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# Advising the traveller

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## Abstract

Global travel continues to increase, particularly to tropical destinations that have different health risks from those encountered closer to home. Currently, over a billion people travel annually, with over 65 million visits made from the UK. Seeking pre-travel advice should be an essential part of any trip for a traveller. The key elements of pre-travel advice are health risk assessment, health promotion and risk management; this involves advice on prevention of malaria, travellers' diarrhoea, sexually transmitted infections and accidents, as well as appropriate vaccinations. Higher risk groups of travellers, such as those visiting friends and relatives, those with co-morbidities, pregnant women and very young or elderly individuals, particularly need to be targeted.

**Keywords** Health promotion; health risk assessment; malaria prevention; MRCP; pre-travel advice; travel medicine; travellers' diarrhoea; vaccinations; yellow fever

## Introduction

International travel continues to increase, with >1 billion travellers worldwide now crossing international borders, and >65 million visits made from the UK each year. Although many travellers from the UK visit Europe and North America, there has been an increase in travel to tropical destinations. This places travellers at risk of a variety of travel-related conditions, such as malaria, dengue and other tropical or vaccine-preventable infections, many of which are rarely, if ever, encountered at home. Travellers are therefore an important group to target owing to their movement, the risk of adverse health outcomes abroad and the possibility of importation or exportation of infectious diseases.

However, estimation of disease risk in travellers has proved elusive, with difficulty ascertaining precise data on both numbers travelling to specific locations and incidence of illness in travellers. Despite their limitations, frequently quoted studies estimate the overall risk of morbidity from illness or injury to be between 20% and 70%.<sup>1</sup> Although most illnesses tend to be self-limiting, approximately 5% of travellers require a doctor's attention, 1% require hospitalization while abroad, and many travellers require medical care on returning home. However, the most likely causes of mortality in travellers are accidental injury (e.g. road traffic

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## Key points

- There has been an increase in travel to tropical destinations, with subsequent exposure of travellers to malaria, dengue and other tropical and vaccine-preventable infections
- The most likely causes of mortality in travellers are accidental injury or a cardiovascular event, rather than an infectious disease
- Malaria is one of the most common and serious causes of fever in travellers
- Vaccine-preventable diseases are uncommon in travellers
- The key features of a pre-travel consultation are health risk assessment, and health promotion with risk management
- Higher risk groups of travellers include those visiting friends and relatives, those with co-morbidities, pregnant women and very young or elderly travellers

accident (RTA), drowning) or a cardiovascular event, rather than an infectious disease, which accounts for only 1–2% of deaths.

Many travel-related illnesses are preventable by taking sensible precautionary measures, and, for some diseases, by having the appropriate vaccinations and taking chemoprophylactic medications. In the UK, pre-travel advice is given in the primary care setting or at specialized travel clinics, and is usually nurse-led.

## Access to pre-travel healthcare

Surveys of travellers visiting less-developed countries indicate that approximately 50% seek pre-travel health advice. Use of pre-travel healthcare is low because of a lack of concern about health issues related to travel; primary care and the internet were the most common sources of information. The likelihood of seeking pre-travel advice varies in different groups of travellers, with migrants who return to their country of origin to visit friends and relatives (VFRs) being the least likely to seek advice or take precautionary measures. This group has a disproportionately increased risk of acquiring the more common tropical infections compared with other travellers, and they should be targeted specifically for pre-travel advice.<sup>2</sup>

## The travel clinic consultation

The key features of a pre-travel consultation are health risk assessment, and health promotion with risk management (Table 1).

## Risk assessment

Risk of infection varies according to the area to be visited, endemicity of diseases, nature of travel (holiday, business, backpacker, VFR), type of accommodation, anticipated activities and duration of trip. It also varies according to the health status

of the traveller: their medical conditions, current medications, allergies and immunization history.

Most (80–95%) travellers to the tropics undertake short-term visits (<1 month). The remaining 5–20% spend long periods abroad, either travelling or working (e.g. backpackers, missionaries, volunteer workers, placements with the armed forces), or on repeated short-term visits (e.g. businessmen, airline crews). These groups incur different risks and exposures, depending on both individual behaviour and environment, with the long-term traveller at greater risk of acquiring infections endemic in the local population they are visiting. There is also a risk difference between the sexes, with male travellers at greater risk of most disease acquisition, except for travellers' diarrhoea, which is more frequent in female travellers.

Risk also varies according to the geographical area visited. Travellers to Africa have the highest rate of all-cause morbidity and account for the greatest number of cases of *Plasmodium falciparum* malaria. The highest risk of *Plasmodium vivax* and diarrhoeal illness is in travellers to South Asia, while cutaneous leishmaniasis is most common in visitors to Latin America. Furthermore, risk within a country can differ; for example, malaria risk is negligible in Nairobi compared with a significant risk on the Kenyan coast. Travel medicine is dynamic, and both travellers and physicians should be aware of, and respond to, changes in epidemiology of potential infections, including the occurrence of outbreaks.

Recent outbreaks (e.g. Ebola, Zika, yellow fever, Middle East respiratory syndrome), and wide media coverage have alerted travellers to the potential risk of previously rarely encountered tropical infections. However, although the risk of acquiring these infections is low for most travellers, they can have a role in spread of disease, particularly VFRs. Information about outbreaks can be found on various websites including those of the World Health Organization, the National Travel Health Network and Centre, and the Centers for Disease Control and Prevention (Table 2). These websites also offer valuable information for vaccine recommendations, although regional prevalence of specific disease can be difficult to obtain.

Finally, it is important to remember that non-tropical infections account more commonly for the infections that present in returned travellers.

### Health promotion and risk management

Many travel consultations focus on vaccinations, but these can be among the least cost-effective preventive measures in travellers as vaccine-preventable diseases account for <5% of travel-associated morbidity. The main priorities should be given to health problems that are common, preventable, treatable and serious or potentially fatal. These include malaria, travellers' diarrhoea, sexually transmitted infections (STIs) and RTAs. Health hazards that are rare (e.g. cholera, Japanese encephalitis, parasitic infections) should be put into perspective and discussed, based on the individual traveller's risk profile.

Current best practice emphasizes the need for a patient-centred approach and shared decision-making. Therefore, for each risk, the travel medicine practitioner must balance the need for prophylaxis against the realistic risk of infection, and the likelihood of adherence to preventive measures by the traveller. The latter depends on a number of factors including perception of risk, concerns about available preventive measures and treatments, and preferred risk management options.<sup>3</sup> Travellers should know that no intervention is fully protective.

### Malaria (Table 3)

Malaria is one of the most common and serious causes of fever in travellers, occurring while abroad or on return (see Malaria on pages 52–58 of this issue). The risk of malaria is greatest in sub-Saharan Africa (particularly West Africa), intermediate in South Asia (India), and lowest in Central and South America and South-East Asia. However, the risk for acquiring malaria can vary widely from traveller to traveller, from region to region and within countries. Those at particular risk of disease acquisition are long-term VFR travellers, while those at risk of severe disease are pregnant women, travellers with complex co-morbidities and elderly individuals.

Prevention of infection involves understanding the disease process and the 'ABCD' of malaria:

- Awareness of risk
- Bite prevention from nocturnal *Anopheles* spp. mosquitoes
- Chemoprophylaxis
- prompt Diagnosis of infection.

## Key elements of travel medicine

### Health risk assessment

- Health status of traveller – medical conditions, medications and allergies, immunization history
- Health risk of travel – itinerary (rural, urban), accommodation, duration of trip, anticipated activities, mode of transport, travel style (budget/luxury)

### Health promotion and risk management

- Responsible personal behaviour and safety
- Vaccine-preventable illness
- Vector avoidance
- Malaria prevention and chemoprophylaxis
- Travellers' diarrhoea – prevention and self-treatment
- Environmental illness – altitude, heat, swimming, jet lag, prevention of deep-vein thrombosis
- Travel insurance and access to medical care overseas
- Post-travel screening, care and triage of illness (e.g. fever, diarrhoea, rash, respiratory symptoms)

Table 1

## Useful websites

- National Travel Health Network and Centre: [www.nathnac.org](http://www.nathnac.org)<sup>a</sup>
- Health Protection Scotland: [www.hps.scot.nhs.uk](http://www.hps.scot.nhs.uk)<sup>a</sup>
- UK Foreign and Commonwealth Office (FCO): [www.gov.uk/government/organisations/foreign-commonwealth-office](http://www.gov.uk/government/organisations/foreign-commonwealth-office)
- FCO 'Travel Aware' site — provides information on travel insurance and safety: <https://travelaware.campaign.gov.uk/>
- WHO Travellers' Health section: [www.who.int/ith/en](http://www.who.int/ith/en)<sup>a</sup>
- US Centers for Disease Control and Prevention: [www.cdc.gov/travel](http://www.cdc.gov/travel)<sup>a</sup>
- International Society of Travel Medicine: [www.istm.org](http://www.istm.org)<sup>a</sup>
- Faculty of Travel Medicine, Royal Society of Physicians and Surgeons, Scotland: <https://rcpsg.ac.uk/travel-medicine/home>

<sup>a</sup> These organizations aim to improve travellers' health by providing guidance and setting standards for health professionals in settings ranging from primary care to specialized travel clinics.

**Table 2**

Bite prevention measures include use of insect repellent such as DEET, covering up during the highest risk time periods (dusk to dawn), and sleeping under an insecticide-impregnated mosquito net if enclosed and screened accommodation is not available.

The choice of chemoprophylaxis depends on the type of malaria that is endemic in the region being visited, and whether drug resistance (usually chloroquine resistance of *P. falciparum*) is present. It also depends on individual factors and preferences for the different drug regimens, such as dosing frequency (e.g. weekly for mefloquine, daily for doxycycline or atovaquone–proguanil), and affordability. For countries with a high prevalence of chloroquine-resistant *P. falciparum*, mefloquine, doxycycline or atovaquone–proguanil can be taken. For the limited areas with little chloroquine resistance, chloroquine plus proguanil should be taken, and in areas without resistance, chloroquine alone can be used. Practitioners should be aware of the adverse effects of and contraindications to all the antimalarials.

For detailed information, including adverse effects and special situations such as pregnancy, see the 2017 UK malaria guidelines at: [www.gov.uk/government/publications/malaria-prevention-guidelines-for-travellers-from-the-uk](http://www.gov.uk/government/publications/malaria-prevention-guidelines-for-travellers-from-the-uk). Travellers should be advised that although malaria prevention methods are highly effective, they do not provide 100% protection, and they should seek immediate medical attention if they have symptoms suggestive of infection.

### Gastrointestinal illness

Diarrhoea is the most common illness affecting travellers to developing countries, with 20–60% being affected (see Diarrhoea in travellers on pages 24–29 of this issue). It can cause significant morbidity and can result in loss of travel time, amendment of itineraries and medical encounters, including hospitalization. Travellers diarrhoea is usually non-bloody, watery, may be frequent and explosive, but has minimal or no fever.

## Prevention of malaria (the 'ABC' of malaria prevention)

### Awareness of risk

- Review of geographical risk areas
- Review of malaria transmission cycle

### Bite (vector) avoidance

- Protective clothing
- Repellents — N,N-diethyl-meta-toluamide (DEET)<sup>a</sup> is the most effective. Picaridin and lemon eucalyptus extract or PMD are available for those who prefer not to use DEET-based products
- Netting — impregnated with a residual insecticide such as permethrin
- Limiting exposure during transmission time (dusk to dawn)

### Antimalarial chemoprophylaxis<sup>b</sup>

- Chloroquine (restricted to limited areas where there is no resistant *Plasmodium falciparum*)
- Chloroquine plus proguanil (restricted to limited areas where there is little resistant *P. falciparum*, or where *Plasmodium vivax* predominates)
- Atovaquone plus proguanil
- Doxycycline
- Mefloquine

<https://www.gov.uk/government/publications/malaria-prevention-guidelines-for-travellers-from-the-uk>

<sup>a</sup> A 20–50% concentration is usually recommended and is safe for all travellers >2 months of age; manufacturer's guidelines for use should be followed.

<sup>b</sup> Before prescribing an antimalarial agent, the prevalence, species and potential resistance of malaria found in the travel destination must be determined, as should any medical contraindications.

**Table 3**

The most common causal organisms are bacteria, particularly enterotoxigenic *Escherichia coli*, enteroaggregative *E. coli*, *Salmonella* spp., *Campylobacter* and *Shigella*, but viruses (rotavirus, noroviruses) and protozoa (*Giardia lamblia*, *Cryptosporidium* spp.) can also be the cause. Rarer, but more serious, are the enteric fevers (typhoid, paratyphoid), which have the same risk factors as other gastrointestinal infections. Travellers can be concerned about the risk of cholera, but apart from a few specific circumstances (e.g. working in refugee camps), this poses little threat to most travellers.

The travel health practitioner should discuss both prevention and self-treatment. Prevention advice should focus on food and water hygiene, and it is useful to emphasize the 'boil it, cook it, peel it or forget it' approach to eating while abroad. The importance of hand hygiene (washing, sanitizer gels) should also be stressed; however it is not always easy to follow this advice, and illness can still occur despite adhering to it. Prophylaxis with antibiotics is recommended in limited circumstances (see Diarrhoea in travellers on pages 24–29 of this issue).

Guidelines on self-treatment should stress the importance of maintaining hydration and advise when to control symptoms with an antimotility agent, and when to treat illness with a short course of antibiotics. Mild diarrhoea should only require increased hydration and possibly an antimotility agent (e.g. loperamide), but antibiotics may be advised for moderate diarrhoea and should be used if it is severe.<sup>4</sup>

Self-administered fluoroquinolone antibiotics (ciprofloxacin, levofloxacin) or a macrolide (e.g. azithromycin) significantly reduce the duration and severity of symptoms in acute watery diarrhoea. A single dose of ciprofloxacin or levofloxacin can be sufficient in many cases if taken soon after the onset of symptoms, but treatment can be continued for up to 3 days if diarrhoea persists. In areas where fluoroquinolone-resistant *Campylobacter* is widespread (South and South-East Asia), azithromycin is the drug of choice. However, owing to its proarrhythmic properties, it should be avoided in elderly travellers with cardiovascular disease.

For moderate diarrhoea, the combination of antibiotic and loperamide is more effective in reducing both the duration and severity of symptoms compared with antibiotics alone. However, an antimotility agent is not advised if the diarrhoea is dysenteric (i.e. bloody stool with abdominal pain) or if the person is febrile.

Packaged oral rehydration salts (or a self-made simple rehydration solution) can be used to maintain hydration in infants, young children and the elderly.

Medical advice should be sought abroad if symptoms continue or if the diarrhoea is dysenteric. Travellers with persistent diarrhoea on return from their trip should undergo further investigations, particularly looking for protozoan infection with *Giardia intestinalis* or *Cryptosporidium*.

### Sexually transmitted infections

Travellers and tourists often engage in risky behaviour when abroad, and may have unprotected sexual intercourse with other travellers or locals from high-risk populations. Studies have found that 25–30% of people with a confirmed STI attending a genitourinary medicine clinic reported a new partner while away, with 60–70% not using or inconsistently using condoms.

The risk of transmission of STIs and HIV should be discussed with all travellers who seek pre-travel advice, as the risk can be virtually eliminated by practising safer sex. Raising awareness of these sensitive issues is an important part of the travel health consultation, although some practitioners find them difficult to address.

Less common risk factors for HIV infection include invasive medical treatment and transfusion with contaminated blood, which are of particular importance in sub-Saharan Africa, where the seroprevalence of HIV can approach 30%.

### Vaccinations (Table 4)

Vaccine-preventable diseases are uncommon to rare in travellers (usually <1 case per 1000 overseas visits). The decision to vaccinate a traveller is based on the epidemiology and risk of the disease, the effectiveness of the vaccine, the risk of vaccine-associated adverse events, the individual's underlying health, the cost of vaccination and the ability to employ other disease-preventing measures. The three main reasons for vaccinating travellers are:

- recommended as part of routine healthcare
- required by the destination country
- recommended because of travel-related risk.

**Routine vaccinations:** the pre-travel visit is an ideal time to make sure that travellers are up to date with routinely recommended vaccines, such as those against measles, mumps, rubella, tetanus, diphtheria, pertussis and polio. It also provides an opportunity to ensure that the traveller is up to date with any additional vaccines that might be recommended as a result of their work, lifestyle choice or underlying health problems. The recent increase in cases of measles in high-income countries emphasizes the need both to protect travellers and the destination and receiving countries.

**Required vaccinations:** the International Health Regulations (IHR) (2005) stipulate that certain vaccinations may be required for public health reasons. There are currently only two vaccinations for which the IHR (2005) apply: yellow fever and polio.

Yellow fever vaccine is recommended for those travelling to areas where there is a risk of yellow fever transmission (tropical parts of Africa, South America, eastern Panama in Central America, Trinidad in the Caribbean). However, as a condition of entry, some countries require an International Certificate of Vaccination or Prophylaxis (ICVP) against yellow fever as proof of vaccination against the infection. Before administering yellow fever vaccine, consideration must be given to the viscerotropic and neurological severe adverse events associated with the vaccine, which have been recognized over the past decade. Although these adverse events are rare (0.3–0.8 events per 100,000 doses), they are more common in those aged 60 years and older.

The IHR (2005) have also recently been applied to poliovirus. In 2014, an Emergency Committee of the World Health Organization declared that, under IHR (2005), the international spread of poliovirus represented a Public Health Emergency of International Concern, and recommendations were made for countries

## Vaccines used for international travel

### Vaccines administered in the UK for age-specific routine healthcare<sup>a</sup>

- Diphtheria<sup>b</sup>
- Tetanus<sup>b</sup>
- Pertussis<sup>b</sup>
- Poliomyelitis<sup>b</sup> (also recommended when there is a risk of disease during travel)
- *Haemophilus influenzae*<sup>b</sup>

Hepatitis B<sup>b</sup> (to be added to childhood schedule in October 2017)

- Pneumococcal
- Meningococcal B
- Rotavirus
- Measles, mumps and rubella (MMR combination vaccine) (live attenuated vaccine)
- BCG<sup>c</sup> (live attenuated vaccine)
- Influenza (inactivated and live attenuated vaccine available)
- Meningococcal C conjugate
- Human papillomavirus
- Meningococcal groups A, C, W and Y disease
- Varicella-zoster (shingles vaccine) (live attenuated vaccine)

### Vaccines that may be required for entry into a destination country

- Yellow fever (live attenuated vaccine) (required under IHR (2005))
- Polio (required under IHR (2005) for certain travellers as a condition of exit from a country reporting and/or exporting cases of polio)
- *Neisseria meningitidis* (serotypes A, C, Y, W 135; required by Saudi Arabia for Hajj and Umrah pilgrims and seasonal workers)

### Vaccines that may be recommended because of risk during travel

- Cholera
- Hepatitis A
- Hepatitis B
- Japanese encephalitis
- Rabies<sup>d</sup>
- Typhoid (inactivated and live attenuated vaccine available)
- Tick-borne encephalitis

Before administering any vaccine, the manufacturer's complete prescribing information should be consulted

IHR (2005), International Health Regulations (2005).

<sup>a</sup> UK standards for childhood, adolescent and adult immunization, and updates to the 'Green Book' are available from the Department of Health immunization website ([www.immunisation.nhs.uk](http://www.immunisation.nhs.uk)).

<sup>b</sup> Usually provided as part of multivalent vaccine products; since autumn 2004, only inactivated polio vaccine has been available in the UK.

<sup>c</sup> Bacillus Calmette–Guérin (BCG) is now administered only to high-risk children in the UK, certain occupational groups (e.g. healthcare workers) <35 years of age, and travellers <16 years of age going to high-risk destinations for ≥3 months (areas with an annual incidence of tuberculosis ≥40 cases/100,000).

<sup>d</sup> Instruct travellers on the importance of thoroughly washing any bite wound with soap and water, and seeking post-exposure treatment. Rabies immunoglobulin and vaccine can be difficult to access in low-income countries.

**Table 4**

reporting cases and/or exporting the virus to reduce the potential for spread. These measures included a requirement for an ICVP for polio vaccine for some groups of travellers as a condition of exit from a country reporting and/or exporting cases of polio.

There are occasionally specific vaccination requirements for entry into countries. For example, Saudi Arabia requires all pilgrims and seasonal workers travelling for the Hajj or Umrah to show proof of having been given the quadrivalent meningococcal vaccine as a condition for granting a visa.

**Immunization for travel-related risk:** once the practitioner has taken account of the disease epidemiology in the destination region, the mode of acquisition (e.g. food-, water- or vector-borne) and the non-vaccine preventive measures available, they can then determine the likely risk of significant disease, and the need for vaccination.

Most travellers can be safely vaccinated, although in some, vaccination can be contraindicated or should be deferred. Caution is required for travellers who are severely immunosuppressed, for whom live vaccines are contraindicated and the efficacy of inactivated vaccines may be reduced. For travellers living with HIV, guidelines from the British HIV Association ([www.bhiva.org/vaccination-guidelines.aspx](http://www.bhiva.org/vaccination-guidelines.aspx)) should be consulted. Live vaccines should generally be avoided, and must not be given to HIV-positive adults with CD4 cell counts <200 cells/microlitre. However, when travel is unavoidable, and risk of infection outweighs risk of vaccination, some live vaccines can be given to those who are asymptomatic with a stable CD4 count >200 cells/microlitre and a suppressed viral load.

All travellers should be informed that no vaccine is 100% effective and that appropriate precautionary measures should still be taken.

### Accidents, safety and security

Approximately 18–24% of traveller deaths are to the result of injuries. Unfamiliar environments, cultural and language differences, less stringent health and safety standards, increased risk-taking behaviour and lack of accessibility or adequacy of emergency care all contribute.

Most injury deaths are caused by RTAs, and travellers should be aware of the risks of being a pedestrian, passenger or driver in a foreign country, particularly when unfamiliar with local road systems. Travellers should always use seatbelts and should never drive after alcohol consumption.

Other causes of injuries include watersports, adventure activities and crime. Travellers can be perceived as wealthy, naive, inexperienced or unfamiliar with the environment and customs, and are therefore often targets for criminals.

The need for moderation of alcohol consumption and avoidance of illicit drug use must be addressed because of its tendency to promote risk-taking behaviour, including unsafe sexual practices, in addition to accidents. Travellers from the UK should consult the Foreign and Commonwealth Office country page (Table 2) to determine if there are any safety or travel restrictions for their destination.

### Travellers with co-morbidities

Travellers with underlying medical conditions can be at increased risk of adverse outcomes both during and after travel, and therefore require careful evaluation.<sup>5</sup> In addition to the standard travel-related risks, the stability of their condition(s) and the impact of travel, the overseas environment, endemic diseases, and vaccinations and other preventive measures on their underlying diseases or medication must be evaluated. The adequacy of local medical facilities and the availability of medication and medical equipment also need consideration.

Careful counselling on what to do in the event of illness abroad, medication management, use of self-treatment measures and when to seek medical assistance is key. Giving the traveller a summary of their medical record, including a medication list, can also be helpful. In the case of medication, regulations on importing or transporting medicines at their destination may also need to be checked.

Although there are few absolute contraindications to travel, some airlines may refuse to transport individuals with unstable or acute medical conditions. Therefore early preparation, liaison with their specialist and comprehensive travel insurance that will cover their underlying medical condition(s), in addition to their expected activities, is essential. Disease-specific resources are available and provide additional guidance for travellers on healthcare facilities abroad and specialist travel insurance.

In summary, most travel-related illness is avoidable if the necessary preventive measures are taken and the appropriate high-risk groups are targeted for pre-travel advice. However, some tropical infections can manifest only weeks to months after returning home. ◆

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## TEST YOURSELF

To test your knowledge based on the article you have just read, please complete the questions below. The answers can be found at the end of the issue or online [here](#).

### Question 1

A 40-year-old man attended for travel health advice. He planned to travel to Brazil for work in 4 weeks' time. He would be travelling to the Amazon starting in Manaus for 2 weeks, and then he would spend 2 weeks in Rio, although his plans were subject to change. He was well, but was HIV-positive, with a CD4 count of 350 cells/microlitre and a suppressed plasma HIV-1 RNA load. He was on antiretroviral therapy. He was up to date with his

childhood vaccinations, but was non-immune to measles. He had never had any travel vaccinations.

**What is the most appropriate vaccination advice for this traveller?**

- A. Travel vaccines are contraindicated
- B. Replicating (live) vaccines are contraindicated
- C. Oral typhoid vaccine is recommended
- D. Measles/mumps/rubella vaccine is recommended
- E. Yellow fever vaccine is contraindicated

**Question 2**

A 32-year-old woman was planning to take her 6-month-old baby boy to visit her parents in Accra, Ghana, in 3 weeks' time, staying for 4 weeks. Both were fit and well, and the child was up to date with his vaccinations. The mother was 8 weeks' pregnant and was requesting advice about malaria.

**What advice is the most appropriate advice with regard to malaria prevention for mother and child?**

- A. The mother should be advised 50% N,N-diethyl-metoluamide (DEET) is contraindicated for the child because of his age
- B. Chloroquine plus proguanil is suitable for chemoprophylaxis for both mother and child
- C. The mother should be advised that bite prevention measures are particularly important during peak *Aedes* mosquito biting times
- D. Mefloquine is suitable for chemoprophylaxis for both mother and child
- E. The mother should be advised that picaridin is the insect repellent of choice for her in view of her pregnancy

**Question 3**

A 23-year-old student planned to travel to Cambodia the following month to volunteer in a rural school, where he would be staying with a local family. Following 6 weeks of work, he planned to travel around South-East Asia for a further month. He had travelled to South America the previous year but had experienced repeated 'stomach problems' while abroad and was worried about having the same issues again.

**What advice should he be given with regard to prevention of gastrointestinal problems while abroad?**

- A. Given the problems he had last time, antibiotics should be taken as a preventive measure
- B. Ciprofloxacin should be given as a 'standby treatment' if he develops moderate or severe symptoms
- C. Hand, food and water hygiene advice should be an essential part of the consultation
- D. If he develops bloody diarrhoea with fever, he should start antibiotics
- E. Antimotility agents are not generally recommended