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CLINICAL REVIEW

# Preparing young travellers for low resource destinations

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Increasing numbers of young adults travel to developing regions for leisure and social projects. Illness—mainly self limiting gastrointestinal or respiratory syndromes—is reported in three quarters of all such travellers.[1-4] Adverse health events occur more often in young travellers than in older ones, and these are associated with basic living conditions, longer duration of travel, and risk taking behaviours.[3 5] Road traffic crashes and injury while swimming also cause an excess number of deaths.[6]

Although extensive data are available on prevention of infectious diseases, data are lacking on accident prevention and behaviour modification to reduce health risks. Most research has focused on travellers of all ages, so extrapolation is needed to provide information on the subgroup of younger people.

Healthcare professionals are often consulted about pre-travel issues, and this review aims to provide them with published evidence and expert opinion on the major health problems that affect young people travelling to developing countries. It will also provide a framework for performing a travel health risk assessment.

## What is involved in a pre-travel risk assessment?

A pre-travel risk assessment is the process of gathering information on socioeconomic, behavioural, environmental, and medical factors that are likely to affect travellers at their destination (box 1).[7] This is combined with policy recommendations and the individual's preferences to make shared decisions on the most appropriate travel health interventions. Effective communication of risk, traveller's perception of risk, attitude to preventive measures (including cost and side effects), and ability to comply with behaviour modification must all be considered.

## How can infectious diseases be prevented?

### What vaccinations need to be considered?

Cohorts of returning travellers have low rates of vaccine preventable diseases, with hepatitis A occurring at 1.35 per 100 000 person months and typhoid at 0.42 per 100 000 person months.[8 9] The risk may be higher in travellers on a low budget who visit developing regions. Guidelines are available on country specific vaccinations,[10 11] but individual risk assessment is needed for some vaccines.

Decisions on the need for rabies vaccination should take into account the duration of travel, whether rabies is endemic in the travel destination, age (children are at highest risk), and access to post-exposure prophylaxis with rabies immunoglobulin; however, exposure can be unpredictable. In a survey of backpackers in Bangkok (mean age 25 years), the rate of being bitten was 6.9 per 1000 person months, more than half of bites occurred within the first 10 days, and many people were poorly informed about the risk of rabies before travelling.[12] The need for immediate medical attention after a bite must be emphasised, regardless of vaccination status.

The risk of being exposed to hepatitis B during travel is low, and infection is mainly transmitted sexually in those who are visiting friends and relatives.[13] A prospective cohort study found influenza seroconversion rates of one per 100 person months after travel, making flu the most common vaccine preventable infection, and vaccination is increasingly recommended.[14] Because cost is often a problem, a discussion of risk versus benefit will enable the patient to make an informed decision on the most cost effective vaccines. Ensure that the traveller is up to date with routine vaccinations and arrange for catch-up vaccinations if necessary. In a study of people attending a pre-travel clinic in an inner city, a large proportion of whom

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**Summary points**

Data on health problems encountered by young travellers are lacking and further research is needed

Non-infectious threats are a priority in the pre-travel risk assessment

Provide advice on injury and crime prevention, sexual health, alcohol, drug use, and prevention of infectious diseases

Universities and volunteer organisations should emphasise pre-travel preparation, occupational health advice, and protocols to manage illness and injury overseas

Influencing and changing behaviour is important and most difficult in this group

Shared decision making improves understanding and compliance

**Sources and selection criteria**

In this specialty, data come from population surveys, retrospective reviews, and cross sectional or cohort studies, often limited to a single centre or destination,[7] and less often from large randomised controlled trials.

We searched PubMed using combinations of words including young, youth, student, elective, volunteer, travel, traveller, health, illness, risk, advice, developing, tropical. The search was limited to the past 25 years and English language articles, and we focused on the 18-35 age group, excluding studies in children. Appropriate publications were selected from the abstracts, and additional relevant articles included from their references. We also performed searches within specific areas, such as travellers' diarrhoea. In most cases few, if any, such studies focused on young people specifically. Relevant guidelines, policies, and websites were consulted where possible for supplemental data.

**Box 1 Performing a pre-travel risk assessment**

The following must be ascertained to identify risks and appropriate interventions:

- Travel destination(s) including region, planned accommodation, and season of travel
- Purpose of travel: tourism, visiting friends and relatives, study, or work. Aspects to consider include planned leisure activities, nature of work or volunteering, and whether the trip is organised or self prepared
- Modes of transport, taking note of high risk travel, such as motorcycle riding
- Duration of travel
- Whether travelling alone or in a group
- Medical history: long term conditions, psychiatric illness, drugs
- Social history: alcohol use, illicit drug use, sexual history
- Previous travel experience: understanding of health risks at destination, experience of preventive strategies and barriers to uptake, particular concerns
- Behaviour: risk threshold and risk taking
- Likelihood of behaviour change

were young travellers about to visit friends and relatives, at least a third of people needed one or more routine vaccination.[15]

## How can malaria be prevented?

*Plasmodium falciparum* malaria occurs in 52-169 per 100 000 travellers to west Africa.[16] A cross sectional survey at two airports in Zimbabwe found that younger travellers (18-30 years) were more likely to travel to malaria risk areas, were significantly less informed about prophylaxis, and travelled for longer periods (more than four weeks), all of which were associated with lower rates of adherence to chemoprophylaxis.[17] Region specific guidance on chemoprophylaxis is available,[18 19] but malaria surveillance and travel statistics estimate risk at less than one per 100 000 travellers for many parts of South America and Southeast Asia, and it has been suggested that chemoprophylaxis is unnecessary.[20] Education through written information, instructions for chemoprophylaxis, and an outline of malaria symptoms should be provided, with advice to seek medical attention and rapid diagnostic testing should these symptoms occur, even up to six months after return. Some specialists recommend prescribed standby treatment, but a doctor should be consulted as soon as possible.[21] Data are needed on self diagnosis and treatment of malaria in young travellers.

## How can diarrhoea be prevented and treated?

Travellers' diarrhoea affects 20-90% of travellers to high risk areas, including South and Southeast Asia, sub-Saharan Africa, Egypt, and South and Central America.[22] A single centre questionnaire based study that prospectively investigated illness in travellers showed that younger travellers were at greater risk of diarrhoea, and that this was associated with basic living conditions, poor hygiene, and excessive alcohol.[3]

Comparable results were found in a similar study that compared young travellers (18-30 years) with older (>60 years) ones; the young travellers were also noted to have more risk taking behaviours.[5] Reviews of studies investigating diet and travellers' diarrhoea failed to show a correlation with food choice,[23] but travel destination and eating establishment were important predictors.[24] Advice should focus on self treatment and rehydration. A systematic review supported prompt antibiotic treatment (for example, ciprofloxacin) in reducing symptom duration.[25] In South and Southeast Asia, azithromycin is preferred because of fluoroquinolone resistance in *Campylobacter* spp.[26] Loperamide has a role, but it should be avoided in patients with fever or bloody diarrhoea.[27]

## What should we advise young travellers about personal safety?

Advice on personal safety is often not included in the pre-travel consultation. Leggat and Klein have written a useful overview on safety.[28]

## How can accidents and injuries be prevented?

Data on travel related injuries are limited, with most data focusing on mortality. Retrospective studies of deaths in US

and Canadian citizens overseas showed that 25% and 18.7%, respectively, were caused by accidents,[29 30] whereas only 1% were caused by infection. The mean age was significantly younger for accidental death than for natural death (45 *v* 66 years).[30] The most common causes of death were motor vehicle collisions (21-27%), drowning (14-16%), and murder (9-17%).[29 31] Population based studies of road traffic crashes in resorts suggest that risk is fivefold greater for tourists than for locals.[32 33] A travel clinic based survey showed that more than 5% of tourists experience falls and recreational injuries,[3] making them a much more likely occurrence in young travellers than a serious infectious disease. Traumatic injuries may require air evacuation.[34]

In developing regions, risk of accidental injury is high. A review of the health records of tourists presenting to healthcare settings in Jamaican resorts showed that accidents were responsible for around 40% morbidity.[35] In a similar study in Mexico, accidents contributed to 50% of deaths in tourists.[w1] Indeed, accidents are associated with significantly higher proportional mortality ratios in Africa (2.7) and Southeast Asia (1.6) compared with the United States.[31] Morbidity data for developing regions are probably a gross underestimate.[w2] The World Health Organization estimates that, globally, injuries from road traffic collisions are around 20 times more common than deaths.[w3]

Various studies indicate that accidents abroad are associated with male sex,[29 35 w4 w5] younger age,[29 w6] developing countries,[34 35 w1] urban destinations,[w7] risky transport such as motorcycles and watercraft,[5 29 w4 w8] and diving into shallow water.[w9]

Proposed contributing factors include differences in safety measures at the destination compared with the traveller's home country,[w10 w11] high rates of road traffic crashes in developing countries,[w12] unfamiliar environment and activities,[35 w10 w11] poor quality equipment (including lack of safety features and seatbelts),[4 w10 w11] and alcohol and drug intake.[32 w9] Injuries in low resource settings are further complicated by limited and delayed access to healthcare and repatriation.

Strategies to prevent travel related accidents have been proposed, but no interventions have yet been evaluated. A decline in deaths overseas of Peace Corps volunteers (mostly aged 20-39 years) was attributed to a reduction in accidents after restrictions on motorcycle use were introduced.[w13] This shows that policy and legislation may have a greater impact than advice, which relies on action or a change in behaviour by the individual. Preventive strategies require collaboration between medical practitioners, the travel industry, and health officials in the host country so that measures can be implemented at multiple levels.[w8]

Recommendations for water safety and prevention of drowning have been published,[w14] and general advice on accident prevention can be found on national travel health websites.[11 12] Box 2 summarises recommendations based on expert opinion.

## How can violence and attacks by criminals or terrorists be prevented?

Threats to safety and security vary between destinations, and detailed country specific information is available from government websites.[w15 w16] In surveys of young holidaymakers, 2.8-6.4% reported having been in a physical fight.[w5 w17] This type of violence was associated with male sex, alcohol, drug use, and "nightlife" destinations.[w5] In surveys of long term volunteers in developing regions, however, almost 25% reported exposure to violence, such as mugging, police violence, and political unrest.[w18] In the Peace Corps, 17% of deaths were attributable to murder; most occurred in Africa and were motivated by robbery.[w13] Again, there is no evidence on how to prevent criminal attacks. Travellers should consult the Foreign Office website before travel to identify any high risk areas or activity.

## How can environment related illness be avoided?

The table⇓ outlines environmental hazards experienced by travellers.[w19] Adventure travel carries a high risk, and a questionnaire study of expedition participants (mostly aged 18-40 years) showed that 7.6% experienced health problems, ranging from insect bites and stings, to heat exhaustion and acute mountain sickness.[w20] Although acute mountain sickness is a well recognised risk in those who trek and climb mountains, it is often overlooked in non-adventure travellers to high altitude. In Cuzco (3360 m), a cross sectional airport based survey of departing travellers (mean age 32 years) reported 48.5% developed altitude sickness, as defined by the Lake Louis clinical score. Despite high rates of pre-travel advice, many of these people were unaware of this risk.[w21] Prospective collection of data on travellers and expatriates (median age 31) presenting to a Kathmandu clinic showed that male sex, tourist travel, and lack of pre-travel advice were risk factors for environment related illness.[w22] Information and preparation before travel help reduce risk. Travel health websites provide country specific information and supplementary leaflets.[11 12] Specific advice for backpackers,[w23] a review of medically important venomous animals,[w24] and guidelines on prevention of acute mountain sickness are also available.[w25 w26]

## What should we advise on alcohol and illicit drugs?

Surveys of 18-35 year old backpackers in Australia suggest that their alcohol consumption is significantly increased while travelling.[w27] Surveys of travellers (mean age 25 years) to Southeast Asia also showed that rates of illicit drug use exceeded 50%,[w28] probably because of low cost and widespread availability. Cannabis was most popular, although ecstasy, cocaine, or lysergide (LSD) were used by 20% of those who travelled for more than 20 weeks.[w28] Large epidemiological studies on the association between alcohol and substance misuse and accidents, injuries, and psychiatric comorbidity, as well as cross sectional surveys of 16-35 year old British tourists abroad, show that these substances are associated with road traffic incidents,[32 w29] trauma,[w9 w30 w31] violence,[w17 w31] unsafe sex,[w31] and mental health problems.[w32] Substance misuse overseas carries an increased risk of dehydration, hazardous contamination, overdose, lack of social support, anxiety, and depression.[w27 w33]

Predictors of substance misuse are male sex, smoking, previous use, lack of higher education, lone travel, and prolonged travel.[w28] The hazards of alcohol and illicit drugs should be discussed during a pre-travel consultation, with the serious penalties for possession in many countries being described.

## What should we advise on sexual health?

Surveys show that young travellers have high rates of new sexual relationships (47.5%-68.9%),[w34 w35] particularly young travellers,[w36] with 21.5-45% having multiple partners.[w35] In addition, 40% do not use condoms or use them inconsistently.[w34 w35 w37] Although most young people have sex with other travellers or expatriates, some have sex with local people, including sex workers.[w37 w38] Having sex with local people increases the risk of acquiring common sexually transmitted infections and also

**Box 2 Advice on personal safety**

*Any threat*

- Undertake pre-travel research using reputable guide books and web resources to determine threats
- Arrange insurance that is appropriate for the destination and anticipated activities
- Keep family and friends informed of your itinerary, and communicate regularly throughout the trip—for example, with a travel blog
- Register with your embassy if travelling remotely or for more than one month

*Accidents and injuries*

- Avoid using scooters or motorcycles and wear helmets if you do so
- Wear seatbelts in motor vehicles and on public transport if available
- Avoid travel at night and in bad weather conditions
- Avoid unsafe travel, such as a quad bike, on the back of a truck, or on the roof of a bus
- If planning sport or adventure activities, ensure safety equipment is provided and bring appropriate and well fitting clothing, footwear, and protective eye wear
- Undertake adventure sports with a companion or in a small group, with an experienced guide if your experience is limited
- Seek local advice on environmental hazards and weather conditions if planning outdoor pursuits, and carry a mobile phone if possible
- Carry a first aid kit and know how to use it
- Know the depth of water and any underwater hazards before diving; diving feet first is advised
- Pay attention to signs and surf conditions when swimming or undertaking water sports, and use flotation devices or life jackets where necessary
- Do not consume alcohol before swimming, cycling, or using a watercraft

*Violence and theft*

- Avoid travel to areas of conflict or political unrest
- Travel with a companion or group
- Stay in secure accommodation and use a safety deposit box
- Use only official taxi services
- Carry minimal amounts of money; a hidden money belt may be useful for holding passports and larger amounts of money
- Do not wear expensive watches or jewellery
- Dress appropriately with respect to local culture
- Avoid illicit drug use and excessive use of alcohol because of the increased risk of violent attacks and theft
- Never accept food or drink from strangers, and do not leave drinks unattended because of the risk of “spiking”
- Ensure that hired cars are roadworthy and can be locked securely
- Upload important documents onto a secure website before travel in case of theft

*Environment related illness*

- Seek local advice on environmental hazards, including flora, fauna, and weather conditions
- Wear protective clothing, high factor sunscreen (reapplied regularly), and insect repellent
- Carry a first aid kit
- Carry an adequate supply of water and high energy snacks
- Carry a flashlight for walking at night
- Check shoes and clothes carefully for spiders, scorpions, and so on
- Wear a stinger suit when swimming in areas with jellyfish
- Remain in vehicles when travelling through wildlife reserves
- When ascending to high altitude, adjust ascent to 300 m a day if possible; prophylactic acetazolamide may be considered but should not replace gradual ascent

HIV, syphilis, lymphogranuloma venereum, chancroid, and donovanosis, which are endemic in many regions.[w39]

The above studies showed that risky sexual behaviour was associated with the number of pre-travel partners,[w34] prolonged travel,[w35] high frequency of alcohol and drug use,[w34 w35] frequent nightlife,[w35] and pre-travel expectation of sex,[w35 w37] as well as being single,[w37] male,[w37] and homosexual or bisexual.[w37] A randomised controlled trial that compared standard pre-travel consultation, with additional provision of condoms, and a motivational brief intervention showed no effect on condom use in young travellers.[w40] Nevertheless, we should highlight sexual health risks and the role of excess alcohol and drugs, and encourage condom use. A guide to sexual health for young travellers has been published.[w41]

## What extra advice should we give medical students and volunteers travelling to developing countries?

In addition to the above risks, medical students are exposed to tuberculosis and blood borne viruses. Surveys report needlestick injuries and splash exposure in 8-37% of medical students who travel to developing countries, usually when performing procedures in which they lack experience.[w42-w44] Few carry HIV postexposure prophylaxis (PEP), and reporting of exposure to blood and body fluids is poor.[w42-w44]

Stress and psychological problems due to the nature of the work, culture shock, and social isolation are also prevalent.[w45] Forty per cent of humanitarian aid workers report that their mission was more stressful than they had expected.[w46] Stress is exacerbated by the high (16-25%) rates of violence and crime

experienced by aid workers.[w18 w46] Peace Corps volunteers now undergo pre-travel screening, training in hazard avoidance, and self monitoring of physical and psychological status, and this may have contributed to the reduction in deaths from accidents and suicide in this population.[w13]

Pre-travel risk assessment and preparation—focusing on planned practical procedures and competency, access to PEP, psychological screening, adjustment to local cultural norms, personal safety, and insurance (with medical repatriation)—are essential in these groups. Ideally the consultation should be standardised for all travellers. Some organisations prohibit students undertaking invasive procedures in countries where HIV is prevalent. Simulated procedure training has been shown to reduce needlestick injuries but not exposure to splashes,[w43] so students should be provided with safety glasses. A PEP starter kit (5-7 days) should be supplied for areas of high HIV prevalence, accompanied by written instructions on immediate action and reporting if exposure occurs.[w47] Who should pay for PEP is a topic of controversy.[w42 w44] Provision of an emergency helpline for students with health problems overseas and a post-travel consultation have been recommended.[w44 w47]

## What about people with a long term medical condition?

Chronic medical conditions, including psychiatric ones, should be reviewed as part of the risk assessment when deciding on the itinerary or deployment. Suitability and personal safety should be evaluated by both parties at the outset. Advise patients on carrying medical documentation, sufficient medication, or equipment (or a combination thereof) and provide information on how to access relevant healthcare abroad. Health insurance must cover pre-existing conditions. A written individualised self management plan is useful for some chronic conditions such as asthma. Detailed advice is available but outside the scope of this review.[w48 w49]

## How can we encourage young travellers to be more responsible for travel health problems?

Questionnaire surveys of students and backpackers suggest that many do not seek pre-travel advice. Those who do seek advice often use non-expert sources, and the information provided may not agree with that from health professionals.[w50-w52] Information evenings and written travel health advice from hostel organisations, along with web based resources and simulations, may engage and educate young people and potentially influence their perceptions and behaviour.[w52 w53] Further research is needed into health problems in young people who travel to resource poor settings. Collaboration between the tourism and travel industry and healthcare professionals is necessary to identify the most effective methods of influencing risk taking behaviour.

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**Additional educational resources**

*Resources for healthcare professionals*

National Travel Health Network and Centre (www.nathnac.org)—Country specific guidelines for healthcare professionals on vaccination and disease prevention, as well as health and safety advice for the preparing traveller

*Resources for patients*

Centres for Disease Control and Prevention (wwwnc.cdc.gov/travel/destinations/list.htm)—Health and safety advice for the preparing traveller

Fit for Travel (www.fitfortravel.nhs.uk/advice.aspx)—Health information for people travelling abroad from the UK, including advice for patients with asthma, diabetes, or disability, and advice on altitude and volunteer work

Year Out Group (www.yearoutgroup.org/)—An association of independent registered organisations that provide structured programmes for young travellers planning volunteer work, expeditions, or cultural exchanges

# Table

**Table 1| Environmental hazards to travellersw19**

| Activity or destination | Environmental hazards |
|---|---|
| Summer holiday | Sunburn, heat exhaustion or heat stroke, dehydration, insect bites, animal bites, diarrhoeal disease |
| Urban travel | Respiratory illness due to air pollution, heat exhaustion or heat stroke, dehydration, diarrhoeal disease, insect bites |
| Camping or hiking | Skin blisters, hypothermia, diarrhoeal disease, insect bites, animal bites, tick borne and other zoonotic infections |
| Skiing | Hypothermia, frost bite, sunburn, snow blindness, avalanche risk, trauma |
| Mountain climbing | Skin blisters, hypothermia, frost bite, acute mountain sickness, sunburn, snow blindness, trauma |
| Fresh water rafting or kayaking | Drowning and cold water immersion, hypothermia, diarrhoeal disease, minor abrasions, leptospirosis, schistosomiasis in some tropical regions |
| Scuba diving or snorkelling | Venomous jelly fish and stingrays, abrasions, coral cuts, decompression and motion sickness |