CENTERS FOR DISEASE CONTROL

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MORBIDITY AND MORTALITY WEEKLY REPORT

Recommendation of the Immunization Practices Advisory Committee (ACIP)

Inactivated Hepatitis B Virus Vaccine

Introduction

Worldwide, recommendations for using hepatitis B virus (HBV) vaccine will vary in accordance with local patterns of HBV transmission. In the United States, an area of low HBV prevalence, certain groups are at substantially greater risk than the general population of acquiring infection. It is for these higher-risk groups that the vaccine is currently recommended. To date, 12,000 individuals have been given this vaccine, and no untoward effects have been observed over periods of time extending up to 3 years. The recommendations that follow are intended as initial guides for immunization practice, and will be modified as additional data and experience are accumulated. Because the cost of this vaccine is high, a discussion of the cost effectiveness of prevaccination susceptibility testing is included.

Hepatitis B Virus Infection in the United States

The estimated lifetime risk of HBV infection in the United States varies from almost 100% for the highest-risk groups to approximately 5% for the population as a whole. An estimated 200,000 persons, primarily young adults, are infected each year. One-quarter of them become ill with jaundice. More than 10,000 patients are hospitalized with hepatitis B each year, and an average of 250 die of fulminant disease. Between 6% and 10% of young adults with HBV infection become carriers. The United States currently contains an estimated pool of 400,000-800,000 infectious carriers. Chronic active hepatitis develops in over 25% of carriers (100,000-200,000), and often progresses to cirrhosis. Furthermore, recent studies have demonstrated an association between the HBV carrier state and the occurrence of liver cancer. It is estimated that 4,000 persons die from hepatitis B-related cirrhosis each year in this country, and that more than 800 die from hepatitis B-related liver cancer.

The role of the HBV carrier is basic to the epidemiology of HBV transmission. A carrier is defined as a person who is HBsAg positive on at least 2 occasions, at least 6 months apart. Although the degree of infectivity is best correlated with HBeAg positivity, any person with a positive test for HBsAg is potentially infectious. The likelihood of developing the carrier state varies inversely with the age at which infection occurs. During the perinatal period, HBV transmitted from HBeAg-positive mothers results in HBV carriage in up to 90% of infected infants, whereas 6%-10% of acutely infected adults become carriers.

Hepatitis B — Continued

Carriers and persons with acute cases have highest concentrations of HBV in the blood and serous fluids; less is present in other body fluids, such as saliva and semen. Transmission is via percutaneous or permucosal routes. Infective blood or body fluids can be introduced by means of contaminated needles or through sexual contact. Close personal contacts such as those that occur among household contacts of HBV carriers or among children in institutions for the mentally retarded can also spread infection. Transmission of infection by transfusion of contaminated blood or blood products has been greatly reduced since the advent of routine screening with highly sensitive tests for HBsAg.

Although subtypes of HBV exist, infection or immunization with 1 subtype confers immunity to all subtypes.

Serologic surveys demonstrate that although HBV infection is uncommon among adults in the general population, it is highly prevalent in certain groups. Those at risk, based on the presence of serologic markers of infection, are described in Table 1. Immigrants/refugees and their descendants from areas of high HBV endemicity are at high risk of HBV infection. Homosexually active males and users of illicit injectable drugs are among the highest-risk groups, acquiring infection soon (10%-20%/year) after adopting these lifestyles. Inmates of prisons also appear to be at high risk, possibly as a consequence of drug abuse or homosexual practices. Patients and staff in custodial institutions for the mentally retarded are also at increased risk of having HBV infection. Classroom contacts of some deinstitutionalized carriers may

TABLE 1. Expected hepatitis B virus prevalence in various population groups

	Prevalence of serologic markers of HBV infection	
	HBsAG(%)	All markers(%)
High risk		
Immigrants/refugees from areas of high HBV endemicity	13	70-85
Clients in institutions for the mentally retarded	10-20	35-80
Users of illicit parenteral drugs	7	60-80
Homosexually active males	6	35-80
Household contacts of HBV carriers	3-6	30-60
Patients of hemodialysis units	3-10	20-80
Intermediate risk		
Prisoners (male)	1-8	10-80
Staff of institutions for the mentally retarded	1	10-25
Health-care workers Frequent blood contact	1-2	15-30
Low risk		
Health-care workers No or infrequent blood contact	0.3	3-10
Healthy Adults (first-time volunteer blood donors)	0.3	3-5

Hepatitis B — Continued

also be at higher risk than the general population. Intimate household and sexual contact with HBV carriers increases risk, as does receiving certain pooled plasma products and undergoing hemodialysis.

There is increased risk for certain medical and dental workers, and related laboratory and support personnel, who have frequent contact with blood from infective patients. Employment in a hospital without exposure to blood carries no greater risk than that for the general population.

Vaccine

Hepatitis B virus vaccine is a suspension of inactivated, alum-adsorbed 22-nm surface antigen particles that have been purified from human plasma by a combination of biophysical (ultracentrifugation) and biochemical procedures. Inactivation is a 3-fold process using 8-M urea, pepsin at pH 2, and 1:4,000 formalin. Each of these processes has been shown to inactivate HBV and representative viruses from all known groups, and thus should inactivate any viruses potentially contaminating the vaccine. HBV vaccine contains 20 μg/ml of HBsAg protein.

After a series of 3 intramuscular doses of HBV vaccine, an average of over 90% of healthy adults developed protective antibody (*1,2*). A course of 3 10-μg doses induces antibody in virtually all infants and children 3 months through 9 years of age tested to date. Protective antibody titers have persisted during 3 years of observation, although a gradually declining titer has been observed.

Field trials of the United States-manufactured vaccine have shown 80%-95% efficacy in preventing infection or hepatitis among susceptible persons (*3,4*). Protection against illness was complete for persons who developed antibodies after vaccination but before exposure. The duration of protection and the consequent need for booster doses are not yet known.

Studies are planned or are under way in various settings to assess the value of vaccination after HBV exposure. For post-exposure prophylaxis, see the ACIP recommendations for the use of immune globulin (*5*); see below for recommendations regarding infants born to mothers who are HBV carriers and for sexual contacts of patients with acute hepatitis B.

Vaccine Usage

Primary adult vaccination consists of 3 intramuscular doses of 1.0 ml of vaccine (20 μg/1.0 ml) each. The second and third doses should be given 1 and 6 months, respectively, after the first. For patients undergoing hemodialysis, and for other immunosuppressed patients, 3 2-ml doses (40 μg) should be used. For children under 10 years of age, 3 similarly spaced doses of 0.5 ml (10 μg) are sufficient. Vaccine doses administered at longer intervals than those stipulated provide equally satisfactory protection, but optimal protection is not conferred until after the third dose. Since HBV vaccine is an inactivated (non-infective) product, it is presumed that there will be no interference with other simultaneously administered vaccine(s). The duration of protection and the need for booster doses have not yet been determined.

Vaccine Storage

Vaccine should be stored at 2C-8C but not frozen. *Freezing destroys the potency of the vaccine.*

Side Effects and Adverse Reactions

Side effects among 12,000 recipients of HBV vaccine observed to date have been limited to soreness and redness at the injection site (*3,4*).

Hepatitis B — Continued

Data are not available on the safety of the vaccine for the developing fetus, but because it contains only non-infectious HBsAg particles, the risk to the fetus from the vaccine should be negligible. In contrast, HBV infection in a pregnant woman may result in severe disease for the mother and chronic infection for the newborn. Pregnancy should not be considered a contraindication to the use of this vaccine for persons who are otherwise eligible.

Effect of Vaccination on Carriers

The vaccine produces neither therapeutic nor adverse effects in HBV carriers (*6*).

Vaccination of Immune Persons

Vaccination of individuals who possess antibodies against HBV from a previous infection is not necessary but will not cause adverse effects. Such individuals will have a post-vaccination increase in their anti-HBs levels. Passively acquired antibody, whether from hepatitis B immune globulin (HBIG) administration or from the transplacental route, will not interfere with active immunization (*7*).

Prevaccination Serologic Screening for Susceptibility

HBV carriers and those having antibody from previous infection need not be vaccinated, but serologic screening to detect such individuals before vaccination may or may not be cost effective. The decision to screen potential vaccine recipients is an economic one that depends on 3 variables: 1) the cost of vaccination, 2) the cost of testing for susceptibility, and 3) the prevalence of immune individuals in the group. All are important in estimating whether routine, selective, or no screening will be most economical in an HBV vaccination program.

Figure 1 shows the relative cost effectiveness of screening, given different costs of screening tests and the expected prevalence of immunity. In constructing the figure, the assumption was made that the cost of 3 doses of vaccine is $100 and that there are additional costs for administration. For any combination of screening costs and immunity to hepatitis, the cost effectiveness can be estimated. For example, if the expected prevalence of serologic markers for HBV is over 20%, screening is cost effective if costs of screening are no greater than $30/person. If the expected prevalence of markers is less than 8%, and if the costs of screening are greater than $10 per person, vaccination without screening is cost effective.

Screening in groups with the highest risk of HBV infection (e.g., users of illicit injectable drugs, homosexually active males, and institutionalized mentally retarded persons) will be cost effective unless testing costs are extremely high. For groups at intermediate risk (e.g., health-care workers with an expected prevalence of 8%-20%), cost effectiveness of screening may be marginal, and vaccination programs may or may not utilize screening. For groups with a low expected prevalence of HBV serologic markers (e.g., entering health professionals) screening will not be cost effective.

For routine screening, only 1 antibody test, either anti-HBc or anti-HBs, need be used. Anti-HBc will identify all previously infected persons, both carriers and those who are not carriers, but will not discriminate between members of the 2 groups. Anti-HBs will identify those previously infected except for carriers. For groups expected to have carrier rates of $<2\%$, such as health-care workers, neither test has a particular advantage. For groups with higher carrier rates, anti-HBc may be preferred to avoid unnecessary vaccination of carriers. If a radioimmunoassay (RIA) anti-HBs test is used for screening, a minimum of 10 RIA sample ratio units should be used to designate immunity (2.1 is the usual designation of a positive test) (*4*).

Serologic Confirmation of Post-Vaccination Immunity

HBV vaccine produces protective antibody (anti-HBs) in more than 90% of healthy persons

Hepatitis B — Continued

(*1-2*). Revaccination of those persons who did not respond to the primary series has produced antibody in only one-third. Thus, there seems little need to test for immunity following vaccination except for dialysis patients, whose subsequent management depends on knowing their immune status.

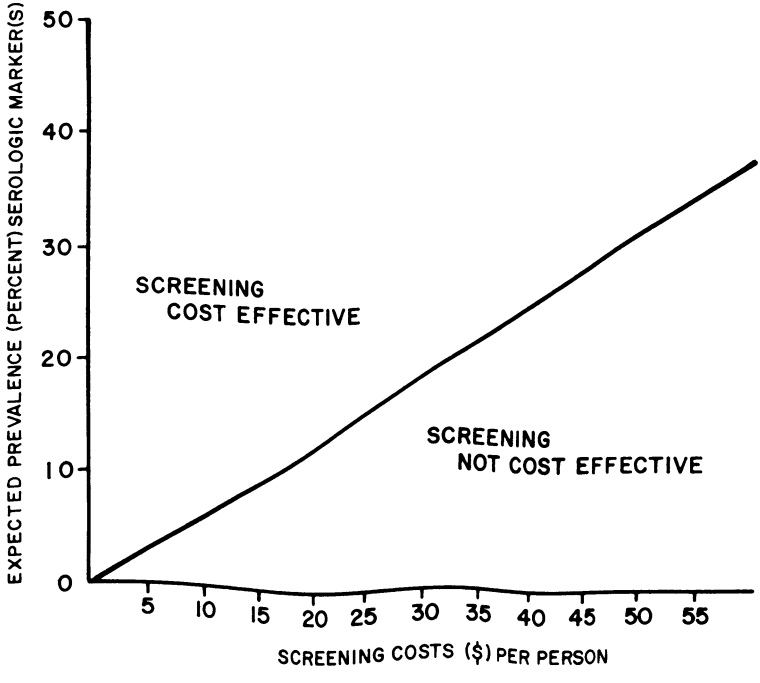
Pre-Exposure Vaccination

Persons at substantial risk of HBV infection who are demonstrated or judged likely to be susceptible should be vaccinated. They include:

Health-Care Workers—Health-care workers (medical, dental, laboratory, and support groups) have varied risks of exposure to HBV depending on their jobs. Those workers for whom vaccine is recommended should be vaccinated as soon as possible after beginning work in a high-risk environment, ideally during their period of training.

Hospital Staff—Hospital staff are at increased risk of HBV infection because of contact with blood and blood products. The risk for hospital personnel can vary both among hospitals and within hospitals. In developing specific immunization strategies, hospitals should use available published data about the risk of infection (*8-10*) and, in addition, may wish to evaluate their own clinical and institutional experience with hepatitis B.

FIGURE 1. Cost effectiveness of pre-vaccination screening of hepatitis B virus vaccine candidates*



*See text for assumptions.

Hepatitis B — Continued

Studies in urban centers have indicated that occupational groups with frequent exposure to blood and/or needles have a substantial risk of acquiring HBV infection. The highest risk is for individuals with frequent blood exposure, including the following groups: medical technologists, operating room staff, phlebotomists and intravenous therapy nurses, surgeons and pathologists, and oncology and dialysis unit staff. Other groups that have been shown to be at increased risk in some hospitals include: emergency room staff, nursing personnel, and physicians. To quantitate HBV risks among workers, groups can be ranked according to their frequency of blood/needle exposure. Additional information can be obtained from employee health records, serologic prevalence surveys, and estimates of HBsAg prevalence among patients.

Other Health-Care Workers—Other health workers, based outside of hospitals, who have frequent contact with blood or blood products are at increased risk of acquiring HBV infection. These include dental professionals (dentists, oral surgeons, dental hygienists), laboratory and blood bank technicians, dialysis center staff, morticians, and similar professionals.

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

DISEASE	24th WEEK ENDING			CUMULATIVE, FIRST 24 WEEKS		
	June 19 1982	June 20 1981	MEDIAN 1977-1981	June 19 1982	June 20 1981	MEDIAN 1977-1981
Aseptic meningitis	129	141	108	1,880	1,765	1,288
Brucellosis	2	6	3	66	66	78
Encephalitis: Primary (arthropod-borne & unspec.)	18	27	16	349	339	290
Post-infectious	2	1	7	36	44	97
Gonorrhea: Civilian	16,689	19,887	19,833	412,055	448,827	432,043
Military	429	450	430	12,182	13,280	12,389
Hepatitis: Type A	363	615	597	10,010	11,805	13,094
Type B	389	472	343	9,311	9,154	7,580
Non A, Non B	42	N	N	983	N	N
Unspecified	188	248	184	4,149	5,086	4,576
Legionellosis	5	N	N	178	N	N
Leprosy	1	2	3	85	102	80
Malaria	13	34	19	396	597	262
Measles (rubeola)	63	33	521	842	2,143	10,788
Meningococcal infections: Total	47	51	51	1,646	2,030	1,508
Civilian	47	51	51	1,640	2,022	1,493
Military	–	–	–	6	8	10
Mumps	156	85	387	3,624	2,613	9,458
Pertussis	16	17	29	473	473	503
Rubella(German measles)	66	29	336	1,569	1,409	9,212
Syphilis (Primary & Secondary): Civilian	662	550	431	14,937	13,764	11,007
Military	17	10	3	186	176	140
Tuberculosis	523	582	615	11,767	12,140	12,507
Tularemia	6	6	6	62	79	63
Typhoid fever	11	16	8	172	219	199
Typhus fever, tick-borne (RMSF)	46	49	56	290	395	283
Rabies, animal	146	150	89	2,842	3,516	2,196

TABLE II. Notifiable diseases of low frequency, United States

	CUM. 1982		CUM. 1982
Anthrax	–	Poliomyelitis: Total	2
Botulism(Ohio 1)	33	Paralytic	2
Cholera	–	Psittacosis (Conn. 1)	52
Congenital rubella syndrome	5	Rabies, human	–
Diphtheria	–	Tetanus (Iowa 1, Ga. 1)	34
Leptospirosis (Upstate NY 1)	29	Trichinosis	53
Plague	4	Typhus fever, flea-borne (endemic, murine)(Tex. 1)	12

N: Not notifiable

TABLE III. Cases of specified notifiable diseases, United States, weeks ending June 19, 1982 and June 20, 1981 (24th 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	129	66	349	36	412,055	448,827	363	389	42	188	5	85
NEW ENGLAND	6	3	15	4	10,067	11,026	24	19	1	6	1	1
Maine	–	–	–	–	464	556	2	–	1	1	–	–
N.H.	2	–	–	–	296	377	–	1	–	–	–	–
Vt.	–	–	–	–	201	195	2	–	–	–	1	–
Mass.	–	–	5	–	4,655	4,529	6	4	–	4	–	–
R.I.	1	–	–	–	699	571	9	–	–	–	–	–
Conn.	3	3	10	4	3,752	4,798	5	14	–	1	–	1
MID. ATLANTIC	10	–	47	9	52,151	51,650	42	72	6	9	–	4
Upstate N.Y.	1	–	18	3	8,242	8,711	8	23	1	2	–	1
N.Y. City	3	–	9	–	22,188	20,654	13	25	–	2	–	1
N.J.	1	–	10	–	9,353	10,132	21	24	5	5	–	1
Pa.	5	–	10	6	12,368	12,153	U	U	–	U	–	1
E.N. CENTRAL	7	–	74	7	55,496	70,551	26	41	1	14	3	3
Ohio	4	–	22	4	17,368	24,551	12	32	1	6	3	–
Ind.	2	–	15	2	6,689	6,386	8	4	–	7	–	–
Ill.	–	–	6	1	11,591	19,188	2	2	–	1	–	3
Mich.	–	–	25	–	14,304	14,396	2	3	–	–	–	–
Wis.	1	–	2	–	5,544	6,030	2	–	–	–	–	–
W.N. CENTRAL	2	7	18	3	19,974	21,158	20	17	2	3	–	1
Minn.	1	–	2	1	3,004	3,397	4	1	–	1	–	–
Iowa	–	1	9	1	2,178	2,295	3	1	–	–	–	–
Mo.	–	2	4	–	9,146	9,672	4	7	–	2	–	1
N. Dak.	–	–	–	–	278	306	–	–	–	–	–	–
S. Dak.	–	1	–	1	552	602	–	–	–	–	–	–
Nebr.	1	–	2	–	1,260	1,614	–	2	–	–	–	–
Kans.	–	3	1	–	3,556	3,272	9	6	2	–	–	–
S. ATLANTIC	33	15	53	6	99,426	109,893	54	77	9	32	–	5
Del.	–	–	–	–	1,698	1,633	2	2	–	2	–	–
Md.	1	–	12	–	13,790	11,846	5	14	–	6	–	2
D.C.	–	–	–	–	5,905	6,935	–	3	–	–	–	–
Va.	5	6	12	1	9,423	10,086	3	11	1	3	–	1
W. Va.	–	–	–	–	1,251	1,638	1	3	–	1	–	–
N.C.	3	–	4	1	17,665	16,970	1	6	–	3	–	–
S.C.	–	2	–	–	10,476	10,240	9	7	–	2	–	–
Ga.	4	1	–	–	9,483	22,501	6	12	3	–	–	–
Fla.	20	6	25	4	29,735	28,044	27	19	5	15	–	2
E.S. CENTRAL	12	7	19	2	36,148	37,358	30	21	1	5	–	–
Ky.	–	–	–	–	4,938	4,773	9	2	–	2	–	–
Tenn.	2	4	11	–	13,905	14,135	19	11	–	–	–	–
Ala.	10	2	5	2	10,809	11,554	2	8	1	3	–	–
Miss.	–	1	3	–	6,496	6,896	–	–	–	–	–	–
W.S. CENTRAL	28	19	38	1	60,016	59,235	82	41	1	86	–	9
Ark.	1	4	1	–	4,947	4,002	3	5	–	2	–	–
La.	1	2	4	–	11,057	9,502	15	6	1	19	–	–
Okla.	2	3	11	–	6,454	6,293	7	4	–	3	–	–
Tex.	24	10	22	1	37,558	39,438	57	26	–	62	–	9
MOUNTAIN	6	–	17	1	14,885	17,629	23	13	7	8	–	2
Mont.	2	–	–	–	615	614	–	–	–	–	–	–
Idaho	–	–	–	–	715	721	–	–	–	–	–	1
Wyo.	–	–	–	–	421	400	–	–	–	–	–	–
Colo.	–	–	7	1	3,989	4,729	1	8	1	–	–	–
N. Mex.	–	–	–	–	1,868	1,924	11	–	4	3	–	–
Ariz.	U	–	6	–	3,951	5,506	U	U	U	U	U	–
Utah	2	–	–	–	691	821	4	–	2	2	–	1
Nev.	2	–	4	–	2,635	2,914	7	5	–	3	–	–
PACIFIC	25	15	68	3	63,892	70,327	62	88	14	25	1	60
Wash.	–	–	7	–	5,229	5,940	7	7	–	1	1	6
Oreg.	2	–	1	–	3,559	4,509	3	4	–	1	–	–
Calif.	22	14	56	3	52,371	56,747	51	76	14	23	–	34
Alaska	–	1	3	–	1,599	1,763	–	–	–	–	–	1
Hawaii	1	–	1	–	1,134	1,368	1	1	–	–	–	19
Guam	U	–	–	–	42	64	U	U	U	U	U	–
P.R.	U	–	1	–	1,295	1,530	U	U	U	U	U	–
V.I.	–	–	–	–	74	76	–	–	–	–	–	–
Pac. Trust Terr.	U	–	–	–	36	199	U	U	U	U	U	1

N: Not notifiable U: Unavailable

TABLE III (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending June 19, 1982 and June 20, 1981 (24th 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	13	396	63	842	2,143	47	1,646	156	3,624	16	66	1,569	1,409
NEW ENGLAND	1	22	1	9	72	2	87	–	143	–	1	14	103
Maine	–	–	–	–	5	1	4	–	32	–	–	–	33
N.H.	–	–	1	2	6	–	12	–	12	–	–	8	42
Vt.	–	–	–	2	2	1	5	–	5	–	–	–	–
Mass.	1	17	–	2	51	–	22	–	70	–	1	3	17
R.I.	–	1	–	–	–	–	11	–	12	–	–	1	–
Conn.	–	4	–	3	8	–	33	–	12	–	–	2	11
MID. ATLANTIC	3	54	14	130	693	17	306	5	225	–	–	76	166
Upstate N.Y.	–	14	8	93	190	3	96	–	42	–	–	37	69
N.Y. City	2	17	6	29	49	–	50	1	35	–	–	26	46
N.J.	1	16	–	4	50	9	62	1	33	–	–	13	43
Pa.	–	7	–	4	404	5	98	3	115	–	–	–	8
E.N. CENTRAL	–	25	7	50	72	3	195	46	2,011	–	5	140	300
Ohio	–	7	1	1	15	1	77	38	1,493	–	–	–	–
Ind.	–	1	–	2	8	2	19	–	33	–	–	24	100
Ill.	–	3	–	16	21	–	49	5	142	–	5	54	71
Mich.	–	12	6	31	27	–	39	2	267	–	–	42	31
Wis.	–	2	–	–	1	–	11	1	76	–	–	20	98
W.N. CENTRAL	2	12	4	35	7	1	69	81	472	–	2	56	72
Minn.	1	1	–	–	3	–	14	80	357	–	1	6	7
Iowa	1	5	–	–	1	–	5	–	29	–	–	–	3
Mo.	–	3	–	2	1	1	21	–	13	–	–	38	2
N. Dak.	–	–	–	–	–	–	6	–	–	–	–	–	–
S. Dak.	–	–	–	–	–	–	3	–	1	–	–	1	–
Nebr.	–	2	–	–	1	–	9	–	–	–	–	–	1
Kans.	–	1	4	33	1	–	11	1	72	–	1	11	59
S. ATLANTIC	2	58	–	33	311	9	330	4	205	5	3	60	111
Del.	–	–	–	–	–	–	–	–	6	–	–	1	1
Md.	–	7	–	2	1	–	20	1	21	–	–	31	1
D.C.	–	3	–	1	1	–	2	–	–	–	–	–	–
Va.	–	22	–	14	6	2	36	–	30	1	2	10	3
W. Va.	1	3	–	2	7	–	7	–	80	–	–	1	20
N.C.	–	–	–	–	3	3	66	–	9	1	–	1	4
S.C.	–	3	–	–	–	1	39	–	11	–	–	1	7
Ga.	–	8	–	–	99	2	69	2	10	1	1	5	29
Fla.	1	12	–	14	194	1	91	1	38	2	–	10	46
E.S. CENTRAL	–	5	1	7	–	4	112	1	29	3	–	37	22
Ky.	–	4	–	1	–	1	19	–	9	–	–	21	13
Tenn.	–	–	1	5	–	3	44	–	11	1	–	–	8
Ala.	–	–	–	–	–	–	43	–	5	–	–	–	1
Miss.	–	1	–	1	–	–	6	1	4	2	–	16	–
W.S. CENTRAL	2	31	2	23	691	6	194	2	136	4	5	83	112
Ark.	–	3	–	–	1	1	12	–	6	–	–	–	2
La.	–	3	–	–	–	–	34	–	3	1	–	–	9
Okla.	–	3	–	–	5	–	16	–	–	–	–	3	–
Tex.	2	22	2	23	685	5	132	2	127	3	5	80	101
MOUNTAIN	–	9	–	5	28	1	82	–	52	2	–	50	68
Mont.	–	–	–	–	–	–	4	–	3	–	–	4	3
Idaho	–	–	–	–	1	–	6	–	3	–	–	–	3
Wyo.	–	–	–	–	–	1	5	–	2	–	–	5	1
Colo.	–	5	–	5	5	–	31	–	8	2	–	4	29
N. Mex.	–	2	–	–	8	–	12	–	–	–	–	5	5
Ariz.	U	1	U	–	4	U	14	U	23	U	U	7	17
Utah	–	1	–	–	–	–	7	–	11	–	–	16	3
Nev.	–	–	–	–	10	–	3	–	2	–	–	9	7
PACIFIC	3	180	34	550	269	4	271	17	351	2	50	1,053	455
Wash.	–	10	1	25	1	–	29	1	58	1	–	30	53
Oreg.	–	5	–	–	3	–	55	–	–	–	–	3	48
Calif.	3	163	33	521	263	4	175	16	281	1	50	1,012	349
Alaska	–	–	–	1	–	–	9	–	6	–	–	1	–
Hawaii	–	2	–	3	2	–	3	–	6	–	–	7	5
Guam	U	1	U	–	6	U	1	U	1	U	U	1	1
P.R.	U	4	U	63	193	U	5	U	39	U	U	4	3
V.I.	–	–	–	–	7	–	–	–	–	–	–	–	1
Pac. Trust Terr.	U	–	U	–	1	U	–	U	–	U	U	–	1

U: Unavailable

TABLE III (Cont.'d). Cases of specified notifiable diseases, United States, weeks ending June 19, 1982 and June 20, 1981 (24th week)

REPORTING AREA	SYPHILIS (Civilian) (Primary & Secondary)		TUBERCULOSIS		TULAREMIA	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	14,937	13,764	523	11,767	62	11	172	46	290	2,842
NEW ENGLAND	252	298	10	311	–	–	11	1	3	21
Maine	1	2	1	24	–	–	–	–	–	19
N.H.	1	12	–	10	–	–	–	–	–	–
Vt.	1	13	–	7	–	–	2	–	–	–
Mass.	176	194	5	208	–	–	8	–	1	–
R.I.	12	18	–	11	–	–	–	–	1	–
Conn.	61	59	4	51	–	–	1	1	1	2
MID. ATLANTIC	2,063	2,077	59	1,926	6	5	29	–	6	69
Upstate N.Y.	216	188	11	329	6	1	3	–	–	36
N.Y. City	1,244	1,262	25	715	–	2	19	–	–	–
N.J.	268	272	23	395	–	1	4	–	5	1
Pa.	335	355	U	487	–	1	3	–	1	32
E.N. CENTRAL	739	572	91	1,790	–	–	14	5	28	323
Ohio	145	128	11	296	–	–	6	5	27	51
Ind.	93	100	8	232	–	–	–	–	–	47
Ill.	317	531	34	705	–	–	3	–	1	153
Mich.	132	166	33	453	–	–	5	–	–	2
Wis.	52	47	5	104	–	–	–	–	–	70
W.N. CENTRAL	290	273	19	357	10	–	6	–	4	625
Minn.	55	97	6	63	–	–	3	–	–	101
Iowa	14	13	2	46	1	–	1	–	–	197
Mo.	175	138	9	164	6	–	1	–	2	63
N. Dak.	4	6	1	7	–	–	–	–	–	57
S. Dak.	–	2	1	14	–	–	–	–	–	47
Nebr.	8	3	–	15	1	–	–	–	–	75
Kans.	34	14	–	48	2	–	1	–	2	85
S. ATLANTIC	4,133	3,637	135	2,433	7	4	27	27	167	463
Del.	8	7	1	26	–	–	–	–	–	–
Md.	232	284	20	297	1	–	6	2	20	21
D.C.	255	303	5	97	–	–	–	–	–	–
Va.	296	339	18	281	1	–	2	6	18	236
W. Va.	15	9	–	69	–	1	3	–	3	21
N.C.	281	284	24	390	–	–	–	11	72	25
S.C.	207	247	1	233	4	–	3	5	40	25
Ga.	861	539	17	344	–	–	–	3	13	101
Fla.	1,978	1,225	49	696	1	3	13	–	1	34
E.S. CENTRAL	1,055	899	45	1,087	6	2	13	2	14	354
Ky.	56	47	10	281	–	–	–	–	–	73
Tenn.	283	354	21	368	4	–	2	1	8	227
Ala.	375	243	8	304	–	2	9	1	4	54
Miss.	341	255	6	134	2	–	2	–	2	–
W.S. CENTRAL	3,827	3,297	77	1,396	25	–	13	9	62	588
Ark.	99	63	13	136	17	–	1	4	11	78
La.	826	734	7	240	1	–	–	–	–	16
Okla.	79	81	12	206	7	–	2	4	30	113
Tex.	2,823	2,419	45	814	–	–	10	1	21	381
MOUNTAIN	369	337	5	333	4	–	6	2	5	93
Mont.	3	8	–	25	–	–	–	–	–	36
Idaho	18	9	1	14	1	–	–	–	1	1
Wyo.	10	6	–	2	1	–	–	–	1	7
Colo.	107	106	3	45	–	–	2	–	–	10
N. Mex.	78	71	1	61	–	–	–	–	1	10
Ariz.	87	69	U	133	–	U	3	U	–	26
Utah	12	11	–	17	2	–	1	–	–	1
Nev.	54	57	–	36	–	–	–	2	2	2
PACIFIC	2,209	1,974	82	2,134	4	–	53	–	1	306
Wash.	69	66	12	132	1	–	3	–	–	–
Oreg.	60	43	7	82	–	–	1	–	–	–
Calif.	2,012	1,823	60	1,728	3	–	48	–	1	237
Alaska	8	6	–	32	–	–	–	–	–	69
Hawaii	60	36	3	160	–	–	1	–	–	–
Guam	1	–	U	3	–	U	–	U	–	–
P.R.	273	315	U	157	–	U	1	U	–	24
V.I.	5	6	–	1	–	–	–	–	–	–
Pac. Trust Terr.	–	–	U	19	–	U	–	U	–	–

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending June 19, 1982 (24th week)

REPORTING AREA	ALL CAUSES, BY AGE (YEARS)						P&I** TOTAL
	ALL AGES	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	624	415	143	29	18	18	46
Boston, Mass.	138	92	31	6	6	3	16
Bridgeport, Conn.	49	31	12	3	2	1	5
Cambridge, Mass.	28	22	4	1	1	–	3
Fall River, Mass.	25	19	6	–	–	–	–
Hartford, Conn.	38	19	14	1	2	2	1
Lowell, Mass.	28	18	10	–	–	–	–
Lynn, Mass.	13	10	3	–	–	–	1
New Bedford, Mass.	29	20	7	1	1	–	4
New Haven, Conn.	56	40	9	3	1	3	1
Providence, R.I.	64	37	13	6	1	7	4
Somerville, Mass.	14	7	5	1	1	–	1
Springfield, Mass.	42	25	11	3	1	1	4
Waterbury, Conn.	34	26	6	2	–	–	4
Worcester, Mass.	66	49	12	2	2	1	2
MID. ATLANTIC	2,443	1,570	551	144	81	96	71
Albany, N.Y.	52	36	9	2	1	4	–
Allentown, Pa.	15	15	–	–	–	–	1
Buffalo, N.Y.	110	73	26	6	3	2	7
Camden, N.J.	42	25	13	2	1	1	2
Elizabeth, N.J.	36	21	13	–	–	2	–
Erie, Pa.†	40	25	12	–	2	1	–
Jersey City, N.J.	65	36	14	2	1	12	1
N.Y. City, N.Y.	1,359	868	291	106	54	40	34
Newark, N.J.	67	32	18	3	4	9	6
Paterson, N.J.	27	17	8	1	–	1	1
Philadelphia, Pa.†	199	121	52	8	7	11	7
Pittsburgh, Pa.†	70	42	23	2	–	3	1
Reading, Pa.	28	19	6	–	–	3	1
Rochester, N.Y.	140	97	31	7	3	2	5
Schenectady, N.Y.	17	12	3	2	–	–	–
Scranton, Pa.†	27	21	5	–	1	–	–
Syracuse, N.Y.	81	62	9	3	4	3	2
Trenton, N.J.	28	18	9	–	–	1	–
Utica, N.Y.	15	12	3	–	–	–	1
Yonkers, N.Y.	25	18	6	–	–	1	2
E.N. CENTRAL	2,178	1,292	538	176	88	84	60
Akron, Ohio	54	37	9	3	2	3	–
Canton, Ohio	39	21	13	4	1	–	2
Chicago, Ill.	508	295	109	56	18	30	12
Cincinnati, Ohio	135	74	39	10	9	3	4
Cleveland, Ohio	154	73	53	15	7	6	2
Columbus, Ohio	132	84	35	6	4	3	4
Dayton, Ohio	99	61	25	4	6	3	1
Detroit, Mich.	282	151	77	37	12	5	18
Evansville, Ind.	26	19	6	–	–	1	–
Fort Wayne, Ind.	43	30	9	1	3	–	2
Gary, Ind.	18	11	4	2	1	–	–
Grand Rapids, Mich.	48	33	7	3	2	3	1
Indianapolis, Ind.	162	88	43	15	8	8	1
Madison, Wis.	43	34	6	1	1	1	1
Milwaukee, Wis.	145	104	29	4	3	5	–
Peoria, Ill.	41	31	7	2	–	1	3
Rockford, Ill.	53	27	11	4	3	8	4
South Bend, Ind.	47	23	13	4	4	3	1
Toledo, Ohio	101	69	25	4	3	–	2
Youngstown, Ohio	48	27	18	1	1	1	2
W.N. CENTRAL	755	532	144	37	19	22	26
Des Moines, Iowa§	55	51	–	1	1	1	–
Duluth, Minn.	33	23	5	–	4	1	2
Kansas City, Kans.	29	23	3	2	1	–	–
Kansas City, Mo.	153	99	34	5	5	10	8
Lincoln, Nebr.	39	27	11	–	1	–	–
Minneapolis, Minn.	88	65	14	5	–	4	2
Omaha, Nebr.	92	65	21	3	2	1	4
St. Louis, Mo.	147	87	38	15	3	4	8
St. Paul, Minn.	62	53	7	1	–	1	–
Wichita, Kans.	57	39	11	5	2	–	2
S. ATLANTIC	1,145	679	297	78	44	46	29
Atlanta, Ga.	133	78	44	10	1	–	1
Baltimore, Md.	222	133	58	20	7	4	2
Charlotte, N.C.	65	42	13	3	4	2	1
Jacksonville, Fla.	99	55	26	8	8	2	3
Miami, Fla.	105	67	21	10	4	3	1
Norfolk, Va.	56	30	17	2	2	5	–
Richmond, Va.	68	41	20	3	3	1	7
Savannah, Ga.	27	11	9	1	1	5	–
St. Petersburg, Fla.	91	73	12	2	1	3	2
Tampa, Fla.	65	29	19	3	4	10	3
Washington, D.C.	151	84	39	13	5	10	6
Wilmington, Del.	63	36	19	3	4	1	3
E.S. CENTRAL	679	415	169	48	24	23	33
Birmingham, Ala.	93	50	26	4	9	4	2
Chattanooga, Tenn.	53	31	12	8	1	1	5
Knoxville, Tenn.	37	22	12	3	–	–	1
Louisville, Ky.	107	71	26	6	2	2	7
Memphis, Tenn.	176	110	40	15	4	7	12
Mobile, Ala.	69	37	17	3	7	5	4
Montgomery, Ala.	29	21	3	3	1	1	–
Nashville, Tenn.	115	73	33	6	–	3	2
W.S. CENTRAL	1,333	756	337	120	70	50	47
Austin, Tex.	67	42	14	4	4	3	3
Baton Rouge, La.	52	36	13	2	1	–	1
Corpus Christi, Tex.	55	38	15	1	–	1	2
Dallas, Tex.	168	101	41	13	6	7	3
El Paso, Tex.	50	25	9	9	3	4	3
Fort Worth, Tex.	82	54	15	8	4	1	4
Houston, Tex.	416	192	126	50	32	16	5
Little Rock, Ark.	62	39	13	4	2	4	6
New Orleans, La.	68	42	12	8	5	1	–
San Antonio, Tex.	155	94	37	10	5	9	6
Shreveport, La.	64	36	16	4	5	3	3
Tulsa, Okla.	94	57	26	7	3	1	11
MOUNTAIN	570	369	119	39	26	17	18
Albuquerque, N. Mex.	67	39	12	7	6	3	4
Colo. Springs, Colo.	41	24	10	3	2	2	1
Denver, Colo.	103	64	24	10	3	2	4
Las Vegas, Nev.	68	44	14	5	2	3	3
Ogden, Utah	24	15	5	1	2	1	2
Phoenix, Ariz.	121	88	22	4	2	5	1
Pueblo, Colo.	20	16	4	–	–	–	1
Salt Lake City, Utah	45	26	9	6	4	–	–
Tucson, Ariz.	81	53	19	3	5	1	2
PACIFIC	1,884	1,250	390	118	75	49	73
Berkeley, Calif.	17	8	8	–	–	1	–
Fresno, Calif.	57	35	10	4	6	2	4
Glendale, Calif.	36	27	7	1	1	–	1
Honolulu, Hawaii	61	41	11	4	4	1	4
Long Beach, Calif.	100	67	25	5	1	2	–
Los Angeles, Calif.	648	436	125	48	28	11	18
Oakland, Calif.	62	44	14	3	1	–	–
Pasadena, Calif.	32	25	4	1	–	2	3
Portland, Oreg.	99	71	19	2	1	4	7
Sacramento, Calif.	59	32	17	3	5	2	2
San Diego, Calif.	158	93	37	14	7	7	13
San Francisco, Calif.	179	112	40	17	5	5	2
San Jose, Calif.	164	110	36	8	8	2	14
Seattle, Wash.	116	83	16	6	5	6	1
Spokane, Wash.	43	29	10	1	1	2	4
Tacoma, Wash.	53	37	11	1	2	2	–
TOTAL	11,611††	7,278	2,688	789	445	405	403

*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.

Hepatitis B — Continued

Clients and Staff of Institutions for the Mentally Retarded — Susceptible clients and selected staff of institutions for the mentally retarded should be vaccinated. Risks for staff are comparable to those for health-care personnel in other high-risk environments. However, the risk in institutional environments is associated not only with blood exposure, but is also consequent to bites and contact with skin lesions, saliva, and other infective secretions.

Hemodialysis Patients — Numerous studies have established the high risk of HBV virus transmission in hemodialysis units. While recent data have shown a decrease in the rate of HBV infection in hemodialysis units following introduction of environmental control measures, vaccination is recommended for susceptible patients.

Homosexually Active Males — Susceptible homosexually active males should be vaccinated regardless of their age or duration of their homosexual practices. It is important to vaccinate persons as soon as possible after their homosexual activity begins. Homosexually active females do not appear to be at increased risk of sexually transmitted HBV infection.

Illicit Injectable Drug Users — All users of illicit injectable drugs who are susceptible to HBV should be vaccinated as early as possible after their drug use begins.

Recipients of Certain Blood Products — Although screening of all blood donors for HBsAg has decreased the incidence of transfusion-related HBV infection, patients with clotting disorders who receive factor VIII or IX concentrates have an elevated risk of HBV infection. Vaccination is recommended for these persons, and should be initiated at the time their specific clotting disorder is identified. Screening is recommended for patients who have already received multiple infusions of these products.

Household and Sexual Contacts of HBV Carriers — Household contacts of HBV carriers are at high risk of HBV infection. Sexual contacts appear to be at greatest risk. Vaccination of susceptible household contacts of carriers is recommended. At present, most carriers are identified through routine screening of donated blood, diagnostic testing in hospitals, or through other screening programs among high-risk groups. As part of expanded HBV control programs, additional screening to identify HBV carriers may be warranted.

Other Contacts of HBV Carriers — Persons in contact with carriers at schools, offices, etc., are at minimal risk of contracting HBV, and vaccine is not routinely recommended for them. However, classroom contacts of deinstitutionalized mentally retarded HBV carriers who behave aggressively or have special medical problems that increase the risk of exposure to their blood or serous secretions may be at risk. In such situations, vaccine may be offered to classroom contacts.

Special High-Risk Populations — Some American populations, such as Alaskan Eskimos, and immigrants and refugees from areas with highly endemic disease (particularly eastern Asia and sub-Saharan Africa) have high HBV infection rates and deserve special attention. Depending on specific epidemiologic and public health considerations, more extensive vaccination programs may be warranted.

Inmates of Long-Term Correctional Facilities — The prison environment may provide a favorable setting for the transmission of HBV because of the frequent use of illicit injectable drugs and homosexual practices. In such institutions, prison officials may elect to undertake screening and vaccination programs.

Post-Exposure Vaccination

Infants Born to HBsAg-Positive Mothers — Pregnant women who are HBsAg positive should be informed about the risk of transmission to their infants. Infants born to these

Hepatitis B — Continued

women should receive HBIG (*5,11*). Infants whose mothers are chronic carriers will be continuously exposed to HBV throughout their childhood; therefore these infants should receive vaccine. The optimum timing for vaccination in conjunction with HBIG administration has not been established. Pending additional information, it is recommended that vaccination begin at 3 months of age or shortly thereafter. Studies to determine the immunogenicity and efficacy of vaccine at birth, with or without HBIG, are currently under way.

Sexual and Household Contacts of Acute Hepatitis B Cases and Health Workers Who Receive Needle Sticks from HBsAg-Positive Patients—Possible alternatives for post-exposure prophylaxis include HBIG, immunoglobulin (IG), HBV vaccine, or a combination of vaccine and an immune globulin. Recommendations for immune globulin use have already been published (*5*). Studies are currently under way to evaluate the use of vaccine in some of these settings. No recommendations can be made at this time for post-exposure use of HBV vaccine.

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Current Trends

Revised Recommendations for Malaria Chemoprophylaxis for Travelers to East Africa

The following statement updates information published in the "East Africa" section of the MMWR supplement, "Prevention of Malaria in Travelers, 1982" (MMWR Vol. 31/No.1S, p. 24S) dated April 16, 1982.

Infections with chloroquine-resistant *Plasmodium falciparum* malaria acquired by travelers to East Africa were first reported in 1978 (*1*). Since then, there have been a number of similar case reports in the world literature, all describing chloroquine-prophylaxis and/or -treatment

Malaria Chemoprophylaxis — Continued

failures in non-immune travelers to East Africa (*2-4*).

In the past 18 months, an additional 19 such cases of chloroquine-prophylaxis failure among U.S. travelers have been reported to and documented by CDC. When available, chloroquine levels in blood tested at the time of diagnosis have corroborated the history of chloroquine prophylaxis. In several instances, malaria parasites from these patients have been adapted to *in vitro* culture, and *in vitro* drug-sensitivity testing has confirmed the parasites' *in vivo* resistance to chloroquine. To date, the countries in which chloroquine-resistant infections in non-immune travelers have been acquired include: Kenya, Tanzania, Uganda, Madagascar, and Comoros (*5*). There have been no documented cases from West Africa.

These data offer compelling evidence that chloroquine-resistant *P. falciparum* transmission is widely dispersed in East Africa, and that there is substantial risk of infection for American travelers, despite chloroquine prophylaxis. Foreign Service officers, Peace Corps volunteers, missionaries, and workers who live for extended periods in areas with high transmission may be at particular risk. Consultation with medical personnel of the U. S. Department of State and of the Peace Corps confirms that cases of chloroquine prophylaxis failure have occurred in these groups within the past year.

Fansidar* is the drug most commonly used to suppress chloroquine-resistant *P. falciparum* malaria. Each tablet contains a fixed combination of pyrimethamine, 25 mg, and sulfadoxine, 500 mg. Fansidar was licensed for sale in the United States in January 1982.

Chloroquine and the 2 components of Fansidar interrupt different metabolic pathways of the malaria parasite. Therefore, while the risk of acquiring malaria can never be completely eliminated, available information indicates that the combination of chloroquine with Fansidar will be substantially more effective prophylactically than Fansidar alone. When Fansidar prophylaxis is indicated, chloroquine should always be taken concurrently because: 1) Fansidar alone may not always be efficacious (even against sensitive strains of *P. falciparum*) due to "host failure" (*6*), 2) the addition of chloroquine may retard the emergence of Fansidar-resistant malaria, and 3) the effectiveness of Fansidar as a prophylaxis for the other species of human malaria in East Africa has not been adequately documented.

On the basis of accumulating evidence and the advice of a recently convened group of experts, CDC's recommendations now are: **Fansidar, 1 tablet once weekly PLUS chloroquine 300 mg (base) once weekly.** Weekly doses of Fansidar and chloroquine may be taken on the same day, at the same time.

Contraindications to Fansidar

1. **Pregnant women**. Fansidar is not recommended for pregnant women, due to results of animal studies suggesting that pyrimethamine may have teratogenic potential. Pregnant women who cannot avoid travel to areas of the world with chloroquine-resistant malaria should use chloroquine alone as prophylaxis. Health-care providers should advise these patients that they are at increased risk of acquiring malaria, and should be especially alert for the development of a febrile illness.
2. **Allergy to sulfonamides**. The use of Fansidar is contraindicated for persons allergic to sulfonamides; a pyrimethamine-dapsone combination (marketed overseas as Maloprim) may be useful for individuals who do not have cross-hypersensitivity to sulfones. Of note, hematologic toxicity attributed to dapsone has been reported when it has been taken for malaria prophylaxis (*7*).

*Use of trade names is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Malaria Chemoprophylaxis – Continued

3. **Children under 2 months old.** Fansidar should not be given to children <2 months of age, as sulfa drugs may induce neonatal jaundice. Chloroquine may be given to newborns, but parents should be aware of the potential for prophylaxis failure in areas where transmission of chloroquine-resistant malaria is known to occur.

Long-Term Use of Fansidar.

There have been few studies of the long-term side effects of Fansidar prophylaxis (*8,9*), and no studies of the side effects of concurrent use of both chloroquine and Fansidar. Long-term administration of pyrimethamine may induce megaloblastic anemia, leukopenia, or other hematologic toxicity. While these side effects are usually reversible, routine hemograms should be obtained from persons on Fansidar prophylaxis for longer than 6 months.

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

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Erratum, Vol. 31, No. 20

p275. In the article "Licensure of Yomesan," the generic name for this drug remains niclosamide. Niclocide™ is the trade name under which it will be marketed by Miles Pharmaceuticals for human use in the United States. Yomesan™ is a Bayer (West Germany) trade name under which niclosamide is marketed in certain other countries. Physicians should not request niclosamide directly from the manufacturer. Prescriptions can be filled by pharmacists, who should obtain the drug through Miles distributors.

Erratum, Vol. 31, No. 21

p277. In the article "Diffuse, Undifferentiated Non-Hodgkins Lymphoma among Homosexual Males—United States," in the fourth paragraph of the Editorial Note on page 278, the incorrect term "anal rectum" was used in 2 sentences. The correct term is "anorectum."

Erratum, Vol. 31, No. 22

p301. In the article "Plague Vaccine," in the section **Primary Vaccination** on page 303, the age range for children was incorrect. That portion should read: "Children ≤10 years old: The primary series is also 3 doses of vaccine, but the doses are smaller (Table 1). The intervals between injections are the same as for adults."

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