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Revised Recommendations for Preventing Malaria in Travelers to Areas with Chloroquine-Resistant *Plasmodium falciparum*

Since 1982, CDC has recommended the combined use of chloroquine and Fansidar® (pyrimethamine-sulfadoxine) as the primary chemoprophylactic regimen for travelers to areas with transmission of chloroquine-resistant *Plasmodium falciparum* (CRPF). Based on preliminary reports of serious adverse cutaneous reactions associated with the use of Fansidar®, in January 1985, CDC issued interim guidelines that limited areas for which the prophylactic use of the drug was recommended (*1*). Since then, additional information that has been used to formulate revised recommendations for travelers to specific areas with CRPF (Table 1) has become available. These recommendations, presented below, differ significantly from those previously issued (*2,3*).

Since Fansidar® became available in the United States in 1982, 20 cases of severe cutaneous reactions (erythema multiforme, Stevens-Johnson syndrome, and toxic epidermal necrolysis) have been documented among American travelers using Fansidar®; 19 of these reactions occurred among persons simultaneously using chloroquine. Six of these reactions were fatal. Based on IMS America Ltd* data, the U.S. Food and Drug Administration (FDA) estimates that, for the United States, between 109,000 and 156,000 persons have been exposed to the drug since 1982. These data indicate that the incidence of fatal cutaneous reactions associated with the prophylactic use of Fansidar® among American travelers ranges from 1/18,000 to 1/26,000 users.

These reactions have been associated only with multiple (two to five) doses of Fansidar® when used as weekly prophylaxis, and none of these serious reactions have been associated with single-dose Fansidar® therapy as used in treating malaria. In addition to these cases of erythema multiforme, Stevens-Johnson syndrome, and toxic epidermal necrolysis, other adverse reactions associated with Fansidar® use have also been reported to CDC and FDA. These include serum sickness-type reactions, urticaria, exfoliative dermatitis, and hepatitis.

Because of the risk of these adverse reactions, it is no longer recommended that all travelers to areas with CRPF use Fansidar® combined with chloroquine for chemoprophylaxis. The following recommendations have been formulated with the assistance of an ad hoc panel of expert consultants convened at CDC in February 1985. They are based on the estimated risk of acquiring a *P. falciparum* infection in various geographic areas and on CDC malaria surveillance data and travel industry data on the number of Americans who travel to these areas each year. Of necessity, these revised recommendations place increased emphasis on individualized recommendations for travelers and increased responsibility on individual travelers and their physicians.

GENERAL ADVICE FOR TRAVELERS TO MALARIA-ENDEMIC AREAS

Travelers must be informed that, regardless of the malaria prophylactic regimen employed, it is still possible to contract malaria. The symptoms of malaria, such as fever with chills and

*A private firm that conducts comprehensive marketing surveys of pharmaceutical products.

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headache, demand medical attention *as soon as possible* and should not be presumptively ascribed by either the physician or traveler to a "flu-like" illness. Malaria symptoms can develop as early as 8 days after initial exposure in a malaria-endemic area and can appear months after departure from a malarious area, even after chemoprophylaxis is discontinued. It is important for travelers to understand that malaria can be effectively treated early in the course of the disease but that delays before the institution of appropriate therapy can have serious or even fatal consequences.

PERSONAL PROTECTION MEASURES

Because of the nocturnal feeding habits of *Anopheles* mosquitoes, malaria transmission occurs primarily between dusk and dawn. Travelers must be advised of the importance of measures to reduce contact with mosquitoes during those hours. Such measures include remaining in well-screened areas, using mosquito nets, and wearing clothes that cover most of the body. Additionally, travelers should be advised to purchase insect repellent before travel to use on any exposed areas of skin. The most effective repellent is N,N diethylmetatoluamide (deet), an ingredient in many commercially available insect repellents. Travelers may also be

TABLE 1. Areas with reported chloroquine-resistant *Plasmodium falciparum* (CRPF)*

AFRICA†	**ASIA**
Angola	Burma
Burundi	China (Hainan Island and southern provinces)
Central African Republic	Indonesia§
Comoros	Kampuchea†
Gabon	Laos¶
Kenya	Malaysia
Madagascar	Philippines (Luzon, Basilan, Mindoro, Palawan, and Mindanao Islands; Sulu Archipelago)
Malawi	Thailand
Mozambique	Vietnam
Namibia	
Rwanda	**OCEANIA**†
Sudan (northern provinces)	Papua New Guinea
Tanzania	Solomon Islands
Uganda	Vanuatu
Zaire (northeastern)	
Zambia (northeastern)	
SOUTH AMERICA	**INDIAN SUBCONTINENT**†
Bolivia	Bangladesh (north and east)
Brazil**	India
Colombia	Pakistan (Rawalpindi)
Ecuador††	
French Guiana	
Guyana	
Panama (east of the Canal Zone, including the San Bias Islands)	
Peru (northern provinces)	
Surinam	
Venezuela	

*There is no malaria risk in urban areas unless otherwise indicated. This table should be used in conjunction with the text in determining appropriate prophylaxis.

†Malaria risk exists in most urban areas.

§Malaria risk exists in urban areas of Timor and Kalimantan provinces. Irian Jaya should be considered as Oceania.

¶Malaria risk exists in all urban areas except Vientiane.

**Malaria risk exists in urban areas of interior Amazon River region.

††Malaria risk exists in urban areas of Esmeraldas, Manabi, El Oro, and Guayas provinces (including city of Guayaquil).

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advised to purchase a pyrethrum-containing flying insect spray to use in living and sleeping areas during evening and nighttime hours.

RATIONALE FOR USING CHLOROQUINE IN AREAS WITH CRPF

Because of its record of safety and efficacy, chloroquine remains the primary prophylactic drug of choice for travelers to all malarious areas, including areas with CRPF. In all areas with CRPF, there is malaria caused by one or more other species of *Plasmodium* (*P. vivax, P. ovale, P. malariae*) that remain sensitive to chloroquine. In addition, chloroquine-sensitive *P. falciparum* may coexist with chloroquine-resistant parasites within a geographic area.

TRAVELERS TO AREAS IN AFRICA WITH CRPF

In general, travelers to malaria-endemic Africa are at considerable risk of exposure to *Plasmodium* because of the high level of malaria transmission in many areas. Of 358 reports to CDC of *P. falciparum* infections imported into the United States by American civilian travelers during 1982-1984, 256 (72%) were acquired in Africa. Nine of these were fatal (three fatal cases were acquired in areas of east Africa with CRPF). An estimated 90,000 Americans travel to sub-Saharan Africa each year. Except for the city of Nairobi, where the level of malaria transmission is very low, there is considerable risk of acquiring CRPF in areas in east Africa frequented by tourists.

Short-Term Travel. For short-term travelers (3 weeks or less) to areas of Africa with CRPF, the weekly use of chloroquine alone is recommended. In addition, these travelers (except those with histories of sulfonamide or pyrimethamine intolerance) should be given a single treatment dose of Fansidar® (Table 2) to be kept in their possession during travel and should be advised to take the Fansidar® promptly in the event of a febrile illness during or after their travel *when professional medical care is not readily available*. It must be emphasized to travelers that such presumptive self-treatment of a possible malarial infection is only a temporary measure and that professional medical follow-up care as soon as possible is imperative. They should also be advised to continue weekly chloroquine prophylaxis after presumptive treatment with Fansidar®.

Longer-Term Travel. Because persons with prolonged exposure in areas of CRPF transmission are at higher risk of acquiring malaria, the use of combined weekly prophylaxis with chloroquine and Fansidar® (Table 2) can be considered. Physicians who advise such travelers and expatriate residents must take into consideration individual living conditions while in Africa, the availability of local medical care, and when possible, local malaria transmission patterns. The suitability of the regimen described above for short-term travelers, and alternatives discussed below, should also be assessed. The potential benefit of the routine prophylactic use of Fansidar® for these travelers must be weighed against the risk of a possible serious or fatal adverse reaction. If weekly use of Fansidar® is prescribed, the traveler should be advised to discontinue it immediately in the event of a possible ill effect, especially if any mucocutaneous signs or symptoms, such as pruritus, erythema, rash, orogenital lesions, or pharyngitis, develop.

Alternatives. Alternatives to these regimens have shortcomings either because of less than conclusive efficacy data and/or unavailability in the United States. Amodiaquine (Camoquin®, Flavoquine®), a 4-aminoquinoline compound related to chloroquine, has been shown to be more effective than chloroquine in treating CRPF infections and may afford more protection than chloroquine when used as weekly prophylaxis (*4*). Amodiaquine, like chloroquine, is generally well tolerated. Although licensed, this drug is not marketed in the United States but is widely available in Africa. Its use, therefore, is probably more practicable in long-term visitors and persons who will reside in areas of Africa with CRPF (Table 2). If amodiaquine is prescribed for such travelers, they should also have in their possession a treatment dose of Fansidar® to be taken under the same conditions described previously for the short-term traveler.

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Another alternative for travelers to areas of Africa with CRPF is the use of daily doxycycline *alone* (Table 2). This drug could be considered for use in short-term travelers, such as those with previous histories of sulfonamide intolerance. Limited studies conducted in the early 1970s indicated that tetracyclines, when used alone, were effective against *P. falciparum* (*5,6*). Tetracyclines are contraindicated in pregnancy and in children under 8 years of age. Persons who use doxycycline as prophylaxis must be made aware of the possible side effects associated with tetracyclines; of particular concern in travelers to tropical climates is the possibility of photosensitivity, usually manifested as an exaggerated sunburn reaction. The risk of such a reaction can be minimized by avoiding prolonged, direct exposure to the sun.

The use of proguanil (Paludrine®) alone or in combination with other antimalarials has been suggested for travelers to east Africa (*7*). Because adequately controlled efficacy trials have yet to be reported, the use of this drug cannot be recommended.

For travelers to Africa, the importance of using the general protection measures outlined previously and the absolute necessity for prompt recognition and treatment of possible malaria cannot be overemphasized.

TRAVELERS TO AREAS IN CHINA AND SOUTHEAST ASIA WITH CRPF

An estimated 500,000 Americans travel to China and Southeast Asia each year. In contrast to travelers to Africa, they are at very low risk of acquiring malaria. Of the 358 reported *P. falciparum* infections among American civilians during 1982-1984, only 11 (3%) were acquired in these areas; none were fatal. Malaria transmission in China and Southeast Asia is largely confined to rural areas that are not visited by most travelers; furthermore, travelers who do visit rural areas usually do so only during daytime hours when there is minimal risk of exposure.

Therefore, malaria chemoprophylaxis is not recommended for travelers who will visit only urban centers of Asia or who will have only daytime exposure in rural areas. This includes most travelers to China, Indonesia, Malaysia, the Philippines, and Thailand. Such travelers should, however, be advised to observe general precautions to minimize mosquito contact as outlined previously and to seek prompt medical attention in the event of a febrile illness either during or after their trip.

Travelers who veer from the usual tourist routes of these areas and who will have outdoor exposure in rural, malarious areas during evening and nighttime hours should be given consideration similar to travelers to CRPF areas of Africa as previously described. Special consideration should be given to travelers who will have substantial exposure in rural areas of Thailand, where widespread resistance to both chloroquine and Fansidar® has been reported. Regimens for these travelers should be made in consultation with local or state health departments or CDC.

TRAVELERS TO AREAS OF SOUTH AMERICA WITH CRPF

It is estimated that over 400,000 Americans visit South America each year. Travelers to malaria-endemic regions of South America are at minimal risk of exposure to *Plasmodium*. Only seven (2%) of the 358 reported *P. falciparum* infections among American civilians were acquired in South America; one case was fatal. Malaria transmission in South America occurs primarily in rural areas, except for certain urban areas of the interior Amazon River basin and urban coastal areas of Ecuador.

Therefore, travelers to areas of South America with CRPF should be advised in the use of chemoprophylaxis regimens as previously described for China and Southeast Asia.

TRAVELERS TO THE INDIAN SUBCONTINENT

Nineteen (5%) of the 358 reported *P. falciparum* infections among American civilians were acquired in India; none were fatal. Approximately 100,000 American residents visit the Indian subcontinent each year. Since transmission occurs in both urban and rural areas of Bangladesh, India, and Pakistan, travelers to these areas must be considered at risk of acquiring malaria. While there have been reports of chloroquine resistance from multiple areas of these

2 months of age. Physicians who prescribe the drug to be used as presumptive treatment in the event of a febrile illness when professional medical care is not readily available should ensure that such prescriptions are clearly labeled with instructions to be followed in the event of a febrile illness. If used as weekly prophylaxis, travelers should be advised to discontinue the use of the drug immediately in the event of a possible adverse effect, especially if any mucocutaneous signs or symptoms develop.

§The use of doxycycline is contraindicated in pregnancy and in children under 8 years of age. FDA considers the use of tetracyclines as antimalarials to be investigational. Physicians who prescribe doxycycline as malaria chemoprophylaxis should advise their patients to limit direct exposure to the sun to minimize the possibility of a photosensitivity reaction.

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countries, it has generally been low-level resistance in areas not frequented by tourists.

Chloroquine prophylaxis alone is, therefore, recommended for travelers to the Indian subcontinent (Table 2). These travelers should be advised to observe general precautions to minimize mosquito contact as outlined previously and to seek prompt medical attention in the event of a febrile illness either during or after their trip.

TRAVELERS TO OCEANIA

Malaria transmission in many areas of Papua New Guinea, Irian Jaya, the Solomon Islands, and Vanuatu is intense and in some areas may approximate that found in malarious areas of Africa. Travelers to these areas should, therefore, be advised in the use of the chemoprophylaxis regimens previously described for travelers to CRPF areas of Africa.

Reported by Div of Quarantine, Center for Prevention Svcs, Malaria Br, Div of Parasitic Diseases, Center for Infectious Diseases, CDC; Div of Epidemiology, Office of Epidemiology and Biometry, US Food and Drug Administration.

References

1. CDC. Adverse reactions to Fansidar® and updated recommendations for its use in the prevention of malaria. MMWR 1985;33:713-4.
2. CDC. Prevention of malaria in travelers, 1982. MMWR 1982;31:1S-28S.
3. CDC. Health information for international travel, 1984. U.S. Public Health Service, Department of Health and Human Services (publication no. [CDC] 84-8280):11-58.

(Continued on page 195)

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

Disease	14th Week Ending: Apr. 6, 1985	14th Week Ending: Apr. 7, 1984	14th Week Ending: Median 1980-1984	Cumulative, 14th Week Ending: Apr. 6, 1985	Cumulative, 14th Week Ending: Apr. 7, 1984	Cumulative, 14th Week Ending: Median 1980-1984
Acquired Immunodeficiency Syndrome (AIDS)	93	70	N	1,684	946	N
Aseptic meningitis	63	75	64	954	1,114	1,086
Encephalitis: Primary (arthropod-borne & unspec.)	20	17	17	238	210	221
Post-infectious	3	3	3	34	25	24
Gonorrhea: Civilian	13,965	14,156	15,907	208,455	218,304	249,479
Military	186	431	512	4,966	5,525	7,324
Hepatitis: Type A	394	407	407	5,584	5,684	6,376
Type B	511	556	424	6,523	6,559	5,425
Non A, Non B	69	100	N	1,411	948	N
Unspecified	92	109	185	1,349	1,211	2,307
Legionellosis	8	9	N	141	133	N
Leprosy	6	3	3	86	54	54
Malaria	13	16	20	172	166	201
Measles: Total*	71	69	69	619	712	712
Indigenous	49	61	N	434	622	N
Imported	22	8	N	185	90	N
Meningococcal infections: Total	52	79	84	838	968	968
Civilian	52	78	84	838	967	967
Military	-	1	-	-	1	5
Mumps	80	70	85	1,129	979	1,512
Pertussis	17	44	28	332	489	288
Rubella (German measles)	19	11	70	107	145	653
Syphilis (Primary & Secondary): Civilian	425	458	608	6,632	7,667	8,159
Military	6	4	4	50	89	100
Toxic Shock syndrome	6	16	N	95	120	N
Tuberculosis	353	441	482	4,927	5,310	6,338
Tularemia	-	3	3	23	19	25
Typhoid fever	7	4	4	62	84	99
Typhus fever, tick-borne (RMSF)	3	3	3	11	19	18
Rabies, animal	111	98	141	1,202	1,182	1,424

TABLE II. Notifiable diseases of low frequency, United States

	Cum 1985		Cum 1985
Anthrax	-	Plague	-
Botulism: Foodborne	1	Poliomyelitis: Total	1
Infant (Calif. 1)	10	Paralytic	1
Other	-	Psittacosis (Minn. 3)	36
Brucellosis (Fla. 1)	19	Rabies, human	-
Cholera	-	Tetanus	12
Congenital rubella syndrome	-	Trichinosis (Calif. 2, Alaska 1)	23
Diphtheria	-	Typhus fever, flea-borne (endemic, murine)	3
Leptospirosis	7		

*Twenty-two of the 71 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending April 6, 1985 and April 7, 1984 (14th Week)

Reporting Area	AIDS	Aseptic Menin-gitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionel-losis	Leprosy
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1985	1985	Cum. 1985	Cum. 1985	Cum. 1985	Cum. 1984	1985	1985	1985	1985	1985	Cum. 1985
UNITED STATES	1,684	63	238	34	208,455	218,304	394	511	69	92	8	86
NEW ENGLAND	56	3	4	-	6,685	6,767	10	40	1	12	1	1
Maine	3	-	-	-	263	258	-	-	-	-	-	-
N.H.	-	-	2	-	135	171	-	-	-	-	-	-
Vt.	-	-	-	-	61	102	1	-	-	-	-	-
Mass.	36	1	2	-	2,512	2,637	6	20	1	12	1	1
R.I.	4	2	-	-	484	402	1	4	-	-	-	-
Conn.	13	-	-	-	3,230	3,197	2	16	-	-	-	-
MID ATLANTIC	690	12	38	-	27,678	30,125	31	48	5	3	-	7
Upstate N.Y.	97	4	14	-	4,146	4,521	10	16	-	-	-	-
N.Y. City	455	-	3	-	11,822	13,283	-	-	-	-	-	7
N.J.	86	3	9	-	6,090	4,740	15	14	3	3	-	-
Pa.	52	5	12	-	5,620	7,581	6	18	2	-	-	-
E.N. CENTRAL	94	4	60	8	30,523	29,855	17	46	4	4	1	1
Ohio	21	2	23	3	7,557	7,310	1	12	1	1	1	1
Ind.	4	-	11	-	2,981	3,354	1	7	-	-	-	-
Ill.	39	1	6	4	8,994	7,473	1	5	-	2	-	-
Mich.	17	1	17	-	8,674	8,302	14	22	3	1	-	-
Wis.	13	-	3	1	2,317	3,416	-	-	-	-	-	-
W.N. CENTRAL	14	3	21	3	10,612	10,211	19	16	-	1	2	-
Minn.	3	1	7	1	1,577	1,449	13	6	-	-	-	-
Iowa	2	1	9	-	1,128	1,185	1	1	-	-	-	-
Mo.	6	1	-	-	4,908	4,736	4	5	-	1	2	-
N. Dak.	-	-	-	1	78	111	-	-	-	-	-	-
S. Dak.	-	-	-	-	190	301	-	-	-	-	-	-
Nebr.	-	-	1	-	1,027	734	1	3	-	-	-	-
Kans.	3	-	4	1	1,704	1,695	-	1	-	-	-	-
S. ATLANTIC	195	14	24	12	45,140	55,369	21	82	10	7	2	1
Del.	5	-	1	-	953	926	-	-	-	-	2	-
Md.	27	1	7	1	6,898	6,828	-	10	2	1	-	-
D.C.	28	1	-	-	3,688	4,030	1	-	-	-	-	-
Va.	14	2	1	4	4,839	5,357	7	4	2	-	-	-
W. Va.	1	1	2	-	588	653	-	1	-	-	-	-
N.C.	13	1	10	-	8,670	8,897	4	14	1	1	-	1
S.C.	2	-	3	-	5,798	5,192	-	8	-	-	-	-
Ga.	36	5	-	-	-	10,708	4	16	-	-	-	-
Fla.	69	3	-	7	13,706	12,778	5	29	5	5	-	-
E.S. CENTRAL	11	3	9	3	18,575	18,427	9	35	2	1	-	-
Ky.	5	1	3	-	2,042	2,317	5	1	1	-	-	-
Tenn.	-	1	4	-	7,292	7,426	2	20	-	1	-	-
Ala.	5	1	2	3	5,760	5,933	1	11	1	-	-	-
Miss.	1	-	-	-	3,481	2,751	1	3	-	-	-	-
W.S. CENTRAL	121	4	19	-	29,622	29,288	34	10	1	10	1	10
Ark.	2	-	1	-	2,801	2,498	-	-	-	-	-	-
La.	15	4	-	-	6,200	6,301	-	-	-	-	-	1
Okla.	2	-	9	-	2,971	3,303	16	4	1	3	1	-
Tex.	102	-	9	-	17,650	17,186	18	6	-	7	-	9
MOUNTAIN	25	2	9	3	6,851	6,708	47	32	7	11	1	-
Mont.	-	-	-	-	209	310	1	-	-	1	-	-
Idaho	-	-	-	-	239	315	4	-	-	1	-	-
Wyo.	-	-	-	-	188	200	-	-	-	-	-	-
Colo.	6	-	3	-	2,029	1,925	5	5	1	6	-	-
N. Mex.	4	-	-	-	816	792	4	5	1	-	-	-
Ariz.	10	-	1	-	2,033	1,715	19	10	4	1	-	-
Utah	2	2	5	3	261	361	2	6	1	1	1	-
Nev.	3	-	-	-	1,076	1,090	12	6	-	1	-	-
PACIFIC	478	18	54	5	32,769	31,554	206	202	39	43	-	66
Wash.	21	-	3	-	2,219	2,191	12	7	2	1	-	9
Oreg.	10	-	-	-	1,738	1,747	7	4	2	-	-	2
Calif.	434	16	51	5	27,473	26,301	186	191	35	42	-	50
Alaska	2	-	-	-	823	771	1	-	-	-	-	-
Hawaii	11	2	-	-	516	544	-	-	-	-	-	5
Guam	-	U	-	-	6	78	U	U	U	U	U	-
P.R.	26	5	1	1	1,068	926	4	7	-	9	-	2
V.I.	1	U	-	-	103	112	U	U	U	U	U	-
Pac. Trust Terr.	-	U	-	-	-	-	U	U	U	U	U	-

N: Not notifiable U: Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending April 6, 1985 and April 7, 1984 (14th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported *		Total									
	Cum. 1985	1985	Cum 1985	1985	Cum. 1985	Cum. 1984	Cum. 1985	1985	Cum. 1985	1985	Cum. 1985	Cum. 1984	1985	Cum 1985	Cum 1984
UNITED STATES	172	49	434	22	185	712	838	80	1,129	17	332	489	19	107	145
NEW ENGLAND	6	-	-	18	40	3	34	-	26	-	15	12	-	4	11
Maine	-	-	-	-	-	-	1	-	2	-	2	-	-	-	1
N.H.	-	-	-	-	-	3	3	-	4	-	8	3	-	1	-
Vt.	-	-	-	-	-	-	4	-	2	-	2	5	-	-	-
Mass.	3	-	-	18 †	40	-	7	-	15	-	2	3	-	3	10
R.I.	1	-	-	-	-	-	6	-	2	-	1	1	-	-	-
Conn.	2	-	-	-	-	-	13	-	1	-	-	-	-	-	-
MID ATLANTIC	30	7	33	-	8	22	143	5	120	1	42	26	13	28	6
Upstate N.Y.	14	2	17	-	1	4	67	4	78	-	18	16	1	6	4
N.Y. City	7	5	16	-	5	11	14	-	12	-	7	1	-	7	1
N.J.	3	-	-	-	2	3	23	-	11	-	1	1	-	3	1
Pa.	6	-	-	-	-	4	39	1	19	1	16	8	12	12	-
E.N. CENTRAL	8	2	133	1	94	314	154	24	525	-	44	178	-	8	29
Ohio	2	-	-	-	13	2	53	-	165	-	13	30	-	-	2
Ind.	1	-	-	-	1	2	25	5	20	-	11	115	-	-	1
Ill.	-	-	72	-	66	73	31	10	92	-	3	14	-	2	17
Mich.	5	2	35	1 †	14	230	32	9	206	-	7	10	-	6	4
Wis.	-	-	26	-	-	7	13	-	42	-	10	9	-	-	5
W.N. CENTRAL	4	1	1	-	3	-	37	1	38	4	35	64	1	7	17
Minn.	1	-	-	-	1	-	10	1	1	1	11	3	-	-	1
Iowa	-	-	-	-	-	-	5	-	5	-	1	3	-	-	-
Mo.	1	-	-	-	2	-	19	-	5	-	8	12	-	-	-
N. Dak.	1	-	-	-	-	-	-	-	-	1	6	-	-	-	3
S. Dak.	1	-	-	-	-	-	1	-	-	-	-	1	-	-	-
Nebr.	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Kans.	-	1	1	-	-	-	2	-	27	2	9	43	1	7	13
S. ATLANTIC	22	17	33	-	3	6	156	7	80	3	76	51	1	11	14
Del.	-	-	-	-	-	-	3	-	1	-	-	-	-	-	-
Md.	5	2	2	-	1	-	21	-	10	1	15	3	-	1	-
D.C.	3	-	-	-	1	-	4	-	-	-	-	-	-	-	-
Va.	5	5	11	-	1	2	24	1	12	-	2	7	-	-	-
W. Va.	1	-	2	-	-	-	3	1	28	-	-	5	-	-	-
N.C.	2	-	-	-	-	-	21	-	7	1	7	17	-	-	-
S.C.	-	-	-	-	-	-	14	2	3	-	-	1	-	2	-
Ga.	1	3	8	-	-	-	21	2	4	-	36	5	-	4	2
Fla.	5	7	10	-	-	4	45	1	15	1	16	13	1	4	12
E.S. CENTRAL	3	-	-	-	-	3	40	-	6	-	4	2	-	1	1
Ky.	1	-	-	-	-	1	2	-	1	-	1	1	-	1	-
Tenn.	-	-	-	-	-	2	16	-	4	-	1	1	-	-	-
Ala.	2	-	-	-	-	-	12	-	-	-	2	-	-	-	1
Miss.	-	-	-	-	-	-	10	-	1	-	-	-	-	-	-
W.S. CENTRAL	9	9	12	-	-	91	70	5	97	4	18	62	-	13	5
Ark.	-	-	-	-	-	-	7	-	3	-	7	9	-	1	2
La.	-	1	1	-	-	-	13	-	-	-	1	2	-	-	-
Okla.	-	-	-	-	-	4	10	N	N	4	10	42	-	-	-
Tex.	9	8	11	-	-	87	40	5	94	-	-	9	-	12	3
MOUNTAIN	7	5	159	-	17	102	46	13	91	1	20	42	-	3	3
Mont.	-	5	105	-	17	-	3	-	4	-	2	16	-	-	-
Idaho	-	-	-	-	-	-	-	-	4	-	-	1	-	1	1
Wyo.	-	-	-	-	-	-	3	-	1	-	-	3	-	-	-
Colo.	2	-	-	-	-	-	12	-	10	-	8	12	-	-	-
N. Mex.	4	-	-	-	-	77	6	N	N	-	3	3	-	1	-
Ariz.	1	-	54	-	-	-	15	1	43	-	3	4	-	1	-
Utah	-	-	-	-	-	25	5	-	2	1	4	1	-	-	2
Nev.	-	-	-	-	-	-	2	12	27	-	-	2	-	-	-
PACIFIC	83	8	63	3	20	171	158	25	146	4	78	52	4	32	59
Wash.	6	-	1	-	1	39	27	-	9	-	11	8	-	-	1
Oreg.	4	2	2	-	-	-	17	N	N	-	16	6	-	2	-
Calif.	59	6	57	3 †	15	130	111	25	128	4	48	22	4	28	57
Alaska	1	-	-	-	-	-	3	-	2	-	1	-	-	-	-
Hawaii	13	-	3	-	4	2	-	-	7	-	2	16	-	2	1
Guam	-	U	7	U	-	79	-	U	-	U	-	-	U	-	1
P.R.	-	1	40	-	-	-	4	8	49	-	1	-	-	4	2
V.I.	-	U	4	U	5	-	-	U	3	U	-	-	U	-	-
Pac. Trust Terr.	-	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 III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending April 6, 1985 and April 7, 1984 (14th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1985	Cum. 1984	1985	Cum. 1985	Cum. 1984	Cum. 1985	Cum. 1985	Cum. 1985	Cum. 1985
UNITED STATES	6,632	7,667	6	4,927	5,310	23	62	11+3	1,202
NEW ENGLAND	145	166	1	161	144	-	4	-	-
Maine	5	1	-	14	8	-	-	-	-
N.H.	-	2	-	-	12	-	-	-	-
Vt.	-	-	-	2	2	-	-	-	-
Mass.	80	107	1	98	72	-	3	-	-
R.I.	5	7	-	16	14	-	-	-	-
Conn.	55	49	-	31	36	-	1	-	-
MID ATLANTIC	877	1,048	-	970	991	1	8	-	113
Upstate N.Y.	61	84	-	132	156	-	5	-	25
N.Y. City	565	615	-	528	417	1	-	-	-
N.J.	186	199	-	87	191	-	2	-	2
Pa.	65	150	-	223	227	-	1	-	86
E.N. CENTRAL	332	354	-	642	692	-	6	-	16
Ohio	30	60	-	124	141	-	2	-	1
Ind.	28	41	-	74	75	-	3	-	3
Ill.	178	134	-	277	284	-	1	-	2
Mich.	81	93	-	134	154	-	-	-	-
Wis.	15	26	-	33	38	-	-	-	10
W.N. CENTRAL	74	123	-	132	137	7	2	-	186
Minn.	19	27	-	23	22	1	2	-	27
Iowa	11	10	-	22	22	-	-	-	48
Mo.	28	70	-	61	60	5	-	-	10
N. Dak.	-	-	-	-	4	-	-	-	19
S. Dak.	4	-	-	5	5	-	-	-	59
Nebr.	3	5	-	8	9	1	-	-	11
Kans.	9	11	-	13	15	-	-	-	12
S. ATLANTIC	1,663	2,345	4	994	1,182	5	9	6	382
Del.	14	8	-	8	15	1	-	-	-
Md.	120	157	-	97	119	-	2	-	216
D.C.	88	85	1	42	41	-	-	-	-
Va.	89	119	-	77	109	-	1	-	47
W. Va.	2	8	1	22	49	-	-	-	3
N.C.	194	258	2	107	190	4	1	4	-
S.C.	221	218	-	127	127	-	-	1	17
Ga.	-	390	-	145	169	-	-	-	45
Fla.	935	1,102	-	369	363	-	5	1	54
E.S. CENTRAL	633	487	-	409	493	2	2	3+1	60
Ky.	21	26	-	69	115	-	-	-	12
Tenn.	156	118	-	130	157	2	-	1	11
Ala.	208	162	-	152	170	-	2	2 1	37
Miss.	248	181	-	58	51	-	-	-	-
W.S. CENTRAL	1,609	1,809	-	490	524	2	3	2+2	227
Ark.	82	68	-	40	50	1	-	-	31
La.	280	343	-	82	64	-	-	-	4
Okla.	48	56	-	66	58	1	-	2 -2	29
Tex.	1,199	1,342	-	302	352	-	3	-	163
MOUNTAIN	230	178	-	105	125	4	2	-	87
Mont.	1	-	-	16	8	1	-	-	44
Idaho	2	9	-	2	6	-	-	-	-
Wyo.	4	1	-	1	-	-	-	-	3
Colo.	52	43	-	11	11	-	1	-	-
N. Mex.	27	24	-	19	29	1	1	-	1
Ariz.	129	66	-	48	52	-	-	-	39
Utah	3	6	-	3	10	2	-	-	-
Nev.	12	29	-	5	9	-	-	-	-
PACIFIC	1,069	1,157	1	1,024	1,022	2	26	-	131
Wash.	35	42	-	42	45	-	-	-	1
Oreg.	27	33	-	35	41	1	-	-	-
Calif.	987	1,057	1	863	859	1	25	-	130
Alaska	-	1	-	38	20	-	-	-	-
Hawaii	20	24	-	46	57	-	1	-	-
Guam	-	-	U	2	14	-	-	-	-
P.R.	253	238	-	75	93	-	1	-	8
V.I.	-	6	U	1	2	-	-	-	-
Pac. Trust Terr.	-	-	U	-	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending April 6, 1985 (14th Week)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	656	454	129	37	15	21	51
Boston, Mass.	202	125	49	13	3	12	20
Bridgeport, Conn.	52	35	13	2	-	2	4
Cambridge, Mass.	24	18	2	2	2	-	4
Fall River, Mass.	24	18	3	2	1	-	2
Hartford, Conn.	41	30	7	2	1	1	-
Lowell, Mass.	34	23	6	4	1	-	2
Lynn, Mass.	21	17	4	-	-	-	1
New Bedford, Mass	20	16	4	-	-	-	-
New Haven, Conn.	51	39	9	1	1	1	1
Providence, R.I.	60	39	15	3	1	2	7
Somerville, Mass.	7	7	-	-	-	-	-
Springfield, Mass.	48	34	9	1	3	1	2
Waterbury, Conn.	20	15	2	3	-	-	1
Worcester, Mass.	52	38	6	4	2	2	7
MID. ATLANTIC	2,579	1,723	547	209	44	55	120
Albany, N.Y.	62	43	14	2	1	2	1
Allentown, Pa.	29	17	10	2	-	-	-
Buffalo, N.Y.	108	69	27	7	1	4	2
Camden, N.J.	47	32	10	3	1	1	-
Elizabeth, N.J.	15	9	4	2	-	-	2
Erie, Pa.†	47	34	10	2	-	1	6
Jersey City, N.J.	40	25	8	2	1	4	-
N.Y. City, N.Y.	1,356	885	290	127	24	30	54
Newark, N.J.	82	38	23	18	2	1	9
Paterson, N.J.	23	13	7	-	1	2	2
Philadelphia, Pa.	306	215	52	22	9	8	12
Pittsburgh, Pa.†	67	46	16	3	1	1	2
Reading, Pa.	31	27	3	1	-	-	3
Rochester, N.Y.	142	102	28	8	2	1	15
Schenectady, N.Y.	27	22	3	1	1	-	1
Scranton, Pa.†	35	26	9	-	-	-	3
Syracuse, N.Y.	73	56	14	3	-	-	3
Trenton, N.J.	37	25	9	3	-	-	2
Utica, N.Y.	19	13	5	1	-	-	-
Yonkers, N.Y.	33	26	5	2	-	-	3
E.N. CENTRAL	2,135	1,520	327	126	66	95	91
Akron, Ohio	54	39	8	3	4	-	2
Canton, Ohio	39	22	14	1	1	1	10
Chicago, Ill §	553	462	11	26	16	37	16
Cincinnati, Ohio	105	73	25	4	1	2	12
Cleveland, Ohio	135	81	38	8	2	6	2
Columbus, Ohio	116	65	34	8	3	6	4
Dayton, Ohio	91	63	20	4	3	1	2
Detroit, Mich.	276	175	51	28	8	14	11
Evansville, Ind.	32	26	2	3	-	1	-
Fort Wayne, Ind.	43	31	7	3	1	1	2
Gary, Ind.	10	9	-	1	-	-	-
Grand Rapids, Mich	74	46	14	7	4	3	4
Indianapolis, Ind.	194	131	40	6	11	6	2
Madison, Wis.	48	35	7	4	2	-	6
Milwaukee, Wis.	89	68	14	1	4	2	3
Peoria, Ill.	48	32	7	2	1	6	4
Rockford, Ill.	42	22	10	4	3	3	1
South Bend, Ind.	29	25	2	1	-	1	2
Toledo, Ohio	88	67	11	5	2	3	5
Youngstown, Ohio	69	48	12	7	-	2	3
W.N. CENTRAL	757	523	152	32	17	33	35
Des Moines, Iowa	44	32	11	-	-	1	1
Duluth, Minn.	32	24	6	1	-	1	2
Kansas City, Kans.	35	27	4	3	-	1	4
Kansas City, Mo.	139	78	42	8	5	6	10
Lincoln, Nebr.	50	40	5	2	2	1	5
Minneapolis, Minn.	88	56	14	7	5	6	1
Omaha, Nebr.	86	57	23	2	2	2	6
St. Louis, Mo.	152	114	23	5	2	8	1
St. Paul, Minn.	75	52	15	1	1	6	1
Wichita, Kans.	56	43	9	3	-	1	4
S. ATLANTIC	1,328	831	302	115	35	43	55
Atlanta, Ga.	139	83	38	13	2	3	6
Baltimore, Md.	243	150	62	21	2	8	13
Charlotte, N.C.	71	49	16	3	2	1	8
Jacksonville, Fla.	124	79	27	14	3	1	2
Miami, Fla.	101	59	21	13	4	4	2
Norfolk, Va.	51	29	9	5	2	6	6
Richmond, Va.	70	41	19	7	2	1	5
Savannah, Ga.	48	31	6	7	3	1	2
St. Petersburg, Fla.	119	100	17	-	2	-	6
Tampa, Fla.	81	42	21	8	5	3	2
Washington, D.C.	242	136	60	23	8	15	2
Wilmington, Del.	39	32	6	1	-	-	1
E.S. CENTRAL	837	538	213	50	21	15	52
Birmingham, Ala.	117	69	32	9	4	3	5
Chattanooga, Tenn.	49	35	11	2	1	-	6
Knoxville, Tenn.	64	41	14	5	3	1	3
Louisville, Ky.	123	76	36	4	5	2	11
Memphis, Tenn.	250	158	65	21	3	3	13
Mobile, Ala.	62	48	8	2	2	2	3
Montgomery, Ala.	54	43	10	-	-	1	2
Nashville, Tenn.	118	68	37	7	3	3	9
W.S. CENTRAL	1,307	924	215	79	56	33	52
Austin, Tex.	63	42	10	6	5	-	1
Baton Rouge, La.	26	18	4	2	1	1	1
Corpus Christi, Tex.	26	19	5	1	1	-	-
Dallas, Tex.	198	109	45	22	14	8	7
El Paso, Tex.	46	31	11	2	2	-	-
Fort Worth, Tex.	80	53	16	5	1	5	8
Houston, Tex. §	401	355	5	9	18	14	14
Little Rock, Ark.	72	43	22	4	2	1	7
New Orleans, La.	106	71	28	5	2	-	2
San Antonio, Tex.	183	117	43	15	5	3	7
Shreveport, La.	45	27	12	4	2	-	1
Tulsa, Okla.	61	39	14	4	3	1	4
MOUNTAIN	665	420	146	51	28	19	36
Albuquerque, N.Mex.	69	49	13	5	-	1	2
Colo. Springs, Colo.	39	21	10	5	1	2	4
Denver, Colo.	100	66	20	10	2	2	4
Las Vegas, Nev.	94	54	21	9	7	3	8
Ogden, Utah	15	7	5	2	1	-	2
Phoenix, Ariz.	163	98	36	10	15	4	1
Pueblo, Colo.	19	11	7	-	-	1	3
Salt Lake City, Utah	58	34	14	4	2	4	-
Tucson, Ariz.	108	80	20	6	-	2	12
PACIFIC	2,170	1,442	423	176	69	53	123
Berkeley, Calif.	29	19	5	5	-	-	1
Fresno, Calif.	63	37	16	4	2	4	7
Glendale, Calif.	25	23	2	-	-	-	1
Honolulu, Hawaii	61	43	11	2	3	2	8
Long Beach, Calif.	110	72	24	4	7	3	3
Los Angeles, Calif.	681	437	136	67	30	6	19
Oakland, Calif.	90	60	14	7	2	7	6
Pasadena, Calif.	29	23	4	1	1	-	5
Portland, Oreg.	128	99	21	6	-	2	11
Sacramento, Calif.	138	84	33	12	5	4	7
San Diego, Calif.	146	97	27	7	7	7	14
San Francisco, Calif.	162	105	29	21	2	4	7
San Jose, Calif.	183	111	44	21	4	3	14
Seattle, Wash.	180	129	30	12	3	6	7
Spokane, Wash.	76	56	11	6	2	1	9
Tacoma, Wash.	69	47	16	1	1	4	4
TOTAL	12,434††	8,375	2,454	875	351	367	615

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

** Pneumonia and influenza

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

†† Total includes unknown ages.

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

Malaria Prevention — Continued

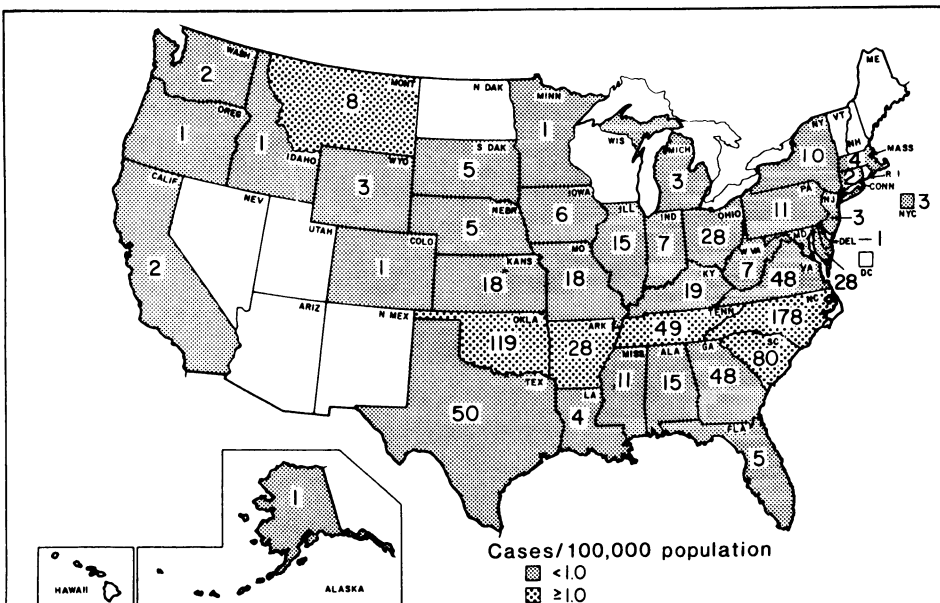
4. Watkins WM, Sixsmith DG, Spencer HC, et al. Effectiveness of amodiaquine as treatment for chloroquine-resistant *Plasmodium falciparum* infections in Kenya. Lancet 1984;I:357-9.
5. Rieckmann KH, Willerson WD Jr, Carson PE, Frischer H. Effects of tetracyclines against drug-resistant falciparum malaria. Proceedings of the Helminthological Society of Washington 1972;39:339-47.
6. Clyde DF, Miller RM, DuPont HL, Hornick RB. Antimalarial effects of tetracyclines in man. J Trop Med Hyg 1971;74:238-42.
7. McLarty, DG, Webber RH, Jaatinen M, et al. Chemoprophylaxis of malaria in non-immune residents in Dar Es Salaam, Tanzania. Lancet 1984;II:656-8.

Rocky Mountain Spotted Fever — United States, 1984

For 1984, a provisional total of 847 cases of Rocky Mountain spotted fever (RMSF) in the United States was reported to the *MMWR*, for an incidence rate of 0.36 cases per 100,000 population. Oklahoma had the highest incidence rate (119 cases; 3.6/100,000). Other states with high RMSF rates were North Carolina (178 cases; 2.9/100,000), South Carolina (80 cases; 2.4/100,000), Arkansas (28 cases; 1.2/100,000), Tennessee (49 cases; 1.0/100,000), Montana (8 cases; 1.0/100,000), Virginia (48 cases; 0.9/100,000), and Georgia (48 cases; 0.8/100,000) (Figure 1).

States submitted case report forms for 717 (85%) of the cases reported to the *MMWR*. Of the 717 cases, 399 (56%) were confirmed either by serologic testing, isolation of spotted fever group rickettsia, or fluorescent antibody staining of biopsy or autopsy specimens. Serologic confirmation requires a single complement fixation (CF) titer 1:16 or higher or single indirect fluorescent antibody (IFA) titer 1:64 or higher or fourfold rise in the CF, IFA, microagglutination (MA), latex agglutination (LA), or indirect hemagglutination (IHA) assays. An additional 66 patients (9%) were classified as "probable" cases as indicated by a fourfold rise in titer or single titer 1:320 or higher in the Weil-Felix assay (Proteus OX-19 or OX-2) or a LA, MA, or IHA

FIGURE 1. Reported cases and rates of Rocky Mountain spotted fever, by state — United States, 1984



Rocky Mountain Spotted Fever — Continued

titer 1:128 or higher. The other 252 diagnoses (35%) were supported by clinical findings alone. Ninety-six percent of the patients became ill between April 1 and September 30.

Like that of previous years (*1,2*), 1984 surveillance revealed that 51% of the patients were under 20 years of age; 61% were male; and 91% were white. Symptoms reported included fever (96%), headache (90%), myalgias (86%), rash (84%), and rash on the palms of the hands or on the soles of the feet (61%). Seventy-five percent of the patients were hospitalized. Sixty-six percent of patients for whom exposure information was available reported a tick bite within 14 days of onset of illness. The case-fatality rate (3.6%) was higher for older individuals and for persons not receiving treatment with either tetracycline or chloramphenicol. Of the 613 patients from whom information about treatment and clinical outcome was available, only 13 (2%) received neither chloramphenicol nor tetracycline. Of these 13 patients, three (23%) died, compared with 16 deaths (3%) among the 600 patients who received treatment with chloramphenicol or tetracycline. For persons 30 years of age or older, the case-fatality rate was 6.5%, compared with 2.0% for individuals under 30.

Reported by Div of Viral Diseases, Center for Infectious Diseases, CDC.

Editorial note: RMSF, the most commonly reported rickettsial infection in the United States, is transmitted to humans by ticks. The incidence of infection begins to increase in April and is highest in May and June.

After the rapid increase in RMSF noted in the United States during the 1970s, infection rates remained approximately the same from 1977 through 1981, when a decrease in the number of cases began. In 1984, 25% fewer cases were reported than in 1983, and all states reporting over 10 cases in 1984 reported either a decrease or no change in number of cases from 1983. This decrease occurred in both of the major foci of RMSF in the United States, the West South Central and South Atlantic states. The West South Central states reported 45% fewer cases, and the South Atlantic states, 18% fewer cases. The reason for the decrease in RMSF is not known but does not seem attributable to reporting artifact. The decrease was widespread geographically, occurred in both the cases reported to the *MMWR* and in cases reported by case report forms, was distributed uniformly over the April 1-September 30 period, and occurred in the absence of any changes in the reporting system. The decrease may be part of a cyclic pattern of RMSF incidence that appears to be occurring for the second time since reporting began in 1920 (*3*) (Figure 2).

Laboratory confirmation of a clinical diagnosis of RMSF by serologic or other methods remains important in distinguishing RMSF from other diseases with similar clinical presentations, even though treatment frequently precedes confirmation. Laboratory confirmation is also important for improving the specificity of national RMSF surveillance. The importance of obtaining serologic confirmation of clinically diagnosed cases has been reinforced by a recent study that showed at least 36% of clinically diagnosed cases in an endemic area were found not to be RMSF when serologic testing was performed (*4*).

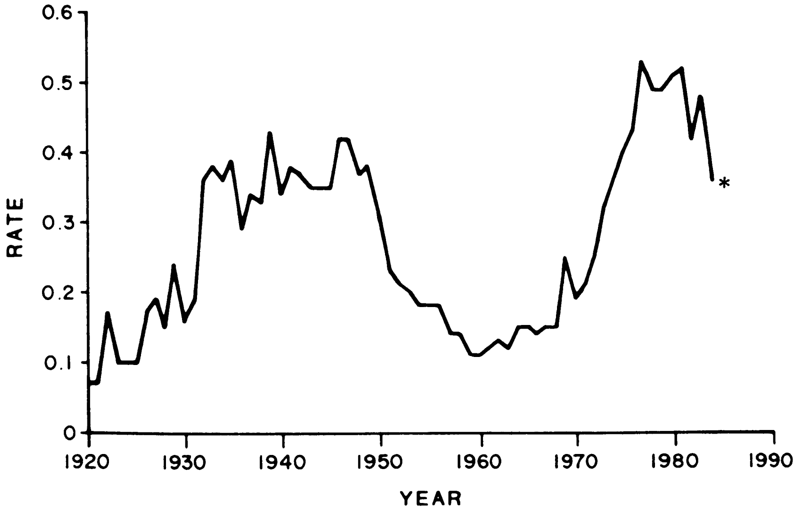
No vaccine against RMSF is currently available; RMSF is best prevented by inspecting persons who may have been exposed to ticks. If discovered, ticks should be removed by grasping them with tweezers as close as possible to the point of attachment and pulling slowly and steadily. Fingers, protected with facial tissue, may be used when tweezers are not available. Because ticks' secretions can be infective, hands should always be washed after removal of ticks. Particularly during the spring and summer months in RMSF-endemic areas and during the 3-12 day period after bites or exposures to ticks, RMSF should be considered and medical treatment sought by any individual who develops fever, myalgia, or headache, even in the absence of rash (*5*). Failure to treat cases with tetracycline or chloramphenicol, particularly early in disease, remains a risk factor for deaths from RMSF (*5,6*).

Rocky Mountain Spotted Fever — Continued

References

1. Bernard KW, Helmick CG, Kaplan JE, Winkler WG. Surveillance of Rocky Mountain spotted fever in the United States, 1978-1980. J Infect Dis 1982;146:297-9.
2. Fishbein DB, Kaplan JE, Bernard KW, Winkler WG. Surveillance of Rocky Mountain spotted fever in the United States, 1981-1983. J Infect Dis 1984;150:609-11.
3. Hattwick MA, O'Brien RJ, Hanson BF. Rocky Mountain spotted fever: epidemiology of an increasing problem. Ann Intern Med 1976;84:732-9.
4. Wilfert CM, MacCormack JN, Kleeman K, et al. Epidemiology of Rocky Mountain spotted fever as determined by active surveillance. J Infect Dis 1984;150:469-79.
5. Helmick CG, Bernard KW, D'Angelo LJ. Rocky Mountain spotted fever: clinical, laboratory, and epidemiological features of 262 cases. J Infect Dis 1984;150:480-8.
6. Hattwick MA, Retailliau H, O'Brien RJ, Slutzker M, Fontaine RE, Hanson B. Fatal Rocky Mountain spotted fever. JAMA 1978;240:1499-503.

FIGURE 2. Reported cases of Rocky Mountain spotted fever per 100,000 population, by year — United States, 1920-1984



*Provisional data.

Infertility — United States, 1982

In 1982, more than one in eight couples were classified as infertile, that is, they had not used contraception and had failed to conceive for at least 1 year (*1*). The same year, nearly one in five ever-married women of reproductive age reported that they had sought professional consultation during their lifetimes to increase their chances of having children (*2*).

The demand for infertility services has escalated markedly in recent years (Figure 3) and continues to increase. The estimated number of visits to private physicians' offices for infertility-related consultation increased from approximately 600,000 in 1968 to over 900,000 in 1972 but has remained near that level through 1980 (*3*). Beginning in 1981, requests for advice on infertility rose again rather rapidly. By 1983, the number of infertility-related visits had more than doubled to over 2 million. If it is conservatively estimated that each infertility visit costs $100, the health-care costs of infertility are at least $200 million annually.

Infertile couples in the United States have a distinct epidemiologic profile: they are older and more likely to be black and have had no previous children (Table 3). They also tend to

Infertility — Continued

have received less than a high school education. In particular, the risk of infertility among women 35-44 years of age is double that of women 30-34 years of age, and the risk is 1½ times higher for blacks than for whites (*4*). However, different characteristics predicted which couples would seek infertility services (*5*). Although older and black women were more likely to be infertile in 1982, a larger proportion of younger and white women had requested medical evaluation of their infertility within the previous 3 years. Women with fewer children were more likely to have obtained infertility consultation than women with more children.

Reported by WF Pratt, WD Mosher, C Bachrach, MC Horn, National Center for Health Statistics; Div of Reproductive Health, Center for Health Promotion and Education, Div of Sexually Transmitted Diseases, Center for Prevention Svcs, CDC.

Editorial Note: The prevalence of infertile couples in any population depends on such factors as: age distribution of the population, age-specific infertility rates, age at which couples begin their intended childbearing, type of contraceptive used before attempting to conceive, and time interval into which couples compress their intended childbearing. By the mid-1980s, in the United States, these five factors appear to have interacted and caused an increase in the number of couples seeking treatment for infertility (*3*).

However, the increase in requested infertility services seems to have surpassed the increase in infertility, especially since the mid-1970s. In fact, between 1965 and 1982, age-specific infertility increased substantially only among 20- to 24-year-olds. Although this is an important age group for childbearing (one of every three births occurs to mothers aged 20-24 years), the actual increase in infertility confined to this age group is not large enough to account for the increase in infertility consultations.

Factors other than actual increases in age-specific infertility also contribute to the rising demand for infertility services. These include: (1) the delayed age of initial childbearing, which exposes couples to higher age-specific infertility rates (*6-8*); (2) the increased proportion of infertile couples seeking infertility services because of both an increased awareness of modern treatments for infertility and a decreased supply of infants available for adoption (*9*); and (3) the greater number of physicians who offer infertility services.

Unfortunately, the treatment of infertility is both costly and often ineffective, even using modern surgical techniques (*10*). Moreover, once established, this condition has a profound

TABLE 3. Percentage of currently married women 15-44 years of age* who were infertile, by age, parity, and race — United States, 1965, 1976, 1982†

Profile	Percentage, by year 1965	1976	1982
Age			
15-19 yrs.	0.6	2.1	2.1
20-24 yrs.	3.6	6.7	10.6
25-29 yrs.	7.2	10.8	8.7
30-34 yrs.	14.0	16.1	13.6
35-39 yrs.	18.4	22.8	24.4
40-44 yrs.	27.7	31.1	27.2
Parity			
0	15.6	19.2	21.8
1	18.6	13.6	12.9
2	10.8	8.9	9.3
3 or more	12.0	15.8	10.4
Race			
White	12.5	13.3	13.3
Black	19.0	23.1	20.6
Total	**13.3**	**14.3**	**13.8**

*Excluding surgically sterile.

†Source: National Survey of Family Growth Cycle III, National Center for Health Statistics, 1982.

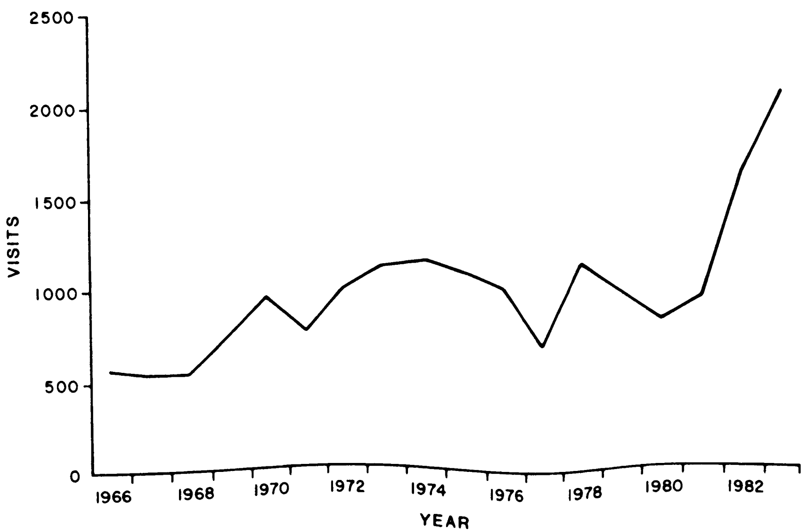
Infertility — Continued

impact on the emotional well-being and quality of life of the infertile couple (*11*). Thus, public health professionals must direct efforts toward prevention rather than cure. A major available intervention to reduce infertility is to prevent that portion caused by sexually transmitted diseases (*12,13*). Sexually transmitted organisms, particularly *Chlamydia trachomatis* and gonorrhea, lead to upper genital tract infections and eventual tubal scarring. They account for an estimated 30% of infertility in some high-risk populations in the United States. Limiting numbers of sexual partners and use of barrier contraceptives with spermicides can help prevent transmission of sexually transmitted diseases, such as gonorrhea and chlamydia, that may cause infertility.

References

1. Pratt WF, Mosher WD, Bachrach CA, Horn MC. Understanding U.S. fertility: findings from the National Survey of Family Growth, Cycle III. Population Bulletin 1984;39:27-8.
2. Horn MC, Mosher WD. Use of services for family planning and infertility: United States, 1982. Advance Data from Vital and Health Statistics, No. 103. Hyattsville, Maryland: U.S. Public Health Service, Department of Health and Human Svcs, 1984.
3. Aral SO, Cates W Jr. The increasing concern with infertility. Why now? JAMA 1983;250:2327-31.
4. Mosher WD, Pratt WF. Fecundity and infertility in the United States, 1965-82. Advance Data from Vital and Health Statistics, No. 10. Hyattsville, Maryland: U.S. Public Health Service, Department of Health and Human Services 1985.
5. Mosher WD. Special tabulation from National Survey of Family Growth, Cycle III. Personal communication, January 11, 1985.
6. DeCherney AH, Berkowitz GS. Female fecundity and age. N Engl J Med 1982;306:424-6.
7. Schwartz D, Mayaux BH. Female fecundity as a function of age. N Engl J Med 1982;306:404-6.
8. Bongaarts J. Infertility after age 30: a false alarm. Fam Plann Perspect 1982;14:75-8.
9. Hogue CJR, Mollenkamp M. The increasing concern with infertility [Letter]. JAMA 1984;252:208.
10. Frantzen C, Schlosser H-W. Microsurgery and postinfectious tubal infertility. Fertil steril 1982;38: 397-402.
11. Freeman EW, Boxer AS, Rickels K, Tureck R, Mastroianni L. Psychological evaluation and support in a program of in vitro fertilization and embryo transfer. Fertil Steril 1985;43:48-53.
12. Sherris JD, Fox G. Infertility and STD: a public health challenge. Pop Reports 1983;L:114-51.
13. Moore DE, Spadoni LR. Infertility in women. In: Holmes KK, Mardh P-A, Sparling PF, Wiesner PJ, eds. Sexually transmitted diseases. New York: McGraw Hill, 1984:763-73.

FIGURE 3. Total visits to physicians for infertility — United States, 1966-1983



Milk-Borne Salmonellosis — Illinois

Between March 22, and April 8, 1985, over 1,500 culture-confirmed cases of salmonellosis in northern Illinois have been reported to the Illinois Department of Public Health. Investigations have linked the outbreak to 2% pasteurized milk ("Blue Brook" brand) from one processing plant. *Salmonella typhimurium*, resistant to ampicillin and tetracycline, has been isolated from patients and from milk in unopened cartons. The dairy stopped producing milk April 9, and investigations by local, state, and federal officials are continuing.

Reported by local Illinois health departments, Illinois Dept of Public Health; Enteric Diseases Br, Div of Bacterial Diseases, Center for Infectious Diseases, CDC; US Food and Drug Administration.

Editorial Note: Pasteurized milk constitutes approximately 99% of all (cow) milk consumed in the United States, but milk-borne outbreaks of *Salmonella* investigated by CDC in the past have almost always involved raw milk because effective pasteurization kills *Salmonella*. The large number of affected persons in this outbreak illustrates how a widely consumed product, once contaminated, can result in many cases. Similar widespread transmission of *Salmonella* occurred in a waterborne outbreak involving an estimated 16,000 people (100 reported cases) in Riverside, California, in 1965 (*1*) and in an estimated 3,400 affected Navajo Indians (105 investigated cases) at a barbecue on a reservation in 1974 (*2*).

References

1. Aserkoff B, Schroeder SA, Brachman PS. Salmonellosis in the United States—a five-year review. Am J Epidemiol 1970;92:13-24.
2. Horwitz MA, Pollard RA, Merson MH, Martin SM. A large outbreak of foodborne salmonellosis on the Navajo Nation Indian Reservation, epidemiology and secondary transmission. Am J Public Health 1977;67:1071-6.

Reported Measles Cases — United States, Past 4 Weeks

The following states have reported measles during the past 4 weeks: Arizona, California, Florida, Georgia, Hawaii, Illinois, Indiana, Massachusetts, Michigan, Minnesota, Missouri, Montana, New Jersey, upstate New York, Ohio, Texas, Virginia, Washington, and West Virginia; New York City has also reported measles.

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