (e.g., improper use of electric equipment can result in electrocution, and unfiltered diesel exhaust contains hazardous particulates). Even though diesel equipment and well-maintained gasoline-fueled equipment that are fitted with catalytic converters emit less CO, the reduced levels may be too high for safe indoor use.

The risk for CO exposure to workers can be reduced through improved ventilation. In addition, however, risk-reduction efforts must include air monitoring for CO levels. Reliable air monitoring includes the requirement for persons who have been trained to perform the monitoring and for equipment that has been properly calibrated and maintained. Training and warning labels can increase awareness among contractors and workers about the risks associated with use of gasoline-fueled equipment in enclosed spaces.

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Carbon Monoxide Poisoning — Continued

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Eye Injuries to Agricultural Workers — Minnesota, 1992–1993

During 1993, U.S. farm workers incurred an estimated 13,500 eye injuries that resulted in lost work time (*1*); many of these injuries could have been prevented. To determine the incidence of eye injuries and use of eye protection among farm workers, the Minnesota Occupational Health Nurses in Agricultural Communities (OHNAC)* examined data from the Minnesota Farming Health Survey (MFHS) conducted during January–April 1992 and December 1992–April 1993. This report summarizes the results of this analysis.

Occupational health nurses administered questionnaires during on-farm visits. Square-mile sections of land in three agricultural regions of the state were sampled at a sampling rate of 3.5%. All farms on any portion of the sampled land were selected. Farms were considered eligible for the survey if farm operators reported that they actively farmed, that they sold ≥$1000 of farm produce annually, and that their farm income accounted for at least half of their total household income. Overall, 1359 farm household members living on 372 (68.5%) of 543 eligible farms were included in the survey; respondents were farm operators and selected adult household members. Farm injuries were defined as self-reported events related to farm operation that resulted in restricted activities for at least four hours, loss of consciousness, or seeking of medical care.

Respondents reported 106 farm injuries during the two periods† (annual rate: 78.0 injuries per 1000 farm household members [95% confidence interval (CI)=63.7–92.2]). Ten persons sustained 11 farm-related eye injuries (10% of all injuries and 8.1 eye injuries per 1000 farm household members [95% CI=3.3–12.9]).

Of the 11 farm-related eye injuries, four were caused by chemicals and seven by foreign bodies. Chemical-related eye injuries involved splashes of liquid agricultural chemicals (two cases) and fungicidal dust (one case); the fourth incident involved discovery of an eye injury in a child who had exited a chemical storage shed, although the details of the injury could not be ascertained. Foreign body-related injuries were

*OHNAC is a national surveillance program conducted by CDC's National Institute for Occupational Safety and Health, which has placed public health nurses in rural communities and hospitals in 10 states (California, Georgia, Iowa, Kentucky, Maine, Minnesota, New York, North Carolina, North Dakota, and Ohio) to conduct surveillance for agriculture-related illnesses and injuries that occur among farmers and their family members. These surveillance data are used to assist in reducing the risk for occupational illness and injury in agricultural populations.

†The reporting period for the winter 1992 survey was January 1991–December 1991; the period for the winter 1993 survey was November 1991–October 1992.

Eye Injuries — Continued

sustained in association with activities including working with hand and power tools, welding, grinding, cutting metal, and augering grain. The injured person was reported to have been using eye protection in only one of these incidents. Medical care was sought for nine (82%) of the 11 injuries; seven required immediate medical attention. However, no residual problems or restrictions were reported by respondents; three of the 10 injuries to adults resulted in lost work time.

Farm operators also were asked about their use of protective equipment and/or procedures while performing specific work tasks involving potential dermal exposures to agricultural chemicals (Table 1). For mixing or loading agricultural chemicals or for sprayer maintenance, 50% reported never wearing eye protection (e.g., goggles or safety glasses), and 9% reported never using protective gloves.

Of the 207 respondents who worked with anhydrous ammonia (an extremely caustic alkali that is stored under pressure and applied as a liquid fertilizer), 73 (35%) reported that they never or sometimes wore goggles, and 92 (44%) reported that they never or sometimes checked the water supply in their field emergency water tank.[§]

Reported by: C Lexau, MPH, D Bishop, PhD, Div of Family Health, Minnesota Dept of Health. Div of Safety Research, and Div of Surveillance, Hazard Evaluations, and Field Studies, National Institute for Occupational Safety and Health, CDC.

Editorial Note: The MFHS findings document the occurrence of eye injuries in a specific production-agriculture worker group—farmers and household members living on family-operated farms—and are consistent with other recent reports. For example, the Regional Rural Injury Study, a population-based survey in five midwestern states, documented an annual rate of 58.3 farm injury events per 1000 household members—farm-related eye injuries accounted for 8.2% of all farm injuries (*2*).[¶] Based on the Traumatic Injury Surveillance of Farmers survey during 1993, the estimated 13,500 eye injuries among farm workers in the United States that resulted in lost time from work accounted for approximately 6.7% of all lost-time injuries estimated for farming operations (*1*). Although the survey participation rate was relatively low, MFHS data for selected characteristics of farm operators and farm operations were consistent with data from the 1992 Census of Agriculture.

§Keeping an emergency water supply in the field is a standard safety precaution; immediate flushing of skin or eyes following contact with anhydrous ammonia is necessary to mitigate the severe burns that will otherwise result.

¶The questionnaire for farm injuries used on the MFHS was adapted from the Regional Rural Injury Study, but the population eligible for inclusion in the MFHS included more full-time farmers.

TABLE 1. Percentage of respondents who reported using protective equipment during mixing and loading of agricultural chemicals and during sprayer maintenance — Minnesota Farming Health Survey Minnesota, 1992–1993*

	Always/ Most of the time		Some of the time		Never	
Equipment	**No.**	**%**	**No.**	**%**	**No.**	**%**
Protective gloves	238	(77)	46	(15)	27	(9)
Eye protection	82	(26)	74	(24)	155	(50)
Face shield	11	(4)	22	(7)	278	(89)

*Respondents were farm operators (n=311) who reported performing these work tasks.

Eye Injuries — Continued

Based on the incident descriptions obtained by MFHS, each of the 10 eye injuries to adults would most likely have been prevented if appropriate and well-fitting eye protection had been worn while those persons engaged in work with agricultural chemicals, power and hand tools, and grain- or seed-moving equipment. Personal protective equipment traditionally has not been considered a primary strategy for hazard control. The preferred strategies have included hazard substitution (i.e., replacing a hazardous chemical with a less hazardous one) and hazard isolation or use of engineering controls (*3*). Although these strategies are applicable in agricultural settings (e.g., use of closed pesticide-handling systems), use of eye protection provides a practical and cost-effective method of preventing eye injuries among farm workers. Goggles are recommended for chemical splash protection, and safety glasses with side shields can provide adequate protection (except in dusty environments) against flying particles or objects (*4,5*).

In Minnesota, OHNAC is working with individual agricultural chemical dealers to promote the use of eye protection among their clients. Concurrent with educational programs and media promotions by Minnesota OHNAC staff, the chemical dealers have agreed to sell eye protection devices at a discount during the spring and early summer. Minnesota OHNAC has successfully used a similar approach with operators of local grain elevators to increase the availability of respiratory protection (*6*).

Chemical-related eye injuries are a focus for prevention efforts in Minnesota because they accounted for many of the eye injuries reported in the MFHS and represented most (67%) of the reported chemical injuries. The recently implemented U.S. Environmental Protection Agency Worker Protection Standard (*7*) requires farm operators (including family farmers) to adopt preventive measures when working with pesticides. This standard includes requirements that all workers comply with personal protective equipment recommendations detailed on pesticide labels, that decontamination sites—including an emergency water supply—be furnished for employees, and that eye protection be used when closed pesticide-handling systems are operated under pressure.

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Notice to Readers

National Chronic Disease Prevention and Control Conference

CDC is soliciting abstracts for the Tenth National Conference on Chronic Disease Prevention and Control to be held in Atlanta, December 6–8, 1995. The 12 topic areas are: forming coalitions with nontraditional partners; the changing nature of leadership and advocacy; moving from a service provision model to a population-based model; social marketing; system changes to incorporate or implement prevention; program institutionalization with communities; new research paradigms—broadening chronic disease epidemiology; measuring chronic diseases, behaviors, and other risks; translating science into reasonable policy and effective implementation; critical points in the life cycle for behavior change; trends in the chronic disease burden—the changing priorities of chronic disease; and use of technology to improve the prevention of chronic disease. The deadline for submission of abstracts is June 23, 1995.

Additional information and abstract forms are available from Dr. Philip Huang, Chief, Bureau of Disease Prevention, Texas Department of Health, 1100 West 49th St., Austin, TX 78756-3199; telephone (512) 458-7200; fax (512) 459-7618.

Notice to Readers

Course in Hospital Epidemiology

CDC, the Society for Healthcare Epidemiology of America (SHEA), and the American Hospital Association will cosponsor a hospital epidemiology training course October 14–17, 1995, in Miami, Florida. The course, designed for infectious disease fellows, new hospital epidemiologists, and infection-control practitioners, provides hands-on exercises to improve skills in detection, investigation, and control of epidemiologic problems encountered in the hospital setting and lectures and seminars on fundamental aspects of hospital epidemiology.

Additional information is available from SHEA Meetings Department, Suite 200, 875 Kings Highway, Woodbury, NJ 08095-3172; telephone (609) 845-1720; fax (609) 853-0411.

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