Preparing the traveller

Alan M Spira

The four steps for giving travellers the foundation for healthy journeys are to assess their health, analyse their itineraries, select vaccines, and provide education about prevention and self-treatment of travel-related diseases. This process takes time. Since there is a risk of information overload, travellers should leave the clinic with some written advice for reinforcement. The order of these steps can be tailored to what best suits the travel clinic, but vaccinating early in the process allows monitoring for adverse reactions. Face-to-face discussion is vital for explaining the use and side-effects of medications. Those who provide a travel medicine service should be seeing many travellers and should seek specialist training. In 2003, the International Society of Travel Medicine introduced a certificate of knowledge examination in travel medicine. We cannot make travellers bullet-proof but it is possible to make them bullet-resistant. The pre-travel visit should minimise health risks specific to the journey, give travellers the capability to handle most minor medical problems, and allow them to identify when to seek local care during the trip or on return.

Tourists, business travellers, expatriates returning to visit friends and family, missionaries, students, and the military are all at risk of falling ill when they visit less developed and/or tropical parts of the world. Travel medicine is an emerging subspecialty that aims to keep disease and injury at bay by arming travellers with education, vaccinations, medical supplies, and resources to cope with problems on the way. Travellers may ask about immunisations, diarrhoea, and insect bites, for example, but what they expect from or ask of physicians may not always match what they need to stay healthy. Travel medicine encompasses these issues and many more, and may be provided by primary-care physicians or by doctors and nurses in specialised travel clinics who have had additional training.

Travellers face various health risks during their journeys (panel 1) and three of every four are taken ill or injured during their journeys.1 Travellers need to be aware of these risks and of the availability of advice before departure and of care if the traveller returns home ill or falls sick shortly afterwards. Preparing the traveller for a journey to the less-developed world is not easy and takes time; education is as vital to healthy travel as are immunisations. The skill lies in the practitioner’s ability to pass on information in a practical, understandable manner so that the traveller will make use of it.

More than 50 million people from developed nations visit the less-developed world every year. In 2000, there were about 699 million international travellers. After the terrorist attacks in the USA (2001) and in Bali (2002) numbers fell slightly, but they will grow again.2,3 After the massacre of tourists near Luxor in 1997, fewer people visited Egypt, but in 1999, tourism to Luxor rose by a remarkable 40%. With tourists near Luxor in 1997, fewer people visited Egypt, but numbers fell slightly, but they will grow again.2,3 After the massacre of tourists near Luxor in 1997, fewer people visited Egypt, but in 1999, tourism to Luxor rose by a remarkable 40%. With tourists near Luxor in 1997, fewer people visited Egypt, but numbers fell slightly, but they will grow again.

Preparing the traveller to stay healthy during their journeys and travel agents are notoriously inconsistent, or worse, in giving information about disease or the need for a medical referral.4,5 The risks can be broadly categorised as trauma, routine illness, or exotic illness. Injury, especially as a result of traffic accidents, is the most likely cause of morbidity and mortality in travellers.4,5 and trauma carries the additional risk of complications arising out of substandard local

Search strategy

I used PubMed and the Cochrane Library (a disappointing source for travel medicine references) and my personal collection of The Lancet, Transactions of the Royal Society of Tropical Medicine, Journal of Travel Medicine, American Journal of Tropical Medicine and Hygiene, Clinical Infectious Diseases, Journal of Infectious Diseases, New England Journal of Medicine, Undersea and Hyperbaric Medicine Journal, and Journal of Wilderness Medicine, which dates back to 1992. I also have the abstract reviews from the annual meetings of the American Society of Tropical Medicine and Hygiene and those from the biannual meetings of the International Society of Tropical Medicine for the past 10 years.
Panel 2: Approach to pre-travel visit

<table>
<thead>
<tr>
<th>Stage</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of traveller</td>
<td>State of current health, medical history, underlying conditions, medications, allergies, pregnancy</td>
</tr>
<tr>
<td>Review of itinerary</td>
<td>Dates of travel, stopovers, season and climate, type and style of travel, environments to be visited</td>
</tr>
<tr>
<td>Vaccine</td>
<td>Routine/required/recommended, adverse events, vaccine administration, observation</td>
</tr>
<tr>
<td>Counselling</td>
<td>Insect precautions; malaria chemoprophylaxis; food and water precautions; traveller's diarrhoea and self-treatment; current disease outbreaks in destination; environmental risks from waterborne, vector-borne disease, climate, and jet lag; trauma from motor vehicle accidents and animals; general health and routine illness; clothing and footwear; travel-specific medications, self-treatment, prophylaxis, and adverse events; routine medications; sexual activity; first aid kits; local medical care, when, why, and who; when to get assessment post-travel; insurance; crime and safety; other resources, text, internet, audiovisual</td>
</tr>
</tbody>
</table>

Optional based on risk and trip

Environmental risks from altitude, marine and scuba-diving associated diseases, heat/cold, motion sickness, adventure/expedition health risks; specific advice for pregnant women, children, elderly people, immunocompromised people; region-specific pathogens; parasites; zoonoses; drug use

Immunisations

Considerations in choosing vaccines include destination and climate; severity of potential disease; duration of travel; activities planned; whether the trip will be urban, rural, or remote from medical care; time remaining before departure; vaccine availability, cost, and the number of doses needed; history of allergy to vaccines or their components; medications currently being taken; pregnancy; chronic illness; and underlying medical conditions such as a compromised immune system. Patients should be informed about the risks of contracting disease as well as the risks of adverse events from immunisations. Vaccines are best given simultaneously; inactivated vaccines can be administered before, with, or after different inactivated or live vaccines. Multiple parenteral live-virus vaccines can impair the immune response and so should be given simultaneously or separated by at least 4 weeks. Interruption of vaccination schedule should not force restarting a vaccine series; it is generally acceptable to continue from the last dose.

Required

Yellow fever is found only in the tropical Americas and Africa (figure 1). The vaccine is the only vaccine mandated by WHO’s International Health Regulations. It should be administered at least 10 days before arrival and, though officially it lasts 10 years, immunity may be lifelong. The vaccine has a good safety record, and reports of severe reactions in a few elderly recipients should not prevent it being given to those at risk. Contraindications include age 9 months or younger, pregnancy, egg allergy, and immunosuppression. Yellow fever vaccination must be properly certified. Travellers with contraindications can have an exemption documented on the certificate, which should be kept with the passport since some countries demand certificates before admitting visitors.

Cholera vaccine is no longer a WHO requirement; the disease is rare in travellers and vaccination offers only slight protection. Some individual countries, however, can require proof of cholera vaccination, though this is sometimes got round by recording that the traveller is allergic to the vaccine or by declaring the vaccine as having been given but with the initials NI (not indicated) on the certificate. Meningitis vaccination is mandatory only in Saudi Arabia, for pilgrims undertaking the Haj pilgrimage.

Routine

Routine vaccinations are boosters for the standard immunisations of childhood (in particular tetanus and diphtheria) as well as pneumococcal vaccine for travellers older than 65 years with chronic illnesses such as diabetes or renal disease. For adult travellers to Asia and sub-Saharan Africa, poliomyelitis vaccination might also be sensible since the WHO plan for eradicating this disease has not been met (figure 1).

Recommended

These immunisations are those given on the basis of the risk of exposure during the planned itinerary and on the traveller’s current immune status. They include hepatitis A, hepatitis B, rabies, typhoid fever, meningococcal meningitis, Japanese encephalitis, and tick-borne encephalitis (figure 1).
Hepatitis A is the most common vaccine-preventable illness; the risk in standard, scheduled tourist itineraries is 3 per 1000 per month, but this rate increases sevenfold in adventure travel or journeys off traditional tourist routes. Within 2 weeks of the first dose of vaccine, up to 94% of travellers develop protective antibodies; thus, since the incubation period is 2–6 weeks, the vaccine can be given close to departure time and still offer substantial protection. A combined vaccine against hepatitis A and B confers equal protection with fewer injections.

Typhoid vaccine is most valuable for travellers to south Asia, west and North Africa, and South America—especially for long-term travellers, those travelling off standard tourist routes, immunocompromised travellers, those of south Indian ancestry, and patients with cholecystitis. The vaccine is available as a parenteral or a live oral version. It does not protect against paratyphoid fever. Meningocecal meningitis vaccination is sensible for those visiting the meningitis belt (figure 1) of Africa and areas with active outbreaks of the disease or recent epidemics. Although the risk of infection is generally low, the case fatality rate is 5–10% despite treatment. The decision to immunise should be guided not only by the current local situation, but also by the duration and type of travel, immune status of the traveller, and season—the risk is greatest in winter or dry season. For pilgrims on the Hajj or Umra (known as the little pilgrimage and involving travel to Mecca) vaccination is compulsory and must be done no longer than 3 years and at least 10 days before arrival in Saudi Arabia.

Rabies is invariably fatal. Since the risk of a bite from a potentially rabid animal is up to 2% for travellers to the developing world and safe, postexposure rabies vaccination can be hard to obtain in many less-developed countries, pre-exposure protection is important, especially for children, adventure travellers, those who will be in contact with animals, and others at high risk. Even travellers given pre-exposure vaccination should be advised that if bitten they must thoroughly clean the wound and seek additional vaccination on days 0 and 3.

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### Panel 3: Examples of web and print resources for physicians

<table>
<thead>
<tr>
<th>Source</th>
<th>Website or title</th>
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<tbody>
<tr>
<td><strong>Governmental/academic</strong></td>
<td></td>
</tr>
<tr>
<td>WHO</td>
<td>International travel and health (printed version updated annually) <a href="http://www.who.int/ith">http://www.who.int/ith</a></td>
</tr>
<tr>
<td>UK Department of Health</td>
<td><a href="http://www.doh.gov.uk/traveladvice">http://www.doh.gov.uk/traveladvice</a></td>
</tr>
<tr>
<td>PHLS Malaria Reference Laboratory</td>
<td><a href="http://www.phls.co.uk">http://www.phls.co.uk</a></td>
</tr>
<tr>
<td>London School of Hygiene and Tropical Medicine Eurosurveillance</td>
<td><a href="http://www.europneu.org/update/">http://www.europneu.org/update/</a></td>
</tr>
<tr>
<td>UK Foreign and Commonwealth Office Centers for Disease Control (CDC)</td>
<td><a href="http://www.fco.gov.uk/travel/">http://www.fco.gov.uk/travel/</a></td>
</tr>
<tr>
<td>Health Canada Travel Medicine</td>
<td><a href="http://www.travel.state.gov">http://www.travel.state.gov</a></td>
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<tr>
<td><strong>Professional societies/organisations</strong></td>
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<tr>
<td>International Society of Travel Medicine</td>
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<tr>
<td>Royal Society of Tropical Medicine and Hygiene</td>
<td><a href="http://www.rstmh.org">http://www.rstmh.org</a></td>
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<tr>
<td>American Society of Tropical Medicine and Hygiene</td>
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<tr>
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<td>IAMAT</td>
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<td>Wilderness Medical Society</td>
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<tr>
<td><strong>Commercial</strong></td>
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<tr>
<td>GIDEON</td>
<td><a href="http://www.cyinfo.com">http://www.cyinfo.com</a>/</td>
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<tr>
<td>Tropimed</td>
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</tr>
<tr>
<td>Travax Encompass</td>
<td><a href="http://www.travax.com">http://www.travax.com</a></td>
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<tr>
<td>EXODUS Traveller</td>
<td><a href="http://www.exodus.ie">http://www.exodus.ie</a></td>
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<tr>
<td>International SOS</td>
<td><a href="http://www.internationalsos.com">http://www.internationalsos.com</a></td>
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<tr>
<td><strong>Texts</strong></td>
<td></td>
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</tbody>
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PHLS=Public Health Laboratory Service. IAMAT=International Association for Medical Assistance to Travellers. GIDEON=Global Infectious Disease Epidemiology Network. MASTA=Medical Advisory Service for Travellers Abroad.
### Panel 4: Immunisations

<table>
<thead>
<tr>
<th>Vaccine <strong>Routine</strong></th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diphtheria/tetanus</strong></td>
<td>Tetanus may be contracted by any wound; large diphtheria outbreaks occurred in CIS during the 1990s.</td>
</tr>
<tr>
<td><strong>Poliomyelitis</strong></td>
<td>Not necessary for western hemisphere or Oceania/Pacific.</td>
</tr>
<tr>
<td><strong>Measles</strong></td>
<td>Those born before 1957 have high probability of natural immunity. First generation vaccine not as effective as originally believed. Live virus. Egg component.</td>
</tr>
<tr>
<td><strong>Mumps</strong></td>
<td>Live vaccine. Egg component.</td>
</tr>
<tr>
<td><strong>Rubella</strong></td>
<td>Live vaccine. Egg component.</td>
</tr>
<tr>
<td><strong>Influenza</strong></td>
<td>Season in northern hemisphere opposite that of southern hemisphere. Egg component. Duration 5 years. For those &gt;65 years, pulmonary disease, high risk.</td>
</tr>
<tr>
<td><strong>Japanese encephalitis vaccination</strong></td>
<td>Should be considered for travellers to Asia who will be in rural areas for more than 3–4 weeks (less if during the peak transmission season). Although mainly a rural disease, outbreaks have occurred in the urbanised Kathmandu valley in Nepal. Hypersensitivity reactions occur in up to 0·6% of vaccine recipients, but the severity of reactions seems less than once feared and the risk should not preclude necessary vaccination.</td>
</tr>
<tr>
<td><strong>Hypersensitivity reactions</strong></td>
<td>Reaction: urticaria and angio-oedema 2 weeks after vaccination (15 in 10 000 people). For &gt;1 year of age. Vi polysaccharide vaccine. Duration 2 years. May give to age &gt;2 years. Whole cell heat and phenol inactivated vaccine. Duration 3 years, more side-effects. No longer manufactured in North America.</td>
</tr>
<tr>
<td><strong>Tick-borne encephalitis vaccination</strong></td>
<td>Duration 3 years. Inactivated whole-virus vaccine.</td>
</tr>
<tr>
<td><strong>Recommended</strong></td>
<td>Must be frozen until just before administration. Second dose confers &gt;10 years immunity. Different commercial brands interchangeable. Not approved in children &lt;2 years.</td>
</tr>
<tr>
<td><strong>Hepatitis A</strong></td>
<td>Initial dose given 2–4 weeks before departure produces protective antibodies in &gt;95% recipients. Second dose confers &gt;10 years immunity. Different commercial brands interchangeable. Not approved in children &lt;2 years. Series confers &gt;20 years immunity. Series confers same protection as individual vaccines, but fewer doses.</td>
</tr>
<tr>
<td><strong>Hepatitis B</strong></td>
<td>Duration 5 years. Finish before using atovaquone-proguanil for malaria chemoprophylaxis. For &gt;6 years age. Vi polysaccharide vaccine. Duration 2 years. May give to age &gt;2 years. Whole cell heat and phenol inactivated vaccine. Duration 3 years, more side-effects. No longer manufactured in North America.</td>
</tr>
<tr>
<td><strong>Typhoid</strong></td>
<td>Duration 5 years. Finish before using atovaquone-proguanil for malaria chemoprophylaxis. For &gt;6 years age. Vi polysaccharide vaccine. Duration 2 years. May give to age &gt;2 years. Whole cell heat and phenol inactivated vaccine. Duration 3 years, more side-effects. No longer manufactured in North America.</td>
</tr>
<tr>
<td><strong>Meningococcal meningitis</strong></td>
<td>Repeat every 3 years. ACYW:135 strains do not protect against type B. Does not eliminate nor prevent carriage. Can give to &gt;2 years age.</td>
</tr>
<tr>
<td><strong>Japanese encephalitis</strong></td>
<td>Duration 3 years. Reports of urticaria and angio-oedema 2 weeks after vaccination (15 in 10 000 people). For &gt;1 year of age. Vaccines: HDCV, PCEC, or RVA. 2 years protection. May give to children &gt;1 year. HDCV only. Lower protective titres. Must complete 1 month before malaria chemoprophylaxis with mefloquine or chloroquine.</td>
</tr>
<tr>
<td><strong>Tick-borne encephalitis</strong></td>
<td>Duration 3 years. Inactivated whole-virus vaccine.</td>
</tr>
</tbody>
</table>

### Recommended

- **Varicella**: Must be frozen until just before administration. Second dose confers >10 years immunity. Different commercial brands interchangeable. Not approved in children <2 years.
- **Hepatitis A**: Initial dose given 2–4 weeks before departure produces protective antibodies in >95% recipients. Second dose confers >10 years immunity. Different commercial brands interchangeable. Not approved in children <2 years. Series confers >20 years immunity. Series confers same protection as individual vaccines, but fewer doses.
- **Hepatitis B**: Duration 5 years. Finish before using atovaquone-proguanil for malaria chemoprophylaxis. For >6 years age. Vi polysaccharide vaccine. Duration 2 years. May give to age >2 years. Whole cell heat and phenol inactivated vaccine. Duration 3 years, more side-effects. No longer manufactured in North America.
- **Typhoid**: Duration 5 years. Finish before using atovaquone-proguanil for malaria chemoprophylaxis. For >6 years age. Vi polysaccharide vaccine. Duration 2 years. May give to age >2 years. Whole cell heat and phenol inactivated vaccine. Duration 3 years, more side-effects. No longer manufactured in North America.
- **Meningococcal meningitis**: Repeat every 3 years. ACYW:135 strains do not protect against type B. Does not eliminate nor prevent carriage. Can give to >2 years age.
- **Japanese encephalitis**: Duration 3 years. Reports of urticaria and angio-oedema 2 weeks after vaccination (15 in 10 000 people). For >1 year of age. Vaccines: HDCV, PCEC, or RVA. 2 years protection. May give to children >1 year. HDCV only. Lower protective titres. Must complete 1 month before malaria chemoprophylaxis with mefloquine or chloroquine.

### Required

- **Meningococcal meningitis**: Required by government of Saudi Arabia at least 10 days before arrival and not longer than 3 years after last dose.
- **Rabies**: HDCV, PCEC, or RVA. 2 years protection. May give to children >1 year. HDCV only. Lower protective titres. Must complete 1 month before malaria chemoprophylaxis with mefloquine or chloroquine. Must complete 1 month before malaria chemoprophylaxis with mefloquine or chloroquine.

### Not recommended

- **Cholera**: Oral: Duration 12–18 months. Live vaccine. Not available in USA. Short duration, efficacy slight. Repeat every 6 months as needed if at high risk. No longer endorsed by WHO.
- **Cholera**: Parenteral: Short duration, efficacy slight. Repeat every 6 months as needed if at high risk. No longer endorsed by WHO.

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**Japanese encephalitis vaccination should be considered for travellers to Asia who will be in rural areas for more than 3–4 weeks (less if during the peak transmission season).** Although mainly a rural disease, outbreaks have occurred in the urbanised Kathmandu valley in Nepal. Hypersensitivity reactions occur in up to 0·6% of vaccine recipients, but the severity of reactions seems less than once feared and the risk should not preclude necessary vaccination.

**Tick-borne encephalitis vaccination can be given to people visiting northern, eastern, and central Europe as well as the far east of Russia.** The routine series consists of three doses over 1 year but there is an accelerated schedule that provides excellent protection.

**Varicella vaccination might be important for travellers without a history of chickenpox.** Travellers should begin their immunisation series as early as possible before departure since many vaccinations require multiple doses and time for immunity to develop.
Obligatory advice
Traveller’s diarrhoea and diet
Traveller’s diarrhoea affects 30–60% of travellers to less-developed areas of the world. It is defined as the passage of three or more unformed stools in 24 h. The usual causes are enterotoxigenic and enter-aggregative *Escherichia coli* and *Campylobacter*, *Shigella*, and *Salmonella* spp. Most cases, usually resulting from contaminated food rather than water, occur in the first 2 weeks of travel and last an average of 4 days. Rarer but more serious enteric fever with *Salmonella typhi* or *Salmonella paratyphi* is possible even in areas with high concentrations of tourists, whereas cholera is uncommon in travellers. Viral threats include Norwalk, rotavirus, hepatitis A, and hepatitis E. Less common causes include protozoa and helminths.

Prevention
Since it is almost impossible for travellers to establish whether food or water is safe, they need to know how to combine prevention with self-treatment (panels 5 and 6). Food handlers may not follow basic principles of hygiene, and local sanitary regulations may be non-existent, even in seemingly high-quality restaurants and resorts. Selection of safe food and water is important, but travellers should not deny themselves the pleasure of international cuisine. Travellers should check the integrity of caps before buying bottled water to avoid bottles filled with tap water. Personal water filters, in particular those with iodinated cores, are effective, but the most preventive action is hand-washing after visiting the toilet and before eating.

Self-treatment
Travellers need to be aware of when to self-treat diarrhoea and that prophylaxis is rarely indicated. Aggressive action should be taken early with rehydration, oral rehydration salts, antimotility agents, antibiotics, and supplementary measures (panel 6). Antimotility agents such as natural (paregoric, codeine) or synthetic opioids

Figure 1: Worldwide disease prevalence
Typhoid and meningococcal meningitis maps adapted using data from http://www.who.int/ith/diseasemaps_index.html; Global Infectious Disease Epidemiology Network; and Guerrant RL, Walker DH, Weller PF, eds. Tropical infectious diseases. Philadelphia: Churchill-Livingstone, 1999. All other maps are from WHO (website address as above).
Panel 5: Food and water precautions

**Passive**
- Avoid tap water, bottled water where seal is not intact, and ice (including alcoholic drinks with ice)
- Avoid buffets, salads (unless washed in water known to be clean), unpasteurised fruit juices, cold sauces, and unpasteurised dairy products
- Avoid thin-skinned fruits such as raspberries or strawberries
- Avoid raw seafood

**Active**
- Drink boiled water or carbonated beverages
- Consume freshly cooked, piping hot food
- Purchase processed/packaged foods
- Peel thick-skinned fruits yourself
- Use a portable water filter

**Bismuth subsalicylate**: two tablets with meals and at bedtime (8 tablets/day) offers about 60% protection. Side-effects include black tongue/stools, tinnitus, and similar cautions as with aspirin

**Cautions**
- Halogens, such as iodine and chlorine, do not eliminate all enteric pathogens and iodine should not be used during pregnancy and used cautiously in those with thyroid disorders
- Lactobacillus preparations have some, but slight, efficacy. They should be taken as pills, not yoghurt, and not simultaneously with antibiotics


(diphenoxylate, loperamide) can be used to reduce the flow of diarrhoea, even with fever, and can be as effective as rehydration, especially when combined with an appropriate antibiotic.34 Bismuth subsalicylate and dietary supplements, such lactobacilli, can also be used, but bismuth should not be taken at the same time as a fluoroquinolone because it may chelate the antibiotic.35 Fluoroquinolones, in particular ciprofloxacin, are the most popular drugs for self-treatment, but they are contraindicated in pregnancy and resistance is rapidly increasing. These drugs are not recommended for children younger than 8 years, but this restraint may be unreasonable since fluoroquinolones have been shown to be safe in children with cystic fibrosis.36 In southeast Asia, rates of *Campylobacter jejuni* resistance to fluoroquinolones approach 77%.37,38 Alternatives include azithromycin and furazolidone39 and rifaximin, a poorly absorbed rifamycin derivative, shows promise as a safe and effective alternative to fluoroquinolones.40 If self-treatment is not followed by rapid improvement the traveller ought to seek medical care, and other reasons for seeking urgent care include inability to keep down fluids as a result of vomiting, high fever, chills, blood in the stool, or prostration.

Panel 6: Self-treatment approach to traveller’s diarrhoea

<table>
<thead>
<tr>
<th>When and how to treat</th>
<th>Mild: 1–2 stools/24 h with mild or no symptoms</th>
<th>Moderate: ≥2 stools/24 h with:</th>
<th>Distressing symptoms</th>
<th>Severe: &gt;6 stools/24 h with fever or bloody stools</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>→ Choose No treatment</td>
<td>→ Do</td>
<td>→ Do</td>
<td>→ Do</td>
</tr>
<tr>
<td></td>
<td>Loperamide</td>
<td>Loperamide or bismuth subsalicylate and single dose antibiotic if worsening</td>
<td>Loperamide and antibiotic. Reassess in 12–24 h: if resolved, stop antibiotic, otherwise repeat up to 3 days Antibiotic for 1–3 days. Seek medical care if unable to keep down fluids or food, prostration, or abdominal pain</td>
<td></td>
</tr>
</tbody>
</table>

**Antibiotics**
- Fluoroquinolones (ciprofloxacin, norfloxacin, levofloxacin)
- Azithromycin
- Furazolidone

**Other**
- Loperamide
- Diphenoxylate/atropine
- WHO oral rehydration salts
- Other rehydration* Bland diet†

If therapy does not rapidly work or if condition worsens, traveller should seek prompt medical attention. Adapted from: Ericsson CD. Traveler’s diarrhea: epidemiology, prevention, and self-treatment. Infect Dis Clin North Am 1998; 83: 285–303. Adachi JA, Ostrosky-Zeichner L, DuPont HL, Ericsson CD. Empirical antimicrobial therapy for traveler’s diarrhea. Clin Infect Dis 2000; 31: 1079–83. Ansdell VE, Ericsson CD. Prevention and empiric treatment of traveler’s diarrhea. Med Clin North Am 1999; 4: 945–73. *Sodium bicarbonate 2.5 g/L; or about 0.25 L (8 ounces) of fruit juice (dilute acidic juices such as orange juice) and about 5 g (0.5 tsp) honey or sugar and a pinch of salt (the amount trapped between thumb and index finger). †BRAT diet includes bananas, rice, apple sauce, and toast until feeling better; any non-rovocative and binding foods will do.
Malaria
Malaria is the most important disease for travellers to avoid when travelling through endemic areas. It is largely a preventable disease in travellers, who should combine personal protective measures against mosquito bites with chemoprophylaxis and know that if they fall ill after travelling through a malarious area they should consult a doctor, even months later. Malaria has a long incubation period and no prophylaxis is 100% protective.11
According to WHO, 300–500 million people are infected with this blood parasite, and malaria causes 2 million deaths every year.12 An estimated 30 000 European and North American travellers are infected yearly, but this might be only one-fifth of the true incidence.13 In the decade 1992–2001, there were 20 594 cases of malaria imported into the UK (Bradley DJ. Data from the PHLS Malaria Reference Laboratory, 2002; personal communication). In the same period, 4685 malaria cases were identified in US citizens.14 The genus Plasmodium has four species that infect people: Plasmodium falciparum, Plasmodium vivax, Plasmodium malariae, and Plasmodium ovale. The risk of contracting malaria varies with destination, season, climate, altitude (very rare above 2000 m), and number of mosquito bites. Most travellers have a low risk of contracting malaria, although there is potential for high risk in Africa, Oceania (Solomon Islands and Papua New Guinea), the Indian subcontinent, and Amazonia (figure 2). Most serious malaria, due to P. falciparum, is contracted in Africa.
Malaria deaths in travellers are typically due to inappropriate chemoprophylaxis or non-compliance15 as a result of confusion, poor advice, difficult regimen, side-effects, or personal beliefs.15,16 Health providers, especially primary-care physicians, often prescribe inappropriate chemoprophylaxis and advice,17 and a pre-travel consultation does not always translate into protection.18 A worldwide lack of consistent policy and confusing regimens contributes to this situation.19 81% of travellers from the UK who contracted malaria either took no or inappropriate chemoprophylaxis; in the USA and Canada the percentages are 84% and 97%, respectively.20,21 Physicians themselves do not always comply with their malaria chemoprophylaxis, so how will they be able to convince a traveller to do so?22
The main goal of chemoprophylaxis is to prevent deaths from falciparum malaria. Medications suppress malaria by killing asexual blood stages of the parasite before they cause disease, so protective levels of medication must be present in the blood before developing parasites emerge from the liver. Thus, prophylaxis should usually be started before the first possible exposure and continued for a set period after the last possible bite (panel 7). The choice of drug requires assessment of the duration of the journey, resistance patterns, potential adverse events, and cost. The prescribing physician needs to know whether compliance will be a problem,23,24 and the benefits must outweigh the risks.
Panel 8: Medications for travellers

<table>
<thead>
<tr>
<th>Category</th>
<th>Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traveller’s diarrhoea</strong></td>
<td>Ciprofloxacin, norfloxacin, ofloxacin, levofloxacin, co-trimoxazole, azithromycin</td>
</tr>
<tr>
<td><strong>Malaria prevention</strong></td>
<td>See panel 7</td>
</tr>
<tr>
<td><strong>Emergency contraception</strong></td>
<td>Ethinylestradiol/levonorgestrel</td>
</tr>
<tr>
<td><strong>Respiratory or ENT infections</strong></td>
<td>Decongestants, Inhalers, Non-steroidal antiinflammatory drugs, Narcotics, Motion sickness</td>
</tr>
<tr>
<td><strong>Motion sickness</strong></td>
<td>Meclozine</td>
</tr>
<tr>
<td><strong>Transdermal hyoscine</strong></td>
<td>Can wear patch behind ear for 3 days</td>
</tr>
<tr>
<td><strong>Allergic reactions</strong></td>
<td>Diphenhydramine, Epinephrine, Steroids</td>
</tr>
<tr>
<td><strong>Skin problems</strong></td>
<td>Sunscreen SPF30, Bite salves, Antibiotic ointments</td>
</tr>
<tr>
<td><strong>Altitude sickness</strong></td>
<td>Acetazolamide, Dexamethasone, Nifedipine</td>
</tr>
<tr>
<td><strong>Leptospirosis prevention</strong></td>
<td>Doxycycline, Nelfinavir mesilate</td>
</tr>
<tr>
<td><strong>HIV exposure</strong></td>
<td>Triple antiretroviral therapy: zidovudine and lamivudine and nelfinavir mesilate</td>
</tr>
</tbody>
</table>

**Self-treatment**

Atovaquone/proguanil, Mefloquine, Sulfadoxine-pyrimethamine


ENT=ear, nose, and throat. SPF=sun protection factor. HAPE=high altitude pulmonary oedema. *High flexibility, varying with ease of use, availability, efficacy, and specific needs. Travellers should attempt to use the fewest drugs that give the most effect.
The most effective drug, mefloquine, unfortunately has the worst reputation, and its lower tolerability, perceived or otherwise, leads to non-compliance.61,62 There is a 1 in 100–200 risk of mild to moderate neuropsychiatric adverse events such as sleep disturbances, emotional lability, anxiety, and cognitive changes and about a 1 in 10 000 risk of severe reactions such as seizures, psychosis, or hallucinations.63,64 Clearly, mefloquine must not be used in anyone with a history of psychiatric disease, epilepsy, or arrhythmia. Moreover, resistance to mefloquine is now common in southeast Asia along the Thai-Cambodian and Thai-Myanmar borders and there are also reports of emerging resistance in Africa and Latin America.65–67 Generally, it is still highly effective and convenient, being taken once weekly. A loading dose of mefloquine can be given as a rule out side-effects or to provide adequate blood concentration quickly by taking one dose daily for 3 days, and if tolerated, continuing with the standard weekly dosage.68,69

An alternative to mefloquine is atovaquone-proguanil, a combination drug taken daily, which is highly effective against P falciparum and reasonably effective against P vivax; it has fewer side-effects than mefloquine and some causal prophylaxis (activity against liver-stage parasite), and thus can be stopped 1 week after leaving the malarious zone, which increases compliance.71 The most common side-effects are headache, abdominal pain, vomiting, and dyspepsia, but with a frequency similar to that of placebo.72 Doxycycline is another effective antimalarial, but may cause phototoxicity, vaginal candidiasis, bone and dental damage in fetuses and children (8 years old or younger), and oesophageal ulcers; furthermore, it has to be taken daily during the trip and continued for 4 weeks on return.73

It is time to stop using the worn-out distinction of chloroquine-sensitive P falciparum, since chloroquine is no longer useful for protecting most travellers. Most P falciparum are resistant to chloroquine, and so is an increasing percentage of P vivax.74–79 Chloroquine is best used on prolonged trips through Central America.11 The combination of chloroquine-proguanil, popular because of its favourable safety profile, is only 60–70% effective and should not be a first-line drug for the prevention of malaria.76,77 Exposure to P vivax or P ovale warrants the use of primaquine phosphate to eradicate hypnozoites from the liver, but only after measurement of the serum glucose-6-phosphate dehydrogenase (G6PD) activity in the traveller. If at high risk for exposure to P vivax or P ovale the traveller should begin a course of primaquine for 2–4 weeks on leaving the malarious area.78,79

Self (or stand-by) treatment for possible malaria has long been controversial. The target is possible P falciparum infection in someone who is far from medical care. The arguments against self-treatment are: drug toxicity with no medical supervision; the fact that travellers can usually reach medical supervision; the fact that travellers can usually reach medical care within a day; inappropriate use of the regimen; treating a disease that is not malaria but needs medical attention; and failure to follow up with appropriate medical care as soon as possible after self-treatment.12,13 Self-treatment may be warranted if a traveller is visiting a high-risk area from which medical assistance cannot be reached within 24 h,14 but only as a temporary measure (panel 7).

Current outbreaks in the destination

A practitioner providing advice to a traveller is obligated to be aware of current disease outbreaks around the world. To send a traveller unprepared to a destination where an epidemic is ongoing is unacceptable. To keep up to date, there are many sources that should be consulted at least weekly, preferably daily (panel 3). Environmental risks

Water-borne disease

Travellers who swim, wade, bathe, or otherwise expose themselves to fresh water may be vulnerable to infections with leptospirosis or schistosomiasis. Leptospirosis is an infection with a spirochaete that can cause renal, hepatic, and pulmonary damage. It is spread in fresh water by the urine of rodents, dogs, or cattle. The infection is being increasingly detected in returning travellers, especially in those taking adventurous trips to remote places.75,76 Leptospirosis can be prevented with doxycycline chemoprophylaxis (panel 8).77 Schistosomiasis (bilharzia), an infection with blood trematodes, is also an increasing problem in travellers.78 Application of DEET before entry into water that contains schistosomes might prevent skin penetration by cercariae, but is not long-lasting unless applied as a lipid-based formula.79 Swimming in warm, dirty freshwater can result in infection with free-living amoebae and resultant primary amoebic meningoencephalitis.11 Furthermore, swallowing a small amount of faecally-contaminated water can lead to traveller’s diarrhoea. If a swimming pool has inadequate amounts of chlorine, there is a risk of contracting cryptosporidium, giardia, hepatitis A, or Norwalk-virus infections.11 Walking barefoot poses a risk for several diseases such as cutaneous larva migrans (from canine hookworm larvae), Strongyloides stercoralis, and hookworm infections.

Sun exposure

Excessive exposure to solar radiation causes both acute (sunburn) and chronic (carcinoma) injury to skin. Sunscreens to protect against both ultraviolet A and ultraviolet B radiation are graded by SPF (sun protective factor), which is a ratio of the time required to burn with or without sunscreen. For example, an SPF of 10 confers 150 min of solar exposure in a person who would burn in 15 min without any protection. Sunscreens can reduce the risk of skin cancer if applied correctly; however, many travellers overestimate their effectiveness and do not apply a sufficient amount to confer protection.80 Sunscreen effectiveness can be reduced by wind, heat, humidity, sweat, and altitude. When applying both sunscreen and insect repellent, it is sensible to apply sunscreen first to allow skin absorption, then repellent.

Heat or cold

Heat carries the risk of heat exhaustion and heat stroke. Prevention is through limited exertion in hot weather with adequate hydration. Travellers should be informed of the importance of staying well hydrated. The best gauge of hydration is not thirst—a late and poor gauge—but urine. Urination should be possible every 4 h and the urine should look clear. Cold exposure can lead to hypothermia or cold injury such as frostbite. Properly layered clothing and limiting exposure are the keys to avoiding these problems.

Motion sickness

Motion sickness is best avoided since once it has begun it is difficult to treat. Prevention begins with sitting in the most stable part of the vehicle—near the forward section of the wings by a window in a plane or, if afloat, the centre of the boat at waterline—and looking at the horizon. In a car or bus, sit next to a window and open the window for a breeze at waterline—and looking at the horizon. In a car or bus, sit next to a window and open the window for a breeze. In a boat, sit as far forward as possible. In general, motion sickness includes antihistamines, phenothiazines, and belladonna alkaloids. Natural remedies that may have benefit include ginger-root tablets and acupressure wristbands.
syndrome” describes an increased risk for deep vein thrombosis and pulmonary embolism from prolonged immobility during a flight. Those at highest risk include

**Panel 9: Travel first-aid kit** *

**Standard medications**

**General infections**
- Minor infection of the skin: dicloxacillin or cephalexin
- Respiratory tract infections: erythromycin or amoxicillin-clavulinate
- Dysentery: co-trimoxazole or ciprofloxacin (which also work well against urinary tract infections)
- Fungal infections: clotrimazole or tolnaftate

**Malaria prophylaxis**
- Very important if travelling through a malaria endemic region

**Pain or injury**
- Aspirin or non-steroidal anti-inflammatories (eg, ibuprofen). Beware of stomach upset or ulcers
- Paracetamol
- Narcotic analgesics such as paracetamol with codeine. Some countries are suspicious of such medications, so make sure the prescription is labelled officially by a pharmacy or take a doctor’s note
- FEVERS
  - Paracetamol or aspirin

**Decongestant**
- Choose one that does not make you drowsy. Loratadine works 24 h, but have some restrictions with other drugs and diseases. Pseudoephedrine lasts 6 h

**Gastrointestinal**
- Antidiarrhoeal: loperamide or diphenoxylate/atropine (following a BRAT diet is just as important)
- Antinausea: meclizine, metoclopramide, or prochlorperazine
- Dysentery: no prophylaxis. Take a just-in-case prescription as for antidiarrhoea

**Serious allergic reaction**
- Epinephrine: this comes as a premeasured amount in an autoinjector or in a kit, which has syringe needle and medications, but is more complicated. Epinephrine can reverse life-threatening allergic reactions, life threatening asthma attacks, and is used for cardiac resuscitations in hospital
- Antihistamine: diphenhydramine or hydroxyzine. Taken after epinephrine in serious attacks or alone in mild-to-moderate reactions

**Personal medications**
- Especially important for people with pre-existing disease—problems from asthma, diabetes, or a heart condition are more likely while travelling than from exotic infections. Make sure that these medications are not checked-in during flights

**Wound care**
- Dressings and bandages should include simple adhesive bandages and also gauze—both flat and rollable; non-adherent dressings can be useful too
- Elastic wraps support injured areas and can be used as slings
- Tape should be water-resistant
- Bandanas work as slings, pressure dressings, and have many other uses
- Safety pins, scissors, tweezers/forceps for removing splinters and ticks
- Steristrips (paper sutures for skin lacerations): put across wound after cleaning to help heal
- Antibiotic ointment: use in cleaned wounds
- Vitamin E or aloe vera can help wound healing
- Irrigation fluid for wounds and eyes to remove debris
- Towelettes for cleaning hands before and after working with wounds

**Medical essentials**
- Oral rehydration salts: sachets, mix with clean water in dehydration or diarrhoea
- Thermometer
- Sunscreen: SPF 30 or 50
- Lip screen
- Water purification system
- Moleskin to avoid pressure blisters
- Sealed package of syringes and needles for travel to remote areas where medical care and sterility is questionable

**Dental kit**
- Temporary fillings and pain control

**Accessories**
- First-aid booklet
- Flashlight with fresh batteries
- Chemical lightstick

**Special considerations**
- Medications and equipment for high altitude, jungle, desert, marine environments, children, pregnancy, etc
- Extra pair of prescription eye glasses
- BRAT=bananas, rice, apple sauce, toast. SPF=sun protection factor. *Travellers must follow all label warnings.

**Flying**
- Issues associated with flying include motion sickness, vascular thrombosis, and barotrauma. “Economy class syndrome” describes an increased risk for deep vein thrombosis and pulmonary embolism from prolonged immobility during a flight. Those at highest risk include
pregnant women, elderly people, those who have had deep vein thrombosis or cancer, smokers, and women taking oral contraceptives. Risk reduction involves moving about the cabin every few hours when awake, staying adequately hydrated, wearing support stockings, and taking an aspirin before the flight. 

Jet lag
Jet lag occurs after crossing three or more time zones and tends to be worse after flying eastwards. If travelling west, travellers should be advised to go to bed later than usual and awaken later; and to reverse this if travelling east. They should set timepieces to their destination’s time zone once aboard the aircraft and stay awake on arrival until a suitable local time to go to sleep. Melatonin has a good reputation for helping travellers adapt but, most being derived from bovine pineal glands, is probably wise to avoid. Prescription sleeping medications such as zolpidem help travellers sleep during long flights or upon arrival at their destination.

Trauma
Injury is a far greater threat to travellers than infections or unusual illnesses. The most common preventable causes of death during travel are accidents, mainly caused by motor vehicles, but falls, swimming, and animals contribute as well, with intoxication a common cofactor. Tourists are four-to-five times more likely to be involved in road trauma than local residents. Wounds sustained in the less-developed world carry higher risk of turning septic and require prompt attention. If the wound is from a mammal there is a risk of contracting rabies. Rabies is transmitted mainly by dog or bat bites, but can also be carried by raccoons, foxes, monkeys, cats, skunks, hyenas, and even ruminants such as cattle. About 50,000 cases of rabies occur worldwide every year. Pre-travel immunisation may be indicated for expatriates, adventurers, missionaries (especially their children), animal handlers, those who will be far from medical care, and others at risk while in less-developed nations—especially in view of the chronic, worldwide shortage of rabies immune globulin, which must be given along with vaccine for postexposure treatment. Hymenoptera (bees, wasps, hornets), reptiles, and arachnids (spiders, scorpions) are the most likely causes of envenoming during travel. Snakebite can occur in urban as well as rural areas. Although roughly 50% of bites do not result in envenoming, they should be treated seriously. Antivenoms must be obtained in serious cases and are likely to be manufactured locally.

Antivenoms must be obtained in serious cases and are likely to be manufactured locally. Ice packs and cool compresses can relieve burning and pain from stings; if pruritis, anxiety, or urticaria develop, topical and oral antihistamines should be given. In cases with throat or larynx involvement, endotracheal intubation may be required. A sensible first-aid kit is invaluable. It should contain basic supplies and specific components as needed (panel 9).

Clothing
A basic virtue in travel is to travel lightly and dress appropriately for the climate and culture. Well-fitting, comfortable shoes or boots help avoid foot trauma such as blisters, cuts, and snake bites. Under hot and humid conditions, fungal infections can rapidly arise, which must be kept under control with antifungal powder or cream. In climates where weather changes quickly, dress in layers, taking off and putting on additional clothing to adapt to changing conditions.

Meditations
Several travel-specific medications should be taken on a journey, dependent on type of travel and risk of exposure to various problems (panel 8). These medications can be divided broadly into two categories: prophylaxis and self-treatment. Medications should be designed for simplicity in self-treatment, with clear, explicit instructions so travellers can use them correctly under duress. Travellers should be warned about common adverse events, their management, and indications for stopping treatment.

Travellers with underlying illnesses need to take extra amounts of their routine prescriptions, and the generic name with dosages should be recorded on the vaccine certificate. Spare medication should be kept in separate luggage in case of loss or theft. Some countries restrict drugs even if prescription, especially in Asia. Medications should be kept in pharmacy-labelling bottles, and if carrying narcotics, a signed and stamped note from a physician may help if questioned by immigration authorities.

Attitude
Traveling to a foreign country can be stressful. Sights and sounds, language difficulties, and cultural and dietary differences can have adverse effects on travellers. Travel with an open mind, expect the unexpected, and retain a sense of humour; mental health goes hand-in-hand with physical health.
Sexual activity
Inhibitions often diminish with travel, and travellers often engage in activities that they would normally eschew at home, including increased and reckless sexual activity. 5–67% of travellers engage in sexual activities with local inhabitants or fellow travellers who are not their regular sexual partners.101 Many travellers (up to 68%) intend to have casual sex during their journey.102 Furthermore, despite many travellers carrying condoms, only 25–69% use them,81–84 putting travellers at increased risk for HIV, hepatitis B, and hepatitis C infections and other sexually transmitted diseases. Additionally, resistance patterns for gonorrhoea around the world have reached alarming rates: in Asia, resistance to penicillin is commonly greater than 90% and to ciprofloxacin greater than 30%.95 Although abstinence may be the best policy, it is frequently unrealistic, and physicians should advise travellers to follow safe practices. Use of condoms is essential, but in hot, humid conditions their integrity may be compromised.

Travellers at high-risk of exposure to HIV, such as missionary or medical workers volunteering in the less-developed world, could be provided with HIV postexposure prophylaxis with triple antiretrovirals for use until they can obtain PCR identification of viral genetic material.95 For women, physicians should consider the possibility of unwanted pregnancy and even rape. The risk of acquiring a sexually transmitted disease in addition to pregnancy warrants extra counselling time for women travellers, especially if travelling alone. Emergency contraception for female travellers might be necessary in cases of condoms rupturing, decreased absorption of oral contraceptives due to traveller’s diarrhoea, or a rape occurs—a scenario in which postexposure prophylaxis for HIV is strongly advised.82,86

Optional advice
Some journeys and travellers require specific advice, for example on altitude illness, scuba-diving holidays, pregnancy, immunocompromised states, children, elderly people, and unusual or region-specific pathogens.

Altitude sickness
Altitude sickness poses a threat to any traveller who will be more than 2500 m above sea level. The degree of risk for acquiring this illness is related to altitude and the rate of ascent. Other risk factors include previous altitude sickness, exertion, and some cardiovascular diseases—but fitness does not protect against this illness.89 Altitude sickness has several manifestations; acute mountain sickness is the most common and is defined as headache in a person recently arrived at an altitude above 2500 m with one or more of: nausea, vomiting, anorexia, light-headedness, fatigue, or insomnia, typically beginning within 8 h of ascent. Less common, but more serious, are high altitude pulmonary oedema and high altitude cerebral oedema, both of which can be fatal. Prevention of altitude illness is accomplished through acclimatisation and drugs. Acetazolamide (which contains a sulphonamide component) is the only drug that truly accelerates acclimatisation; steroids such as dexamethasone, which can be used in emergency ascents and nifedipine which can be used for HAPE, do not aid acclimatisation and can have severe adverse effects in some individuals.89–92 Non-pharmacological methods of avoiding altitude sickness include acclimatisation through staged gradual ascents and spending 2–3 nights at intermediate altitudes and avoiding alcohol and sedative-hypnotics. Travellers must not ascend higher if symptoms are present and must be advised that the definitive treatment for this condition is to descend at once.

Marine environment and scuba diving
Swimming or diving can expose travellers to envenoming from coelenterates with nematocysts (eg, jellyfish and fire coral), venomous spines (lionfish, stone fish, cone shells, urchins), and bites (blue-ring octopus, barracuda, and sharks). In the Indo-Pacific, the box jellyfish, Chironex fleckeri, is particularly dangerous, and stings can lead rapidly to death. Cuts and abrasions in the marine environment are at high risk for infection. Travellers who will be in the marine environment should travel with 5% acetic acid to treat nematocyst stings and instant hot packs (to place in water buckets in which the injured part is placed until the pain dissipates) to treat venomous spine injuries. Drowning is a common cause of death in travellers; it is often associated with intoxication, cardiac events, or overestimation of capabilities. Scuba diving carries the potential for severe, life-threatening conditions such as pulmonary barotrauma with air embolism and decompression sickness. Mefloquine can produce side-effects that can mimic symptoms of decomposition sickness, and divers in a malarious region who are not mefloquine-tolerant or have not taken it before should use atovaquone/proguanil or doxycycline. Scuba divers should not fly for at least 24 h after their last dive.102 Before departure, it is wise to learn the location of the hyperbaric chamber nearest the destination.

Pregnancy
Since during the first trimester there is a risk of miscarriage and in the third trimester of premature labour, abortion, and other serious complications, the second trimester is the safest period to travel. Flying on airlines is generally allowed until the last 4 weeks of pregnancy, but policy can vary between airlines. Pregnant travellers should stay well hydrated and move about the cabin to reduce the risk of venous thrombosis.11,103 Pregnant travellers ought not to receive live vaccines, but if the risk is high enough then even yellow fever can be given.104 If travelling through a malarious area, fastidious personal protective measures against mosquito bites are essential: malaria, especially in primigravida, increases fetal loss and maternal mortality. WHO and CDC (Centers for Disease Control) have endorsed the use of mefloquine during the second and third trimesters, and both proguanil and chloroquine have a long history of safe use during pregnancy; women do not need to wait after taking mefloquine if they wish to become pregnant.11,12 The safety of atovaquone/proguanil during pregnancy has not been established. Pregnant travellers must be careful to avoid traveller’s diarrhoea. Antibiotics such as fluoroquinolones, doxycycline/tetracycline, and trimethoprim-sulphamethoxazole are contraindicated during pregnancy; if antibiotic treatment is needed for traveller’s diarrhoea a third-generation cephalosporin is the best choice.11 Contracting hepatitis E during pregnancy has a maternal mortality rate of up to 40%.

Children
Children can travel as well as, if not better than, many adults. However, they have special needs that vary with age, health, and their behaviour.105 Children may have greater problems with hygiene and with their natural curiosity can expose themselves to infection and injury, especially from animals. Medications, such as malarial chemoprophylaxis and antibiotics for presumptive treatment, that are dosed by weight require special attention.

Immunocompromised travellers
Travellers with weakened immune systems, such as those with HIV infection, malignancy, transplantation, severe
diabetes, end-stage renal disease, or on high-dose corticosteroids (>2 mg per kg daily or >20 mg prednisone) are at greater risk than others for illness during their trips, and for adverse events from vaccinations, especially with live-virus vaccines.11,105 HIV-infected individuals who have CD4+ percentages greater than 25% (no evidence of suppression) can take live vaccines including measles and yellow fever; inactivated vaccines are generally safe irrespective of CD4+ status, although the immune response to vaccines may be reduced. Such patients need to be more aggressive about self-treatment and seeking prompt medical care at the first signs of illness.

Back home
Most travelers do not need assessment on return from their journeys. If, during the trip or on return home, the traveler has fever, diarrhea, disordered digestion, jaundice, skin lesions, excessive fatigue, or other symptoms he or she should seek medical care from a specialist in travel and tropical medicine.

Conflict of interest statement
None declared.

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