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Current Trends

Hepatitis B Virus Vaccine Safety: Report of an Inter-Agency Group

On June 25, 1982, the Immunization Practices Advisory Committee (ACIP) recommended using inactivated hepatitis B virus (HBV) vaccine for individuals who are at high risk for HBV infection because of their geographic origins, life styles, or exposures to HBV at home or work (*1*). The recommendations included statements on vaccine efficacy and safety. However, requests for additional information on safety continue to be received, primarily because of the plasma origins of the antigen used to prepare the vaccine. In response to these requests, the Inter-Agency Group to Monitor Vaccine Development, Production, and Usage, with representatives from the Centers for Disease Control (CDC), Food and Drug Administration (FDA), and National Institutes of Health (NIH), has further reviewed the available data. Its conclusions on vaccine production and safety evaluation follow.

HBV vaccine licensed in the United States is prepared from human plasma containing hepatitis surface antigen (HBsAg) (*2*). Hypothetical side effects from the vaccine include reactions to blood substances or to infectious agents present in donor plasma. In trials involving approximately 1900 persons, reactions among vaccine recipients were compared with reactions among placebo recipients, and only minor immediate complaints, primarily of soreness at the injection site, were observed (*3,4*). Infectious agents that might be present in donor plasma are most likely to be viruses. Virus transmission by blood or blood products requires the virus to circulate in plasma or in cellular elements such as leukocytes. The chance of virus transmission increases with the duration of the viremic state. HBV is the only well-characterized extra-cellular human virus with a prolonged carrier state. Other agents, presumably viruses, which remain unidentified despite their common association with post-transfusion hepatitis, are responsible for non-A/non-B hepatitis.

Beginning in 1978, a disease or group of diseases was recognized, manifested by Kaposi's sarcoma and opportunistic infections, associated with a specific defect in cell-mediated immunity. This group of clinical entities, along with its specific immune deficiency, is now called acquired immune deficiency syndrome (AIDS). The epidemiology of AIDS suggests an unidentified and uncharacterized blood-borne agent as a possible cause of the underlying immunologic defect (*5-7*). Because AIDS occurs

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among populations that are sources of HBV-positive plasma, this syndrome should be considered in regard to the inherent safety of HBV vaccine.

Vaccine plasma donors are screened, and only healthy individuals (HBsAg positive) are selected. The plasmapheresis centers are licensed and inspected by the FDA. A physician gives each donor a complete physical examination, which includes a history and suitable laboratory tests. At the time of each donation, the donor's hemoglobin, hematocrit, and serum protein levels must be within normal limits. HBsAg-positive donors' levels of serum aminotransferase activity are permitted to exceed those limits set for otherwise healthy donors, but they must be stable.

The process for producing each lot of licensed HBV vaccine is designed to remove or inactivate infectious HBV and other viruses from the desired immunogen, the 22 nm HBsAg particle. The process relies on both biophysical elimination of infectious particles and treatments which inactivate viruses (pepsin at pH 2, 8M urea, and formalin). The elimination of infectious virus by biophysical purification depends on the density and flotational property of HBsAg in contrast with those of infectious virus particles. The double ultracentrifugation process (isopyknic and rate zonal) has been proven effective in removing 10^4 infectious doses of HBV/ml, as measured by chimpanzee inoculation (*8*). Pepsin treatment alone (1 μg/ml, pH 2.0, 37 C for 18 hours) inactivates 10^5 or more infectious doses of HBV/ml, as measured by chimpanzee inoculation, and has been shown to inactivate viruses in the rhabdovirus, poxvirus, togavirus, reovirus, herpesvirus and coronavirus groups (*9,10*). Urea treatment alone (8M, 37 C for four hours) inactivates 10^5 or more infectious doses of HBV/ml and has been shown to inactivate viruses in the rhabdovirus, myxovirus, poxvirus, togavirus, reovirus, picornavirus, herpesvirus, and coronavirus groups (*9*). Slow viruses, characterized by the viruses of kuru and Creutzfeld-Jakob disease, are inactivated by 6M urea, a lesser concentration than that routinely applied to the HBV vaccine (*11*). Formalin alone inactivates HBV (*9*), as well as many other virus groups, including parvoviruses (*12*), retroviruses (*13,14*) and the delta agent (*15*).

Each lot of HBV vaccine is tested for sterility, innocuousness in animals, and pyrogenicity and is free of detectable viruses, as shown by inoculation into both human and monkey cell-culture systems. Additionally, 22 doses of each vaccine lot are inoculated intravenously into four chimpanzees.

United States licensed vaccine (produced by Merck, Sharp, and Dohme) has been given to over 19,000 persons, 6,000 of whom received vaccine between October 1975 and December 1981 and 13,000 of whom received it in 1982. The vaccine has been demonstrated to protect recipients from HBV infection (*3,4*), and no evidence of hepatitis has been observed as a result of HBV vaccination. Also, studies by CDC, FDA, and others of aminotransferase levels in chimpanzees and humans confirm that HBV vaccine does not transmit the non-A/non-B agent(s).

In three vaccine-placebo trials (two among homosexual men between 1978 and 1980 [*3,4*] and one among hospital employees in 1981), 549, 714, and 664 persons, respectively, received vaccine, and equal numbers received placebo. Follow-up surveillance of participants in these studies was 24, 15, and 18 months, respectively, after the first dose of vaccine with no cases of AIDS being reported. In

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addition to the vaccine/placebo trials, 17,602 persons (including 8,941 health-care workers and 5,985 healthy adults, children, and infants from non-high-risk group settings) have received Merck HBV vaccine in various study settings. Periods of follow-up of these vaccine recipients have ranged from a few months to over 7 years. However, lots used in early studies may have been produced before the occurrence of AIDS. Some of the groups from which HBV vaccine is prepared or for which it is recommended are also at high risk for AIDS; therefore reports of AIDS among donors and vaccinees at some future time may be expected on the basis of chance alone.

To summarize, these findings support the ACIP statement on hepatitis vaccine: 1) immediate side effects are minimal after receipt of HBV vaccine; 2) no long-term reactions have been reported; 3) the purification and inactivation process is known to inactivate representatives of all known groups of animal viruses; 4) each lot is safety tested in primates; 5) no known cases of hepatitis B or non-A/non-B hepatitis have been transmitted by the vaccine and no known occurrence of AIDS has been associated with the vaccine.

Reported by the Inter-Agency Group to Monitor Vaccine Development, Production, and Usage, represented by the Centers for Disease Control, Food and Drug Administration, and National Institutes of Health.

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International Notes

Dengue Type 1 in Mexico

During the past 3 months, health authorities in Mexico have reported cases of dengue-like illness from scattered locations. Serologic evidence from the Instituto de Salubridad y Enfermedades Tropicales in Mexico City suggested the virus was dengue type 1. More recently, transmission has increased with outbreaks reported from Apatzingan and Huetamo in Michoacan State and Culiacan in Sinaloa State on the west coast of Mexico, and from Veracruz, Cordoba, and Tierra Blanca in Veracruz State on the east coast (Figure 1). In the latter state, dengue has moved north and scattered cases have been reported recently from cities in the Tampico area.

An investigation of the outbreak in Cordoba, Veracruz, began in July 1982. Acute-phase serum specimens were taken from 18 patients with a dengue-like illness and sent to the San Juan Laboratories, CDC, for virus isolation. In subsequent visits, paired specimens were obtained from 16 additional patients and were also sent to the same laboratory for virologic and serologic testing.

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

Disease	34th Week Ending			Cumulative, First 34 Weeks		
	August 28, 1982	August 29, 1981	Median 1977-1981	August 28, 1982	August 29, 1981	Median 1977-1981
Aseptic meningitis	310	432	407	4,210	4,777	3,530
Brucellosis	1	3	3	102	95	117
Encephalitis: Primary (arthropod-borne & unspec.)	43	36	45	646	715	554
Post-infectious	1	3	3	49	66	148
Gonorrhea: Civilian	17,547	19,263	21,472	591,696	649,687	638,780
Military	253	372	487	16,289	18,884	17,723
Hepatitis: Type A	412	401	561	14,165	16,530	18,652
Type B	414	375	311	13,560	13,295	10,765
Non A, Non B	49	N	N	1,403	N	N
Unspecified	148	209	188	5,900	7,113	6,525
Legionellosis	15	N	N	302	N	N
Leprosy	1	10	5	128	175	112
Malaria	33	15	15	650	939	477
Measles (rubeola)	14	13	82	1,184	2,555	12,747
Meningococcal infections: Total	35	33	30	2,051	2,496	1,899
Civilian	35	33	30	2,039	2,487	1,882
Military	-	-	-	12	9	14
Mumps	20	35	70	4,080	3,132	10,984
Pertussis	58	26	50	878	772	903
Rubella (German measles)	12	11	49	1,958	1,706	10,562
Syphilis (Primary & Secondary): Civilian	713	603	480	21,348	19,654	15,697
Military	5	2	5	272	240	193
Tuberculosis	539	568	568	16,653	17,402	18,151
Tularemia	8	8	4	149	156	133
Typhoid fever	14	13	8	255	339	306
Typhus fever, tick-borne (RMSF)	21	39	45	757	943	846
Rabies, animal	144	175	117	4,114	5,056	3,291

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1982		Cum. 1982
Anthrax	-	Poliomyelitis: Total	3
Botulism	54	Paralytic	3
Cholera	-	Psittacosis (Calif. 1)	84
Congenital rubella syndrome	5	Rabies, human	-
Diphtheria	2	Tetanus (NYC 1, Pa. 1)	53
Leptospirosis	35	Trichinosis (NYC 1)	66
Plague	10	Typhus fever, flea-borne (endemic, murine)	24

TABLE III. Cases of specified notifiable diseases, United States, weeks ending August 28, 1982 and August 29, 1981 (34th week)

Reporting Area	Aseptic Meningitis	Brucellosis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	1982	Cum. 1982	Cum. 1982	Cum. 1982	Cum. 1982	Cum. 1981	1982	1982	1982	1982	1982	Cum. 1982
UNITED STATES	310	102	646	49	591,696	649,687	412	414	49	148	15	128
NEW ENGLAND	20	3	28	5	14,772	16,080	6	19	1	8	1	1
Maine	1	-	-	-	752	817	1	1	-	-	-	-
N.H.	1	-	5	-	429	581	2	3	-	-	-	-
Vt.	-	-	-	-	276	266	-	-	1	-	-	-
Mass.	9	-	9	-	6,731	6,740	2	5	-	8	-	-
R.I.	5	-	-	1	995	903	1	2	-	-	-	-
Conn.	4	3	14	4	5,589	6,773	-	8	-	-	1	1
MID. ATLANTIC	39	3	74	13	76,482	77,340	82	93	-	28	5	4
Upstate N.Y.	15	3	24	3	12,406	12,917	13	12	-	3	-	1
N.Y. City	6	-	14	-	31,973	32,105	9	30	-	8	-	1
N.J.	10	-	13	-	13,757	14,539	9	18	-	7	5	1
Pa.	8	-	23	10	18,346	17,779	51	33	-	10	-	1
E.N. CENTRAL	53	1	144	10	83,110	97,902	41	40	4	8	7	3
Ohio	28	1	53	4	24,244	32,047	17	22	2	4	7	-
Ind.	9	-	32	3	10,562	8,412	6	3	-	3	-	-
Ill.	-	-	9	1	19,358	27,357	1	2	2	-	-	3
Mich.	16	-	45	-	20,984	21,249	17	13	-	1	-	-
Wis.	-	-	5	2	7,962	8,837	-	-	-	-	-	-
W.N. CENTRAL	20	14	53	3	28,979	31,016	19	18	-	2	1	3
Minn.	2	1	20	1	4,236	4,846	2	1	-	2	-	1
Iowa	2	3	20	1	3,071	3,383	-	2	-	-	-	-
Mo.	-	4	6	-	13,757	14,317	2	3	-	-	-	1
N. Dak.	2	-	-	-	390	407	-	-	-	-	-	-
S. Dak.	-	1	-	1	802	857	-	-	-	-	-	1
Nebr.	5	2	4	-	1,707	2,359	-	-	-	-	1	-
Kans.	9	3	3	-	5,016	4,847	15	12	-	-	-	-
S. ATLANTIC	48	19	105	7	140,413	160,425	31	88	7	19	-	9
Del.	-	-	-	-	2,606	2,573	-	16	-	1	-	-
Md.	4	-	17	-	20,616	18,344	3	6	4	1	-	3
D.C.	1	-	-	-	9,067	9,436	-	1	-	-	-	-
Va.	10	7	22	1	12,802	14,767	2	16	1	1	-	1
W. Va.	-	-	6	-	1,790	2,419	1	-	-	-	-	-
N.C.	8	-	12	1	25,781	24,942	5	5	-	1	-	-
S.C.	1	2	-	-	15,627	15,664	10	13	-	12	-	-
Ga.	5	1	8	-	9,483	33,103	2	19	1	-	-	1
Fla.	19	9	40	5	42,641	39,177	8	12	1	3	-	4
E.S. CENTRAL	32	11	36	2	53,213	54,047	25	28	6	2	-	-
Ky.	3	-	-	-	7,255	6,709	18	1	-	-	-	-
Tenn.	5	6	16	-	20,972	20,485	4	16	4	2	-	-
Ala.	24	4	15	2	15,542	16,363	3	10	2	-	-	-
Miss.	-	1	5	-	9,444	10,490	-	1	-	-	-	-
W.S. CENTRAL	43	27	82	1	85,183	85,709	95	45	1	41	1	18
Ark.	3	5	6	-	6,952	6,354	-	1	-	9	-	-
La.	6	6	13	-	15,951	14,566	5	13	-	4	-	-
Okla.	5	4	18	-	9,456	9,335	30	11	1	2	1	-
Tex.	29	12	45	1	52,824	55,454	60	20	-	26	-	18
MOUNTAIN	11	-	20	3	20,873	25,302	21	8	7	2	-	2
Mont.	-	-	-	-	863	919	1	-	-	-	-	-
Idaho	5	-	-	-	951	1,127	-	1	1	-	-	1
Wyo.	-	-	-	-	611	575	-	-	-	-	-	-
Colo.	1	-	10	1	5,686	6,884	5	3	1	-	-	-
N. Mex.	-	-	-	-	2,728	2,730	8	-	3	-	-	-
Ariz.	U	-	6	-	5,450	7,528	U	U	U	U	U	-
Utah	5	-	-	2	994	1,213	5	3	1	2	-	1
Nev.	-	-	4	-	3,590	4,326	2	1	1	-	-	-
PACIFIC	44	24	104	5	88,671	101,866	92	75	23	38	-	88
Wash.	10	1	10	-	7,375	8,440	6	2	4	3	-	7
Oreg.	-	-	3	-	5,053	6,059	7	7	-	-	-	1
Calif.	29	22	87	5	72,355	82,768	77	60	19	35	-	58
Alaska	1	1	3	-	2,199	2,563	-	-	-	-	-	1
Hawaii	4	-	1	-	1,689	2,036	2	6	-	-	-	21
Guam	U	-	-	-	83	78	U	U	U	U	U	-
P.R.	-	-	1	-	1,904	2,139	8	8	-	6	-	-
V.I.	-	-	-	-	148	134	-	-	-	-	-	-
Pac. Trust Terr.	U	-	-	-	245	293	U	U	U	U	U	12

N: Not notifiable U: Unavailable

TABLE III. (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending August 28, 1982 and August 29, 1981 (34th week)

Reporting Area	Malaria		Measles (Rubeola)			Meningococcal Infections (Total)		Mumps		Pertussis	Rubella		
	1982	Cum. 1982	1982	Cum. 1982	Cum. 1981	1982	Cum. 1982	1982	Cum. 1982	1982	1982	Cum. 1982	Cum. 1981
UNITED STATES	33	650	14	1,184	2,555	35	2,051	20	4,080	58	12	1,958	1,706
NEW ENGLAND	1	33	1	11	75	1	107	3	167	1	-	18	112
Maine	-	-	-	-	5	-	8	-	36	-	-	-	33
N.H.	-	1	-	2	6	-	15	-	12	-	-	8	44
Vt.	-	-	-	2	2	-	6	-	7	-	-	-	-
Mass.	-	21	1	4	54	-	27	1	80	1	-	6	23
R.I.	-	2	-	-	-	-	11	1	15	-	-	1	-
Conn.	1	9	-	3	8	1	40	1	17	-	-	3	12
MID. ATLANTIC	12	103	-	157	811	9	373	-	255	17	1	92	200
Upstate N.Y.	-	21	-	110	207	1	130	-	56	5	1	45	94
N.Y. City	7	36	-	39	72	4	67	-	44	2	-	31	49
N.J.	1	25	-	4	54	1	75	-	36	1	-	16	46
Pa.	4	21	-	4	478	3	101	-	119	9	-	-	11
E.N. CENTRAL	-	39	2	73	79	5	241	5	2,150	5	2	161	356
Ohio	-	9	-	1	15	1	88	-	1,556	1	-	-	3
Ind.	-	1	-	2	8	-	22	-	37	-	-	27	123
Ill.	-	6	-	23	23	3	66	2	171	-	-	57	88
Mich.	-	21	2	47	30	1	53	-	294	3	-	48	34
Wis.	-	2	-	-	3	-	12	3	92	1	2	29	108
W.N. CENTRAL	2	19	-	49	10	4	91	-	542	3	-	55	76
Minn.	-	2	-	-	3	1	22	-	416	-	-	5	7
Iowa	1	6	-	-	1	-	5	-	30	-	-	-	4
Mo.	-	5	-	2	1	-	26	-	16	2	-	38	2
N. Dak.	-	1	-	-	-	-	6	-	-	-	-	-	-
S. Dak.	-	-	-	-	-	-	4	-	1	-	-	1	-
Nebr.	-	3	-	3	4	1	12	-	-	-	-	-	1
Kans.	1	2	-	44	1	2	16	-	79	1	-	11	62
S. ATLANTIC	1	99	-	37	358	8	417	1	234	7	-	70	130
Del.	-	4	-	-	-	-	-	-	10	-	-	1	1
Md.	-	15	-	2	5	-	25	-	24	5	-	33	1
D.C.	-	4	-	1	1	-	2	-	-	-	-	-	-
Va.	-	28	-	14	7	1	49	1	33	-	-	13	5
W. Va.	-	6	-	3	9	-	8	-	87	-	-	1	22
N.C.	-	3	-	-	3	-	79	-	11	-	-	1	5
S.C.	-	4	-	-	2	4	51	-	13	-	-	1	8
Ga.	1	14	-	-	108	1	87	-	11	1	-	6	35
Fla.	-	21	-	17	223	2	116	-	45	1	-	14	53
E.S. CENTRAL	-	7	-	8	5	1	135	2	41	3	-	44	28
Ky.	-	4	-	1	1	-	24	2	14	-	-	26	19
Tenn.	-	-	-	6	2	-	56	-	15	2	-	2	8
Ala.	-	-	-	-	2	-	45	-	6	1	-	-	1
Miss.	-	3	-	1	-	1	10	-	6	-	-	16	-
W.S. CENTRAL	2	48	1	39	836	5	247	1	166	5	2	104	143
Ark.	-	3	-	-	1	-	12	-	6	-	-	1	3
La.	1	4	-	2	2	2	51	-	5	-	-	1	9
Okla.	1	7	1	21	5	-	25	-	-	2	-	3	-
Tex.	-	34	-	16	828	3	159	1	155	3	2	99	131
MOUNTAIN	-	17	-	8	33	-	96	3	81	1	-	75	82
Mont.	-	1	-	-	-	-	4	-	3	-	-	5	3
Idaho	-	1	-	-	1	-	6	-	3	1	-	6	3
Wyo.	-	-	-	-	-	-	5	-	2	-	-	7	7
Colo.	-	8	-	6	9	-	41	-	15	-	-	6	30
N. Mex.	-	2	-	-	8	-	14	-	-	-	-	6	5
Ariz.	U	3	U	2	5	U	16	U	33	U	U	14	19
Utah	-	2	-	-	-	-	8	3	19	-	-	20	5
Nev.	-	-	-	-	10	-	2	-	6	-	-	11	10
PACIFIC	15	285	10	802	348	2	344	5	444	16	7	1,339	579
Wash.	-	14	-	34	3	1	37	-	61	-	-	37	88
Oreg.	-	9	-	15	4	-	67	-	-	-	-	6	50
Calif.	15	260	10	748	339	1	227	4	368	2	7	1,283	426
Alaska	-	-	-	1	-	-	10	-	6	-	-	5	1
Hawaii	-	2	-	4	2	-	3	1	9	14	-	8	14
Guam	U	1	U	6	6	U	2	U	3	U	U	2	1
P.R.	-	4	4	93	262	-	7	3	50	-	-	7	3
V.I.	-	-	-	-	24	-	-	1	2	-	-	-	1
Pac. Trust Terr.	U	-	U	-	1	U	2	U	4	U	U	-	1

U: Unavailable

TABLE III. (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending August 28, 1982 and August 29, 1981 (34th week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Tuberculosis		Tula-remia	Typhoid Fever		Typhus Fever (Tick-borne) (RMSF)		Rabies, Animal
	Cum. 1982	Cum. 1981	1982	Cum. 1982	Cum. 1982	1982	Cum. 1982	1982	Cum. 1982	Cum. 1982
UNITED STATES	21,348	19,654	539	16,653	149	14	255	21	757	4,114
NEW ENGLAND	356	388	25	452	4	-	16	-	8	32
Maine	3	3	2	38	-	-	-	-	-	23
N.H.	1	12	3	15	-	-	-	-	1	-
Vt.	1	13	1	10	-	-	2	-	-	-
Mass.	244	259	12	295	4	-	12	-	4	5
R.I.	19	23	-	18	-	-	-	-	2	-
Conn.	88	78	7	76	-	-	2	-	1	4
MID. ATLANTIC	2,966	2,923	113	2,798	7	2	39	-	28	120
Upstate N.Y.	294	262	6	484	7	-	6	-	9	61
N.Y. City	1,776	1,750	95	1,071	-	2	23	-	1	-
N.J.	408	404	12	548	-	-	6	-	12	8
Pa.	488	507	U	695	-	-	4	-	6	51
E.N. CENTRAL	1,118	1,393	75	2,553	1	1	21	1	74	446
Ohio	198	192	8	436	-	1	10	1	69	65
Ind.	133	153	5	322	-	-	-	-	-	65
Ill.	538	752	37	1,057	-	-	3	-	5	231
Mich.	185	232	22	600	-	-	7	-	-	4
Wis.	64	64	3	138	1	-	1	-	-	81
W.N. CENTRAL	369	407	29	494	20	-	9	2	25	908
Minn.	74	137	5	87	-	-	5	-	-	161
Iowa	21	16	2	54	1	-	1	-	4	288
Mo.	218	221	18	236	14	-	1	1	9	87
N. Dak.	7	7	-	9	-	-	-	-	-	77
S. Dak.	1	2	1	20	-	-	-	-	4	71
Nebr.	11	5	-	20	2	-	1	-	1	103
Kans.	37	19	3	68	3	-	1	1	7	121
S. ATLANTIC	5,813	5,218	124	3,445	10	1	34	7	418	731
Del.	10	8	-	33	-	-	-	-	-	2
Md.	315	390	6	397	1	-	9	2	43	35
D.C.	327	423	6	139	-	-	-	-	-	-
Va.	399	461	12	383	2	-	2	1	63	371
W. Va.	20	16	3	104	-	-	3	-	7	36
N.C.	446	397	13	543	-	1	1	3	179	52
S.C.	344	336	9	308	6	-	3	-	90	43
Ga.	1,188	1,332	34	532	-	-	-	1	34	142
Fla.	2,764	1,855	41	1,006	1	-	16	-	2	50
E.S. CENTRAL	1,492	1,302	40	1,520	6	-	14	6	64	483
Ky.	78	72	19	400	-	-	-	-	1	97
Tenn.	411	489	12	487	4	-	2	4	41	281
Ala.	544	363	9	429	-	-	9	2	10	103
Miss.	459	378	-	204	2	-	3	-	12	2
W.S. CENTRAL	5,580	4,708	51	2,007	78	-	25	4	126	787
Ark.	138	100	7	220	50	-	3	2	22	107
La.	1,270	1,107	4	309	3	-	3	-	-	27
Okla.	119	110	2	253	23	-	2	-	65	146
Tex.	4,053	3,391	38	1,225	2	-	17	2	39	507
MOUNTAIN	538	514	3	452	17	-	11	-	9	179
Mont.	3	11	-	27	1	-	-	-	2	67
Idaho	24	17	-	23	1	-	-	-	2	7
Wyo.	14	7	-	2	2	-	-	-	1	13
Colo.	147	153	1	50	3	-	3	-	1	32
N. Mex.	136	93	-	86	1	-	-	-	1	13
Ariz.	115	123	U	194	-	U	5	U	-	32
Utah	15	20	-	25	9	-	2	-	-	12
Nev.	84	90	2	45	-	-	1	-	2	3
PACIFIC	3,116	2,801	79	2,932	6	10	86	1	5	428
Wash.	100	112	3	183	1	-	3	-	-	4
Oreg.	73	61	1	119	-	-	3	-	1	2
Calif.	2,856	2,572	74	2,375	4	10	77	1	4	345
Alaska	8	10	-	57	1	-	1	-	-	77
Hawaii	79	46	1	198	-	-	2	-	-	-
Guam	1	-	U	14	-	U	-	U	-	-
P.R.	443	434	1	256	-	-	2	-	-	36
V.I.	17	13	-	1	-	-	-	-	-	-
Pac. Trust Terr.	-	-	U	85	-	U	-	U	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending August 28, 1982 (34th week)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	657	453	130	27	22	25	43
Boston, Mass.	172	108	32	13	8	11	18
Bridgeport, Conn.	50	36	7	3	2	2	2
Cambridge, Mass.	31	25	6	-	-	-	3
Fall River, Mass.	28	23	3	1	1	-	1
Hartford, Conn.	61	37	18	3	2	1	1
Lowell, Mass.	31	21	9	-	1	-	-
Lynn, Mass.	22	14	8	-	-	-	-
New Bedford, Mass.	18	15	2	1	-	-	-
New Haven, Conn.	51	39	2	-	4	6	-
Providence, R.I.	48	35	10	-	2	1	3
Somerville, Mass.	14	11	2	-	1	-	2
Springfield, Mass.	48	24	19	3	-	2	7
Waterbury, Conn.	27	19	6	1	-	1	1
Worcester, Mass.	56	46	6	2	1	1	5
MID. ATLANTIC	2,291	1,472	532	173	63	50	100
Albany, N.Y.	48	33	10	4	-	1	2
Allentown, Pa.	19	15	4	-	-	-	-
Buffalo, N.Y.	129	76	34	9	5	5	5
Camden, N.J.	42	20	18	1	1	2	3
Elizabeth, N.J.	30	25	4	1	-	-	4
Erie, Pa.†	34	22	9	2	-	1	2
Jersey City, N.J.	45	31	12	2	-	-	1
N.Y. City, N.Y.	1,227	788	268	103	39	29	42
Newark, N.J.	81	42	25	9	3	2	8
Paterson, N.J.	31	16	11	2	1	1	3
Philadelphia, Pa.†	202	118	55	22	6	1	17
Pittsburgh, Pa.†	97	57	28	7	3	2	4
Reading, Pa.	23	22	1	-	-	-	-
Rochester, N.Y.	65	47	12	3	2	1	1
Schenectady, N.Y.	22	16	2	1	1	2	1
Scranton, Pa.†	38	28	9	1	-	-	2
Syracuse, N.Y.	84	58	20	2	1	3	1
Trenton, N.J.	29	25	3	-	1	-	2
Utica, N.Y.	20	14	4	2	-	-	-
Yonkers, N.Y.	25	19	3	2	-	-	2
E.N. CENTRAL	2,099	1,302	503	144	78	72	45
Akron, Ohio	69	50	12	4	2	1	-
Canton, Ohio	36	26	8	2	-	-	3
Chicago, Ill	539	316	118	45	30	30	8
Cincinnati, Ohio	89	53	25	5	1	5	4
Cleveland, Ohio	163	95	54	8	5	1	1
Columbus, Ohio	137	81	35	12	3	6	4
Dayton, Ohio	97	65	20	6	2	4	-
Detroit, Mich.	242	134	63	27	11	7	5
Evansville, Ind.	38	20	15	2	1	-	-
Fort Wayne, Ind.	52	34	9	3	1	5	3
Gary, Ind.	13	6	4	1	2	-	2
Grand Rapids, Mich.§	51	49	-	1	-	1	1
Indianapolis, Ind.	146	89	37	6	6	8	2
Madison, Wis.	30	23	5	1	1	-	1
Milwaukee, Wis.	114	76	25	7	4	2	-
Peoria, Ill.	35	20	12	2	1	-	5
Rockford, Ill.	38	27	10	-	1	-	1
South Bend, Ind.	41	27	9	3	1	1	3
Toledo, Ohio	114	71	31	7	4	1	2
Youngstown, Ohio	55	40	11	2	2	-	-
W.N. CENTRAL	698	468	137	48	23	21	27
Des Moines, Iowa §	53	51	-	-	1	-	-
Duluth, Minn.	36	29	7	-	-	-	2
Kansas City, Kans.	37	21	9	4	1	2	1
Kansas City, Mo.	119	70	32	9	6	2	5
Lincoln, Nebr.	32	25	4	2	1	-	-
Minneapolis, Minn.	87	50	16	11	5	5	4
Omaha, Nebr.	84	56	12	8	4	4	5
St. Louis, Mo.	135	84	33	11	3	4	7
St. Paul, Minn.	54	42	8	1	-	3	1
Wichita, Kans.	61	40	16	2	2	1	2

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,431	811	396	114	49	60	34
Atlanta, Ga.	139	81	36	10	11	1	2
Baltimore, Md.	412	214	135	38	10	15	6
Charlotte, N.C.	72	43	15	6	3	4	1
Jacksonville, Fla.	98	56	30	5	5	2	4
Miami, Fla.	122	67	28	14	2	11	1
Norfolk, Va.	50	26	11	7	2	4	1
Richmond, Va.	81	46	23	5	3	4	10
Savannah, Ga.	41	25	12	3	1	-	3
St. Petersburg, Fla.	94	76	14	1	1	2	3
Tampa, Fla.	70	46	15	4	2	3	2
Washington, D.C.	191	98	58	16	6	13	1
Wilmington, Del.	61	33	19	5	3	1	-
E.S. CENTRAL	708	405	178	66	24	35	22
Birmingham, Ala.	105	52	36	7	2	8	2
Chattanooga, Tenn.	57	38	11	6	2	-	3
Knoxville, Tenn.	33	23	6	4	-	-	-
Louisville, Ky.	115	55	35	15	3	7	3
Memphis, Tenn.	158	92	41	10	4	11	4
Mobile, Ala.	81	45	18	11	6	1	1
Montgomery, Ala.	31	18	5	2	-	6	2
Nashville, Tenn.	128	82	26	11	7	2	7
W.S. CENTRAL	1,199	657	304	104	69	62	38
Austin, Tex.	39	27	8	2	1	1	5
Baton Rouge, La.	32	14	10	2	5	1	4
Corpus Christi, Tex.	29	18	8	2	-	1	-
Dallas, Tex.	232	128	59	23	12	10	2
El Paso, Tex.	47	25	12	5	2	2	2
Fort Worth, Tex.	96	60	19	4	5	8	5
Houston, Tex.	210	97	53	27	15	18	3
Little Rock, Ark.	70	42	17	4	4	3	5
New Orleans, La.	118	63	34	12	7	2	-
San Antonio, Tex.	150	82	40	12	7	9	6
Shreveport, La.	75	40	24	5	3	3	1
Tulsa, Okla.	101	61	20	6	8	4	5
MOUNTAIN	596	344	138	57	31	26	20
Albuquerque, N.Mex.	70	37	17	5	8	3	1
Colo. Springs, Colo.	22	14	5	1	2	-	2
Denver, Colo.	123	75	25	13	5	5	2
Las Vegas, Nev.	72	39	15	15	3	-	3
Ogden, Utah	15	11	2	-	1	1	1
Phoenix, Ariz.	123	68	32	11	5	7	1
Pueblo, Colo.	22	16	4	1	1	-	-
Salt Lake City, Utah	61	29	17	4	3	8	1
Tucson, Ariz.	88	55	21	7	3	2	9
PACIFIC	1,649	1,037	371	125	69	47	90
Berkeley, Calif.	14	8	4	2	-	-	1
Fresno, Calif.	61	40	12	2	3	4	1
Glendale, Calif.	24	18	4	2	-	-	1
Honolulu, Hawaii	70	42	16	6	4	2	5
Long Beach, Calif.	90	55	27	4	2	2	4
Los Angeles, Calif.	491	322	92	45	20	12	21
Oakland, Calif.	62	32	18	4	6	2	2
Pasadena, Calif.	27	17	6	3	-	1	2
Portland, Oreg.	96	60	22	8	2	4	9
Sacramento, Calif.	63	36	17	3	5	2	1
San Diego, Calif.	146	84	45	9	6	2	13
San Francisco, Calif.	115	71	27	9	4	4	1
San Jose, Calif.	183	114	41	14	9	5	17
Seattle, Wash.	122	81	25	10	5	1	2
Spokane, Wash.	51	36	7	3	3	2	6
Tacoma, Wash.	34	21	8	1	-	4	4
TOTAL	11,328††	6,949	2,689	858	428	398	419

* 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 4 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.

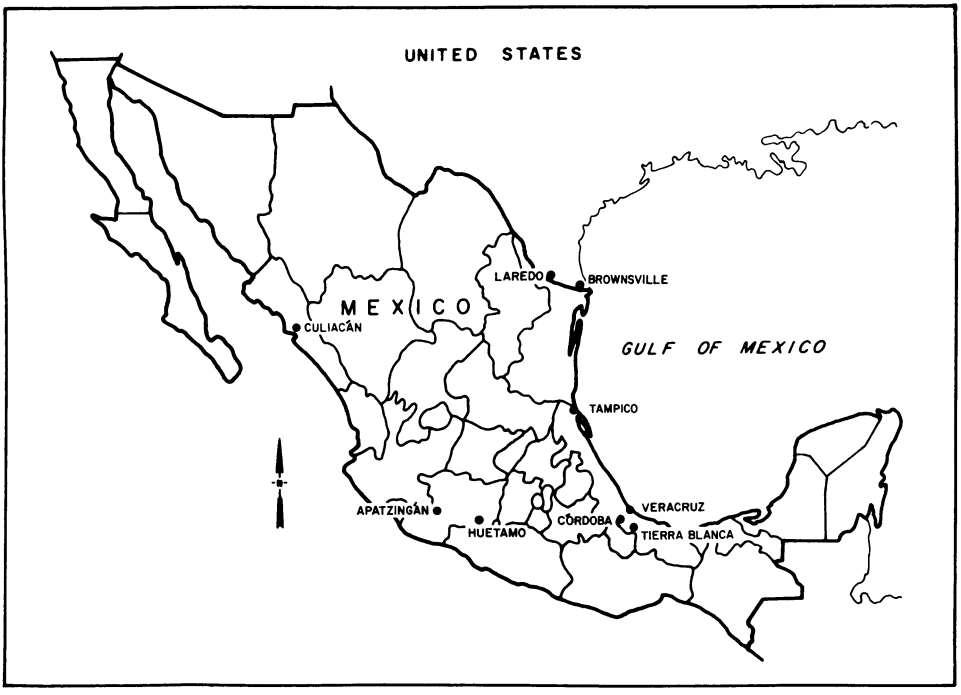
Dengue — Continued

The first acute-phase specimens were inoculated into *Toxorhynchites* mosquitoes. Three viruses were isolated and tentatively identified as dengue type 1 by type- specific monoclonal antibodies on mosquito brain tissue. This serotype was confirmed by complement fixation (CF) using antigen prepared from the bodies of infected mosquitoes.

Serology has been completed on the second group of specimens received. Ten of 16 paired specimens (62%) showed a $\geq$ 4-fold rise in dengue hemagglutination-inhibition (HI) antibodies between acute- and convalescent-phase specimens. Seven of these 10 patients had HI antibody titers compatible with primary dengue infection and follow-up serology by CF suggested that all were probably due to dengue type 1 virus. Four more dengue type 1 viruses were isolated from these specimens. The virus(es) responsible for the outbreaks in Michoacan and Sinaloa States are unknown at this time.

Because of the potential northward movement of dengue on Mexico's east coast, active virologic surveillance for dengue has been implemented in the Texas border towns of Brownsville and Laredo. Texas State Health Department health centers in each city will take five to 10 acute-phase serum specimens from suspected dengue cases each week and will send them to the San Juan Laboratories for virus isolation. In addition, health authorities in other border communities have been alerted to the possibility of increased dengue-like illness.

FIGURE 1. Areas of reported dengue-like illness, Mexico, 1982



Dengue — Continued

Entomological surveillance has also been intensified in Texas. Detailed surveys to determine the relative abundance and the breeding sites of *Aedes aegypti* will be undertaken in Brownsville, Laredo, Eagle Pass, and Corpus Christi. At this time, no implementation of virologic surveillance in other gulf coast cities is planned, but health authorities should be aware of the potential introduction of dengue from Mexico and the Caribbean (*1-3*).

Reported by L Cabrera-Coello, MD, Subdirector de Vigilancia y Epidemiologia, Secretaria de Salubridad y Asistencia, FP Miranda, E Zorrilla, MD, Instituto de Salubridad y Enfermedades Tropicales, Mexico City, Mexico; T Betz, MD, Texas State Health Dept; Vector-Borne Viral Diseases Div, Center for Infectious Diseases, CDC.

Editorial Note: Dengue type 1 outbreaks were widespread in Mexico in 1979 and 1980 (*4*). Since then, only sporadic transmission has been reported. Dengue types 1, 2, and 4 have been responsible for major epidemics in other parts of the Caribbean basin during the past 12 months (*1-3*). There is no evidence that either dengue type 2 or 4 is currently being transmitted in Mexico.

During 1980, epidemics of dengue were reported in several cities in northeastern Mexico (*4*). In August of that year, indigenous transmission of dengue virus in the United States was documented for the first time since 1945 (*5*). A total of 21 locally transmitted cases of dengue type 1 were confirmed in Texas from August to November 1980. For reasons not fully understood, however, transmission remained sporadic in Texas that year.

Because the principal vector mosquito, *A. aegypti*, is currently widespread in Texas border cities and in other major gulf coast urban areas, health authorities in these cities and states should be aware of the potential of dengue transmission in the United States.

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5. CDC. Dengue—Texas. MMWR 1980;29:451.

Erratum, Vol.31, No. 32

p. 434. In the article, "Arboviral Encephalitis—United States, 1982," the statement reading "Equine cases of EEE have been documented in South Carolina and Maryland" should have excluded Maryland. No equine cases of EEE have been documented in Maryland.

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