Patients planning to travel to other countries often ask for information about prevention of diarrhea, malaria, and other travel-related conditions. Vaccines recommended for travelers based on their destination, length of stay, and planned activities were reviewed in a previous issue.1

TRAVELERS’ DIARRHEA

The most common cause of travelers’ diarrhea, usually a self-limited illness lasting several days, is infection with noninvasive strains of *Escherichia coli*. Infections with other types of bacteria such as *Campylobacter jejuni*, *Shigella* spp., viruses, and parasites are less common. In recent years, norovirus has become a more frequent cause of diarrhea in travelers; according to one study, norovirus infection was detected in 16% of US travelers returning from Mexico with diarrhea.2 Travelers to areas where hygiene is poor should avoid raw vegetables, fruit they have not peeled themselves, unpasteurized dairy products, cooked food not served steaming hot (dry foods such as bread are usually safe), and tap water, including ice.

TREATMENT — For mild diarrhea without fever or bloody stools, loperamide (*Imodium*, and others), an over-the-counter synthetic opioid (4-mg loading dose, then 2 mg orally after each loose stool to a maximum of 8 mg/d for adults), often relieves symptoms in ~24 hours, but some patients complain of constipation after taking it. Addition of loperamide to an appropriate antibiotic can shorten the duration of illness.3 Loperamide is not recommended for use in children <2 years old.

If diarrhea is moderate to severe, associated with high fever or bloody stools, or extremely disruptive of travel plans, self-treatment with a fluoroquinolone such as ciprofloxacin is usually recommended (see Table 1).4 Fluoroquinolones are not recommended for use in children or pregnant women. Azithromycin is an effective alternative and is the drug of choice for travelers to areas with a high prevalence of fluoroquinolone-resistant *C. jejuni*, such as South and Southeast Asia.5,6 It can also be used in patients who do not respond to a fluoroquinolone within 48 hours.

Rifaximin, a nonabsorbed oral antibiotic, appears to be similar in efficacy to ciprofloxacin for treatment of diarrhea due to noninvasive *E. coli*, with fewer adverse effects.7 It should not be used for invasive infections associated with fever or blood in the stool or for those caused by *C. jejuni*, *Salmonella* spp., or *Shigella* spp.

Packets of oral rehydration salts (*Ceralyte*, *ORS*, and others) mixed in potable water can prevent and treat dehydration. They are available from suppliers of travel-related products and some pharmacies in the US, and from pharmacies overseas.

PROPHYLAXIS — Travel medicine experts generally do not recommend antibiotic prophylaxis for travelers’ diarrhea because of concerns about adverse effects and development of resistance. Some travelers, however, such as persons with immunocompromising conditions, poorly-controlled diabetes, or chronic renal failure, or those with time-dependent activities who

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Table 1. Some Antimicrobial Drugs for Treatment of Travelers’ Diarrhea

<table>
<thead>
<tr>
<th>Drug</th>
<th>Adult Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azithromycin¹ –</td>
<td>500 mg once/d x 1-3d or</td>
</tr>
<tr>
<td>Zithromax* (Pfizer)</td>
<td>1000 mg once²</td>
</tr>
<tr>
<td>Ciprofloxacin³ –</td>
<td>500 mg once/d or bid⁴ or 750 mg</td>
</tr>
<tr>
<td>Cipro* (Bayer)</td>
<td>once/d x 1-3d</td>
</tr>
<tr>
<td>extended-release¹</td>
<td></td>
</tr>
<tr>
<td>Cipro XR*</td>
<td>500 or 1000 mg once/d x 1-3d</td>
</tr>
<tr>
<td>Levofloxacin¹,³ –</td>
<td>500 mg once/d x 1-3d</td>
</tr>
<tr>
<td>Levaquin* (Ortho-McNeil)</td>
<td></td>
</tr>
<tr>
<td>Rifaximin –</td>
<td>200 mg tid x 3d</td>
</tr>
<tr>
<td>Xifaxan (Salix)³</td>
<td></td>
</tr>
</tbody>
</table>

*Also available generically
1. Not FDA-approved for treatment of travelers’ diarrhea.
2. Use of a single 1000-mg dose of azithromycin has been associated with a high incidence of adverse effects, particularly nausea. Pediatric dosage is 10 mg/kg/d x 3 days.
3. Not recommended for use in children or pregnant women.
4. FDA-approved dosage for treatment of infectious diarrhea is 500 mg bid.
5. FDA-approved for treatment of travelers’ diarrhea caused by noninvasive strains of *E. coli* in travelers ≥12 years of age.
cannot risk the temporary incapacitation associated with diarrhea, might benefit from prophylaxis.

In such patients, ciprofloxacin 500 mg or levofloxacin 500 mg can be given once daily during travel (not exceeding 2-3 weeks) and for 2 days after return. Azithromycin 250 mg once daily is an alternative. It is preferred over a fluoroquinolone for travel to areas with a high rate of fluoroquinolone-resistant C. jejuni, such as South and Southeast Asia. Rifaximin (200 mg once or twice daily) appears to be effective in preventing travelers’ diarrhea. In a recent study, it reduced the incidence by 48%, compared to placebo, in travelers going to South and Southeast Asia for 6-28 days.8

**Bismuth subsalicylate (Pepto-Bismol, and others), 2 tablets (524 mg) 4 times a day taken for the duration of travel, can prevent diarrhea in travelers, but it is less effective than antibiotics and can cause the tongue and stools to turn black. It is not recommended for children <3 years old.**

### INSECT BITES

To minimize insect bites, travelers should wear light-colored, long-sleeved shirts, pants, and socks and covered shoes. They should sleep in air-conditioned or screened areas and use insecticide-impregnated bed nets. Mosquitoes that transmit malaria are most active between dusk and dawn; those that transmit dengue and chikungunya fever bite during the day, particularly during early morning and late afternoon.9

**DEET** — The most effective topical insect repellent is N, N-diethyl-m-toluamide (DEET). Applied on exposed skin, DEET repels mosquitoes, as well as ticks, chiggers, fleas, gnats, and some flies. DEET is available in formulations of 5-100%, but increasing the concentration above 50% has not been shown to improve efficacy. Travel medicine experts prefer concentrations of 20-35%.

According to the CDC, DEET is safe for use in children and infants >2 months old, but the American Academy of Pediatrics recommends use of formulations containing no more than 30% in children. One study found that applying DEET regularly during the second and third trimesters of pregnancy did not result in any adverse effects on the fetus.10

DEET has been shown to decrease the effectiveness of sunscreens when it is applied after the sunscreen; nevertheless, sunscreen should be applied first because it may increase the absorption of DEET when DEET is applied first.11

**PICARIDIN** — Picaridin, which appears to be better tolerated on the skin than DEET, is used against flies, mosquitoes, chiggers, and ticks. It is available in concentrations of 5-20%. The 20% formulation (Natrapel 8 Hour; GoReady, and others) has been shown to repel mosquitoes for up to 8 hours.12-14

**OTHERS** — IR3535 (Skin So Soft Bug Guard Plus Expedition, SkinSmart, and others) and oil of lemon eucalyptus (Repel, Off! Botanicals, and others) have also been shown to prevent mosquito bites.15

**PYRETHROIDS** — Permethrin (Duranon, Permanone, and others), a synthetic pyrethroid insecticide available in liquid and spray forms, can be used on clothing, mosquito nets, tents, and sleeping bags for protection against mosquitoes and ticks. After application to clothing, it remains active for several weeks through multiple launderings. The combination of DEET on exposed skin and permethrin on clothing provides increased protection. Use of pyrethroid-impregnated mosquito nets while sleeping is helpful. Long-lasting insecticide-treated nets are available that maintain effective levels of insecticide for at least 3 years.

### MALARIA

No drug is 100% effective for prevention of malaria; travelers should be told to use protective measures against mosquito bites in addition to medication.16 Travelers to malarious areas should be reminded to seek medical attention if they develop fever either during their trip or within the year after their return (especially during the first 2 months). Travelers to developing countries, where counterfeit and poor quality drugs are common, should obtain antimalarial agents before travel. Countries with a risk of malaria are listed in Table 2.

**CHLOROQUINE-SENSITIVE MALARIA** — Chloroquine is generally the drug of choice for prevention of malaria in the few areas that still have chloroquine-sensitive malaria (see Table 2, footnotes 5 and 7). Patients who cannot take chloroquine should take atovaquone/proguanil, doxycycline, mefloquine or, in some circumstances, primaquine in the same doses used for chloroquine-resistant malaria (see Table 3).

**CHLOROQUINE-RESISTANT MALARIA** — Three drugs with similar efficacy (atovaquone/proguanil, mefloquine, and doxycycline) are recommended for prevention of malaria in US travelers to areas with chloroquine resistance.
The fixed-dose combination of atovaquone and proguanil taken once daily is generally the best tolerated prophylactic, but it can cause headache, GI disturbances, nightmares, insomnia, and mouth ulcers, and it is expensive. Cases of Stevens-Johnson syndrome and hepatitis have been reported. There have been isolated case reports of treatment-related resistance to atovaquone/proguanil in Plasmodium falciparum, but acquisition of resistant disease in travelers appears to be rare. The protective efficacy of atovaquone/proguanil against Plasmodium vivax is variable; it has ranged from 84% in Indonesian New Guinea to 100% in Columbia.

Mefloquine has the advantage of once-weekly dosing, but it is contraindicated in patients with a history of any psychiatric disorder (including severe anxiety and depression), and also in those with a history of seizures or cardiac conduction abnormalities. Dizziness, headache, insomnia, and disturbing dreams are the most common CNS adverse effects. The drug appears to be better tolerated in children, with a lower incidence of CNS effects. If a patient develops psychological or behavioral abnormalities such as depression, restlessness, or confusion while taking mefloquine, another drug should be substituted. Halofantrine (not available in the US) or ketoconazole should not be taken with mefloquine, or within 15 weeks of the last dose of mefloquine, due to potentially fatal prolongation of the QT interval. Quinine, quinidine, or chloroquine should not be taken with mefloquine.

Doxycycline, which frequently causes GI disturbances and can cause photosensitivity and vaginitis, is an inexpensive once-daily alternative. Doxycycline should not be taken concurrently with antacids, oral iron, or bismuth salts (including Pepto-Bismol).

A fourth drug, primaquine phosphate, is the most effective drug for preventing P. vivax, and it is recommended for prophylaxis in areas where P. vivax is the predominant species. It is somewhat less effective than other drugs against P. falciparum, but it can be used when other prophylactic drugs are not tolerated or are contraindicated. In addition to primary prophylaxis, some experts also prescribe primaquine for “terminal prophylaxis” after departure from areas where P. vivax and Plasmodium ovale are endemic (see Table 3, footnote 3).

Primaquine can cause hemolytic anemia, especially in patients with glucose-6-phosphate dehydrogenase (G-6-PD) deficiency, which is most common in African, Asian, and Mediterranean peoples. Travelers should be screened for G-6-PD deficiency before taking this drug. Primaquine should be taken with food to reduce GI adverse effects.

**Mefloquine-resistant malaria** — Doxycycline or atovaquone/proguanil is recommended for prophylaxis against mefloquine-resistant malaria, which occurs in the malarious areas of Thailand, in the areas of Burma (Myanmar) and Cambodia that border on Thailand, in the border areas between Burma and China, and between Laos and Burma, and in southern Vietnam.
Table 3. Drugs of Choice for Prevention of Malaria

<table>
<thead>
<tr>
<th>Drug</th>
<th>Adult Dosage</th>
<th>Pediatric Dosage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Plasmodium species in chloroquine-sensitive areas</strong>&lt;sup&gt;1,3&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chloroquine phosphate&lt;sup&gt;4&lt;/sup&gt; (Aralen, and others)</td>
<td>500 mg (300 mg base) once/wk</td>
<td>5 mg/kg base (300 mg max) once/wk</td>
<td>Start: 1-2 wks before travel Stop: 4 wks after leaving malarious zone</td>
</tr>
<tr>
<td><strong>All Plasmodium species in chloroquine-resistant areas</strong>&lt;sup&gt;2,3&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atovaquone/proguanil&lt;sup&gt;6&lt;/sup&gt; (Malarone, Malarone Pediatric, and others)</td>
<td>1 adult tablet (250 mg/100 mg) once/d&lt;sup&gt;d&lt;/sup&gt;</td>
<td>5-8 kg: ½ ped tab/d&lt;sup&gt;d&lt;/sup&gt; 9-10 kg: ¾ ped tab/d&lt;sup&gt;d&lt;/sup&gt; 11-20 kg: 1 ped tab/d&lt;sup&gt;d&lt;/sup&gt; 21-30 kg: 2 ped tabs/d&lt;sup&gt;d&lt;/sup&gt; 31-40 kg: 3 ped tabs/d&lt;sup&gt;d&lt;/sup&gt; &gt;40 kg: 1 adult tab/d&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Start: 1-2d before travel Stop: 1 wk after leaving malarious zone</td>
</tr>
<tr>
<td>Doxycycline&lt;sup&gt;7&lt;/sup&gt; (Vibramycin, and others)</td>
<td>100 mg once/d</td>
<td>≥8 yrs: 2.2 mg/kg/d, up to 100 mg/d</td>
<td>Start: 1-2d before travel Stop: 4 wks after leaving malarious zone</td>
</tr>
<tr>
<td>Mefloquine&lt;sup&gt;8&lt;/sup&gt;</td>
<td>250 mg once/wk&lt;sup&gt;10&lt;/sup&gt;</td>
<td>≤9 kg: 5 mg/kg salt once/wk&lt;sup&gt;11&lt;/sup&gt; 10-19 kg: ½ tab once/wk&lt;sup&gt;11&lt;/sup&gt; 20-30 kg: ½ tab once/wk&lt;sup&gt;11&lt;/sup&gt; 31-45 kg: ¾ tab once/wk&lt;sup&gt;11&lt;/sup&gt; &gt;45 kg: 1 tab once/wk</td>
<td>Start: ≥2 wks before travel&lt;sup&gt;12&lt;/sup&gt; Stop: 4 wks after leaving malarious zone</td>
</tr>
<tr>
<td>Alternative: Primquine phosphate&lt;sup&gt;13,14&lt;/sup&gt;</td>
<td>30 mg base once/d</td>
<td>0.5 mg/kg base once/d</td>
<td>Start: 1-2d before travel Stop: 1 wk after leaving malarious zone</td>
</tr>
</tbody>
</table>

1. No drug guarantees protection against malaria. Travelers should be advised to seek medical attention if fever develops during travel or after they return. Insect repellents, insecticide-impregnated bed nets, and proper clothing are important adjuncts for malaria prophylaxis.
2. Chloroquine-resistant *P. falciparum* occurs in all malarious areas except Central America (resistance occurs in Panama east of the Canal Zone), Mexico, Haiti, the Dominican Republic, Paraguay, North and South Korea, most of rural China, and some countries in the Middle East (chloroquine resistance has been reported in Yemen, Saudi Arabia, and Iran). *P. vivax* with decreased susceptibility to chloroquine is a significant problem in Papua New Guinea and Indonesia. There are also reports of resistance from Burma (Myanmar), Vietnam, the Solomon Islands, Vanuatu, Turkey, Guyana, Brazil, Colombia, and Peru (JK Baird, Clin Microbiol Rev 2009; 22:508). Chloroquine-resistant *P. malariae* has been reported from Sumatra, Indonesia (JD Maguire et al, Lancet 2002; 360:58).
3. Primquine is given for prevention of relapse after infection with *P. vivax* or *P. ovale*. In addition to primary prophylaxis, some experts also prescribe primaquine phosphate 30 mg base/d (0.5 mg/kg base/d for children) for 14 days after departure from areas where these species are endemic (Presumptive Anti-Relapse Therapy [PART], "terminal prophylaxis"). Since this is not always effective as prophylaxis, others prefer to rely on surveillance to detect cases when they occur, particularly when exposure was limited or doubtful. See also footnote 12.
4. Alternatives for patients who are unable to take chloroquine include atovaquone/proguanil, mefloquine, doxycycline, or primaquine dosed as for chloroquine-resistant areas.
5. Chloroquine should be taken with food to decrease gastrointestinal adverse effects. If chloroquine phosphate is not available, hydroxychloroquine sulfate is as effective; 400 mg of hydroxychloroquine sulfate is equivalent to 500 mg of chloroquine phosphate.
6. Atovaquone/proguanil is available as a fixed-dose combination tablet: adult tablets (Malarone, and others; 250 mg atovaquone/100 mg proguanil) and pediatric tablets (Malarone Pediatric, and others; 62.5 mg atovaquone/25 mg proguanil). To enhance absorption and reduce nausea and vomiting, it should be taken with food or a milky drink. The drug should not be given to patients with severe renal impairment (creatinine clearance <30 mL/min).
8. Doxycycline should be taken with adequate water to avoid esophageal irritation. It can be taken with food to minimize gastrointestinal adverse effects. It should not be used in children <8 years old.
9. Mefloquine can be given to patients taking beta blockers if they do not have an underlying arrhythmia; it should not be used in patients with conduction abnormalities. Mefloquine should not be taken on an empty stomach; it should be taken with at least 8 oz. of water.
10. In the US, a 250-mg tablet of mefloquine contains 228 mg mefloquine base. Outside the US, each 275-mg tablet contains 250 mg base.
11. For pediatric doses <½ tablet, it is advisable to have a pharmacist crush the tablet, estimate doses by weighing, and package them in gelatin capsules. There is no data for use in children <5 kg, but based on dosages in other weight groups, a dose of 5 mg/kg can be used.
12. Most adverse events occur within 3 doses. Some Medical Letter reviewers favor starting mefloquine 3-4 weeks prior to travel and monitoring the patient for adverse events; this allows time to change to an alternative regimen if mefloquine is not tolerated.
13. Patients should be screened for G-6-PD deficiency before treatment with primaquine. It should be taken with food to minimize nausea and abdominal pain.
14. Not FDA-approved for this indication.

PREGNANCY — Malaria in pregnancy is particularly serious for both mother and fetus; prophylaxis is indicated if travel cannot be avoided. Chloroquine has been used extensively and safely for prophylaxis of chloroquine-sensitive malaria during pregnancy. Mefloquine is classified as category B (no evidence of risk in humans) for use during pregnancy; it has been reported to be safe for prophylactic use during any trimester of pregnancy. The safety of atovaquone/proguanil in pregnancy has not been established, and its use is generally not recommended. However, case series that included women in all trimesters of pregnancy who were treated with the combination have not identified major birth defects, and proguanil alone has been used in pregnancy without evidence of toxicity. Doxycycline and primaquine are contraindicated in pregnancy.

SOME OTHER INFECTIONS

**DENGUE AND CHIKUNGUNYA** — Dengue and chikungunya fever are viral diseases transmitted by mosquito bites that occur worldwide in tropical and subtropical areas, including cities. Dengue outbreaks have increased in recent years in South Asia, sub-Saharan Africa, and the Middle East. Before 2013, outbreaks of chikungunya had been identified in countries in Africa, Asia, Europe, the Indian and Pacific Oceans. Local transmission of chikungunya...
fever in the Americas was first reported in December 2013 on the island of Saint Martin in the Caribbean, and has since been reported in most countries in the Caribbean, in Central and South America, and in the US (Florida). Prevention of mosquito bites is the primary way to protect against dengue and chikungunya virus infection.

**LEPTOSPIROSIS** — Leptospirosis, a bacterial disease that occurs in many domestic and wild animals, is endemic worldwide, but the highest incidence is in tropical and subtropical areas, particularly after heavy rainfall or flooding. Transmission to humans usually occurs through contact with fresh water or damp soil contaminated by the urine of infected animals. Travelers at increased risk, such as adventure travelers and those who engage in recreational water activities, should consider prophylaxis with doxycycline 200 mg orally once a week, beginning 1-2 days before and continuing throughout the period of exposure.

**NON-INFECTIONOUS RISKS OF TRAVEL**

Many non-infectious risks are associated with travel. Injuries, such as traffic accidents and drowning, account for the majority of preventable travel-related deaths.

**ACUTE ALTITUDE ILLNESS** — Rapid exposure to altitudes >8,000 feet (2500 meters) may cause acute mountain sickness (AMS), which can progress to high-altitude cerebral or pulmonary edema. Symptoms include headache, malaise, nausea, anorexia, sleep disturbance, and dizziness. Sleeping altitude appears to be especially important in determining whether symptoms develop.

The most effective preventive measure is pre-acclimatization at intermediate altitude (6000-9000 feet) for several days and gradual ascent to higher elevations. If rapid ascent to an altitude >9100 feet (2800 meters) cannot be avoided, acetazolamide, a carbonic anhydrase inhibitor taken in a dosage of 125 mg twice daily (or 500 mg daily with the slow-release formulation Diamox Sequels) beginning the day before ascent and continuing at high altitude for 2 days or longer, decreases the incidence and severity of AMS. The recommended dose for children is 2.5 mg/kg (max 125 mg) every 12 hours. Although acetazolamide, a nonantibiotic sulfonamide, has little cross-reactivity with sulfonamide antibiotics, hypersensitivity reactions to acetazolamide are more likely to occur in those who have had severe (life-threatening) allergic reactions to sulfonamide antibiotics.

**VENOUS THROMBOEMBOLISM** — Prolonged immobilization, particularly during air travel, increases the risk of venous thromboembolism (lower extremity deep vein thrombosis [DVT] or pulmonary embolism) in travelers. Those with risk factors for thrombosis (past history of thrombosis, recent surgery, severe obesity, active malignancy, pregnancy, estrogen use, advanced age, limited mobility, thrombophilic disorders, increased platelets) are at even higher risk. Nevertheless, flight-related symptomatic pulmonary embolism is rare.

To minimize the risk, travelers taking long-distance flights (~6 hours) should be advised to walk around frequently, exercise calf muscles while sitting, and drink extra fluids. Properly fitted light compression stockings can decrease the risk of asymptomatic DVT. Giving a single dose of a low-molecular-weight heparin as prophylaxis to travelers at high risk reduced the incidence of asymptomatic DVT in a clinical trial.

**JET LAG** — Disturbance of body and environmental rhythms resulting from rapidly crossing multiple time zones gives rise to jet lag, which is characterized by insomnia, daytime sleepiness, decreased quality of sleep, diminished physical performance, loss of concentration, irritability, and GI disturbances. It is usually more severe after eastward travel.

Shifting daily activities to correspond to the time zone of the destination country before arrival along with taking short naps, remaining well hydrated, avoiding alcohol, and pursuing activities in sunlight on arrival may be helpful. A program of appropriately timed light exposure and avoidance in the new time zone may adjust the “body clock” and reduce jet lag. The dietary supplement melatonin (0.5-5 mg started 30-60 minutes before bedtime on the first night of travel and continued for 1-5 days after arrival) has been reported to facilitate the shift of the sleep-wake cycle and decrease symptoms in some patients. Taking the benzodiazepine receptor agonist zolpidem (Ambien, and others) or the melatonin receptor agonist ramelteon (Rozerem) on the first night after eastward travel and continuing for 3-4

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**Dexamethasone** (*Decadron, and others*) 2 mg every 6 hours or 4 mg every 12 hours has also been shown to prevent AMS in adults. It is not recommended for prophylaxis in children. Sustained-release *nifedipine* (*Procardia XL, and others*) may be helpful for prevention and treatment of pulmonary edema. The addition of *tadalafil* (*Cialis; Adcirca*) to acetazolamide has been shown to reduce the incidence of pulmonary edema.
nights has helped improve sleep.44,45 A randomized, double-blind study found that taking the stimulant armodafinil (Nuvigil) in the morning for 3 days after eastward travel through 6 time zones increased daytime wakefulness.46

MOTION SICKNESS — Therapeutic options for motion sickness are limited.47 A transdermal patch of the prescription anticholinergic drug scopolamine (Transderm Scop) placed behind the ear 6-8 hours before exposure and changed, alternating ears, every 3 days can prevent symptoms. Oral promethazine (Phenergan, and others) is a highly sedating alternative. Over-the-counter antihistamines such as dimenhydrinate (Dramamine, and others) or meclizine (Bonine, and others) are less effective, but may be helpful for milder symptoms.

SUNBURN — Use of sunscreens is generally recommended for adults and children older than 6 months during any sun exposure that might burn unprotected skin. UVB is mostly responsible for the erythema of sunburn. Both UVA and UVB can cause photoaging and skin cancer. For patients without pathologic photosensitivity, a sunscreen with a Sun Protection Factor (SPF) of 15–30 as customarily used should be about as effective as one with a higher SPF. For those who need added protection, a broad-spectrum (both UVA and UVB protection), high-SPF sunscreen is preferred. When using both sunscreen and insect repellent, the sunscreen should be applied first.11

34. EV Low et al. Identifying the lowest effective dose of atovaquone for the prophylaxis of acute mountain sickness: systematic review and meta-analysis. BMJ 2012; 345:e6779.
45. PC Zee et al. Effects of ramelteon on insomnia symptoms induced by rapid, eastward travel. Sleep Med 2010; 11:525.