Malarial Prophylaxis

Malaria is easier to prevent than to cure.

One of the greatest risks to travelers in many parts of the developing world is malaria. Prophylactic drugs must be taken when going to an area in which malaria transmission occurs. It must be emphasized that despite taking the recommended prophylaxis, malaria may be contracted. Those who develop symptoms of malaria must seek prompt attention. Symptoms usually appear from 12-30 days after the bite of the mosquito, depending on the type of parasite transmitted. Some strains lie dormant in the liver and may not cause symptoms for months or even years. Go to an Emergency Room for any unexplained flu-like illness within several months (or even 2 or more years) after returning from a malaria area. Inform them of your travel to a malaria area. **LATE ONSET MALARIA CAN KILL YOU.**

Malaria causes a flu-like illness and these would include:

- Fever
- rigors headaches sweating tiredness
- myalgia (limbs and back)
- abdominal pain diarrhea
- loss of appetite
- orthostatic hypotension nausea
- slight jaundice
- cough, enlarged liver and spleen (sometimes not palpable) as well as vomiting

Fever in the first week of travel in a malaria-risk area is unlikely to be malaria; however, any traveler feeling ill should seek immediate medical care.

Non-medicinal recommendations for the prevention of malaria include remaining in well screened areas after sunset and using mosquito bed nets at night. These mosquitoes bite from dusk to dawn. Wear light colored clothing covering most of your body. No perfume or after-shave lotion. Use mosquito repellents containing DEET.

DEET containing products include:

- Jungle Juice: 100% DEET
- DEET Plus: 18-20% DEET, but acts as 100%
- Skedalle: lowest percentage of DEET, is good for children. Must reapply every 4-6 hours.
- Note: Avon Skin-So-Soft works for only 20 minutes.
- Picaridin has been the active ingredient for many years in mosquito repellents sold in Europe, Australia, Latin America and Asia, and is recommended by WHO for malaria prevention. Its effectiveness is comparable to DEET products containing a similar concentration of active ingredient. In the U.S. the first commercially available product contains 7% picaridin and is marked under the name Cutter Advanced. Tests show that picaridin and DEET offer long-lasting protection.

- Oil of lemon eucalyptus protects for shorter periods, similar to low concentrations of DEET. CDC cautioned that oil of lemon eucalyptus should NOT be used on children under the age of 3 years and that it has not been tested against the mosquitoes that spread malaria and some other tropical diseases.
- Citronella and Avon Skin-so-Soft, as well as DEET- impregnated wristbands offered only very short protection times.
- Of the non-DEET products, a 2% soybean oil product called Bite Blocker provided up to 90 minutes of mosquito protection.

Duranon is a permetherin based product good for impregnating clothing. Do not apply when clothing is on the body. It may be irritating to the skin.

Important Note: Any traveler who becomes ill with a fever or flu-like illness while traveling or within several months (or even 2 or more years) **after returning home**, should immediately seek professional medical care. You should tell your health-care provider that you have been traveling in an area where malaria transmission occurs and ask to be tested for malaria infection.

Malaria is a serious, sometimes fatal, disease and requires prompt treatment. (CDC Website FAQ)

General Instructions with Malaria Medications

Anti-malarial medications do not prevent infection with the malaria parasite, rather, they suppress the symptoms of the infection by killing the parasites either in the liver or as they leave the liver and enter the bloodstream. This should be considered a good thing when one realizes that headache, coma and death are three of the symptoms. There is no perfect antimalarial - i.e. one that is 100% effective, and always without side effects. The choice of antimalarial depends upon the destination and the patient, i.e. medical problems, medications and past experience with anti-malaria ls.

1. Start before travel as guided by your travel health advisor (with some tablets you should start three weeks before).
2. Take the tablets absolutely regularly, preferably with or after a meal.
3. It is extremely important to continue to take them for four weeks after you have returned, to cover the incubation period of the disease. (Atovaquone/proguanil (Malarone®) requires only 7 days post-travel)
4. If you get a fever between one week after first exposure and up to two years after your return, you should seek medical attention and tell the doctor that you have been in a malaria area.
5. The most common reason for malaria to develop in travelers is because the antimalarial medication is not taken correctly. For example, some doses may be missed or forgotten, or the tablets may be stopped too soon after returning from the journey.

Note: Medication is only a part of protection against malaria. It is not 100% effective and does not guarantee that you will not get malaria. Avoiding mosquito bites is just as important, even when you are taking antimalarial medication. Any change in medication due to intolerance will need a doctor's order.

Medicines for the Prevention of Malaria While Traveling

Doxycycline

What is doxycycline?

Doxycycline is an antibiotic that also can be used to prevent malaria. It is available in the United States by prescription only. It is sold under multiple brand names and it is also sold as a generic medicine. It is available in tablets, capsules, and an oral liquid formulation. Two equally effective types of doxycycline are available, doxycycline hyclate and doxycycline monohydrate.

Doxycycline can be prescribed by itself for the prevention of malaria or in combination with another medicine for treatment of malaria.

This fact sheet provides information about its use for the prevention of malaria infection associated with travel.

Who can take doxycycline?

Doxycycline can be prescribed to adults and children who are at least 8 years old.

Who should not take doxycycline?

It should not be used by pregnant women. It should not be given to children under the age of 8 years.

How should I take doxycycline?

Both adults and children should take one dose of doxycycline per day starting a day or two before traveling to the area where malaria transmission occurs. They should take one dose per day while there, and for 28 consecutive days after leaving.

The daily dosage for adults is 1OOmg per day.

Your doctor will have calculated the correct daily dose for your child based on the child's weight. The child's dose should not exceed the adult dose of 1OOmg per day.

Always take doxycycline on a full stomach with a full glass of liquid. Avoid milk and other dairy products within a couple of hours of taking your doxycycline dose. Avoid lying down for 1 hour after taking doxycycline to prevent irritation in your throat.

Where can I buy doxycycline?

Antimalarial drugs are available in the United States by prescription only. Medicines should be obtained at a pharmacy before travel rather than in the destination country. Buying medications abroad has its risks: the drugs could be of poor quality, contaminated, or counterfeit and not protect you against malaria.

Will doxycycline interact with my other medications?

Some other drugs can interact with doxycycline and cause you problems. Your doctor is responsible for evaluating the other medicines you are taking to ensure that there are no interactions between them and doxycycline. In some instances, medicines can be adjusted to minimize the interaction. You can also ask your pharmacist to check for drug interactions.

For example, people taking the common blood- thinning medicine called Coumadin (warfarin) may be at an increased risk for bleeding if they take doxycycline. If there are no alternatives, the Coumadin dose can be adjusted allowing you to take both medicines safely. Certain antacids (containing calcium or magnesium) should also be avoided while taking doxycycline.

Malaria is a serious disease that can cause death if not treated right away. It is caused by a parasite that can infect a certain type of mosquito which feeds on humans.

About 1,500 cases of malaria are diagnosed in the United States each year, almost all in travelers arriving from parts of the world where malaria occurs.

In what parts of the world can doxycycline be used for prevention of malaria in travelers?

Currently doxycycline can be taken in any part of the world where malaria occurs.

CDC keeps track of all the places in the world where malaria transmission occurs and which malaria drugs that are recommended for use in each place. This information can be found using the malaria map on the CDC website: http://www.cdc.gov/ malaria/map/index.html.

What are the potential side effects of doxycycline?

The most common side effects of doxycycline are sun sensitivity (a person can get a sun burn more easily than normal). To prevent sun burn, avoid midday sun, and wear a high SPF sunblock.

Doxycycline may also cause nausea and stomach pain. These side effects can often be lessened by taking doxycycline with food. Doxycycline monohydrate, the more expensive type of the drug, is less likely to upset the stomach than doxycycline hyclate. Your pharmacist may be able to dispense one type or the other if you prefer.

Women who use doxycycline may develop a vaginal yeast infection. You can either take an over the counter or prescription medication if vaginal itching or discharge develops.

All medicines may have some side effects. Minor side effects such as nausea, occasional vomiting, or diarrhea usually do not require stopping the antimalarial drug. If you cannot tolerate your antimalarial drug, see your health care provider; other antimalarial drugs are available.

Other considerations

Good for last-minute travelers because the drug is started 1-2 days before traveling to an area where malaria transmission occurs

Some people are already taking doxycycline regularly to prevent acne. In those instances, they do not have to take an additional medicine

Doxycycline tends to be the least expensive of all the antimalarial medicines, so it might be preferred especially for trips of long duration.

Doxycycline can also prevent some additional infections and so it may be preferred by people planning to do lots of hiking, camping, and wading and swimming in fresh water.

How long is it safe to use doxycycline?

CDC has no limits on the use of doxycycline for the prevention of malaria. There is no evidence of harm when the drug has been used for extended periods of time.

Mefloquine

What is mefloquine?

Mefloquine (also known as mefloquine hydrochloride) is an antimalarial medicine. It is available in the United

States by prescription only. It is available as a generic medicine and used to be sold under the brand name Lariam. It is available in tablets of 228mg base (250mg salt).

The 228mg base tablet is the same as the 250mg salt tablet. It is just two different ways of describing the same thing.

Mefloquine can be prescribed for either treatment or prevention of malaria.

This fact sheet provides information about its use for the prevention of malaria infection associated with travel.

Who can take mefloquine?

Mefloquine can be prescribed to adults and children of all ages. It can also be safely taken by pregnant women during all trimesters of pregnancy and nursing mothers.

Who should not take mefloquine?

People with psychiatric conditions including active depression, a recent history of depression, generalized anxiety disorder, psychosis, schizophrenia, and other major psychiatric disorders should not take mefloquine.

In addition, people with seizure disorders (epilepsy) and certain heart conditions (irregular heartbeat and conduction problems) should not take mefloquine.

How should I take mefloquine?

Both adults and children should take one dose of mefloquine per week starting at least 2 weeks before traveling to the area where malaria transmission occurs. They should take one dose per week while there, and for 4 consecutive weeks after leaving.

The weekly dosage for adults is 228mg base (250mg salt).

Your doctor will have calculated the correct weekly dose for your child based on the child's weight. The child's dose should not exceed the adult dose of 228mg base (250mg salt) per week. Mefloquine has a bitter taste. Children's doses may be added to something sweet such as a spoonful of honey or chocolate syrup to mask the flavor .

Where can I buy mefloquine?

Antimalarial drugs are available in the United States by prescription only. Medicines should be obtained at a pharmacy before travel rather than in the destination country. Buying medications abroad has its risks: the drugs could be of poor quality, contaminated, or counterfeit and not protect you against malaria.

Will mefloquine interact with my other medications?

Some other drugs can interact with mefloquine and cause you problems. Your doctor is responsible for evaluating the other medicines you are taking to ensure that there are no interactions between them and mefloquine. In some instances, medicines can be adjusted to minimize the interaction. You can also ask your pharmacist to check for drug interactions.

Malaria is a serious disease that can cause death if not treated right away. It is caused by a parasite that can infect a certain type of mosquito which feeds on humans.

About 1,500 cases of malaria are diagnosed in the United States each year almost all in travelers to parts of the world where malaria occurs.

In what parts of the world can mefloquine be used for prevention of malaria in travelers?

Mefloquine can be used in most parts of the world where malaria occurs. It is no longer effective for prevention in Southeast Asia and so should not be taken by travelers going to that part of the world . You should talk with your health care provider about your travel itinerary so he or she can identify if anti-malaria drugs are recommended where you are traveling and what kind.

CDC keeps track of all the places in the world where malaria transmission occurs and the malaria drugs that are recommended for use in each place. This information can be found using the malaria map on the CDC website: http://www.cdc.gov/malaria/map/index.html .

What are the potential side effects of mefloquine?

Most people do not experience significant side effects when taking mefloquine. However, for those persons that do experience the side effects, they can be unpleasant and unsettling.

Mefloquine can cause dizziness, difficulty sleeping, anxiety, vivid dreams, and visual disturbances. In rare instances mefloquine can cause seizures, depression, and psychosis. When they occur, these side effects start within the first few doses of the medicine. People who are concerned about the possibility of experiencing these side effects during their trip may choose to start the medicine three or more weeks before travelling. That way, if they do experience these side effects, they can stop the medicine and switch to a different option before leaving home.

Mefloquine may also cause stomach pain, nausea, and vomiting. These side effects can often be lessened by taking mefloquine with food.

Mefloquine is eliminated slowly from the body and so the side effects may continue for weeks after you have stopped taking the drug.

All medicines may have some side effects. Minor side effects such as nausea, occasional vomiting, or diarrhea usually do not require stopping the antimalarial drug. If you cannot tolerate your antimalarial drug, see your health care provider; other antimalarial drugs are available.

Other considerations

- Good choice for longer trips because you only have to take the medicine once per week.
- Usually, people who have not experienced side effects from mefloquine previously, do not experience side effects when they use it again.

How long is it safe to use mefloquine?

CDC has no recommended time limits on the duration of use of mefloquine for the prevention of malaria.

Atovaquone-Proguanil (Malarone TM)

What is atovaquone-proguanil?

Atovaquone-proguanil is a combination of two drugs, atovaquone and proguanil, in a single tablet. It is available in the United States by prescription only. It is sold under the brand name Malarone and it is also sold as a generic medicine in two sizes:

Adult tablet: 250mg atovaquone plus 1OOmg proguanil

Pediatric tablet: 62.5mg atovaquone plus 25mg proguanil

Atovaquone-proguanil can be prescribed for either prevention or treatment of malaria.

This fact sheet provides information about its use for the prevention of malaria infection associated with travel.

Who can take atovaquone- proguanil?

Atovaquone-proguanil can be prescribed to adults and children who weigh at least 11 pounds (5 kg).

Who should not take atovaquone-proguanii?

Pregnant women, women who are nursing infants less than 5kg, or infants who weigh less than 5kg should not take atovaquone-proguanil. Also, people with severe kidney disease should not take atovaquone-proguanil.

How should I take atovaquone- proguanil?

Both adults and children should take one dose of atovaquone-proguanil per day starting a day or two before traveling to the area where malaria transmission occurs. They should take one dose per day while there, and for 7 consecutive days after leaving. In rare instances (such as if you switched to atovaquone-proguanil from another malaria medicine) your doctor may instruct you to take it for a longer period of time.

The daily dosage for adults is a single adult tablet.

The daily dosage for children depends on their weight. The list below shows the daily dose for children based on their weight:

5-8 kg children should take a 1/2 pediatric tablet daily,

> 8-10 kg: 3/4 pediatric tablet daily

> 10-20 kg: 1 pediatric tablet daily

> 20-30 kg: 2 pediatric tablets daily

> 30-40 kg: 3 pediatric tablets daily

> 40 kg: 1 adult tablet daily

Atovaquone-proguanil should be taken with food or a milky drink.

Where can I buy atovaquone- proguanil?

Antimalarial drugs are available in the United States by prescription only. Medicines should be obtained at a pharmacy before travel rather than in the destination country. Buying medications abroad has its risks: the drugs could be of poor quality, contaminated, or counterfeit and not protect you against malaria.

Currently atovaquone-proguanil can be taken in any part of the world where malaria occurs.

CDC keeps track of all the places in the world where malaria transmission occurs and the malaria drugs that are recommended for use in each place. This information can be found using the malaria map on the CDC website: http://www.cdc.gov/malari a/map/index.html. Center for Global Health Division of Parasitic Diseases and Malaria.

Malaria is a serious disease that can cause death if not treated right away. It is caused by a parasite that can infect a certain type of mosquito which feeds on humans.

About 1,500 cases of malaria are diagnosed in the United States each year almost all in travelers to parts of the world where malaria occurs.

Will atovaquone-proguanil interact with my other medications?

Some other drugs can interact with atovaquone-proguanil and cause you problems. Your doctor is responsible for evaluating the other medicines you are taking to ensure that there are no interactions between them and atovaquone-proguanil. In some instances, medicines can be adjusted to minimize the interaction. You can also ask your pharmacist to check for drug interactions.

For example, people taking the common blood-thinning medicine called Coumadin may be at an increased risk for bleeding if they take atovaquone-proguanil. The Coumadin dose can be adjusted allowing you to take both medicines safely.

What are the potential side effects of atovaquone-proguanil?

Atovaquone-proguanil is well tolerated, and side effects are rare. The most common adverse reactions reported are stomach pain, nausea, vomiting, and headache. These side effects can often be lessened by taking atovaquone-proguanil with food.

All medicines may have some side effects. Minor side effects such as nausea, occasional vomiting, or diarrhea usually do not require stopping the antimalarial drug. If you cannot tolerate your antimalarial drug, see your health care provider; other antimalarial drugs are available.

Other considerations

- Good for last-minute travelers because the drug is started 1-2 days before traveling to an area where malaria transmission occurs
- Good choice for shorter trips because you only have to take the medicine for 7 days after traveling rather than 4 weeks
- Tends to be more expensive than some of the other options (especially for trips of long duration)

How long is it safe to use atovaquone-proguanil?

CDC has no limits on the use of atovaquone-proguani l for the prevention of malaria. There is no evidence of harm when the drug has been used for extended periods of time.

Chloroquine (Aralen TM)

What is chloroquine?

Chloroquine (also known as chloroquine phosphate) is an antimalarial medicine. It is available in the United States by prescription only. It is sold under the brand name Aralen, and it is also sold as a generic medicine. It is available in tablets of two sizes: 150mg base (250mg salt) and 300mg base (500mg salt).

You should know that the 150mg base tablet is the same as the 250mg salt tablet and the 300mg base tablet is the same as the 500mg salt tablet. It is just two different ways of describing the same thing.

Chloroquine can be prescribed for either prevention or treatment of malaria. This fact sheet provides information about its use for the prevention of malaria infection associated with travel.

Who can take chloroquine?

Chloroquine can be prescribed to adults and children of all ages. It can also be safely taken by pregnant women and nursing mothers.

Who should not take chloroquine?

People with psoriasis should not take chloroquine .

How should I take chloroquine?

Both adults and children should take one dose of chloroquine per week starting at least 1 week before traveling to the area where malaria transmission occurs. They should take one dose per week while there, and for 4 consecutive weeks after leaving.

The weekly dosage for adults is 300mg base (500mg salt).

Your doctor will have calculated the correct weekly dose for your child based on the child's weight. The child's dose should not exceed the adult dose of 300mg base (500mg salt) per week.

Where can I buy chloroquine?

Antimalarial drugs are available in the United States by prescription only. Medicines should be obtained at a pharmacy before travel rather than in the destination country. Buying medications abroad has its risks: the drugs could be of poor quality, contaminated, or counterfeit and not protect you against malaria.

In what parts of the world can chloroquine be used for prevention of malaria in travelers?

There are only a few places left in the world where chloroquine is still effective including parts of Central America and the Caribbean.

CDC keeps track of all the places in the world where malaria transmission occurs and which malaria drugs that are recommended for use in each place. This information can be found using the malaria map on the CDC website: http://www.cdc.gov/ malaria/map/index.html. Center for Global Health Division of Parasitic Diseases and Malaria

Malaria is a serious disease that can cause death if not treated right away. It is caused by a parasite that can infect a certain type of mosquito which feeds on humans.

About 1,500 cases of malaria are diagnosed in the United States each year almost all in travelers to parts of the world where malaria occurs.

Will chloroquine interact with my other medications?

Some other drugs can interact with chloroquine and cause you problems. Your doctor is responsible for evaluating the other medicines you are taking to ensure that there are no interactions between them and chloroquine. In some instances, medicines can be adjusted to minimize the interaction. You can also ask your pharmacist to check for drug interactions.

What are the potential side effects of chloroquine?

Chloroquine is a relatively well-tolerated medicine. The most common adverse reactions reported are stomach pain, nausea, vomiting, and headache. These side effects can often be lessened by taking chloroquine with food. Chloroquine may also cause itching in some people.

All medicines may have some side effects. Minor side effects such as nausea, occasional vomiting, or diarrhea usually do not require stopping the antimalarial drug. If you cannot tolerate your antimalarial drug, see your health care provider; other antimalarial drugs are available.

Other considerations

- Good choice for longer trips because you only have to take the medicine once per week.
- Overdose of antimalarial drugs, particularly chloroquine, can be fatal. Medication should be stored in childproof containers out of the reach of infants and children.

How long is it safe to use chloroquine?

CDC has no limits on the use of chloroquine for the prevention of malaria. When chloroquine is used at higher doses for many years, a rare eye condition called retinopathy has occurred.

People who take chloroquine for more than five years should get regular eye exams.

For more information:

Check out the CDC malaria website at www.cdc.gov/malaria

Health-care providers needing assistance with diagnosis or management of suspected cases of malaria should call the CDC Malaria Hotline: 770-488-7788 or 855-856-4713 toll-free (M-F, 9am-5pm, Eastern time). Emergency consultation after hours, call: 770-488-7100 and request to speak with a CDC Malaria Branch clinician.

Prevent Malaria

- Take an antimalarial drug.
- Prevent mosquito bites.
- If you get sick, immediately seek professional medical care.
- Some strains lie dormant in the liver and may not cause symptoms for months or even years. Go to an Emergency Room for any unexplained flu-like illness within several months (or even 2 or more years) after returning from a malaria area. Inform them of your travel to a malaria area. **LATE ONSET MALARIA CAN KILL YOU.**