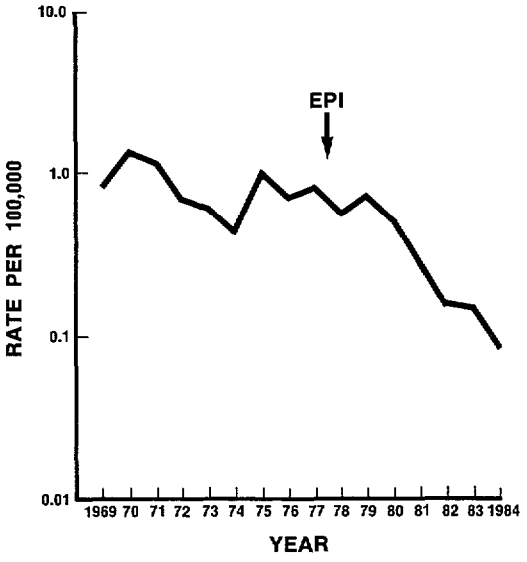
Figure 1. Annual reported poliomyelitis morbidity (per 100,000 population) in the Americas, 1969-1984.



This high degree of polio control can be credited primarily to steadily increasing vaccination coverage of the target populations. The use of special immunization tactics, such as national vaccination days scheduled two or three times a year, has contributed significantly to this increased vaccination coverage. Overall, data from reporting countries indicate that the proportion of children under one year old in the Americas who received three doses of polio vaccine increased from about 34% in 1978 to 78% in 1984 (Table 4).

Table 3. Countries in the Americas having reported poliomyelitis incidences of less than 0.1 cases per 100,000 population for five or more years as of 1984.

Anguilla	Martinique
Antigua and Barbuda	Montserrat
Bahamas	Panama
Barbados	Puerto Rico
Bermuda	Saint Lucia
Canada	St. Christopher/Nevis
Cayman Islands	St. Vincent and the Grenadines
Chile	Trinidad and Tobago
Costa Rica	Turks and Caicos Islands
Cuba	United States
Dominica	Uruguay
Grenada	Virgin Islands (UK)
Guadeloupe	Virgin Islands (US)

In the 1970s, program success was measured in terms of the number of countries that had achieved the Ten-Year Health Plan goal of reducing the poliomyelitis incidence to less than 0.1 case per 100,000 population. From here on, however, success will be measured by the absence of any disease cases due to wild poliovirus, because the high vaccination coverages already achieved in the Americas have made it feasible to think in terms of eradication. (For a more detailed account of the current campaign against poliomyelitis, see "PAHO Director announces campaign to eradicate poliomyelitis from the Americas by 1990" that appeared in our second 1985 issue.[1])

Source: Pan American Health Organization, Poliomyelitis in the Americas, 1985, *EPI Newsletter* 7(3):3-6, 1985.

[1]Pan American Health Organization, *Bull Pan Am Health Organ* 19(2):213-215, 1985.

MALARIA CHEMOPROPHYLAXIS PROBLEMS AMONG TRAVELLERS TO ENDEMIC AREAS

A recent report of six deaths from severe cutaneous reactions among travellers from the United States who were taking sulfadoxine/pyrimethamine (Fansidar®) with chloroquine for chemoprophylaxis of *Plasmodium falciparum* infections once again confirms that no drug regimen is entirely satisfactory for the prevention of malaria. (The general subject of malaria

Table 4. Poliomyelitis vaccination coverage (with three doses) of children under one year of age in the Americas, by country, 1978-1984.

Subregion and country	% coverage in the year indicated						
	1978	1979	1980	1981	1982	1983	1984
Northern America:							
Bermuda	–[c]	–	39	–	68	53	48
Canada[a]	–	–	–	–	–	–	–
United States[a]	–	–	–	–	–	–	–
Caribbean:							
Anguilla	77	48	86	81	86	99	73
Antigua and Barbuda	53	–	36	47	90	99	93
Bahamas	99	27	35	40	67	65	62
Barbados	56	60	99	54	63	62	77
British Virgin Islands	–	14	95	70	94	75	85
Cayman Islands	31	52	47	63	91	90	90
Cuba[b]	99	97	99	82	82	95	99
Dominica	20	31	53	97	73	92	82
Dominican Republic	28	35	46	42	37	22	99
Grenada	–	6	32	41	61	72	75
Haiti	1	3	2	3	7	6	12
Jamaica	–	–	34	37	68	47	56
Montserrat	63	5	38	55	95	95	82
Saint Lucia	32	–	58	65	81	80	84
St. Christopher/Nevis	–	25	76	71	93	91	97
St. Vincent and the Grenadines	5	–	26	33	99	84	90
Trinidad and Tobago	45	28	38	55	59	61	66
Turks and Caicos Islands	–	21	44	27	80	79	70
Continental Middle America:							
Belize	45	42	21	51	52	61	54
Costa Rica	58	44	67	85	78	54	81
El Salvador[b]	–	57	42	38	42	48	44
Guatemala[b]	–	62	43	42	45	44	37
Honduras	7	25	32	37	53	70	84
Mexico	–	11	43	85	85	74	91
Nicaragua	18	–	99	52	50	30	73
Panama	41	57	45	50	61	60	70
Tropical South America:							
Bolivia	3	12	14	15	15	11	57
Brazil[b]	34	49	99	99	99	99	89
Colombia	17	19	16	22	27	42	60
Ecuador	10	16	14	19	36	34	36
Guyana	31	37	42	37	73	59	41
Paraguay	2	5	14	26	39	47	59
Peru	21	19	16	20	23	18	26
Suriname	–	20	24	22	53	83	79
Venezuela	83	88	95	75	77	67	59
Temperate South America:							
Argentina	–	5	31	38	94	94	64
Chile	98	97	91	93	98	93	87
Uruguay[b]	52	58	59	58	72	74	83
Total:	*34*	*34*	*59*	*69*	*74*	*72*	*78*

[a]Canada and the U.S. do not provide figures for children under one.
[b]Second-dose instead of third-dose data.
[c]Data not available.

prevention by drugs has been discussed and updated in several recent WHO documents.[1])

In considering the use of antimalarial drugs for prevention of the disease, the first question that must be asked is: "Will the traveller actually be exposed to the risk of contracting malaria?" Chemoprophylactic drugs continue to be given indiscriminately to a large number of persons visiting large towns or areas where they are not exposed to malaria. For example, the great majority of travellers to South-East Asia, although not exposed to malaria, are given chemoprophylaxis, and thus run an unnecessary risk of side-effects.

Despite abundant literature on the subject, physicians as well as travel agents and the travellers themselves are too often unaware of the risk of malaria in international travel and of the measures needed to prevent infection. In all instances, travellers to malarious areas should protect themselves by utilizing methods that reduce man-mosquito contact—including avoidance of transmission areas (mainly rural) in the evening and at night, times which correspond to periods of peak mosquito activity

When travellers find it impossible to avoid a high risk of exposure to malaria, prophylactic drugs must be used. Taken at recommended dosages, the 4-aminoquinolines (chloroquine and amodiaquine) are safe drugs, even for pregnant women and young children, and are highly effective against the blood forms of susceptible strains of all the human malaria parasites. Amodiaquine appears to have an advantage over chloroquine, particularly in areas of incipient parasite resistance. Adverse reactions to the 4-aminoquinolines are rare following short- or medium-term use. However, when they are used for a prolonged period (more than six years of continuous chemoprophylaxis at the recommended dosages) there is a risk of serious eye damage, which becomes significant if doses higher than those recommended are employed.

For areas where there is a high proportion of *P. falciparum,* and especially if a high degree of chloroquine resistance has been observed, the choice of an appropriate drug regimen becomes difficult. All of the alternative drugs are limited in either efficacy or safety.

Both chloroquine and sulfadoxine/pyrimethamine (Fansidar®) are effective suppressants of sensitive *falciparum* infections. When used alone, the sulfadoxine/pyrimethamine drug combination is relatively ineffective in the prevention of *vivax* (and presumably *ovale*) infections. Therefore, in the event of exposure to multiple species, and so as to provide additive action against *falciparum* malaria, chloroquine was often prescribed with the weekly dose of sulfadoxine/pyrimethamine.

However, in the United States, where chloroquine in combination with sulfadoxine/pyrimethamine (Fansidar®) has been recommended since 1982 and is still considered for chemoprophylaxis, 19 severe skin reactions, six of them fatal, have been reported among users of this combination. Overall, the incidence of fatal cutaneous reactions associated with the (prophylactic) use of this combination was estimated to range from 1 in 18,000 to 1 in 26,000 users.

It is likely that the sulfonamide moiety is largely responsible for the reported reactions, but it is possible that an interaction with chloroquine increases both the frequency and the severity of adverse reactions. Therefore, use of the combined chloroquine-sulfadoxine/pyrimethamine prophylaxis is not recommended.

Other sulfonamides containing drug combinations, such as sulfalene/pyrimethamine (Metakelfin®), may be expected to present a similar risk of severe cutaneous reactions.

Agranulocytosis associated with the administration of dapsone/pyrimethamine (Maloprim®) for malaria prevention is a rare phenomenon. Of the 19 cases reported in the literature, 12 (seven fatal) were found in subjects who had taken the drug twice weekly for six to nine weeks. Another fatal case occurred among six individuals with agranulocytosis who had been under dapsone/pyrimethamine prophylaxis on a regimen of one tablet a week for six to 10 weeks.

[1]See World Health Organization, *Weekly Epidemiological Record* 59(29, 30, and 31):221-227, 229-235, and 237-240, 1984; and World Health Organization, *Vaccination Certificate Requirements and Health Advice for International Travel,* Geneva, 1985.

The biguanides, proguanil (Paludrine®) and chlorproguanil (Lapudrine®), have been used for many years. Practitioners who have advised their use consider them to be effective, either alone or in association with one of the 4-aminoquinolines. The biguanides are known to have remarkably few side-effects or adverse reactions, and are therefore recommended for young children and pregnant women as well as for those subjects who do not tolerate sulfonamides and sulfones.

The utilization of proguanil (200mg daily, adult dosage) or chlorproguanil (20mg weekly, adult dosage) is based on observations that the pre-erythrocytic stages of a drug-sensitive and a drug-resistant strain of *P. falciparum* appeared more sensitive to proguanil than the blood stages of the corresponding strains. Definitive data from the field are not available to confirm the efficacy of this class of compounds, although several studies designed to provide such information are currently underway, and circumstantial evidence suggests the continued prophylactic usefulness of these drugs.

It should be remembered that *P. falciparum* strains resistant to sulfadoxine/pyrimethamine continue to be reported, especially from East Africa. Six cases have also been observed in nonimmune persons in the Netherlands, where parasitemia was also found on two occasions in subjects under dapsone/pyrimethamine prophylaxis. Failures seem to be related to the presence of a high degree of pyrimethamine resistance; breakthroughs may also be expected with proguanil or chlorproguanil in situations where the asexual stages of the parasite show a very high resistance to these drugs.

Finally, based on volunteer studies conducted a number of years ago, it was proposed that one of the tetracyclines, doxycycline, should be considered for use, either alone or in combination with chloroquine or amodiaquine. However, since the prophylactic efficacy of tetracyclines in malaria has not yet been adequately tested in the field, it is premature to recommend these drugs at this time.

Considering the very few drugs available for the treatment of multi-resistant *P. falciparum* infections, it is advisable to restrict the use of tetracycline, in combination with quinine, to the treatment of these infections.

On the basis of the above-mentioned considerations, recommendations for drug prophylaxis of malaria may be summarized as follows:

- Prevention of malaria should be mainly based on personal protection from mosquito contact.
- Chemoprophylaxis should only be used when the risk of infection is likely to be higher than the risk of drug side-effects.
- If a chemoprophylactic agent is required, chloroquine (in a weekly adult dosage of 300mg base) or, preferably, amodiaquine (in a weekly adult dosage of 300 or 400mg base) should be used for travellers to any endemic area.
- Travellers should be warned of possible breakthroughs and side-effects under any prophylactic medication.
- Travellers to areas where chloroquine-resistant *falciparum* infections are prevalent should carry a therapeutic dose (for longer exposure, several treatment doses) of sulfadoxine/pyrimethamine with them in case a febrile illness occurs and access to prompt diagnosis and medical attention is not easily available.

If sulfadoxine/pyrimethamine or dapsone/pyrimethamine is prescribed for prophylaxis, it is important to take the following steps:

- the physician should inquire about any previous patient history of sulfonamide/sulfone intolerance and should point out the risk and the need for immediate drug withdrawal if side-effects do occur;
- under no circumstances should the sulfone/pyrimethamine (Maloprim®) dosage exceed *one tablet (adult dosage) once a week.*

Additional information and a list of references dealing with this subject can be obtained upon request from the Malaria Action Program, World Health Organization, 1211 Geneva 27, Switzerland.

Source: World Health Organization, *Weekly Epidemiological Record* 60(24):181-183, 1985.