


Providing medical advice to travellers

See the traveller early

New Zealanders love to travel. In the year to September 2011, New Zealand residents made over two million short-term trips overseas.¹ World Health Organisation (WHO) guidelines recommend that where appropriate, travellers visit a health professional six to eight weeks prior to international departure. This allows sufficient time for any vaccination schedules to be completed.² It is important that this message is promoted to improve individual health and safety and to prevent the spread of infectious disease.

Ask detailed questions

The degree of health risk an international traveller is exposed to will be determined by their underlying health and the nature of their intended travel. Medical recommendations should be based on the risk assessment of both the traveller's health and the country of destination.

 **Best Practice tip:** A checklist for obtaining relevant information is a good way to streamline consultations. The Centers for Disease Control and Prevention (CDC) provides a suggested format for travel consultations, in the "Yellow Book", available from: wwwnc.cdc.gov/travel/page/yellowbook-2012-home.htm

Health status

Health risks associated with travel are increased for young children, elderly people, people with disabilities, pregnant women, people who are immunocompromised, people with a long-term medical condition and those travelling to a remote destination. A simple "fit to fly" test is to determine whether the patient can walk 50 m or climb one flight of stairs at normal pace without discomfort.³

Air travel is contraindicated in **infants** aged under 48 hours.² Generally, it is advisable to wait one to two weeks after birth before an infant travels by plane, to ensure that the anatomy of the respiratory system has fully developed.³ Parents should ensure that infants are adequately hydrated at all times.⁴ Malaria is particularly harmful to infants so travel to high-risk regions should be avoided if possible.

Pregnancy is not a barrier to air travel for healthy woman with uncomplicated pregnancies. Air travel is generally the safest in the second trimester. Airlines have individual policies on pregnant passengers and in some cases a doctor may be required to provide written verification that a pregnant woman is fit for travelling. Malaria during pregnancy can be extremely harmful both to mother and foetus. Travel to areas where malaria is prevalent should be avoided where possible.

Key concepts

- Travellers are encouraged to seek advice from a health professional six to eight weeks prior to departure to an international location – two or more appointments may be required
- Medical recommendations to travellers should be based on a risk assessment of both their underlying health and the duration, purpose and destination of their intended journey
- A travel medicine assessment typically includes advice about avoidance of risks, prescription of prophylactic medicines such as antimalarials and administration of indicated vaccinations

People with a **long-term medical condition** should take all necessary medicines with them in their carry-on luggage with additional supplies in their checked-in luggage. However, insulin should not be placed in cargo as cold temperature can cause it to freeze and denature. All medicines should be clearly labelled in their original containers and accompanied by a letter from a doctor detailing the need and purpose of the medicine.

Women taking **oral contraceptives** should confirm that their medicine is available in the country of destination, if their supply will run out while travelling. In some cases it may be advisable to switch to a form of oral contraceptive known to be available, prior to departure, or to use a longer-acting contraceptive for convenience while travelling, e.g. intra-uterine device, implant.

Uncomplicated **urinary tract infections** (UTIs) are common amongst young, otherwise healthy women.⁵ Consider prescribing a supply of antibiotics for female travellers with a history of recurrent UTIs.

Destination and purpose

Countries with poor water quality and hygiene standards may have high rates of infectious disease. In developing countries and areas affected by natural disaster, outbreaks of disease can be rapid and unpredictable. It is important to gather specific details on the itinerary of the traveller including whether they are visiting cities or provincial areas, the purpose of the visit and what kind of activities or work they will be engaged in.

Additional factors

There are numerous other factors that may impact on a traveller's health. Travellers that venture into more remote areas increase their risk of insect-borne infection. Budget conscious travellers may be at increased risk from contagions in crowded public transport or unsanitary accommodation, while "thrill-seekers" may be exposed to many different sources of infection and injury.⁶ Encouraging people to think ahead can help them to minimise their own exposure through avoidance strategies.

 All travellers should be advised to purchase medical insurance before beginning their journey and to register their details on the New Zealand Ministry of Foreign Affairs and Trade website, which also has updated travel warnings: www.safetravel.govt.nz

Educate to reduce risk

Traveller's diarrhoea

Traveller's diarrhoea affects up to 60% of travellers who visit high-risk destinations.⁷ Diarrhoea is defined as three or more loose or liquid stools a day and may be accompanied by nausea, vomiting, abdominal cramps and fever.⁸ The most common reason is bacteria, but viruses and parasites may also be causative.

What to tell people at risk? Advise the traveller, that if diarrhoea begins, it is important that fluid intake is increased to compensate for losses. An oral rehydration solution can be purchased, or made by adding six level teaspoons of sugar and one level teaspoon of salt to one litre of bottled water.² An anti-motility medicine, e.g. loperamide, may be used for immediate symptom control, however, these medicines are contraindicated in children aged less than three years and are not recommended for children aged under 12 years. Ciprofloxacin may be given empirically to limit the duration of the illness (500 mg, twice daily, for three days). Azithromycin is the first-line choice for children and pregnant women and visitors to the Indian subcontinent, where there is resistance to fluoroquinolones. A supply of antibiotics and anti-motility medicines may be prescribed prior to travel.

A vaccine is available which provides protection against cholera and traveller's diarrhoea caused specifically by *Escherichia coli* (protective efficacy is approximately 60%).⁹ However, this vaccine is only indicated for travellers who may be particularly vulnerable to infection, e.g. spending a long period of time in high risk areas.¹⁰ The vaccine (Dukoral) costs approximately \$60 and is in the form of an oral suspension.

Long-haul air travel


Cabin pressure in commercial aircrafts is normally equivalent to 1500 m to 2000 m, with humidity ranging from 10–15%.³ Passengers must also contend with the noise, vibration, cramped space and jet lag associated with airline travel. Drying of airways, corneas and skin is common. Travellers should be encouraged to maintain adequate levels of hydration and to use a skin moisturiser if required. Most airlines are able to offer additional services to passengers with special needs, such as specific meals, medical oxygen, wheelchairs and specific seating.

People taking regular medicines may need to be given advice on adjusting their dosing intervals in response to the timing of meals on board flights and changing time zones.

Hypnotics may be prescribed to help alleviate sleep loss during the flight, however, these medicines do not alter circadian cycles. Medicines should be prescribed at the lowest effective dose and ideally should not be prescribed for the first-time for a patient, for use during a flight.


Deep vein thrombosis (DVT) is associated with long-haul travel (over four hours) and can lead to pulmonary embolism or venous thromboembolism (VTE), which can be fatal. People at increased risk of VTE include those with pro-thrombotic states (e.g. deficiencies of antithrombin III, protein C, protein S), a history of VTE, recent surgery or a significant medical illness. Advice should be given to wear correctly fitted compression stockings and consider prescribing prophylactic low molecular weight heparin. People who are not at increased risk of VTE do not require prophylactic medicines. All passengers on air flights should be advised to regularly stretch the lower limbs and take any opportunity to walk around the cabin.

This is especially important for pregnant women. In addition, comfortable, non-restrictive clothing should be worn.

 For further information about VTE prophylaxis and treatment, see: “The use of antithrombotic medicines in general practice”, BPJ 39 (Oct, 2011).

Descent from altitude can cause pain in the middle ear and sinus cavities due to unequal air pressure. This may be particularly bad in women who are pregnant, due to tissue hyperplasia, and in young children, who often have poor eustachian tube function. Equalising pressure in the ears can alleviate these symptoms. This can be achieved by swallowing, chewing or by holding the nose and gently generating pressure against a closed mouth (Valsalva maneuver). Infants can be assisted by upright feeding, use of a pacifier or eating. Avoiding the consumption of gas-producing food in the day before a flight can ease discomfort caused by intestinal gas expansion.³

After arriving at the destination, it is important to try to adapt to the new time zone and local customs as quickly as possible. If sleep is required (and it is daytime), a short rest of no more than two hours is advised.³ Exposure to natural light is recommended to help to “reset” the circadian cycle.

 For further information about treating traveller's diarrhoea see: "Antimicrobials, choices for common infections", *bpac^{nz}* (Apr, 2011).

Heat and humidity

Loss of water and electrolytes can cause heat exhaustion and heat stroke. Travellers should be advised to drink sufficient fluid to maintain normal urine production. Older travellers need to take particular care, as the thirst reflex and ability to concentrate urine diminishes with age.¹¹

Fungal skin infections such as tinea pedis are often accelerated by heat and humidity.¹² Frequent showering and thoroughly drying the skin can help to reduce the incidence of such infections.

Cook it, peel it, boil it - or avoid it!

The following general advice can be given to any traveller to a region where infectious disease is a concern:

Basic first aid kit for travellers

- Paracetamol (for pain)
- Antiseptic cream, e.g. povidone-iodine
- Antihistamine tablets, hydrocortisone cream (for allergies, bites and stings)
- Prophylactic antibiotics, e.g. for diarrhoea
- Loperamide (for diarrhoea)
- Insect repellent, sun screen
- Water sterilising tablets
- Dressings for blisters

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- Fluids**
- All water (other than bottled water) should be boiled before drinking, or filtered and chemically disinfected
 - Avoid ice, unless made from clean water
 - Boil unpasteurised milk

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- Food**
- Do not eat uncooked food or food that has been left uncovered at room temperature.
 - Food that is thoroughly cooked and served above 60 degrees Celsius is generally safe
 - Avoid dishes containing raw or uncooked eggs
 - Avoid ice cream from unreliable sources

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- Behaviour**
- Use bottled water to brush teeth
 - Always wash hands before preparing food
 - Obtain local advice about the safety of buying any shellfish and seafood
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Avoidance is the first line of defence

Travellers can significantly reduce their risk of exposure to disease and injury by avoiding situations with increased risk and practicing effective management strategies, e.g. using insect repellent.

Animals

Rabies is prevalent in many countries and is transmitted by animal bites, scratches or licks (in the site of broken skin). When animals become infected with rabies they may be aggressive and bite without warning, therefore animals should not be approached. Rabies is mainly transmitted by dogs, however, any mammal can transmit the disease, e.g. bats, cats or monkeys. People travelling to regions where rabies is prevalent should consider pre-exposure vaccination (Page 38) before departure.

Advise travellers that in the event of an animal bite, the lesion should be immediately and thoroughly washed with disinfectant, soap or detergent and medical care sought.

Insects

Humans can be infected by a number of insect-borne infectious diseases such as malaria, chikungunya fever and dengue fever. Transmission risk varies by region and fluctuates with season. Infection risk can be reduced by seeking accommodation in urban areas and sleeping in air-conditioned rooms.

Travellers should be advised to apply an insect repellent containing 30% DEET (adults, children aged over three months and pregnant women). Insecticide can also be applied to clothes. Spraying a bedroom with insecticide before sleeping and using a mosquito coil in conjunction with a sleeping net provides a high degree of protection. Sleeping nets should have mesh holes no larger than 1.5 mm and their effectiveness is increased if pre-treated with permethrin. Wearing long-sleeved clothing and tucking trousers into socks in flea and tick infested areas is also recommended.

Malaria

Malaria is caused by one of five Plasmodium protozoan parasites – *P. falciparum* (the most severe), *P. ovale*, *P. malariae*, *P. vivax* and *P. knowlesi*. The parasite is transmitted by female Anopheles mosquitoes, which generally bite between dusk and dawn. The various forms of malaria have an incubation period from seven days and the disease is characterised by a fever with chills, headache, muscular aching, weakness, vomiting, cough, diarrhoea and abdominal pain.

Malaria is present in some regions in the following areas:

- Pacific countries west of Fiji, e.g. Papua New Guinea, Solomon Islands, Vanuatu, Indonesia
- Southeast Asia and India
- Africa and South America

There are several antimalarial medicines available in New Zealand (Table 1, over page). Antimalarial drug resistance is spreading and prophylaxis recommendations vary from country to country. It is important to remind patients

Travelling to high altitude

Most people, including those with stable coronary disease, hypertension, diabetes, asthma or mild chronic obstructive pulmonary disease (COPD) and pregnant women, can generally travel to locations at high altitude, e.g. mountainous regions, without complications - although their condition should be monitored. However, people with unstable angina, pulmonary hypertension, moderate to severe COPD or sickle cell anaemia are advised not to travel to high altitude locations.²

When travelling to higher altitudes, gradual ascent and adequate hydration is advised. Even after acclimatisation has occurred, aerobic ability is impaired and travellers may still have problems with sleep.


Above altitudes of 2500 m the risk of high-altitude illness increases markedly. This is exacerbated by the consumption of alcohol or physical exertion.^{13,14} Acute mountain sickness refers to a collection of symptoms including: headache, fatigue, nausea, dizziness, sleep disturbance, and in rare cases, pulmonary or cerebral oedema. Symptoms can occur within one to 12 hours of reaching altitude and often spontaneously resolve within 24–48 hours, or after descent to lower altitude. Gender and fitness levels have little influence on predisposition to acute mountain sickness.¹⁵

Table 1: Antimalarial medicines available in New Zealand

Antimalarial	Cost	Prophylactic dose	Contraindications and cautions	Adverse effects
Hydroxychloroquine sulphate	Fully funded	400 mg, once per week; adults 5 mg/kg, once per week; children Begin two weeks before departure, continue until four weeks after returning	Contraindications: maculopathy, age under six years Interactions: monoamine oxidase inhibitors, digoxin, antidiabetics	Gastrointestinal disturbance, headache, skin reactions, hair loss, visual disturbance
Doxycycline	Funded as an antibiotic only	100 mg, per day; adults 2 mg/kg, per day; children aged over 12 years. Begin two days before departure, continue until four weeks after returning	Contraindications: pregnancy (especially after first trimester), breast feeding, age under 12 years Caution: concurrent use of oral retinoids or vitamin D	Gastrointestinal disturbance, photosensitivity (can be severe), oesophagitis, enamel hypoplasia, tooth discolouration, hepatic dysfunction
Atovaquone + proguanil (malarone)	~ \$100 (12 tablets)	Atovaquone 250 mg and proguanil 100 mg (one tablet), per day; adults and children > 40 kg Begin one to two days before departure, continue until one week after returning	Contraindications: severe renal impairment	Gastrointestinal disturbance, oral ulcers, headache, dizziness, muscle pain, pruritis, alopecia
Mefloquine	~ \$60 (8 tablets)	250 mg, once per week; adults and children > 45 kg Begin one week before departure, continue until four weeks after returning	Contraindications: severe renal or hepatic impairment, psychiatric disturbance, history of convulsions	Gastrointestinal disturbance, anxiety, depression, confusion, dizziness, headache, somnolence, neuropathy, memory impairment, tinnitus, convulsions, sleep and visual disturbances

that no antimalarial medicine is 100% effective and that mosquito bite avoidance is essential.

Antimalarial medicines may be taken by pregnant women if the benefit of prophylaxis outweighs the risk associated with the medicine. However, where practical, pregnant women are advised to avoid travelling to areas where malaria is prevalent. The Australian Therapeutic Goods Administration pregnancy classifications for antimalarial medicines are; hydroxychloroquine and doxycycline category D, mefloquine category B3 and atovaquone and proguanil category B2.

 The WHO publishes regularly updated information about malaria prevalence, drug resistance and recommended antimalarial prevention, including an interactive map. This also includes information about yellow fever and rabies requirements:

www.who.int/malaria/travellers/en

Treating patients upon return

Malaria can be fatal if treatment is delayed beyond 24 hours of symptom onset. Unexplained fever occurring in people within three months of leaving a high-risk country is a medical emergency. All patients with suspected malaria require an immediate blood test to detect the presence of parasites. If there is a delay in confirming a diagnosis then empiric treatment with an antimalarial medicine other than that used for prophylaxis is indicated.

Vaccinate where appropriate

Travel provides an opportunity to review a person's immunisation status. Required vaccinations will depend on the patient's immunisation history, country of destination, duration of travel and the length of time until departure.

The New Zealand immunisation schedule covers all vaccinations that are routinely recommended by the WHO for travellers.¹⁶ A combined booster for tetanus and diphtheria is recommended for travellers when the last vaccination for these diseases was greater than ten

years ago. A booster vaccination against polio should also be considered for those travelling to regions where the disease is prevalent.¹⁷ Generally, where a patient's level of immunity is uncertain (e.g. immunisation received many years previously), it is recommended that a booster vaccination be given. When immunity status is unknown, blood tests can be taken to establish immunity to specific diseases.

Vaccines that are not covered by the national schedule

The following vaccines may be considered depending on the traveller's destination. N.B. these vaccinations are not funded.

Hepatitis A is transmitted via the faecal-oral route. The incubation period is 14–60 days. The regimen is a single dose with a booster six to 12 months later for any person aged over one year. Immunity occurs after 14 days and is thought to persist for at least 25 years. However, the vaccine can be administered up to the day of departure and still provide some level of protection.² Combined hepatitis A and B vaccines can be administered and a combined hepatitis A and typhoid vaccine is also available.

Typhoid is an acute febrile bacterial infection transmitted through ingestion of food or water contaminated with *Salmonella typhi*. The incubation period is generally one to four weeks, but can be as little as three days or up to two months. Immunity occurs in approximately 70% of people, seven days after vaccination. A booster dose is required every two to three years. Immunisation of children younger than age two years is not recommended.

Influenza season in the northern hemisphere occurs from approximately October to May. All people aged 65 years or older, people with co-morbidities, pregnant women and children aged between six months and five years should be encouraged to be immunised prior to travel to the northern hemisphere during "flu season". Although influenza vaccines given in the southern hemisphere may not be as current as the latest northern hemisphere vaccinations, they are still likely to provide some degree of protection to travellers vulnerable to infection.

Japanese encephalitis is a mosquito borne virus transmitted to humans from pigs and birds and occurs in almost all Asian countries. Most infections are asymptomatic, however, approximately 25% of symptomatic cases are fatal.² The risk of infection to most travellers is very low. The incubation period for this disease is five to 15 days. A vaccine is available as a series of two doses which are given 30 days apart. The time to immunity is ten days and lasts for approximately one year.

Meningococcal disease is a bacterial inflammation of tissues surrounding the brain and spinal cord and is transmitted through respiratory secretions. The incubation period is generally three to four days, but can be up to ten. There are two types of meningococcal vaccine available in New Zealand – quadrivalent and meningococcal C vaccines. Quadrivalent vaccination is recommended for travellers to Sub-Saharan Africa or Mecca. A single dose vaccine provides immunisation for approximately three years, beginning ten days after administration. The quadrivalent vaccine does not provide protection against meningococcal B, which is present in New Zealand (N.B. meningococcal B vaccine is no longer available in New Zealand). Meningococcal C vaccine is intended for infants and young adults living in hostel situations and is not specifically a travel-related vaccine.

Rabies is a viral infection transmitted via animal bites, licks or scratches. Rabies causes acute encephalitis in humans and is often fatal. Pre-exposure immunisation does not prevent rabies and does not eliminate the need for rabies treatment, however, it reduces the number of vaccine doses required and increases the length of time in which medical help can be sought, should an incident occur. A full course of pre-exposure intramuscular rabies vaccinations can be given to anyone aged over one year and includes doses on days 0, 7 and 21 to 28, with immunity occurring after 30 days. Post-exposure vaccination for rabies comprises five vaccine doses for people not previously vaccinated or two doses for those who have been previously vaccinated.

Yellow fever is a viral haemorrhagic fever transmitted from monkey to person, or person to person after mosquito

bite. The incubation period is three to six days. Yellow fever vaccination is given in a single dose with complete immunity occurring within ten days. Yellow fever vaccination is available only at designated yellow fever clinics. Some countries, such as those in Sub-Saharan Africa and South America, require that travellers carry a written record of Yellow Fever vaccination (or a written opinion from their physician if the vaccination is contraindicated for medical reasons). International vaccination certificates can be downloaded from the WHO website: www.who.int/ihr/IVC200_06_26.pdf

Travel resources available for health professionals

The World Health Organisation provides a comprehensive website and an annual publication: “The international travel and health book”, which can be accessed and downloaded online: www.who.int/ith/en

The United States Centers for Disease Control provides the latest updates on outbreaks of infectious diseases around the world, including recommended vaccinations. It also publishes a biannual resource for those who advise international travellers about health risks: www.cdc.gov

The Aerospace Medical Association produces medical guidelines for airline travel, covering many common long-term conditions:

www.asma.org/publications/medicalguideline.php

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