**Virtual Clinic**

**This document is designed to guide clinicians in the selection of appropriate chemoprophylaxis and provide vaccine recommendations for children prior to international travel. Please visit the** [**CDC Travelers’ Health**](https://wwwnc.cdc.gov/travel/) **website for up-to-date information, including alerts about current outbreaks.**

**Malaria Chemoprophylaxis:**

The goal of malaria chemoprophylaxis is to prevent malaria caused by all Plasmodium species among short-term and long-term international travelers. Malaria prevention requires combination of chemoprophylaxis with mosquito avoidance measures. This section will focus on optimal choice of chemoprophylactic agent for prevention of malaria among travelers. Several factors need to be considered when choosing optimal agent for a traveler, which include a) travel related factors including travel destination, specific regions (example, rural versus urban) traveled, time to travel, and b) patient related factors, including receipt of concurrent medications, cost of medications, and potential adverse events.

**The following table is adapted from the CDC to help the provider in choosing an optimal malaria chemoprophylaxis regimen.**

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| Table 1. Drugs available for Malaria Chemoprophylaxis | | |
| **Drug** | **Considerations for usage** | **Comments, precautions and contraindications** |
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| **Atovaquone-proguanil** | * Prophylaxis in all areas * Good for last-minute travelers because the drug is started 1–2 days before travel. * Some people prefer to take a daily medicine. * Good choice for shorter trips because the traveler takes the medicine for only 7 days after traveling rather than 4 weeks. * Well tolerated—side effects uncommon. * Pediatric tablets are available and may be more convenient. | * **Not recommended** for prophylaxis for children weighing <5 kg, pregnant women, and women breastfeeding infants weighing <5 kg. * **Contraindicated** in people with severe renal impairment (creatinine clearance <30 mL/min). * Tends to be **more expensive** than some of the other options (especially for long trips). |
| **Chloroquine** | * Prophylaxis only in areas with [chloroquine-sensitive malaria](https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/yellow-fever-malaria-information-by-country) * Some people would rather take medicine weekly. * Good choice for long trips because it is taken only weekly. * Some people are already taking hydroxychloroquine chronically for rheumatologic conditions; in those instances, they may not have to take an additional medicine. * Can be used in all trimesters of pregnancy. | * Not a good choice for last-minute travelers, because drug needs to be started 1–2 weeks before travel. * Cannot be used in areas with chloroquine or mefloquine resistance. * **May exacerbate psoriasis.** * For short trips, some people would rather not take medication for 4 weeks after travel. |
| **Doxycycline** | * Prophylaxis in all areas * Some people prefer to take a daily medicine. * Good for last-minute travelers because the drug is started 1–2 days before travel. * Tends to be the **least expensive** antimalarial. * People who are already taking doxycycline chronically to prevent acne do not have to take an additional medicine. * Doxycycline also can prevent some additional infections (such as rickettsial infections and leptospirosis), so it may be preferred by people planning to hike, camp, and swim in fresh water. | * **Contraindicated** in children <8 years of age and pregnant women. * For short trips, some people would rather not take medication for 4 weeks after travel. * People may want to avoid the increased risk of sun sensitivity. |
| **Mefloquine** | * Prophylaxis in areas with [mefloquine-sensitive malaria](https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/yellow-fever-malaria-information-by-country) * Good choice for long trips because it is taken only weekly * Can be used in all trimesters of pregnancy | * Not a good choice for last-minute travelers because drug needs to be started ≥2 weeks before travel. * Cannot be used in areas with mefloquine resistance. * **Contraindicated** in people allergic to mefloquine or related compounds (quinine, quinidine) and in people with active depression, a recent history of depression, generalized anxiety disorder, psychosis, schizophrenia, other major psychiatric disorders, or seizures. Use with caution in people with psychiatric disturbances or a previous history of depression. * **Not recommended** for people with cardiac conduction abnormalities |
| **Primaquine** | 1. Prophylaxis for short-duration travel to areas with [principally *P.vivax*](https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/yellow-fever-malaria-information-by-country) 2. It is the most effective medicine for preventing *P. vivax*, so it is a good choice for travel to places with >90% *P. vivax*. 3. Good choice for shorter trips because you only have to take the medicine for 7 days after traveling rather than 4 weeks. 4. Good for last-minute travelers because the drug is started 1–2 days before travel. 5. Some people prefer to take a daily medicine. | * **Contraindicated** in people with G6PD deficiency. * **Contraindicated** during pregnancy and lactation, unless the infant being breastfed has a documented normal G6PD level. * Cannot be used in patients who have not been tested for G6PD deficiency: there are costs and delays associated with getting a G6PD test; however, it only has to be done once. Once a normal G6PD level is verified and documented, the test does not have to be repeated the next time primaquine is considered. |

**The following table lists the drugs used for malaria chemoprophylaxis (adapted from the CDC)**

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| **DRUG** | **ADULT DOSE** | **PEDIATRIC DOSE** | **COMMENTS** |
| **Atovaquone-proguanil** | Adult tablets contain 250 mg atovaquone and 100 mg proguanil hydrochloride. 1 adult tablet orally, daily | Pediatric tablets contain 62.5 mg atovaquone and 25 mg proguanil hydrochloride.  5–8 kg: 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 | Begin 1–2 days before travel to malarious areas.  Take daily at the same time each day while in the malarious area and for 7 days after leaving such areas.  **Should be taken with food or a milky drink.** |
| **Chloroquine phosphate** | 300 mg base (500 mg salt) orally, once/week | 5 mg/kg base (8.3 mg/kg salt) orally, once/week, up to maximum adult dose of 300 mg base | Begin 1–2 weeks before travel to malarious areas.  Take weekly on the same day of the week while in the malarious area and for 4 weeks after leaving such areas. |
| **Doxycycline** | 100 mg orally, daily | ≥8 years of age: 2.2 mg/kg up to adult dose of 100 mg/day | Begin 1–2 days before travel to malarious areas.  Take daily at the same time each day while in the malarious area and for 4 weeks after leaving such areas. |
| **Hydroxychloroquine sulfate**  (chloroquine alternative only in areas with chloroquine-sensitive malaria) | 310 mg base (400 mg salt) orally, once/week | 5 mg/kg base (6.5 mg/kg salt) orally, once/week, up to a maximum adult dose of 310 mg base | Begin 1–2 weeks before travel to malarious areas.  Take weekly on the same day of the week while in the malarious area and for 4 weeks after leaving such areas |
| **Mefloquine** | 228 mg base (250 mg salt) orally, once/week | ≤9 kg: 4.6 mg/kg base (5 mg/kg salt) orally, once/week  >9–19 kg: 1/4 tablet once/week  >19–30 kg: 1/2 tablet once/week  >30–45 kg: 3/4 tablet once/week  >45 kg: 1 tablet once/week | Begin ≥2 weeks before travel to malarious areas.  Take weekly on the same day of the week while in the malarious area and for 4 weeks after leaving such areas. |
| **Primaquine** | 30 mg base (52.6 mg salt) orally, daily 30 mg base (52.6 mg salt) orally, daily for 14 days after departure from the malarious area | 0.5 mg/kg base (0.8 mg/kg salt) up to adult dose orally, daily 0.5 mg/kg base (0.8 mg/kg salt) up to adult dose orally, daily for 14 days after departure from the malarious area | Begin 1–2 days before travel to malarious areas.  Take daily at the same time each day while in the malarious area and for 7 days after leaving such areas. |

**The following lists the drugs used for malaria chemoprophylaxis available through Apple Pharmacy**

At this time, limited stock of atovaquone-proguanil is available at the Apple Pharmacy.

**Recommended Travel Related Immunizations:**

1. Routinely recommended vaccines:
   * Providers should ensure that the child is up-to-date on routinely recommended immunizations.
   * Some routinely recommended vaccines need to be administered early or on an accelerated schedule to provide optimal protection prior to international travel.
2. Additional vaccines
   * Additional vaccines may be indicated depending on the [travel destination](https://wwwnc.cdc.gov/travel/destinations/list/) (select travel destination under- ‘for clinician’).

**The following table is adapted from the CDC to help the provider plan the needed immunizations before international travel.**

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| **Vaccine** | **Recommendations** | **Guidance** |
| **Routine vaccines** | Recommended for all travelers | [Immunization schedules](https://www.cdc.gov/vaccines/schedules/hcp/index.html) |
| **Hepatitis A (HAV)** | Recommended for most travelers (regardless of the destination) given the complexity of interpreting HAV risk maps and potential risk of foodborne HAV in countries with low endemicity.  For travel that will begin in ≤2 weeks to countries with high or intermediate hepatitis A endemicity, older adults, immunocompromised persons, and persons with chronic liver disease or other chronic medical conditions may receive IG simultaneously with HAV at a separate anatomic injection site. Travelers who elect not to receive hepatitis A vaccine, who are aged <12 months, or who are allergic to a component of hepatitis A vaccine should receive a single dose of IG before travel | **Vaccine**: 12 months through 40 years (Single dose of monovalent HAV protects most healthy people 1-40 years; monovalent vaccine series should be completed for long-term protection.)  [**IGIM dose**:](https://www.cdc.gov/mmwr/volumes/66/wr/mm6636a5.htm?s_cid=mm6636a5_e)  Up to 1 month of travel: 0.1 ml/kg  Up to 2 months of travel: 0.2 ml/kg  Travel ≥ 2 months: 0.02 ml/kg protects for up to 3 months, for trips of 3 months or longer, 0.06 ml/kg should be administered before departure and every 5 months if exposure to HAV continues |
| **Hepatitis B (HBV)** | Consider for most travelers; recommended for those who might be exposed to blood or other body fluids, have sexual contact with the local population, or be exposed through medical treatment (e.g., for an accident). | Ideally, [HBV vaccination](https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/hepatitis-b) should begin ≥6 months before travel so the full vaccine series can be completed before departure. Because some protection is provided by 1 or 2 doses, the vaccine series should be initiated, if indicated, even if it cannot be completed before departure. Optimal protection, however, is not conferred until after the final vaccine dose is received, and travelers should be advised to complete the vaccine series.  An approved accelerated vaccination schedule can be used for people traveling on short notice who face imminent exposure: vaccine doses administered at days 0, 7, and 21–30; a booster should be administered at 12 months to promote long-term immunity (Twinrix, GSK). |
| **Measles** | Children who travel or live abroad should be vaccinated at an earlier age than recommended for children remaining in the United States.  People who do not have [evidence of measles](https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/measles-rubeola) immunity should be considered at risk for measles, particularly during international travel | People 6 months of age or older who will be traveling internationally should be protected against measles.  Before travelling internationally,   * Infants aged 6–11 months should receive 1 MMR dose. Infants vaccinated before age 12 months must be revaccinated on or after the first birthday with 2 doses of MMR or MMRV separated by ≥28 days. MMRV is not licensed for children aged <12 months. * Children 12 months of age or older should have documentation of two doses of MMR vaccine (the first dose of MMR vaccine should be administered at age 12 months or older; the second dose no earlier than 28 days after the first dose) |
| **Poliovirus** | * Polio vaccination is recommended for all travelers to countries with wild polio virus or vaccine derived polio virus. * Since the situation is dynamic, refer to the CDC Travelers’ Health website destination pages for the most up-to-date polio vaccine recommendations [Travelers' Health | CDC](https://wwwnc.cdc.gov/travel) | In the United States, infants and children should be vaccinated against polio as part of a routine immunization series.  Polio vaccination is recommended for all travelers to countries with WPV or VDPV circulation [Travelers' Health | CDC](https://wwwnc.cdc.gov/travel) |
| **Cholera** | * CDC recommends this vaccine for adults who are traveling to areas of active cholera transmission. Cholera is assumed to be present in India [Travelers' Health | CDC](https://wwwnc.cdc.gov/travel) * No country or territory requires vaccination against cholera as a condition for entry. | The ACIP recommends an oral cholera vaccine (Vaxchora) for adult travelers (**age 18–64 years**) to an area of active cholera transmission.  Vaxchora:   * is administered in a single oral dose * should be taken at least 10 days before potential cholera exposure. * eating or drinking should be avoided for 60 minutes before and after oral ingestion of Vaxchora. * Should be prepared and administered in a health care setting equipped to dispose of medical waste |
| **Japanese Encephalitis** | *Recommended for the following groups:*   * Long-term travelers (i.e. trips lasting a month or more) to [endemic areas](https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/japanese-encephalitis) during Japanese encephalitis virus transmission season.   *Consider for the following groups:*   * Short-term (<1 month) travelers to endemic areas during Japanese encephalitis virus transmission season if their itinerary or activities will increase their risk (e.g. spending substantial time outdoors in rural or agricultural areas; staying in accommodations without air conditioning, screens, or bed nets.) * Travelers to an area with an ongoing outbreak of Japanese encephalitis. * Travelers to endemic areas who are uncertain of specific activities or duration of travel. | An [inactivated Vero cell culture-derived JE virus vaccine (IXIARO)](https://www.cdc.gov/japaneseencephalitis/vaccine/vaccineChildren.html) is approved and available in the US for use in adults and children 2 months and older.  The primary series for IXIARO is 2 doses administered 28 days apart:   * For adults and children aged ≥3 years, each dose is 0.5 mL. * For children aged 2 months through 2 years, each dose is 0.25 mL. To administer a 0.25-mL dose, health care providers must expel and discard half of the volume from the 0.5-mL prefilled syringe before injection. To enable this, the manufacturer has developed a prefilled syringe with a red line on the barrel to indicate the 0.25-mL point. |
| **Typhoid** | Recommended for travelers to areas where there is an increased risk of exposure to *Salmonella enterica* serotype *Typhi.* [Travelers' Health | CDC](https://wwwnc.cdc.gov/travel)  Both typhoid vaccines protect 50%–80% of recipients; travelers should be reminded that typhoid immunization is not 100% effective, and typhoid fever could still occur. Available typhoid vaccines offer no protection against paratyphoid fever. | Two typhoid vaccines are available in the United States:   * Vi capsular polysaccharide vaccine (ViCPS) (Typhim Vi) for IM use (≥ 2 years age) * Oral Ty21a live attenuated vaccine (Vivotif) (≥ 6 years age)   Copy and paste the link below for vaccine dosage, administration, and revaccination information.  https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/typhoid-paratyphoid-fever#5281 |
| **Meningococcus** | ACIP recommends that travelers who visit or reside in parts of sub-Saharan Africa known as the “meningitis belt” [(see Map 3-11)](https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/meningococcal-disease) during the dry season (December–June) receive vaccination with a quadrivalent (serogroup A, C, W, or Y) meningococcal vaccine before travel.  Advisories for travelers to other countries are issued when outbreaks of meningococcal disease are recognized [Travelers' Health | CDC](https://wwwnc.cdc.gov/travel) | Please refer to [Meningococcal Disease(https://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/meningococcal-disease#4670)](https://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/meningococcal-disease#4670) in *CDC Health Information for International Travelers* – “Yellow Book” for up-to-date vaccine information (routine and travel related) |
| **Yellow Fever** | Travelers should get yellow fever vaccine at least 10 days before travel.  Because US-licensed yellow fever vaccine is out of stock, a [limited number of clinics in the United States](https://wwwnc.cdc.gov/travel/page/search-for-stamaril-clinics) are now offering an equally safe and effective alternate vaccine, Stamaril. The nearest Stamaril clinic may be some distance away and appointments may be limited. | Yellow fever vaccine is recommended for people aged ≥9 months who are traveling to or living in areas with risk for YFV transmission in South America and Africa. In addition, some countries require proof of yellow fever vaccination for entry. See the [Yellow Fever & Malaria Information, by Country(https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/yellow-fever-malaria-information-by-country)](https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/yellow-fever-malaria-information-by-country)  For all eligible people, a single injection of reconstituted vaccine should be administered subcutaneously.  [**YF vaccine contraindications:**](https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/yellow-fever) allergy to vaccine component, age < 6 months, symptomatic HIV infection or CD4 T-lymphocytes <200/mm3 (or <15% of total in children aged <6 years, thymus disorder associated with abnormal immune-cell function, primary immunodeficiencies, malignant neoplasms, transplantation, immunosuppressive and immunomodulatory therapies. **YF vaccine precautions** include: age 6-8 months, age ≥ 60 years, asymptomatic HIV infection and CD4 T-lymphocytes 200–499/mm3 (or 15%–24% of total in children aged <6 years, pregnancy, and breastfeeding. |
| **Rabies** | Preexposure rabies vaccination may be recommended for certain international travelers based on the occurrence of animal rabies in the [country of destination](https://wwwnc.cdc.gov/travel/); the availability of antirabies biologics; the intended activities of the traveler, especially in remote areas; and the traveler’s duration of stay. | In the United States, preexposure vaccination consists of a series of 3 intramuscular injections given on days 0, 7, and 21 or 28 in the deltoid with human diploid cell rabies vaccine (HDCV) or purified chick embryo cell (PCEC) vaccine. Travelers should receive all 3 preexposure immunizations before travel. If 3 doses of rabies vaccine cannot be completed before travel, the traveler should not start the series, as few data exist to guide PEP after a partial immunization series.  Please consult [CDC](https://wwwnc.cdc.gov/travel/yellowbook/2018/infectious-diseases-related-to-travel/rabies) for up-to-date information regarding vaccine. |