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IAMAT publication
*How to Protect Yourself
Against Malaria*



World Malaria Risk Chart

Geographical distribution of Malaria risk areas, *Plasmodium falciparum* drug-resistant areas, principal mosquito vectors, and guidelines for suppressive medication by country.

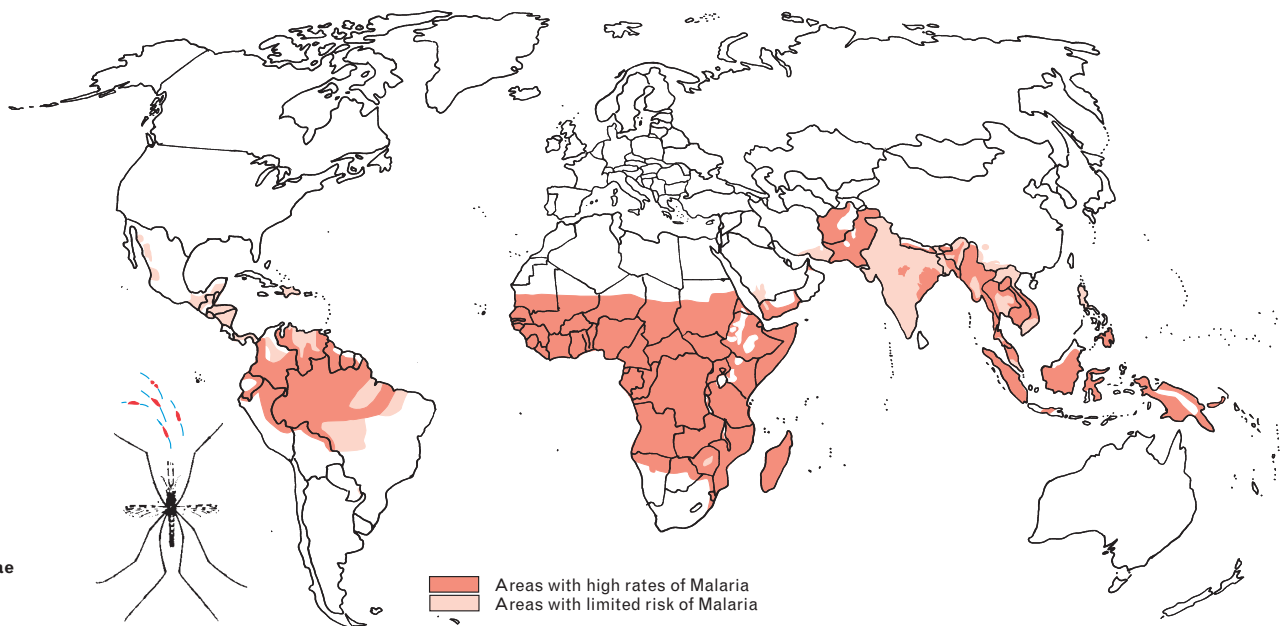
Status as of September 30, 2020

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MALARIA COUNTRY INFORMATION

Afghanistan	Mab 1, 2500, V-XI, A4, A21, A23, P.F. 5%, R3, S2	Congo – Rep.	Mabf, I-XII, A7, A8, P.F. >90%, R3, S2	Guinea-Bissau	Mabf, I-XII, A7, A8, P.F. >85%, R3, S2
Angola	Mabf, I-XII, A7, A8, P.F. 90%, R3, S2	Congo – Dem. Rep.	Mabf, I-XII, A7, A8, P.F. >90%, R3, S2	Guyana	Mabf, 900, I-XII, A2, A5, P.F. 53%, R1, S2
Bangladesh	Mh 2, I-XII, A1, A13, A22, P.F. 91%, R3, S2	Costa Rica	Me 13, I-XII, A1, P.F. 0%, S5	Haiti	Mabf 24, I-XII, A1, P.F.99%, S1
Belize	Mh 3, 400, I-XII, A1, A5, P.F. 0%, S5	Côte d'Ivoire	Mabf, I-XII, A7, A8, P.F. >85%, R3, S2	Honduras	Mab 25, 1000, I-XII, A1, A5, A16, P.F. 20%, S1
Benin	Mabf, I-XII, A7, A8, A11, P.F. >85%, R3, S2	Djibouti	Mabf, I-XII, A8, A9, P.F. >90%, R3, S2	India	Mabc 26, 2000, I-XII, A24, P.F. 40%, R3, S2
Bhutan	Mh 4, 1700, I-XII, A4, P.F. >50%, R3, S3	Dominican Republic	Mabc 14, 1400, I-XII, A1, P.F. 100%, S1	Indonesia	Macd 27, 2000, I-XII, A3, A22, P.F. 57%, P.K., R3, R4, S2
Bolivia	Mabc 5, 2500, I-XII, A5, A16, P.F. 7%, R4, S2	Ecuador	Mabc 15, 1500, I-XII, A1, A16, A17, P.F. 28%, R3, S2	Iran	Mh 28, 1500, III-XI, A4, A21, A23, P.F. 7%, S5
Botswana	Me 6, XI-VI, A8, A9, P.F. >90%, R1, S2	El Salvador	Mh 16, 1000, I-XII, A1, A16, P.F. <1%, S5	Kenya	Mabc 29, 2500, I-XII, A7, A8, A9, P.F. >85%, R3, S2
Brazil	Mh 7, 900, I-XII, A2, A5, P.F. 11%, R3, R4, S2	Equatorial Guinea	Mabf, I-XII, A8, A11, P.F. >85%, R3, S2	Korea – North	Mh 30, IV-XI, A20, P.F. 0%, S5
Brunei Darussalam	Mg 8, A24, P.K., S5	Eritrea	Mabc 17, 2200, I-XII, A9, P.F. 85%, R3, S2	Korea – South	Me 31, V-XII, A20, P.F. 0%, S5
Burkina Faso	Mabf, I-XII, A7, A8, A9, P.F. >80%, R3, S2	Eswatini Swaziland	Mh 18, I-XII, A7, A8, A9, P.F. >90%, R1, S2	Laos	Mabcf 32, I-XII, A13, P.F. 65%, R5, S2, S4
Burundi	Mabf, I-XII, A7, A8, P.F. >85%, R3, S2	Ethiopia	Mabc 19, 2200, I-XII, A7, A9, A15, P.F. 60%, R3, R4, S2	Liberia	Mabf, I-XII, A8, P.F. >85%, R3, S2
Cabo Verde	Me 9, VII-XI, A9, P.F. >99%, S5	French Guiana	Mabcf 20, I-XII, A5, P.F. 45%, R3, S2	Madagascar	Mabf 33, I-XII, A7, A8, A9, P.F. >85%, R1, S2
Cambodia	Mabcf 10, I-XII, A13, A22 P.F. 60%, R4, R5, S2, S4	Gabon	Mabf, I-XII, A7, A8, P.F. >90%, R3, S2	Malawi	Mabf, I-XII, A7, A8, A9, P.F. >90%, R3, S2
Cameroon	Mabf, I-XII, A7, A8, A9, P.F. >85%, R3, S2	Gambia	Mabf, I-XII, A8, A9, A11, P.F. >85%, R3, S2	Malaysia	Mh 34, 1700, I-XII, A3, A22, P.F. 22%, P.K., R3, R4, S2
Central African Republic	Mabf, I-XII, A7, A8, A9, P.F. >85%, R3, S2	Ghana	Mabf, I-XII, A7, A8, A9, P.F. >90%, R3, S2	Mali	Mabf, I-XII, A7, A8, P.F. >85%, R3, S2
Chad	Mabf, I-XII, A7, A9, A15, P.F. >85%, R3, S2	Greece	Me 21, V-X, P.F. 0%, S5	Mauritania	Mabcf 35, I-XII, A8, A9, A15, P.F. >85%, R1, S2
China	Me 11, 1500, I-XII, A13, A20, P.F. 11%, S5	Guatemala	Mabc 22, 1500, I-XII, A1, A5, A16, P.F. 3%, S1	Mayotte	Mabf, I-XII, A7, A8, P.F. 93%, R3, S2
Colombia	Mabc 12, 1700, I-XII, A5, A14, A16, P.F. 50%, R3, S2	Guinea	Mabf, I-XII, A7, A8, A9, P.F. >85%, R1, S2	Mexico	Mh 36, 1000, A1, A5, A16, P.F. 0%, S2
Comoros	Mabf, I-XII, A7, A8, P.F. 98%, R3, S2			Mozambique	Mabf, I-XII, A7, A8, A9, P.F. >90%, R3, S2



Anopheles gambiae

Areas with high rates of Malaria
 Areas with limited risk of Malaria

Myanmar Burma	Macd 37, 1000, I-XII, A13, P.F. 60%, P.K., R5, S2, S4	South Africa	Me 45, IX-V, A7, A9, P.F. 90%, R3, S2
Namibia	Mh 38, XI-VI, A7, A8, P.F. >90%, R3, S3	South Sudan	Mabf, I-XII, A7, A8, A9, P.F. >90%, R3, S2
Nepal	Mh 39, 2000, I-XII, P.F. 15%, R3, S2	Sudan	Macf 46, I-XII, A7, A8, A9, P.F. 90%, R3, S2
Nicaragua	Mabc 40, 1000, I-XII, A1, A16, P.F. 10%, S3	Suriname	Mabc 47, 1300, I-XII, A5, A14, P.F. >40%, R5, S2, S4
Niger	Mabf, I-XII, A7, A8, A9, P.F. >85%, R3, S2	Tajikistan	Me 48, VI-X, P.F. 10%, S5
Nigeria	Mabf, I-XII, A7, A8, A11, P.F. >85%, R3, S2	Tanzania	Mab, 1800, I-XII, A7, A8, A9, P.F. >85%, R3, S2
Pakistan	Mab, 2300, I-XII, A4, A21, P.F. 30%, R3, S2	Thailand	Madf 49, I-XII, A13, A22, P.F. >50%, P.K., R3, R5, S2, S4
Panama	Macd 41, 800, I-XII, A1, A2, A16, P.F. 1%, R2, S3	Timor-Leste	Mh 50, I-XII, A23, P.F. >50%, R3, S2
Papua New Guinea	Mab, 2000, I-XII, A6, A17, P.F. >65%, R3, R4, S2	Togo	Mabf, I-XII, A7, A8, A11, P.F. >85%, R1, S2
Peru	Mh 42, 2000, I-XII, A1, A5, A16, P.F. 15%, R3, R4, S2	Uganda	Mabf, I-XII, A7, A8, P.F. >85%, R3, S2
Philippines	Macd 43, 600, I-XII, A3, A12, P.F. >70%, P.K., R3, S2	Vanuatu	Mabf 51, I-XII, A6, P.F. 60%, R3, R4, S2
Rwanda	Mabf, I-XII, A7, A8, A9, P.F. >90%, R3, S2	Venezuela	Mab 52, 1700, I-XII, A2, A5, A14, P.F. 25%, R3, S2
São Tomé & Príncipe	Mabf, I-XII, A8, P.F. >85%, R1, S2	Vietnam	Macd 53, I-XII, A13, A22, P.F. >50%, P.K., R5, S2, S4
Saudi Arabia	Me 44, 2000, I-XII, A9, A19, A21, P.F. 97%, R1, S5	Yemen	Mabc 54, 2000, I-XII, A4, A9, A19, P.F. >95%, R3, S2
Senegal	Mabf, I-XII, A7, A8, A9, P.F. >85%, R3, S2	Zambia	Mabf 55, I-XII, A7, A8, A9, P.F. >90%, R3, S2
Sierra Leone	Mabf, I-XII, A7, A8, A11, P.F. >85%, R3, S2	Zimbabwe	Mabc 56, 1200, XI-VI, A7, A8, A9, P.F. >90%, R3, S2
Solomon Islands	Mab, I-XII, A6, A17, P.F. 60%, R3, R4, S2		
Somalia	Mabf, I-XII, A7, A9, P.F. 95%, R3, S2		

Reliable information on malarious areas and sound knowledge of your destination's geography, including understanding the feeding and breeding habits of the local Anopheles mosquitoes, will help you to take the appropriate protective measures.

Persons travelling to, or working in, remote areas where medical attention cannot be sought within 24 hours should consult a travel health specialist for advice on a possible self-treatment regimen in case of a malaria breakthrough. See IAMAT's publication *How to Protect Yourself Against Malaria* for more information.

MALARIA RISK CODES

- M** malaria risk
- a** present throughout the country
- b** including urban areas
- c** except areas specified
- d** excluding urban areas
- e** absent in most of the country, risk exists only in specified areas
- f** risk present at all altitudes
- g** no official information available
- h** present in the country; areas of risk are specified

- 1 or 2 digit numerals**
Refers to detailed description of malarious areas in this country
- 3 or 4 digit numerals**
Expresses the altitude levels in metres below which the risk is present. (1 metre is approximately 3.3 feet.)
- Roman numerals**
Identifies months during which the risk of contracting malaria is high: I = January to XII = December.

A = Anopheles
Followed by 1 or 2 digit numerals, the letter **A** refers to the principal *Anopheles* species which transmit malaria in this country. See box below for feeding habits and breeding places.

P.F. followed by %
The number of incidences expressed in percentages of *Plasmodium falciparum* malaria occurring in this country. Note that country-specific information on *P. falciparum* incidence is limited in some circumstances and values listed are estimated based on best available evidence. Of the five species of human malaria parasites, *P. falciparum* is the most dangerous. The remaining percentage represents infections caused by *Plasmodium vivax*, *Plasmodium ovale* and *Plasmodium malariae*.

P.K. Infection with *Plasmodium knowlesi*, a malaria parasite of Old World monkeys, has been reported in humans in this country.

- > More than < Less than
- R** Malaria parasite resistance to antimalarial drugs
- S** Suppressive medication or anti-mosquito bite measures required

ANOPHELES CODES

A = *Anopheles*, the principal vector for transmitting malaria in this country. (See chapter 'The World of *Anopheles*' in IAMAT's publication *How to Protect Yourself Against Malaria*.)

	Breeding places	Feeding habits and daytime resting places
A1 = <i>A. albimanus</i>	• Coastal mosquito of central and northern part of South America; breeds in sunlit water collections, pools, lakes, lagoons.	• Feeds on humans from dusk to midnight; rests outdoors in shaded areas.
A2 = <i>A. aquasalis</i>	• Coastal mosquito; breeds in fresh or brackish water.	• Starts feeding on humans at dusk; rests inside dwellings.
A3 = <i>A. balabacensis</i>	• Hill forest mosquito; breeds in small water collections under shade, in animal footprints, shallow pools.	• Bites late at night, rests outdoors.
A4 = <i>A. culicifacies</i>	• Plains mosquito; breeds in fresh water with grassy edges, slow-moving streams, man-made containers, pools.	• Feeds on humans and livestock at sunset; rests in dark corners of houses and cattle sheds.
A5 = <i>A. darlingi</i>	• Domestic mosquito; breeds in shaded bodies of still water, water under swamp vegetation, grassy edges of rivers, pools.	• Feeds on humans inside human habitation; rests inside houses, often near beds.
A6 = <i>A. farauti</i>	• Domestic mosquito; breeds in sunlit fresh or brackish water collections, pools, man-made containers.	• Feeds indoors and outdoors at night or during the day when skies are overcast; rests outdoors.
A7 = <i>A. funestus</i>	• Open country mosquito; breeds in fresh sunlit swamps, large rivers and grassy stream margins.	• Feeds at night on humans, mostly indoors; rests inside human habitations.
A8 = <i>A. gambiae</i>	• Domestic mosquito; breeds in sunlit pools, footprints, pits, puddles close to human habitations, man-made containers.	• Feeds on humans mostly indoors; peak biting times 2 a.m. - 4 a.m.; rests in dark places indoors and outdoors.
A9 = <i>A. arabiensis</i>	• Savannah and woodland mosquito; breeds in irrigated rice fields, shallow pools of water, land clearings, and man-made containers.	• Feeds on humans and animals; rests and feeds outdoors; peak biting times 7 p.m. - 3 a.m.
A10 = <i>A. maculipennis</i>	• Foothill mosquito; breeds in slow-moving streams, clear still water exposed to sunlight.	• Feeds on humans and animals, rests in animal shelters.
A11 = <i>A. melas</i>	• Sea coast mosquito; breeds in saline water of lagoons, marshes and swamps.	• Feeds on humans indoors; rests indoors.
A12 = <i>A. flavirostris</i>	• Mosquito of foothills and rolling land; breeds in clear water of streams, ditches, wells and seepages.	• Feeds on humans and livestock indoors, leaves dwellings early in the morning to rest in vegetation along stream banks.
A13 = <i>A. minimus</i>	• Mosquito of mountain and hilly areas; breeds in clear water of streams, irrigation ditches, rice paddies.	• Feeds on humans and livestock indoors, peak biting times 10 p.m. - 2 a.m.; rests in houses and cattlesheds.
A14 = <i>A. nunez-tovari</i>	• Mosquito of open marshy areas, ponds and lakes, breeds also in temporary ground pools, animal or wheel tracks.	• Starts to bite humans late in the evening indoors; rests outdoors.
A15 = <i>A. pharoensis</i>	• Breeds in small shallow pools, wells, stagnant desert water, large bodies of water with aquatic vegetation.	• Feeds on humans indoors and outdoors starting at sunset; rests mainly outside among vegetation.
A16 = <i>A. pseudopunctipennis</i>	• Highland valley mosquito; breeds in shallow pools, seepages, drying streams, tanks.	• Feeds on humans indoors; rests indoors.
A17 = <i>A. punctulatus</i>	• Domestic mosquito; breeds in puddles, footprints, streams, man-made water collections.	• Feeds on humans and animals outdoors, rests outdoors.
A18 = <i>A. sacharovi</i>	• Mosquito of inland and coastal swamps; breeds in fresh or brackish water of marshes, swamps, man-made water collections.	• Feeds indoors on humans and livestock, rests in houses and animal shelters.
A19 = <i>A. sergentii</i>	• Oasis mosquito; breeds in small pools, seepages, slow moving water.	• Feeds on humans indoors after dark; rests in houses and tents.
A20 = <i>A. sinensis</i>	• Mosquito of the plains; breeds in rice paddies, swamps, lake margins.	• Feeds outdoors on humans and livestock early in the evening; rests in animal shelters.
A21 = <i>A. stephensi</i>	• Domestic mosquito; breeds in man-made containers, water collections near human habitations, footprints, puddles, lake margins.	• Feeds indoors on humans starting after sunset; rests in houses and shelters.
A22 = <i>A. sudaicus</i>	• Coastal mosquito; breeds in brackish water, sunlit lagoons, swamps and marshes.	• Feeds indoors on humans and livestock; rests in houses and shelters.
A23 = <i>A. superpictus</i>	• Mountain mosquito; breeds in clear water of sunlit pools, hill streams and rivers.	• Feeds indoors on humans, rests outdoors and in animal shelters.
A24	= For the vector in this country see Notes for Malarious Areas on page 5.	

CODES FOR AREAS WITH DRUG RESISTANT MALARIA

In this country, malaria parasites are resistant to some antimalarial drugs.

R1 *P. falciparum* malaria is resistant to chloroquine. Resistance is present in all malarious areas.

R2 Refer to text for description of chloroquine resistant areas.

R3 Multidrug resistance (chloroquine and sulfadoxine-pyrimethamine) *P. falciparum* malaria is present in all malarious areas of this country. The following antimalarial medications are effective: atovaquone-proguanil, doxycycline, mefloquine hydrochloride, and tafenoquine. Artemisinin-based combination drugs are effective for treatment.

R4 Chloroquine resistant *P. vivax* malaria has been reported from this country.

R5 The following areas report *P. falciparum* malaria resistance to chloroquine, mefloquine hydrochloride and sulfadoxine-pyrimethamine.

- **Cambodia:** The provinces of Siem Reap, Preah Vihear, Oddar Meanchey, Banteay Meanchey, Battambang, Pailin, Pursat, Kampot, and Koh Kong. The southern and western provinces also report resistance to artesunate, lumefantrine and piperazine.

- **Laos:** The northwestern provinces of Bokeo and Louang Namtha bordering Myanmar | Burma and China; and the southern provinces of Salavan and Champasak bordering Thailand.

- **Myanmar | Burma:** The states of Bago, Kayah, Kachin, Kayin, Shan and Tanintharyi (eastern half of the country including the areas bordering China, Laos and Thailand). Resistance to artemisinin is reported from southeastern parts of the country.

- **Suriname:** This country reports *P. falciparum* resistance to chloroquine, mefloquine hydrochloride, sulfadoxine-pyrimethamine and some decline in quinine sensitivity.

- **Thailand:** The western border areas with Myanmar | Burma: forested hilly areas of Chang Rai, Chang Mai, Mae Hong Son, Tak, Kanchanaburi, Ratchaburi and Petchaburi provinces (these areas also report *P. falciparum* resistance to quinine and artemisinin); the eastern border areas with Cambodia: forested hilly areas of Ubol Ratchathani, Si Sa Ket, Surin, Buriram, Sa Kaeo, Chantaburi, and Trat provinces.

- **Vietnam:** The provinces of Dak Lak, Gia Lai, Khanh Hoa, Kon Tum, Lam Dong, Ninh Thuan, Song Be and Tay Ninh.

The recommendations for malaria prophylaxis outlined here are intended as guidelines only and may differ according to where you live, your health status, age, destination, trip itinerary, type of travel, and length of stay. Seek further advice from your physician or travel health clinic for the malaria prophylactic regimen most appropriate to your needs.

SUPPRESSIVE MEDICATION CODES

In offering guidance on the choice of antimalarial drugs, the main concern is to provide protection against *Plasmodium falciparum* malaria, the most dangerous and often fatal form of the illness.

Regardless of the medication which has been taken, it is of utmost importance for travellers and their physician to consider fever and flu-like symptoms appearing seven days up to several months after leaving a malarious area as a malaria breakthrough. Early diagnosis is essential for successful treatment

S Suppressives medication or anti-mosquito bite measures are required. For details on how to prevent mosquito bites, drug descriptions, adult and pediatric dosages, and drug contraindications see IAMAT's *How to Protect Yourself Against Malaria*.

S1 Chloroquine is sensitive to *P. falciparum* malaria in this country. **TAKE ONE OF THE FOLLOWING REGIMENS:**

a) Follow a chloroquine regimen:

- TAKE IN WEEKLY DOSES OF 500 mg (300 mg base). START 1 WEEK BEFORE ENTERING MALARIOUS AREA, CONTINUE WEEKLY DURING YOUR STAY AND CONTINUE FOR 4 WEEKS AFTER LEAVING. TAKE IT AFTER A MEAL TO AVOID STOMACH UPSETS.

- **Note:** The bitter taste makes the drug unpalatable. Minor stomach upsets, itching skin, nausea and diarrhea may occur. It may also cause blurred vision and a transitory headache.

b) You can also take hydrochloroquine as an alternative:

- TAKE IN WEEKLY DOSES OF 400 mg (310 mg base). START 1 WEEK BEFORE ENTERING MALARIOUS AREA, CONTINUE WEEKLY DURING YOUR STAY AND CONTINUE FOR 4 WEEKS AFTER LEAVING.

- **Note:** This drug is an alternative to chloroquine that may be better tolerated.

c) Other options are atovaquone-proguanil, doxycycline, mefloquine hydrochloride, or tafenoquine (see S2 for details).

d) Travellers on short-term trips to areas with mainly *P. vivax* malaria can take primaquine phosphate (brand name: Primaquine, Malarid):

- TAKE 1 TABLET OF 52.6 mg (30 mg base) DAILY. START 1-2 DAYS BEFORE ENTERING MALARIOUS AREA, CONTINUE DAILY DURING YOUR STAY AND CONTINUE FOR 7 DAYS AFTER LEAVING.

- **Note:** Primaquine is contraindicated for pregnant women and persons with G6PD (glucose-6-phosphate dehydrogenase deficiency). Screening for G6PD levels must be done prior to taking this drug.

S2 High incidences of chloroquine resistant and / or multidrug resistant *P. falciparum* malaria occur in this country. **TAKE ONE OF THE FOLLOWING REGIMENS:**

a) Atovaquone-proguanil: (brand names:

Malarone, Malanil and others; generics available)

- TAKE 1 TABLET DAILY (ATOVAQUONE 250 mg + PROGUANIL 100 mg). START 1-2 DAYS BEFORE ENTERING THE MALARIOUS AREA, CONTINUE DAILY DURING YOUR STAY AND CONTINUE FOR 7 DAYS AFTER LEAVING.

- **Note:** Take at the same time every day with food or milk.

b) Doxycycline: (brand name: Vibramycin and others; generics available)

- TAKE 1 TABLET OF DOXYCYCLINE (100 mg) DAILY. START 1 DAY BEFORE ENTERING MALARIOUS AREA, CONTINUE DAILY DURING YOUR STAY AND CONTINUE FOR 4 WEEKS AFTER LEAVING.

- **Note:** When taking this drug, avoid exposure to direct sunlight and use sunscreen with protection against long range ultraviolet radiation (UVA) to minimize risk of photosensitive reaction. Take with large amounts of water to prevent esophageal and stomach irritation.

c) Mefloquine hydrochloride (brand names: Lariam, Mephaquin, Mefliam and others; generics available)

- TAKE 1 TABLET OF 250 mg (228 mg base) ONCE A WEEK. START 1-2 WEEKS BEFORE ENTERING THE MALARIOUS AREA, CONTINUE WEEKLY DURING

YOUR STAY AND CONTINUE FOR 4 WEEKS AFTER LEAVING.

- **Note:** Side effects include nausea and headache, including neurological side effects such as dizziness, ringing of the ears, and loss of balance. Psychiatric side effects include anxiety, depression, mistrustfulness, and hallucinations. Neurological side effects can occur any time during use and can last for long periods of time or become permanent even after the drug is stopped. Seek medical advice if any neurological or psychiatric side effects occur.

ALTERNATIVE TO THE ABOVE REGIMENS:

d) Travellers on short trips can take Tafenoquine (brand name: Arakoda):

- TAKE 1 TABLET OF 200 mg. START TAKING DAILY FOR 3 DAYS BEFORE ENTERING MALARIOUS AREA AND CONTINUE WEEKLY DURING YOUR STAY. AFTER LEAVING THE RISK AREA, TAKE ONE TABLET 1 WEEK AFTER THE LAST DOSE.

- **Note:** Tafenoquine is only available in the USA and Australia. This antimalarial is contraindicated for pregnant women, persons under 18 years of age, those with a history of psychiatric disorder or ongoing psychotic symptoms, and persons with G6PD (glucose-6-phosphate dehydrogenase deficiency). Screening for G6PD levels must be done prior to taking this drug.

e) Antimalarial regimen for travellers who cannot follow one of the above regimens:

- TAKE CHLOROQUINE OR HYDROCHLOROQUINE (SEE S1a AND S1b FOR DETAILS). NOTE THAT THESE DRUGS ARE MUCH LESS EFFECTIVE IN THIS COUNTRY THAN ATOVAQUONE-PROGUANIL, DOXYCYCLINE OR MEFLOQUINE HYDROCHLORIDE. SEEK IMMEDIATE MEDICAL ATTENTION IF YOU HAVE FLU-LIKE SYMPTOMS — FEVER, HEADACHE, NAUSEA, GENERAL MALAISE — APPEARING ABOUT 7 DAYS OR LATER AFTER ENTERING THE MALARIOUS AREA.

- **Note:** It is imperative to use a mosquito bed net to avoid the bite of the nocturnal *Anopheles* mosquito. Use repellents and insecticides as described in IAMAT's *How to Protect Yourself Against Malaria*.

S3 See text for malaria prevention guidelines for different areas in this country.

S4 Travellers going to multidrug resistant *P. falciparum* malaria areas of this country (see R5 on this page) should follow an atovaquone-proguanil (see S2a) or doxycycline (see S2b) regimen. Persons who cannot follow one of these regimens or contemplate a long term visit to these areas should seek advice from a travel health specialist for a possible alternative drug regimen.

S5 Risk of contracting malaria is low. Suppressives medication is not recommended. Travellers going to risk areas should follow meticulous anti-mosquito bite measures from dusk to dawn during the malaria season.

Before departure, pack all the antimalarial medication you need for the duration of your trip, including an extra supply in case it gets lost or stolen. Be aware of counterfeit antimalarial medications at your destination. Fake tablets and packaging look very similar to the real ones and can put your life at risk. Always get your medication from a reputable pharmacist.

CERTIFIED MALARIA FREE COUNTRIES

Albania, American Samoa, Armenia, Andorra, Anguilla, Antigua and Barbuda, Australia, Austria, Azores, Bahamas, Bahrain, Barbados, Belarus, Belgium, Bermuda, Bosnia and Herzegovina, Bulgaria, Canada, Canary Islands, Cayman Islands, Chile, Christmas Island, Cocos Islands, Cook Islands, Croatia, Cuba, Cyprus, Czech Republic, Denmark, Dominica, Estonia, Falkland Islands, Faroe Islands, Fiji, Finland, France, French Polynesia, Germany, Gibraltar, Greenland, Grenada, Guadeloupe, Guam, Hungary, Iceland, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kiribati, Kuwait, Kyrgyzstan, Latvia, Lebanon, Lesotho, Libya, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madeira Islands, Maldives, Malta, Marshall Islands, Martinique, Mauritius, Micronesia, Moldova, Monaco, Mongolia, Monserrat, Montenegro,

Morocco, Nauru, Netherlands, Netherlands Antilles, New Caledonia, New Zealand, Niue, Norfolk, Northern Mariana Islands, Norway, Oman, Palau, Paraguay, Pitcairn, Poland, Portugal, Puerto Rico, Qatar, Réunion, Romania, Russia, St. Barthélemy, St. Helena, St. Kitts and Nevis, St. Lucia, St. Martin, Saint Pierre and Miquelon, St. Vincent and the Grenadines, Samoa, San Marino, Serbia, Seychelles, Singapore, Slovakia, Slovenia, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tajikistan, Tokelau, Tonga, Trinidad and Tobago, Tunisia, Turkmenistan, Turks and Caicos, Tuvalu, Ukraine, United Arab Emirates, United Kingdom, United States of America, Uruguay, Virgin Islands (British and U.S.A.), Wake Island, Wallis and Futuna.

Malaria is a medical emergency. If you have a fever and flu-like symptoms appearing 7 days, weeks or up to several months after your trip, don't forget to tell your doctor that you were in a malarious area. Early diagnosis is essential for successful treatment.

1 Afghanistan: Persons travelling overland from and to Pakistan or working in refugee camps should also take malaria suppressive medication.

2 Bangladesh: The city of Dhaka is risk free.

Note: Risk is present in the following rural areas of Dhaka Division, Mymensingh Division (Sherpur, Mymensingh, and Netrakona), Rangpur Division (district of Kurigram), and Sylhet Division (districts of Habiganj, Moulvibazar, Sunamgonj, and Sylhet). High risk is present in urban and rural areas of the following districts of Chittagong Division: Chittagong, Cox's Bazar, Badarban, Rangamati and Khagrachhari. Risk is present year-round, with peak transmission from May to October.

3 Belize: Low risk is present in rural areas of Belize, particularly in the southern districts of Stan Creek and Toledo. Belize district (including Belize City) and the islands are risk free. Persons travelling throughout the country, visiting resorts and the islands, should take meticulous anti-mosquito bite measures.

4 Bhutan: Risk is present year round in the following southern districts bordering India: Samtse, Chukha, Dagana, Sarpang, Zhemgang, Pemagatshel, Samdrup Jongkhar. Use S2 malaria suppressive guidelines for these areas. Focal malaria transmission during the summer rainy season (May to September) occurs throughout the other districts in areas below 1700 m / 5,577 ft. Take meticulous anti-mosquito bite measures during the risk season. The districts of Bhumthang, Gasa, Paro, and Thimphu are risk free.

5 Bolivia: The city of La Paz and the highland areas above 2500 m / 8,202 ft are risk free. There is low risk of *P. falciparum* risk in Beni and Pando. Use S2 antimalarial guidelines in these areas. Take meticulous anti-mosquito measures in other areas of the Amazon Basin. For all other malarious areas use S1 guidelines.

Note: All national parks are within the malarious area.

6 Botswana: Risk is present in the rural and urban areas of Ngamiland District (sub-districts of Okavango, Ngamiland East and West), Chobe District (including Chobe National Park), Central District (sub-districts of Bobirwa, Boteti, Mahalapye, Serowe/Palapye, and Tutume), North-East District, and Ghanzi District (northern half). Use S2 malaria suppressive medication guidelines for these areas. For the rest of the country, take meticulous anti-mosquito bite measures.

Note: Gabarone is risk free.

7 Brazil: Risk of multi-drug-resistant malaria is high throughout the states of the Amazon Basin, including cities and towns (main cities in brackets): Acre (Rio Branco), Amapá (Macapá), Amazonas (Manaus), the northwestern part of Maranhão (outskirts of São Luis), northern part of Mato Grosso (outskirts of Cuiabá), Pará (outskirts of Belém, Marabá, and Santarém), Rondônia (Pôrto Velho), Roraima (Boa Vista), and the western part of Tocantins.

High malaria transmission occurs along the trans-Amazon highway, the highway from Santarém to Cuiabá, and in the valleys of the Araguaia, Xingu, Jamanxim, and Tapajos rivers. Localized malaria outbreaks due to migration from the Amazon region have been reported in other parts of Brazil. Risk is also present in some rural, forested areas of the states of Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo.

Note: Persons on cruises on the Amazon and its tributaries, or travelling overland throughout the Amazon Basin, must follow antimalarial medication guidelines. There is no malaria transmission at Iguazu Falls.

8 Brunei Darussalam: Travellers visiting rural areas, wooded areas, national parks and jungles must take meticulous anti-mosquito bite measures.

Note: Infection with *Plasmodium knowlesi* has been reported in humans. The main vector for *P. knowlesi* is *Anopheles latens* found in forested and jungle areas which feeds outdoors at dusk.

9 Cabo Verde: Risk is present on Boa Vista Island and São Tiago. Take meticulous anti-mosquito bite measures in these areas.

10 Cambodia: The city of Phnom Penh is risk free. There is low risk of malaria transmission at Angkor Wat and in the city centre of Siem Reap. Take meticulous anti-mosquito bite measures if only travelling to these areas. However, if travelling throughout the rest of country, take malaria suppressive medication. See page 4 (R5) for multi-drug resistant areas.

11 China: Limited risk is present throughout the year in the southwestern part of Yunnan Province bordering Myanmar | Burma: Dehong Dai and Jingpo, Baoshan, Lincang, Pu'er and Xishuangbanna Prefectures.

Limited risk is also present in the southeastern part of Tibet in the county of Médog (Motuo) along the lower Yarlung Tsangpo (Zangbo) river and canyon.

Main vectors: *A. minimus*, *A. sinensis*.

Hong Kong is risk free.

Macau is risk free.

12 Colombia: The cities of Barranquilla, Bogotá, Cali, Cartagena, Medellín, Santa Marta, and the island of Providencia are risk free.

Note: Malaria risk is present in urban, rural, and jungle areas below 1700 m / 5,577 ft, and persons travelling to rural areas, making excursions on the Magdalena River (south of Barranquilla), travelling along the Pacific coast, or travelling east of the Cordillera Oriental must follow S2 suppressive medication guidelines.

13 Costa Rica: Risk is present in Limón Province (Matina Canton), Heredia Province (Sarapiquí Canton), Alajuela Province (San Carlos Canton), and Puntarenas Province (Golfo and Osa Cantons).

14 Dominican Republic: Risk is highest in western provinces that border Haiti, particularly Dajabón, Elias Pina and San Juan. Risk is also present in the National District, the provinces of Santo Domingo (excluding the city of Santo Domingo) and La Altagracia, particularly in Bávaro district. Persons travelling to these areas including vacationing in beach resorts (Bávaro, Punta Cana) must follow an antimalarial regimen.

Take meticulous anti-mosquito bite measures in all other areas, including Santo Domingo, Santiago, Puerto Plata, and the resort areas of Romana and Samaná.

15 Ecuador: Risk is present in all regions (cities and rural areas below 1500 m / 4,921 ft), especially in the northwestern provinces of Esmeraldas and Carchi, and the Amazon provinces of Morona-Santiago, Pastanza, Orellana, Napo and Sucumbios. Take antimalarial suppressive medication in these provinces, including

on river cruises in the Amazon. For all other areas, take meticulous anti-mosquito bite measures.

Note: The cities of Quito, Guayaquil, and Cuenca, the Galapagos Islands, and high altitude areas in the Andean valleys are risk free.

16 El Salvador: Risk is present in rural areas in the departments of Santa Ana and Ahuachapan bordering Guatemala. Sporadic cases are also reported from the departments of Sonsonate and La Unión. Persons travelling extensively in these rural areas should take meticulous anti-mosquito bite measures.

Note: The city of San Salvador is risk free.

17 Eritrea: Asmara (2325 m / 7,627 ft) is risk free.

18 Eswatini | Swaziland: Risk exists in the northern and eastern grassland and plain areas of Hhohho and Lubombo districts, including Big Bend, Mhlume, and Sitekti. Manzini and Shiselweni districts are also affected. Highest risk months are from November to May.

Note: Mbabane is risk free.

19 Ethiopia: Addis Ababa is risk free.

20 French Guiana: The city of Cayenne, coastal areas, and Devil's Island (Île du Diable) are risk free.

21 Greece: Locally acquired cases of malaria (*P. vivax*) have been confirmed in Evros (municipalities of Alexandroupoli and Soufli) and Thessaloniki (municipality of Delta). Previous cases have also been reported from Achaia and Elis. Travellers visiting these areas should take anti-mosquito-bite measures.

22 Guatemala: Guatemala City, Antigua, and the high altitude areas of the central highlands are risk free.

Note: Persons vacationing on the Pacific or Caribbean coasts, contemplating trips to the archaeological sites of Sayache and Tikal, the jungle of Petén, or travelling throughout the interior, must follow antimalarial medication guidelines.

23 Guyana: Sporadic cases are reported from the coastal belt, including Georgetown and New Amsterdam. Risk is low in regions 2, 3, 4, 5, 6, and 10. Risk is highest in the interior including regions 1, 7, 8, and 9.

24 Haiti: Persons vacationing in beach resorts must take malaria suppressive medication.

25 Honduras: The urban centres of Tegucigalpa and San Pedro Sula are risk free.

Note: Risk is present in the departments of Colón and Gracias a Dios, Atlántida, El Paraíso, Olancho, and Yoro. Persons vacationing in the resorts of Ceiba, Tela, and the Bay Islands (Islas de la Bahía), travelling along the Atlantic or Pacific coasts or extensively in the interior, must take malaria suppressive medication.

26 India: The urban areas of New Delhi, Agra, Kolkata, Mumbai, Bangalore and Pune, as well as the high altitude areas (above 2000 m / 6,561 ft) of the following states: Himachal Pradesh, Jammu, Kashmir and Sikkim, are risk free.

Note: There is high risk of malaria in the states of Orissa and Assam, including the northeastern districts of Andhra Pradesh state and the southeastern districts of Madhya Pradesh state. Take malaria suppressive

medication for these areas. For the rest of the country, take meticulous anti-mosquito bite measures.

27 Indonesia: Jakarta, Surabaya, Denpasar (Bali) and other large cities are risk free, including the beach resorts in southern Bali. Sporadic cases of malaria in travellers have been reported from rural areas of Java and Bali (Padangbai area), Bintan and Lombok islands.

Note: Persons travelling extensively in rural areas, on cruises between the islands, or making excursions to night festivals must take malaria suppressive medication. Irian-Jaya reports a high incidence of malaria in all regions. *P. knowlesi* has been reported from the province of Kalimantan (Borneo).

28 Iran: Risk is present in rural areas of the following southeastern provinces: Hormozgan, the tropical part of Kerman, and the southern part of Sistan and Baluchestan.

29 Kenya: Risk is present in all rural and urban areas. If you are contemplating safaris or vacationing in Mombasa and beach resorts along the coast, you must take suppressive medication.

Note: Risk is low in Nairobi. There is no risk in the high altitude areas above 2500 m / 8,202 ft of the provinces of Central, Eastern, Western, Nyanza, and Rift Valley.

30 Korea – North: Risk of malaria is present in the southern half of the country. Only limited official information is available.

31 Korea – South: Risk is present in rural areas along the border with North Korea, particularly in Incheon, and Gyeonggi-do and Gangwon-do provinces.

Note: Travellers to these rural areas and on excursions to the DMZ (demilitarized zone) should take meticulous anti-mosquito bite measures from dusk to dawn.

32 Laos: The city of Vientiane (Vientiane) is risk free. See page 4 (R5) for multi-drug resistant areas in this country.

33 Madagascar: Limited risk is present in the city of Antananarivo. Take meticulous anti-mosquito bite measures in this area.

34 Malaysia: Risk is present in the mountainous interiors of the states of Kedah, Perak, Kelantan Pahang, Selangor and Negeri Sembilan.

Sabah: Risk is present throughout the year in rural areas. The incidence of *P. falciparum* is 80%.

Sarawak: Urban and coastal areas are risk free. The incidence of *P. knowlesi* is 28%.

Note: Urban and coastal areas of peninsular Malaysia, including the island of Penang are risk free.

35 Mauritania: The northern areas of Dakhlet-Nouadhibou and Tiris Zemmour north of 20°N are risk free.

Note: In Adrar and Inchiri regions, risk is present from July to October. In the southern part of the country, risk is present throughout the year, including in the city of Nouakchott.

36 Mexico: Risk is present in Chiapas and the southern part of Chihuahua. Travellers going to these areas should take malaria suppressive medication.

Low risk is present in Campeche, Durango, Jalisco, Nayarit, Quintana Roo, San Luis Potosi, Sinaloa, Sonora, and Tabasco. Travellers visiting these areas should take anti-mosquito bite measures.

37 Myanmar | Burma: The urban centres of Yangon (formerly Rangoon) and Mandalay are risk free. See page 4 (R5) for multi-drug resistant areas in this country.

38 Namibia: High risk is present throughout the year in the northern part of the country bordering Angola, Zambia and Botswana in the following regions: Kunene (including Etosha National park), Kavango West, Kavango East, and areas along the Zambezi river (Camprivi Strip). Risk is present during the rainy season (November to June) in the regions of Ohangwena, Omusati, Oshana, and Oshikoto. Follow S2 suppressive medication guidelines in these areas.

Sporadic cases are reported in Omaheke and Otjozondjupa during the rainy season. Take meticulous anti-mosquito bite measures from dusk to dawn when travelling during the risk season in these areas.

Note: Travellers visiting Etosha National Park, Khaudum Game Reserve, and the Skeleton Coast must follow a suppressive medication regimen during the risk season.

39 Nepal: Kathmandu, Pokhara, and the northern Himalayan districts are risk free. There are no malaria cases reported from Chitwan National Park.

Note: Risk is present in areas below 2,000 m / 6,562 ft in rural areas of the Terai districts bordering India. Seasonal transmission typically occurs from March to October. Travellers going to these areas should take malaria suppressive medication.

40 Nicaragua: The city of Managua is risk free. Risk is present in the following departments: Región Autónoma Atlántico Norte, Región Autónoma Atlántico Sur, Jinotega, León and Chinandega. Follow S1 suppressive medication guidelines when travelling in these areas. Sporadic cases are reported from the departments of Masaya, Esteli, Boaco, Managua, Nueva Segovia and Rio San Juan. Take meticulous anti-mosquito bite measures from dusk to dawn in these areas.

41 Panama: The Panama Canal Zone, the cities of Panamá, Santiago, and Colón, and the central highlands above 800 m / 2,624 ft are risk free.

Note: Risk is present in all provinces east of the Canal, including the indigenous regions of Guna Yala (also the San Blas Islands) and Embéera. Follow S2 suppressive medication guidelines when travelling east of the Canal Zone.

Risk is also present in Ngöbe-Buglé Comarca, west of the Panama Canal Zone. Follow S1 suppressive medication guidelines in these areas.

Take meticulous anti-mosquito bite measures in the provinces of Bocas delToro, Chiriquí, Colón, Darién, Panamá Oeste, and Veraguas.

42 Peru: Risk is present in all regions (cities and rural areas) of the Andean valleys below 2000 m / 6,562 ft and the Amazon region, including the tourist areas of Manú National Park, Tambopata National Reserve (Madre de Dios), and Pacaya Samiria (Loreto).

Note: Lima, Cuzco, Puno, Machu Picchu, Lake Titicaca, and the departments of Lima, Ica, Arequipa, Moquegua, Tacna are risk free.

43 Philippines: Risk is generally low in rural areas. Low risk is also present on the islands of Mindanao (specifically Davao del Norte and Sultan Kudarat), Palawan, and the Sulu Archipelago.

44 Saudi Arabia: The cities of Jeddah, Medina, Mecca, Taif, and Riyadh are risk free.

Note: Limited risk is present in the western emirates of 'Asir, and Jizān bordering Yemen.

45 South Africa: Risk is present in the following provinces: northern Limpopo, eastern Mpumalanga, and eastern KwaZulu-Natal.

Note: Travellers visiting Kruger National Park should take malaria suppressive medication.

46 Sudan: Risk is low in Khartoum. Take meticulous anti-mosquito bite measures in this area.

47 Suriname: The city of Paramaribo and the seven coastal districts are risk free. See page 4 (R5) for multi-drug resistant areas.

48 Tajikistan: Risk is present in the southern province of Khatlon bordering Uzbekistan and Afghanistan, the central division of Dushanbe, the southwestern autonomous province of Gorno-Badakhshan bordering Afghanistan, and the northern province of Sughd.

49 Thailand: There is no risk in the cities of Bangkok, Chiang Mai, Pattaya, and other urban areas. Persons flying into cities and making only daytime excursions to rural areas do not need to take malaria suppressive medication.

Persons travelling by car, boat, or train through rural areas of the interior, especially forested and hilly areas, and to mining and refugee camps, as well as to the border areas with Myanmar | Burma, Cambodia, and Laos, should be aware of the presence of multi-drug resistant malaria. Follow S4 malaria suppressive medication guidelines. See page 4 (R5) for multi-drug resistant areas.

50 Timor-Leste: Risk is present in Oecusse district. Follow S2 suppressive medication guidelines in this area. For all other areas, take meticulous anti-mosquito bite measures.

Note: The cities of Balibo, Dili, Lospalos, and Pante Makasar are risk free.

51 Vanuatu: High risk is present on all islands including Efate where locally transmitted cases have been reported in the capital Port Vila.

52 Venezuela: High risk is present in the states of Amazonas, Apure, Barinas, Bolívar, Delta Amacuro, Guárico, Monagas, Sucre, Táchira, and Zulia. Risk is also present on Margarita Island.

Note: The cities of Caracas, Maracaibo, La Asunción, and Valencia are risk free. Travellers visiting Angel Falls must follow malaria suppressive medication guidelines.

53 Vietnam: There is no risk in Hanoi, Ho Chi Minh City, Da Nang, Nha Trang, Qui Nhon, the Red River Delta, and the coastal area along National Route 1A.

Note: Malaria risk is present in all rural areas. The highest incidence rates have been reported from the central highland provinces particularly in Binh Phuoc, Dak Lak, Dak Nong, Gia Lai and Kon Tum, and the western parts of the following provinces: Khanh Hoa, Ninh Thuan, Quang Nam and Quang Tri. See page 4 (R5) for multi-drug resistant areas.

54 Yemen: The city of Sana'a (2377 m / 7,798 ft) is risk free.

55 Zambia: Persons visiting Victoria Falls must take malaria suppressive medication.

56 Zimbabwe: Cases have been reported from Harare (1472m / 4829 ft) and Bulawayo (1343 m / 4406 ft) during the peak malaria season from November to June. In the Zambezi valley, risk is present throughout the year. Persons visiting Victoria Falls must take suppressive medication.

Sources: CATMAT, CDC, DTG, WHO, 2019 World Malaria Report, Malaria Atlas Project.

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