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Progress in Chronic Disease Prevention

Economic Cost of Diabetes Mellitus – Minnesota, 1988

For diabetes mellitus (DM) and other chronic diseases, important indicators of disease burden include morbidity, mortality, measures of disability and quality of life, and economic burden. Because of limited data, however, the economic burden of DM has been difficult to measure. Although national costs for DM have been estimated recently (*1–5*), state-specific estimates have, in general, not been possible. This report summarizes an analysis prepared by the Minnesota Diabetes Surveillance Project (MDSP), Minnesota Department of Health, that estimated the economic impact of DM in Minnesota for 1988.

The prevalence of DM in Minnesota was obtained from a previous population-based study (*6*). The MDSP used national sources to estimate hospitalizations, physician visits, nursing home stays, laboratory tests, outpatient care, and disability for persons with DM (*1*). These estimates were then applied to the population of persons with DM in Minnesota to obtain the number of health-care resource units* attributable to DM in the state (Table 1). Data for the cost per unit were obtained from both state and national sources (*1,7,8*). An estimate of cost (in 1988 dollars) of DM in Minnesota was developed by applying data on the cost per unit to the number of units. Hospitalizations from adverse outcomes of pregnancy were not included in this analysis.

In 1988, the total cost of DM in Minnesota was approximately $301 million (Table 1). The direct cost of DM, including diagnosis, treatment, hospitalizations, nursing home care, and outpatient care, was approximately $189 million; the indirect cost, associated with loss of productivity because of illness, disability, or death, was approximately $112 million.

Chronic complications of DM accounted for more than half of the hospitalization days for persons with DM (Table 1) and cost more than $75 million. These complications included lower extremity amputations and renal, ophthalmic, neurologic, and cardiovascular conditions.

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*Hospital days, physician visits to inpatients, months of nursing home care, outpatient physician visits, physician-ordered laboratory tests, prescriptions, or supplies.

Diabetes — Continued

Editorial Note: There are three levels of prevention for minimizing the burden of DM: primary—to reduce the incidence of DM; secondary—to control the metabolic abnormalities of DM; and tertiary—to limit the consequences of longer term DM complications.

The benefits of tertiary prevention activities include the prevention of blindness; laser photocoagulation can delay severe visual loss in more than 50% of persons who have diabetic retinopathy and macular edema (*3*). Through early detection and treatment of foot ulcers and infections, 50% of amputations can be delayed (*3*). Cardiovascular diseases are the most frequent and costly chronic complication of DM (*1,9*); studies in nondiabetic populations suggest that detection and control of hypertension can reduce the incidence of coronary heart disease by 25%–50% (*3*).

Because chronic complications of DM account for more than half of the hospitalization days for persons with DM in Minnesota, prevention of some of these complications should result in a major reduction in the cost of DM. The Minnesota Diabetes Steering Committee, an advisory group of the Minnesota Diabetes Control Program, has developed the Minnesota Plan to Prevent Disability from Diabetes (*10*), which targets the reduction of morbidity and disability that result from lower extremity amputation, diabetic eye disease, uncontrolled hypertension, and adverse

TABLE 1. Direct and indirect costs* of diabetes† — Minnesota, 1988

Category	Units	Cost per unit (dollars)	Total (dollars)
Direct costs			
Hospital costs			
Diabetes	31,565 days	965.57	30,478,217
Chronic complications	78,304 days	965.57	75,607,993
Increased intensity of care for diabetes	7,588 days	965.57	7,326,745
Additional length of stay for diabetes	37,412 days	965.57	36,123,905
Physician visits to inpatients	170,356 visits	26.00	4,429,256
Nursing home care	6,706 months	1,775.00	11,903,150
Outpatient care			
Physician visits	179,343 visits	26.00	4,662,918
Physician-ordered laboratory tests	130,729 tests	22.10	2,889,111
Prescriptions (insulin, oral agents)	467,966 prescriptions	14.85	6,949,295
Supplies (syringes, swabs, test strips)	55,806,136 supplies	0.16	8,928,982
Total direct costs			**189,299,572**
Indirect costs			
Short-term morbidity			2,037,000
Long-term disability			44,635,386
Mortality			65,498,207
Total indirect costs			**112,170,593**
Total cost			**301,470,165**

*1988 dollars.

†Hospitalizations from adverse outcomes of pregnancy were not included in this analysis.

Diabetes — Continued

pregnancy outcomes. Implementation of this plan entails cooperation among public health and other government agencies, health-care providers, volunteer organizations, businesses, community organizations, and persons with DM and their families. Surveillance efforts include cost estimates and provide policymakers with information at the state level to help assess the impact of the plan. This multifaceted project—which includes measuring the burden of DM, implementing a statewide plan, and monitoring the impact of the plan—is an approach that can be implemented at the state level with the goal of decreasing the morbidity, mortality, and economic costs associated with DM.

Information about the plan is available from the Project Manager, Diabetes Control Program, Minnesota Department of Health; telephone (612) 623-5771.

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Current Trends

Update: Influenza Activity — United States and Worldwide, and the Composition of the 1991–92 Influenza Vaccine

United States

During the 1990–91 influenza season, influenza activity in the United States was at relatively low levels, as evidenced by the small number of reported outbreaks in institutions (primarily schools) and the lack of substantial mortality from pneumonia and influenza.

In mid-November, state epidemiologists first reported sporadic* influenza activity in the mid-Atlantic and New England regions. By mid-January, widespread influenza

*Levels of activity are: 1) *Sporadic*—sporadically occurring influenza-like illness or culture-confirmed influenza, with no outbreaks detected; 2) *Regional*—outbreaks of influenza-like illness or culture-confirmed influenza in counties having a combined population of <50% of the state's total population; 3) *Widespread*—outbreaks of influenza-like illness or culture-confirmed influenza in counties having a combined population of ≥50% of the state's total population.

Influenza — Continued

activity was reported in New York; regional activity was reported in six states east of the Mississippi River, Missouri, and Nebraska. Influenza activity in the United States peaked from February 10 through March 2, when eight to 10 states (predominantly from the four central regions of the country) reported widespread activity each week. After March 9, four states in the Mountain or Pacific regions reported widespread activity.

Of the >2500 influenza virus isolates identified and reported to CDC this season, the majority (93%) were influenza type B. Almost all of an antigenically tested sample of these were related to influenza B/Yamagata/16/88, which was included in this year's vaccine, but were antigenically closer to B/Panama/45/90, a minor variant.

Influenza A viruses constituted 0–2% of the influenza isolates reported from most regions but were approximately 20% of the isolates from the Mountain and Pacific regions. Although sporadic reports of influenza A occurred throughout the season, since mid-February a slight increase in both A(H1N1) and A(H3N2) has occurred. In some areas, the increase was associated with a reported recrudescence of influenza-like illness. As of March 31, 64 (54%) of the 118 reported influenza A viruses with known subtype were A(H3N2) strains, and 54 (46%) were A(H1N1) strains. Of the 11 A(H1N1) strains antigenically tested at CDC, all closely resembled A/Taiwan/1/86, the 1990–91 vaccine strain. Of 16 A(H3N2) strains tested, all showed variation from the 1990–91 vaccine strain, A/Shanghai/16/89; eight were closely related to the reference strain A/Beijing/353/89. Antiserum to A/Beijing/353/89 also reacted well with most of the other recent isolates.

Worldwide

During the 1990–91 season, influenza activity worldwide occurred at low levels. Although influenza B, influenza A(H1N1), and influenza A(H3N2) viruses were all associated with relatively small local or regional outbreaks in different areas of the world, major epidemics affecting entire countries were not reported.

In Canada and Europe, as in the United States, the predominant circulating virus was influenza type B. Although outbreaks occurred in many locations, they were usually local and occurred primarily among school children. Most influenza B isolates were related to B/Yamagata/16/88 and B/Panama/35/90, except in the United Kingdom where viruses closely related to the previously prevalent strain, B/Victoria/2/87, were a substantial proportion of influenza B isolates.

Viruses closely related to A/Taiwan/1/86(H1N1) have been isolated sporadically, but local outbreaks associated with these viruses have been identified only in Stockholm during December and in northern Hungary during late February and early March. Sporadic cases have occurred in Canada, Korea, Japan, and countries in Europe.

In Europe during the 1990–91 season, influenza activity associated with A(H3N2) viruses was less than that associated with A(H1N1) viruses. Sporadic isolates were reported in Canada, Switzerland, the Union of Soviet Socialist Republics, Egypt, and Thailand. Outbreaks were reported in Korea and Japan. Detailed antigenic analyses of recent strains of A(H3N2) viruses are in progress.

Composition of the 1991–92 Influenza Vaccine

For the 1991–92 season, the Food and Drug Administration (FDA) Vaccine Advisory Committee has recommended that the trivalent influenza vaccine contain A/Taiwan/1/86-like(H1N1), A/Beijing/353/89-like(H3N2), and B/Panama/45/90-like viruses. This recom-

Influenza — Continued

mendation was based on the antigenic analysis of recent isolates and studies of the antibody response of persons previously vaccinated with the 1990–91 influenza vaccine.

Antigenic analysis of influenza A(H1N1) isolates from outbreaks in Stockholm and from sporadic isolates from the United States indicates that drift from the 1990–91 vaccine strain (A/Taiwan/1/86) has not occurred. Furthermore, antibody induced by this vaccine component reacts well with currently circulating strains.

From May through September 1990, influenza A(H3N2) was active in the southern hemisphere and isolates were predominately similar to a new variant A/Beijing/353/89 previously detected only in northern China (Table 1) (*1*). During the 1990–91 influenza season, a limited number of isolates available for testing from North America and Japan were more closely related to A/Beijing/353/89 than to the 1990–91 vaccine strain, A/Shanghai/16/89(H3N2) (*2*). In persons who received the 1990–91 vaccine containing A/Shanghai/16/89 as the A(H3N2) component, the postvaccine geometric mean titer to A/Beijing/353/89 was approximately 50% of that to the vaccine strain, A/Shanghai/16/89. Thus, the World Health Organization (WHO) (*3*) and the FDA Vaccine Advisory Panel recommended changing the A(H3N2) strain for the 1991-92 season from A/Shanghai/16/89 to A/Beijing/353/89.

Two strains of influenza B, B/Victoria/2/87 and B/Yamagata/16/88, have cocirculated in the world since 1988. Both viruses circulated in Europe during the 1989–90 epidemic season, and in Australia and Africa during the southern hemisphere epidemic season. Since July 1990, the number of B/Victoria/2/87-like viruses isolated in Asia, the Americas, and Europe (except for the United Kingdom) has been small. Antigenic heterogeneity of viruses related to B/Yamagata/16/88 was detected among isolates during the past year, and the B/Panama/45/90 virus is more representative of the majority of recent isolates (Table 2). Although antibody induced in adult vaccinees by the B/Yamagata/16/88 vaccine component is broadly reactive against B/Panama/45/90, children may have geometric mean titers twofold or threefold lower against the B/Panama/45/90-like viruses than against B/Yamagata/16/88-like viruses (Table 3). Therefore, for the 1991–92 vaccine, the FDA vaccine advisory panel recommended changing the influenza B vaccine component from B/Yamagata/16/88 to B/Panama/45/90.

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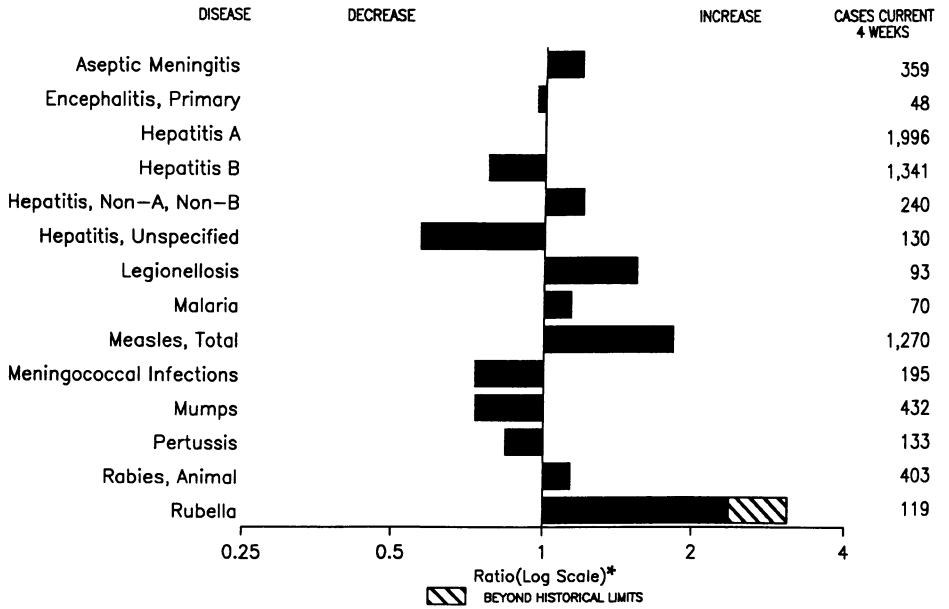
TABLE 1. Hemagglutination inhibition titers of influenza A(H3N2) viruses with serum specimens from infected ferrets*

	Ferret antiserum	
Reference antigen	**A/Shanghai/16/89**	**A/Beijing/353/89**
A/Shanghai/16/89	**320**	80
A/Beijing/353/89	80	**640**

*Differences of fourfold in titer of a serum with two viruses is normally indicative of an experimentally significant variation between the viruses.

FIGURE I. Notifiable disease reports, comparison of 4-week totals ending April 6, 1991, with historical data — United States



*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 April 6, 1991 (14th Week)

	Cum. 1991		Cum. 1991
AIDS	10,869	Measles: imported	34
Anthrax	-	indigenous	2,226
Botulism: Foodborne	5	Plague	-
Infant	15	Poliomyelitis, Paralytic*	-
Other	4	Psittacosis	26
Brucellosis	13	Rabies, human	-
Cholera	-	Syphilis, primary & secondary	11,098
Congenital rubella syndrome	7	Syphilis, congenital, age < 1 year	-
Diphtheria	1	Tetanus	2
Encephalitis, post-infectious	18	Toxic shock syndrome	97
Gonorrhea	148,604	Trichinosis	2
Haemophilus influenzae (invasive disease)	1,026	Tuberculosis	4,979
Hansen Disease	27	Tularemia	20
Leptospirosis	22	Typhoid fever	75
Lyme Disease	1,169	Typhus fever, tickborne (RMSF)	15

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

TABLE II. Cases of selected notifiable diseases, United States, weeks ending April 6, 1991, and April 7, 1990 (14th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea		Hepatitis (Viral), by type				Legionellosis	Lyme Disease
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991
UNITED STATES	10,869	1,316	149	18	148,604	184,065	6,881	4,202	770	391	303	1,169
NEW ENGLAND	448	59	8	-	3,972	5,139	155	251	35	11	28	43
Maine	22	4	3	-	36	66	5	5	2	-	-	-
N.H.	13	3	-	-	77	71	14	6	2	-	1	3
Vt.	8	5	-	-	16	21	8	1	3	-	-	1
Mass.	243	21	3	-	1,683	1,865	86	203	24	9	26	29
R.I.	18	22	-	-	310	276	21	12	2	2	1	10
Conn.	144	4	2	-	1,850	2,840	21	24	2	-	-	-
MID. ATLANTIC	3,014	170	13	5	16,829	25,087	504	356	62	10	89	934
Upstate N.Y.	455	80	6	3	3,279	3,459	328	176	41	4	34	819
N.Y. City	1,554	9	-	-	5,247	10,892	25	6	-	-	3	-
N.J.	674	-	-	-	2,851	4,124	51	79	8	-	7	115
Pa.	331	81	7	2	5,452	6,612	100	95	13	6	45	-
E.N. CENTRAL	864	238	44	4	26,872	36,366	702	503	106	18	51	45
Ohio	192	87	13	1	8,983	11,066	128	114	64	7	26	28
Ind.	62	26	5	1	3,028	3,028	127	56	1	-	3	-
Ill.	393	35	7	2	7,049	11,368	241	51	7	1	1	-
Mich.	150	81	18	-	6,705	8,612	104	172	32	10	15	17
Wis.	67	9	1	-	1,107	2,292	102	110	2	-	6	-
W.N. CENTRAL	295	91	7	1	7,765	9,881	869	178	90	5	15	6
Minn.	67	17	5	-	808	1,188	105	15	6	1	3	2
Iowa	27	22	-	1	533	754	22	9	6	-	-	4
Mo.	157	35	-	-	4,704	5,736	202	138	75	3	7	-
N. Dak.	4	-	-	-	11	44	13	2	2	1	-	-
S. Dak.	-	4	2	-	110	53	367	1	-	-	3	-
Nebr.	14	7	-	-	579	502	138	10	-	-	2	-
Kans.	26	6	-	-	1,020	1,604	22	3	1	-	-	-
S. ATLANTIC	2,501	304	27	7	45,690	51,079	449	958	118	87	35	40
Del.	22	7	-	-	622	691	5	16	4	2	-	10
Md.	246	31	4	-	4,394	5,163	106	130	25	6	8	14
D.C.	179	11	-	-	2,906	2,727	32	25	1	1	-	-
Va.	217	54	6	-	4,352	4,866	48	66	6	64	3	8
W. Va.	10	2	1	-	331	378	9	24	1	3	-	1
N.C.	101	36	10	-	8,859	8,746	61	168	44	-	6	6
S.C.	79	10	-	-	3,489	4,358	13	232	15	2	7	-
Ga.	349	25	4	1	11,678	11,279	57	125	6	-	2	1
Fla.	1,298	128	2	6	9,059	12,871	118	172	16	9	9	-
E.S. CENTRAL	304	79	7	-	13,507	14,850	64	323	91	3	19	25
Ky.	52	20	2	-	1,329	1,809	8	53	5	2	11	13
Tenn.	85	16	4	-	5,197	4,695	39	226	82	-	6	9
Ala.	94	29	1	-	3,448	4,874	16	43	4	1	2	3
Miss.	73	14	-	-	3,533	3,472	1	1	-	-	-	-
W.S. CENTRAL	940	107	9	-	17,100	18,434	980	431	24	56	14	16
Ark.	42	26	1	-	1,908	2,453	120	32	1	2	2	7
La.	180	8	1	-	3,491	3,315	38	68	1	2	5	-
Okla.	27	1	3	-	1,719	1,680	113	75	14	7	4	9
Tex.	691	72	4	-	9,982	10,986	709	256	8	45	3	-
MOUNTAIN	302	54	8	1	2,886	3,967	1,230	292	39	69	27	3
Mont.	5	2	-	-	21	38	43	24	2	3	1	-
Idaho	5	-	-	-	43	26	20	32	-	-	3	-
Wyo.	5	-	-	-	36	45	71	4	-	-	-	3
Colo.	126	17	1	1	559	1,116	115	45	10	9	4	-
N. Mex.	25	6	-	-	343	297	390	58	5	22	1	-
Ariz.	55	17	7	-	1,195	1,578	395	57	4	29	9	-
Utah	19	4	-	-	102	120	101	14	8	6	4	-
Nev.	62	8	-	-	587	747	95	58	10	-	5	-
PACIFIC	2,201	214	26	-	13,983	19,262	1,928	910	205	132	25	57
Wash.	117	-	-	-	1,181	1,846	177	134	42	7	1	-
Oreg.	53	-	-	-	526	692	112	85	33	2	1	-
Calif.	1,973	192	26	-	11,857	16,250	1,561	667	120	122	22	57
Alaska	8	5	-	-	219	343	68	9	8	1	-	-
Hawaii	50	17	-	-	200	131	10	15	2	-	1	-
Guam	-	-	-	-	-	76	-	-	-	-	-	-
P.R.	490	65	-	1	138	347	30	116	27	15	-	-
V.I.	2	-	-	-	168	137	-	3	-	-	-	-
Amer. Samoa	-	-	-	-	-	38	-	-	-	-	-	-
C.N.M.I.	-	-	-	-	-	59	-	-	-	-	-	-

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

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending April 6, 1991, and April 7, 1990 (14th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1991	1991	Cum. 1991	1991	Cum. 1991	Cum. 1990	Cum. 1991	1991	Cum. 1991	1991	Cum. 1991	Cum. 1990	1991	Cum. 1991	Cum. 1990
UNITED STATES	241	506	2,226	1	34	5,295	650	154	1,147	31	572	733	32	202	199
NEW ENGLAND	16	-	5	-	2	107	52	-	11	9	77	92	-	1	3
Maine	-	-	-	-	-	27	4	-	-	-	12	1	-	-	-
N.H.	1	-	-	-	-	8	6	-	3	-	11	7	-	1	-
Vt.	1	-	4	-	-	1	8	-	-	2	3	2	-	-	-
Mass.	10	-	-	-	-	3	26	-	-	7	48	74	-	-	-
R.I.	3	-	-	-	-	22	-	-	2	-	-	-	-	-	1
Conn.	1	-	1	-	2	46	8	-	6	-	3	8	-	-	2
MID. ATLANTIC	17	488	1,148	-	-	539	62	20	129	3	67	153	21	96	2
Upstate N.Y.	6	-	1	-	-	240	35	4	45	2	38	117	20	88	1
N.Y. City	3	-	60	-	-	58	2	-	-	-	-	-	-	-	-
N.J.	5	-	91	-	-	24	9	-	43	-	1	11	-	-	-
Pa.	3	488	996	-	-	217	16	16	41	1	28	25	1	8	1
E.N. CENTRAL	21	-	27	-	2	2,188	97	30	118	3	100	207	-	7	14
Ohio	6	-	-	-	1	210	32	27	27	3	37	36	-	-	-
Ind.	2	-	-	-	-	153	11	-	3	-	20	31	-	1	-
Ill.	6	-	-	-	-	919	25	-	51	-	18	73	-	3	13
Mich.	7	-	25	-	-	318	23	3	34	-	19	30	-	3	-
Wis.	-	-	2	-	1	588	6	-	3	-	6	37	-	-	1
W.N. CENTRAL	5	3	6	-	1	122	33	-	43	1	41	26	1	5	-
Minn.	-	-	1	-	1	39	7	-	2	-	15	-	1	4	-
Iowa	2	3	5	-	-	21	2	-	7	-	4	3	-	-	-
Mo.	3	-	-	-	-	52	17	-	9	1	15	18	-	1	-
N. Dak.	-	-	-	-	-	-	1	-	-	-	1	1	-	-	-
S. Dak.	-	-	-	-	-	2	1	-	-	-	1	1	-	-	-
Nebr.	-	-	-	-	-	1	3	-	3	-	4	1	-	-	-
Kans.	-	-	-	-	-	7	2	-	22	-	1	2	-	-	-
S. ATLANTIC	56	13	170	1	9	303	120	40	375	-	32	60	1	9	10
Del.	1	4	15	-	-	4	-	-	2	-	-	2	-	-	-
Md.	18	1	56	-	-	32	14	8	92	-	6	19	-	8	-
D.C.	4	-	-	-	-	3	-	2	7	-	-	1	-	-	-
Va.	10	3	15	1§	3	20	11	-	19	-	4	7	-	-	-
W. Va.	1	-	-	-	-	6	4	-	8	-	6	5	-	-	-
N.C.	1	-	-	-	-	3	27	3	76	-	7	11	-	-	-
S.C.	4	-	12	-	-	1	19	26	75	-	-	3	-	-	-
Ga.	5	-	-	-	-	6	24	-	12	-	6	8	-	-	-
Fla.	12	5	72	-	6	228	21	1	84	-	3	4	1	1	10
E.S. CENTRAL	2	-	4	-	-	45	55	1	27	-	19	26	-	-	1
Ky.	1	-	-	-	-	2	22	-	-	-	-	-	-	-	-
Tenn.	-	-	4	-	-	17	17	1	13	-	10	12	-	-	1
Ala.	1	-	-	-	-	4	16	-	2	-	9	12	-	-	-
Miss.	-	-	-	-	-	22	-	-	12	-	-	2	-	-	-
W.S. CENTRAL	15	-	-	-	5	479	44	25	148	1	14	7	-	1	-
Ark.	1	-	-	-	5	7	9	-	20	-	-	1	-	1	-
La.	2	-	-	-	-	-	14	-	9	-	7	1	-	-	-
Okla.	1	-	-	-	-	110	4	4	5	1	7	5	-	-	-
Tex.	11	-	-	-	-	362	17	21	114	-	-	-	-	-	-
MOUNTAIN	9	2	153	-	9	184	29	14	71	-	81	69	-	1	8
Mont.	1	-	-	-	-	1	4	-	-	-	-	-	-	-	5
Idaho	-	-	-	-	2	14	6	2	5	-	17	6	-	-	3
Wyo.	-	-	-	-	-	-	1	-	3	-	3	-	-	-	-
Colo.	3	-	-	-	1	14	4	-	16	-	31	46	-	-	-
N. Mex.	1	1	73	-	2	50	4	N	N	-	12	3	-	-	-
Ariz.	4	-	71	-	-	66	6	11	34	-	8	7	-	-	-
Utah	-	-	-	-	4	-	-	1	9	-	10	3	-	-	-
Nev.	-	1	9	-	-	39	4	-	4	-	-	4	-	1	-
PACIFIC	100	-	713	-	6	1,328	158	24	225	14	141	93	9	82	161
Wash.	7	-	1	-	3	39	19	10	63	8	37	28	-	-	-
Oreg.	2	-	7	-	-	105	15	N	N	6	27	7	-	-	-
Calif.	89	-	703	-	3	1,126	120	14	151	-	54	49	9	81	157
Alaska	-	-	-	-	-	56	4	-	4	-	4	-	-	-	-
Hawaii	2	-	2	-	-	2	-	-	7	-	19	9	-	1	4
Guam	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-
P.R.	1	3	3	-	1	300	13	1	6	1	7	4	-	1	-
V.I.	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-
Amer. Samoa	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-
C.N.M.I.	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.
N: Not notifiable U: Unavailable †International §Out-of-state

TABLE II. (Cont'd.) Cases of selected notifiable diseases, United States, weeks ending April 6, 1991, and April 7, 1990 (14th Week)

Reporting Area	Syphilis (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1990	Cum. 1991	Cum. 1991	Cum. 1991	Cum. 1991
UNITED STATES	11,098	12,923	97	4,979	5,485	20	75	15	1,194
NEW ENGLAND	298	519	6	118	100	1	8	2	2
Maine	-	5	3	-	-	-	1	-	-
N.H.	3	30	1	-	1	-	-	-	1
Vt.	1	1	-	1	2	-	-	-	-
Mass.	161	180	2	57	41	1	7	2	-
R.I.	14	1	-	16	23	-	-	-	-
Conn.	119	302	-	44	33	-	-	-	1
MID. ATLANTIC	1,856	2,736	15	1,137	1,359	-	10	-	379
Upstate N.Y.	103	161	7	80	142	-	4	-	125
N.Y. City	885	1,422	-	716	822	-	2	-	-
N.J.	362	434	-	219	209	-	4	-	174
Pa.	506	719	8	122	186	-	-	-	80
E.N. CENTRAL	1,059	882	19	575	519	1	7	-	16
Ohio	155	140	12	89	64	-	1	-	3
Ind.	27	8	-	31	33	-	-	-	-
Ill.	405	324	3	316	269	-	-	-	3
Mich.	323	295	4	107	137	1	5	-	2
Wis.	149	115	-	32	16	-	1	-	8
W.N. CENTRAL	190	119	18	138	129	3	2	-	163
Minn.	21	32	7	23	22	-	2	-	53
Iowa	20	10	5	23	13	-	-	-	33
Mo.	120	53	5	60	60	3	-	-	3
N. Dak.	-	1	-	2	6	-	-	-	15
S. Dak.	1	-	-	11	4	-	-	-	46
Nebr.	1	3	1	5	10	-	-	-	7
Kans.	27	20	-	14	14	-	-	-	6
S. ATLANTIC	3,402	4,055	7	868	996	2	13	10	324
Del.	41	56	1	7	15	-	-	-	42
Md.	283	331	-	71	86	-	5	1	119
D.C.	200	228	-	52	29	-	1	-	5
Va.	281	215	2	89	82	-	3	-	62
W. Va.	8	5	-	26	17	-	1	-	21
N.C.	531	476	4	95	122	1	-	8	-
S.C.	409	214	-	104	125	-	-	-	24
Ga.	833	921	-	181	155	-	2	1	44
Fla.	816	1,609	-	243	365	1	1	-	7
E.S. CENTRAL	1,185	1,167	3	334	446	2	-	2	28
Ky.	24	22	1	84	107	1	-	1	7
Tenn.	463	474	2	42	132	1	-	-	8
Ala.	387	365	-	119	133	-	-	1	13
Miss.	311	306	-	89	74	-	-	-	-
W.S. CENTRAL	2,046	2,011	4	486	631	6	1	1	162
Ark.	115	137	2	50	62	4	-	-	12
La.	656	619	-	20	113	-	1	-	3
Okla.	41	60	2	36	49	2	-	1	54
Tex.	1,234	1,195	-	380	407	-	-	-	93
MOUNTAIN	202	227	10	162	110	4	4	-	17
Mont.	1	-	-	-	4	3	-	-	5
Idaho	3	4	-	2	2	-	-	-	1
Wyo.	1	1	-	2	1	1	-	-	7
Colo.	17	17	1	6	6	-	-	-	1
N. Mex.	45	16	3	31	24	-	-	-	1
Ariz.	116	148	3	83	52	-	3	-	2
Utah	3	2	3	19	3	-	-	-	-
Nev.	16	39	-	19	18	-	1	-	-
PACIFIC	860	1,207	15	1,161	1,195	1	30	-	103
Wash.	42	126	1	71	78	1	-	-	-
Oreg.	26	29	-	29	36	-	1	-	1
Calif.	789	1,036	14	992	1,017	-	28	-	99
Alaska	2	5	-	13	17	-	-	-	3
Hawaii	1	11	-	56	47	-	1	-	-
Guam	-	-	-	-	12	-	-	-	-
P.R.	101	141	-	46	29	-	-	-	7
V.I.	55	1	-	1	2	-	-	-	-
Amer. Samoa	-	-	-	-	5	-	-	-	-
C.N.M.I.	-	-	-	-	12	-	-	-	-

U: Unavailable

TABLE III. Deaths in 121 U.S. cities,* week ending April 6, 1991 (14th Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	565	424	75	31	23	12	59
Boston, Mass.	174	120	26	13	9	6	18
Bridgeport, Conn.§	U	U	U	U	U	U	U
Cambridge, Mass.	27	23	1	1	2	-	6
Fall River, Mass.	23	22	-	1	-	-	2
Hartford, Conn.	71	53	6	5	6	1	2
Lowell, Mass.	28	24	2	1	1	-	2
Lynn, Mass.	11	9	2	-	-	-	1
New Bedford, Mass.	25	17	4	2	2	-	-
New Haven, Conn.	50	37	9	2	1	1	6
Providence, R.I.	62	44	11	2	1	4	7
Somerville, Mass.	6	5	1	-	-	-	1
Springfield, Mass.§	U	U	U	U	U	U	U
Waterbury, Conn.	36	27	6	2	1	-	6
Worcester, Mass.	52	43	7	2	-	-	8
MID. ATLANTIC	2,706	1,751	511	307	66	71	169
Albany, N.Y.	52	39	6	2	-	5	7
Allentown, Pa.	16	10	4	2	-	-	-
Buffalo, N.Y.	110	73	22	5	3	7	12
Camden, N.J.	46	28	10	5	-	3	1
Elizabeth, N.J.	30	23	6	-	1	-	3
Erie, Pa.†	40	31	7	-	2	-	2
Jersey City, N.J.	70	37	11	16	2	4	-
New York City, N.Y.	1,380	850	271	196	34	29	66
Newark, N.J.	62	25	19	13	2	3	4
Paterson, N.J.	35	20	5	6	1	3	3
Philadelphia, Pa.	416	279	79	37	12	9	25
Pittsburgh, Pa.†	72	48	15	7	1	1	9
Reading, Pa.	27	21	4	1	1	-	7
Rochester, N.Y.	138	104	23	6	2	3	14
Schenectady, N.Y.	24	19	3	2	-	-	1
Scranton, Pa.†	29	23	5	1	-	-	3
Syracuse, N.Y.	64	52	3	5	3	1	5
Trenton, N.J.	50	33	11	2	1	3	5
Utica, N.Y.	17	12	4	1	-	-	-
Yonkers, N.Y.	28	24	3	-	1	-	2
E.N. CENTRAL	2,243	1,397	476	200	106	64	149
Akron, Ohio	64	44	14	4	1	1	-
Canton, Ohio	39	30	8	1	-	-	3
Chicago, Ill.	476	203	113	84	61	15	22
Cincinnati, Ohio	120	79	25	10	3	3	13
Cleveland, Ohio	156	101	32	14	3	6	6
Columbus, Ohio	171	115	39	9	4	4	8
Dayton, Ohio	130	86	26	9	3	6	15
Detroit, Mich.	221	137	47	21	11	5	9
Evansville, Ind.	59	47	7	3	1	1	5
Fort Wayne, Ind.	61	44	14	3	-	-	4
Gary, Ind.	27	17	7	1	1	1	2
Grand Rapids, Mich.	33	24	5	2	-	2	9
Indianapolis, Ind.	170	104	42	13	6	5	14
Madison, Wis.	43	26	7	3	1	6	4
Milwaukee, Wis.	138	92	31	9	6	-	14
Peoria, Ill.	37	26	9	1	-	1	5
Rockford, Ill.	51	37	6	5	1	2	6
South Bend, Ind.	66	50	12	2	1	1	3
Toledo, Ohio	122	88	24	4	2	4	4
Youngstown, Ohio	59	47	8	2	1	1	3
W.N. CENTRAL	806	573	145	48	21	19	55
Des Moines, Iowa	75	48	21	2	4	-	7
Duluth, Minn.	28	22	6	-	-	-	-
Kansas City, Kans.	32	23	7	2	-	-	3
Kansas City, Mo.	120	89	22	5	2	2	6
Lincoln, Nebr.	52	40	9	2	1	-	2
Minneapolis, Minn.	189	135	31	14	3	6	17
Omaha, Nebr.	81	58	14	5	1	3	4
St. Louis, Mo.	128	91	19	9	5	4	8
St. Paul, Minn.	47	36	7	2	1	1	5

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
S. ATLANTIC	1,397	836	299	165	55	41	75
Atlanta, Ga.	159	93	30	26	5	5	5
Baltimore, Md.	160	104	34	15	4	3	15
Charlotte, N.C.	116	70	31	8	3	4	5
Jacksonville, Fla.	125	74	29	11	10	1	16
Miami, Fla.	105	58	25	14	4	4	1
Norfolk, Va.	66	38	10	9	2	7	3
Richmond, Va.	60	31	13	9	3	4	3
Savannah, Ga.	55	39	11	3	2	-	4
St. Petersburg, Fla.	72	58	8	3	3	-	3
Tampa, Fla.	163	103	34	16	5	4	7
Washington, D.C.	301	156	72	50	14	9	13
Wilmington, Del.	15	12	2	1	-	-	-
E.S. CENTRAL	1,202	816	244	75	27	38	68
Birmingham, Ala.	113	79	21	7	3	3	5
Chattanooga, Tenn.	74	51	16	4	-	3	6
Knoxville, Tenn.	50	34	11	2	1	2	7
Louisville, Ky.	124	83	24	7	3	7	9
Memphis, Tenn.	207	140	38	11	8	10	9
Mobile, Ala.	510	346	111	37	8	8	25
Montgomery, Ala.§	U	U	U	U	U	U	U
Nashville, Tenn.	124	83	23	7	4	5	7
W.S. CENTRAL	1,413	894	269	164	49	37	112
Austin, Tex.	61	40	13	8	-	-	8
Baton Rouge, La.	55	31	13	7	1	3	3
Corpus Christi, Tex.	41	31	4	3	2	1	1
Dallas, Tex.	199	109	44	27	9	10	10
El Paso, Tex.	77	56	11	7	2	1	7
Ft. Worth, Tex.	104	75	15	6	6	2	5
Houston, Tex.	299	158	62	55	15	9	35
Little Rock, Ark.	58	44	7	3	1	3	2
New Orleans, La.	120	83	20	13	3	1	-
San Antonio, Tex.	213	146	40	19	6	2	22
Shreveport, La.	60	39	14	2	3	2	9
Tulsa, Okla.	126	82	26	14	1	3	10
MOUNTAIN	692	447	128	67	25	25	40
Albuquerque, N.M.	78	56	12	8	2	-	2
Colo. Springs, Colo.	33	21	6	3	-	3	6
Denver, Colo.	119	74	18	8	5	14	5
Las Vegas, Nev.	113	71	26	12	3	1	7
Ogden, Utah	27	21	5	-	-	1	6
Phoenix, Ariz.	127	76	28	16	4	3	1
Pueblo, Colo.	31	25	4	2	-	-	5
Salt Lake City, Utah	40	19	7	6	7	1	3
Tucson, Ariz.	124	84	22	12	4	2	5
PACIFIC	1,975	1,385	295	180	55	52	142
Berkeley, Calif.	21	11	4	4	-	2	1
Fresno, Calif.	70	44	15	5	4	2	11
Glendale, Calif.	31	25	3	1	1	1	3
Honolulu, Hawaii	86	59	11	8	2	6	6
Long Beach, Calif.	80	60	13	3	1	3	8
Los Angeles, Calif.	553	388	77	57	17	7	29
Oakland, Calif.§	U	U	U	U	U	U	U
Pasadena, Calif.	28	20	2	4	-	2	-
Portland, Oreg.	146	112	15	12	5	2	6
Sacramento, Calif.	150	103	30	9	2	6	16
San Diego, Calif.	157	106	24	11	10	6	17
San Francisco, Calif.	165	91	30	34	1	8	9
San Jose, Calif.	177	128	25	17	4	3	14
Seattle, Wash.	155	118	22	9	5	1	3
Spokane, Wash.	66	50	13	1	1	1	9
Tacoma, Wash.	90	70	11	5	2	2	10
TOTAL	12,999††	8,523	2,442	1,237	427	359	869

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

**Pneumonia and influenza.

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

††Total includes unknown ages.

§Report for this week is unavailable (U).

Influenza — Continued

Virology, Center for Biologics Evaluation and Research, Food and Drug Administration. Epidemiology Activity and the WHO Collaborating Center for Influenza, Influenza Br, Div of Viral and Rickettsial Diseases, Center for Infectious Diseases, CDC.

Editorial Note: The 1990–91 influenza season in the United States and many other countries was characterized by a predominance of influenza B among circulating strains and limited mortality. The increase in influenza A activity in the United States late this season indicates a continuing need for surveillance, including culture of specimens from patients with influenza-like illness. Although the severity and types of future influenza epidemics cannot be reliably predicted, the increased isolation of type A viruses, including A(H3N2) strains, suggests that such viruses may predominate next winter.

The composition of influenza vaccine for the United States is determined between January and late March each year to meet the production schedule required for >30 million doses to be manufactured, quality controlled, and distributed before onset of the next influenza season. As in the past, specific recommendations for the use of the newly constituted influenza vaccine will be made by the Immunization Practices Advisory Committee of the Public Health Service and published in an *MMWR Recommendations and Reports.*

TABLE 2. Hemagglutination inhibition titers of influenza B viruses with serum specimens from infected ferrets*

Reference antigen	Ferret antiserum		
	B/Victoria/2/87	B/Yamagata/16/88	B/Panama/45/90
B/Victoria/2/87	**320**	<10	<10
B/Yamagata/16/88	80	**640**	160
B/Panama/45/90	80	80	**160**

*Differences of fourfold in titer of a serum with two viruses is normally indicative of an experimentally significant variation between the viruses. In some cases only asymmetric differences are seen when several variants are simultaneously tested.

TABLE 3. Neutralization antibody responses to the B/Yamagata/16/88 component of the 1990–91 trivalent influenza vaccine*

Age group†	No. persons	Virus strain§	Prevaccination GMT¶	Postvaccination GMT
6 mos–4 yrs	23	B/Yamagata/16/88	<25	344
		B/Panama/45/90-like	<25	157
5–16 yrs	30	B/Yamagata/16/88	23	141
		B/Panama/45/90-like	18	63
25–40 yrs	25	B/Yamagata/16/88	31	147
		B/Panama/45/90-like	50	189
69–100 yrs	31	B/Yamagata/16/88	25	57
		B/Panama/45/90-like	28	50

*In 1989, volunteers received trivalent influenza vaccine containing 15 μg each of A/Shanghai/11/87 (H3N2), A/Taiwan/1/86(H1N1), and B/Yamagata/16/88.

†Actual ages of persons from whom serum specimens were obtained.

§B/Hong Kong/22/89 virus was used in this test as representative of B/Panama/45/90.

¶Geometric mean titer.

Sources: Vanderbilt University, Nashville, Tennessee; University of Colorado, Denver, Colorado; University of Pittsburgh, Pittsburgh, Pennsylvania.

Influenza — Continued

References
1. CDC. Update: influenza activity—worldwide and recommendations for influenza vaccine composition for the 1990–91 influenza season. MMWR 1990;39:293–6.
2. World Health Organization. Recommended composition of influenza virus vaccines for use in the 1990–1991 season. Wkly Epidemiol Rec 1990;65:53–6.
3. World Health Organization. Recommended composition of influenza virus vaccines for use in the 1991–1992 season. Wkly Epidemiol Rec 1991;66:57–60.

Notices to Readers

Treatment of Severe *Plasmodium falciparum* Malaria with Quinidine Gluconate: Discontinuation of Parenteral Quinine from CDC Drug Service

CDC has recently reviewed data on the reported incidence in the United States of *Plasmodium falciparum* malaria and has evaluated information on the effective management of severe life-threatening infections. As a result of this review, CDC has concluded that the drug of choice in the United States for treatment of complicated *P. falciparum* infections is parenteral quinidine gluconate. Therefore, effective immediately, parenteral quinine dihydrochloride will no longer be available from the CDC Drug Service.

Patients with severe malaria in the United States should be treated in intensive-care facilities where central hemodynamic and electrocardiographic monitoring is available. Based on a study of patients with *P. falciparum* treated in the United States (*1*), continuous infusion of quinidine gluconate is recommended. A loading dose of 10 mg of quinidine gluconate (equivalent to 6.2 mg quinidine base) per kg of body weight is given over 1–2 hours, followed by a constant infusion of 0.02 mg quinidine gluconate per kg per minute. This regimen is highly effective and well-tolerated in monitored patients (*2,3*).

The Food and Drug Administration and the drug manufacturer are amending the indications for the use of quinidine gluconate to include therapy of life-threatening *P. falciparum* malaria.

Reasons for recommending the routine use of parenteral quinidine gluconate in the United States include the demonstrated efficacy and safety of parenteral quinidine gluconate and the unavailability of parenteral quinine that has caused delays in administering an antimalarial drug to critically ill persons. An expanded report on the use of quinidine gluconate for the treatment of *P. falciparum* malaria will be published in an *MMWR Recommendations and Reports*. Information regarding treatment of *P. falciparum* malaria is available from the Malaria Branch, Division of Parasitic Diseases, Center for Infectious Diseases, CDC, telephone (404) 488-4046.

Reported by: Malaria Br, Div of Parasitic Diseases, Center for Infectious Diseases, CDC.

References
1. Miller KD, Greenberg AE, Campbell CC. Treatment of malaria in the United States with a continuous infusion of quinidine gluconate and exchange transfusion. N Engl J Med 1989;321:65–70.
2. White NJ, Plorde JJ. Malaria. In: Wilson JD, Braunwald E, Isselbacher KJ, et al, eds. Harrison's principles of internal medicine. 12th ed. New York: McGraw-Hill, 1990.
3. Krogstad DJ. Malaria. In: Wyngaarden JB, Smith LH, Bennett JC, Plum F, eds. Cecil's textbook of medicine. 19th ed. Philadephia: WB Saunders, 1991.

Availability of NIOSH Criteria Document on Ethylene Glycol Monobutyl Ether and Ethylene Glycol Monobutyl Ether Acetate

CDC's National Institute for Occupational Safety and Health (NIOSH) recently published *Criteria for a Recommended Standard: Occupational Exposure to Ethylene Glycol Monobutyl Ether and Ethylene Glycol Monobutyl Ether Acetate* (*1*).* In this document, NIOSH recommends occupational exposure limits for ethylene glycol monobutyl ether (EGBE) and its acetate, ethylene glycol monobutyl ether acetate (EGBEA). The publication also examines the occupational health risks of exposure to these chemicals and presents criteria for eliminating or minimizing these risks during the manufacture and use of EGBE and EGBEA. These criteria include recommendations for preventing dermal contact, sampling and analytical methods, medical monitoring, biological monitoring, engineering controls and work practices, and protective clothing and equipment. Because limited data are available from studies in humans, NIOSH based its recommended exposure limit for EGBE and EGBEA on data from studies in animals. The data were adjusted to allow for uncertainties in the extrapolation from animals to humans.

In humans and animals, the principal health effects of exposure to EGBE and EGBEA involve the blood and hematopoietic system, the central nervous system (CNS), the kidneys, and the liver. In animals, effects on the CNS, liver, and kidneys occur at higher EGBE exposures than do hematotoxic effects. Thus, limiting exposures to prevent hematotoxic effects will prevent CNS, kidney, and liver effects.

NIOSH therefore recommends that exposure to EGBE and EGBEA in the workplace be limited to 5 parts per million parts of air. Dermal contact should be prohibited since both compounds are readily absorbed through the skin. The same exposure limit is recommended for EGBE and EGBEA because any effects of EGBEA are likely to occur after it is metabolized to EGBE.

Reported by: Div of Standards Development and Technology Transfer, National Institute for Occupational Safety and Health, CDC.

Reference

1. NIOSH. Criteria for a recommended standard: occupational exposure to ethylene glycol monobutyl ether and ethylene glycol monobutyl ether acetate. Cincinnati, Ohio: US Department of Health and Human Services, Public Health Service, CDC, 1990; DHHS publication no. (NIOSH)90-118.

*Single copies are available without charge from Publications Dissemination, DSDTT, National Institute for Occupational Safety and Health, CDC, 4676 Columbia Parkway, Cincinnati, Ohio 45226; telephone (513) 533-8287.

Availability of Assessment Guide for Local Health Departments

The National Association of County Health Officials (NACHO), in collaboration with CDC, American Public Health Association, Association of Schools of Public Health, Association of State and Territorial Health Officials, and U.S. Conference of Local Health Officers, has developed the *Assessment Protocol for Excellence in Public Health* (APEX*PH*). APEX*PH* is a workbook designed for use by local health departments to 1) assess and improve the organizational capacity of departments and 2) assist local communities in assessing and improving the health status of their

Assessment Guide — Continued

residents. One copy is available free of charge to state and local health departments from NACHO, 440 First Street, N.W., Suite 500, Washington, DC 20001. The workbook is available to other organizations and persons at $20.00 per copy.

National Conference on the Prevention of Primary and Secondary Disabilities

On June 6–8, 1991, CDC, the National Council on Disability, and the Minority Health Professions Foundation will cosponsor in Atlanta a conference on the prevention of primary and secondary disabilities. The goal of the conference is to clarify priorities for and provide information on the development of a national plan for the prevention of disabilities.

The conference will highlight the Institute of Medicine's report, *Disability in America*; the U.S. Department of Health and Human Services/Public Health Service's publication, *Healthy People 2000*; and prevention-related research, assistive technology, and discussions of draft working papers on developmental disabilities, injuries, chronic conditions, and quality of life issues.

The registration deadline is May 1, 1991. Registration forms are available from the conference manager: PACE Enterprises, 17 Executive Park Drive, Suite 200, Atlanta, GA 30329; telephone (404) 633-8610; FAX (404) 633-8745. Additional information is available from the Disabilities Prevention Program, Center for Environmental Health and Injury Control, Mailstop F-41, CDC, 1600 Clifton Road, NE, Atlanta, GA 30333; telephone (404) 488-4905.

Errata: Vol. 40, No. 10

In the article, "Paralytic Shellfish Poisoning—Massachusetts and Alaska, 1990," the maximum safe level of saxitoxin concentration given in the third-to-last line of page 157 should be 80 μg/100 g.

In the article, "Cyanide Poisonings associated with Over-the-Counter Medication—Washington State," two errors appeared on page 167. First, in the third full paragraph, the date for the manufacturer's recall should be Sunday, March 3. Second, the compound at the beginning of the sixth line from the bottom of the page should be "thiocyanate."

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