

## Diagnosing the tropical traveller

Global travel trends have meant a huge increase in the numbers of people travelling abroad, and to increasingly remote countries. In the 1960s, international travellers numbered <100 million. Now over 900 million people travel abroad every year<sup>[1]</sup>.

There are no published figures for the number of these travelling 'off the beaten track', but it is clear that such destinations are increasingly popular. It's also clear that their (paradoxical) accessibility means they attract a new breed of traveller – those who are not young or particularly fit.

For those travelling to a developing country for one month, injury, usually due to road traffic accidents (RTAs), is the most common cause of mortality and morbidity. However<sup>[2]</sup>:

- 50% will develop a health problem during their trip.
- 8% will see a doctor.
- 0.3% will require hospital admission (either abroad or on return).
- 0.001% will die.
- 1-4% of travel-related deaths are due to infectious disease.

The patient who returns unwell provides a considerable challenge. They may have been exposed to conditions with which you are not familiar, or even to conditions of which you are not aware.

It is important to develop a diagnostic sieve to exclude the serious and potentially fatal, and conditions which could pose a public health risk. If uncertain, health professionals can contact the National Travel Health Network and Centre (NaTHNaC).

# Important questions for history taking

The history needs to be focused on the likely cause of the disease, which will vary with area of travel, but also with risk-taking behaviour and with conditions encountered.

The initial focus must be on ruling out conditions which are progressive, transmissible and treatable. It may be necessary to alert public health authorities or infectious diseases units early with a view to containment.

Doctors seeing returning travellers may feel out of their 'comfort zone', as they may be presented with diseases with which they are not familiar. Most illnesses in returning travellers are caused by common infections such as bacterial pneumonia. Some will be due to more uncommon conditions, in the UK at least, and it important to have some awareness of disease prevalence in the areas of travel, and the ability to access up-to-date information.

- Symptoms - nature, onset, duration.
- Travel departure and return dates.
- Area of travel (which determines disease exposure).
- Rural/urban/forest/mountains - nature of terrain.
- Duration of visit - risk increases with length of stay.
- Purpose of travel: for example, emergency relief workers and healthcare workers are at higher risk of infectious diseases.
- Behaviour and lifestyle of traveller - riskier activities increase the chances of mishap. Swimming in fresh water in certain areas raises the possibility of schistosomiasis.
- Degree of contact with the local population.
- Known disease contacts.
- Known insect or animal bites, scratches or licks.
- Unprotected intercourse.
- Diet whilst travelling.

- Vaccination history.
- Malarial prophylaxis and compliance.
- Injuries or illnesses (how and where treated: injections given, blood taken, blood transfused, surgery, and sterility of equipment and supplies).

## **Findings needing urgent attention**

A number of serious diseases, or manifestations of severe forms of diseases, may present in the returning traveller. Possible bleeding disorder, neurological signs and respiratory distress should prompt an emergency response. Urgent response is also needed for fever in the returning traveller accompanying any of:

- Rash.
- Breathing difficulty.
- Altered conscious level.
- Bruising or unusual bleeding.
- Persistent vomiting.
- Paralysis.
- Jaundice.

## **Presentation of illness**

Fever commonly accompanies serious illness in the returning traveller, and can signify a rapidly progressive condition such as malaria.

## **Conditions presenting with fever**

- **Malaria:**
  - This should be considered in any patient presenting with fever, who has been to a malaria endemic area within the preceding year. More severe forms of malaria tend to present within a month of return from travel<sup>[3]</sup> <sup>[4]</sup> .
  - Clinically the patient may complain of fever, chills, sweats, headaches, muscle pains, nausea and vomiting.
  - Gold-standard diagnosis is finding malarial parasites on a slide.
- **Hepatitis A:**
  - This condition is acquired through oro-faecal ingestion and incubation takes approximately one month.
  - There is generally sudden onset of fever, fatigue, nausea and then jaundice. The condition varies from a mild systemic disturbance to a fulminating hepatitis with liver failure, although the latter is rare.
- **Typhoid fever:**
  - This is reported from virtually all countries, but is concentrated in developing countries and in areas with inadequate sanitation.
  - Fever is the hallmark of the disease, with relative bradycardia, dry cough, constipation and splenomegaly. Rash (rose spots), headache, and diarrhoea may occur.
- **Cholera:**
  - Incidence is very low at two cases per million travellers<sup>[5]</sup> .
  - Cholera causes a catastrophic diarrhoea with resulting fluid and electrolyte imbalance.

- **Yellow fever:**
  - This mosquito-borne disease is found in parts of South America and Africa.
  - Vaccination is available and certification required for entry to some countries.
  - Features include fever, exudative sore throat, facial oedema and prostration.
  - Diagnosis is made on serology.
- **Dengue, Chikungunya fever, West Nile virus:**
  - Arbovirus infections are the main cause of viral fevers in returned travellers, and tend to have short incubation periods, typically less than two weeks<sup>[6]</sup>.
  - Dengue is the most common arbovirus in travellers and is transmitted by *Aedes* mosquitoes, which tend to bite during the day. Symptoms are flu-like, with muscle pains and fever. Epidemics occur in Southeast Asia and large numbers of cases have been recorded in Southern Europe. Most cases are mild but second infections by a different serotype can be severe and lead to thrombocytopenia.
  - Chikungunya fever is increasingly common, and is very similar to dengue.
  - West Nile virus is the most common mosquito-borne infection in mainland USA and is found across all temperate and tropical regions of the world. Most cases are subclinical but it can cause fever, headaches, myalgia, vomiting and neurological symptoms, including meningitis and poliomyelitis-like syndrome of flaccid paralysis.
- **Typhus:**
  - This is an acute rickettsial infection presenting with malaise, fever and rash with joint pains. Forms include epidemic typhus, endemic typhus and scrub typhus.

- Rocky Mountain spotted fever:
  - This is the most lethal rickettsial condition in mainland USA. Reported numbers have been increasing, with 6,248 in 2017, although there was a slight decrease in 2018. It is tick-borne and sometimes called 'tick typhus', as it can resemble typhus, with fever, malaise, myalgia and macular rash which later becomes maculopapular. It can affect the central nervous and respiratory systems.
- Viral haemorrhagic fevers:
  - These are a group of RNA viruses which range from milder disorders (such as the Scandinavian condition *nephropathia epidemica*) to conditions of high infectivity and lethality which can progress rapidly to high fever, shock and death.
  - Patients present with fever, myalgia, diarrhoea and vomiting, pleuritic pain, shock and bleeding tendency.
  - Health.
  - Specific viruses include:
    - [Marburg and Ebola](#) viruses: found in the Sudan, Zaire and Kenya.
    - [Lassa fever](#): found in Nigeria, Sierra Leone and Liberia.
- Rabies:
  - This presents as a nonspecific fever with or without pharyngitis.
  - It is normally transmitted by the saliva of a biting animal, although infection by inhalation of bat faeces or from cat scratch is also possible. The bite site may itch. Common sources are bats and dogs.
  - Incubation period can be prolonged and is related to the distance the virus must travel from the bite site to the central nervous system.

- **Plague:**
  - Is carried by rodent fleas and is endemic in marmots. It is common worldwide. Human-to-human transmission is common.
  - The most common form is bubonic, which features tender swelling of the lymph nodes – buboes. Pneumonic plague infects the lungs predominantly, and septicæmic plague is self-explanatory.
- **Brucellosis:**
  - Is carried in farm animals and their products. Beware unpasteurised cheeses in countries with poor public health systems.
  - Symptoms are like flu.
- **Histoplasmosis:**
  - Histoplasmosis is transmitted by fungal spores, but recent cases have been acquired through entering bat caves and inhaling guano dust.
  - Pre-existing lung disease increases the risk to the traveller.
  - The fever is accompanied by chest pain and cough.

Also, consider all causes of [septicæmia](#) and [meningitis](#).

Early referral to the local infectious diseases unit will provide the most useful, up-to-date advice on management.

## **Diarrhoea**

The most frequent problem encountered in returning travellers is [traveller's diarrhoea](#). Up to 40% of short-term travellers to developing countries and up to 70% of long-term travellers will experience at least one bout of diarrhoea<sup>[7]</sup>.

Most cases of diarrhoea are mild, of short duration and do not require antibiotic treatment. However, travellers who develop three or more loose stools in an eight-hour period, especially if associated with nausea, vomiting, abdominal cramps, fever, or blood in stools, may benefit from antimicrobial therapy. Antibiotics are usually given for 3–5 days. Fluoroquinolones are the drugs of choice. Commonly prescribed regimens are 500 mg of ciprofloxacin twice a day or 400 mg of norfloxacin twice a day for 3–5 days.

Most cases of traveller's diarrhoea are bacterial, with enterotoxigenic *Escherichia coli* the most common cause, producing watery stools with cramping but no fever. There are various other potential causative agents. Because the condition is caused by eating and drinking contaminated food and water, people travelling in primitive conditions will experience more problems. The highest risk is found with travel to Asia, Africa and Latin America.

#### **Important information**

**Where the diarrhoea is severe, bloody and/or prolonged, then laboratory investigation is necessary. Where the patient is severely ill and possibly septicaemic, blood culture is mandatory [7] .**

#### **Initial investigation**

This should include:

- Stool for microscopy, culture and sensitivity to look for enteric pathogens. A separate sample may be needed for occult blood testing.
- Request stool serology for giardial antigens.
- In cases of chronic diarrhoea, consider a lactose tolerance test or a Schilling test with intrinsic factor.
- Advise patients on the reduced efficacy of the combined oral contraceptive pill.



- Endoscopy with biopsy and duodenal aspirate or colonoscopy with biopsies and cultures should follow if initial testing is non-diagnostic; also consider ultrasonography and computerised or magnetic imaging studies as well.

## Respiratory disease

This is spread through cough and close respiratory contact.

- **Influenza:**
  - This occurs in the winter season in temperate areas, and year round in the tropics.
- **Tuberculosis (TB):**
  - TB has a worldwide distribution.
  - Risk of exposure is related to duration of stay in high-prevalence areas and degree of contact with local populations where TB is prevalent.
  - The nature and circumstances of contact with local people are likely to be important determinants of risk; work in a healthcare setting is particularly high-risk.
  - Comorbidity, such as diabetes, long-term steroidal therapy, chronic kidney disease and malignant lymphoma also increase the risk.
  - Co-infection with human immunodeficiency virus (HIV) carries the greatest risk of developing active TB. TB is responsible for about 26% of AIDS-related deaths, with 99% occurring in developing countries<sup>[8]</sup>.

- Pandemic respiratory illness:
  - This includes COVID-19 coronavirus, [severe acute respiratory syndrome \(SARS\)](#), avian flu and swine flu.
  - The first case of COVID-19 was detected in Wuhan, China in December 2019. To date, it has caused 1.54 million deaths, worldwide. First-line investigations are throat and nose swabs; these will diagnose people who are currently infected. A serum antibody test is also available to detect past exposure. At the time of writing, a national vaccination programme is due to be rolled out across the UK.
  - The first major outbreak of SARS was in Singapore in March 2003; cases were also reported in Toronto.
  - First-line investigations should include:
    - Sputum sample for microscopy, culture and sensitivities.
    - CXR.

### **Lymphadenopathy**

Consider plague, HIV, rickettsial infection, brucellosis, leishmaniasis, dengue, lymphogranuloma venereum and Lassa fever.

### **Jaundice**

Viral hepatitis ([hepatitis A](#) or [hepatitis B](#)), [cholangitis](#), [liver abscess](#), [leptospirosis](#) (only 10% of cases), [typhoid fever](#), [dengue](#), [yellow fever](#) and haemoglobinopathies (eg [sickle cell](#), [thalassaemia](#)) should be considered. Jaundice is rare in [malaria](#), although it can occur due to intravascular haemolysis, disseminated intravascular coagulation, and, rarely, 'malarial hepatitis'.

### **Hepatosplenomegaly**

Viral hepatitis, malaria, brucellosis, typhoid fever, leishmaniasis, schistosomiasis and toxoplasmosis should be considered.

### **Gross splenomegaly**

Malaria, visceral leishmaniasis, trypanosomiasis, typhoid, brucellosis, typhus and dengue should be considered.

## Anaemia

Consider hookworm, malaria and visceral leishmaniasis.

## Skin rashes

- [Meningococcal](#) disease, yellow fever, dengue, rickettsial infection and viral haemorrhagic fevers can cause petechiae or bruising.
- [Prickly heat](#) is a sun sensitivity which gives an intensely itchy erythematous rash, usually in a skin fold.
- Dengue presents with generalised rash after travel from the tropics and Indonesia. Transmission is from person to person and mosquito. There are severe headaches and fever with intense joint and muscle pain.
- Trypanosomiasis presents with rash, fever and tender lymph glands. It follows travel to South and East Africa, South America, Angola, Sudan, Congo, and Uganda. There is a variable incubation period.
- [Cutaneous larva migrans](#) is uncommon but may be found after travel to Thailand and Southeast Asia. There are red, itchy, mobile lesions which may move up to 1 cm per hour. They are most common on limbs.
- [Leprosy](#) or Hansen's disease is characterised by multiple symmetrical lesions. Spread is via respiratory droplet from person to person.
- Leishmaniasis results from the bite of an infected sandfly. The bite becomes pruritic and painful. The traveller may present with nasal obstruction and bleeding.

## Sexually transmitted infections

- One study in 2015 found that 9.2% of men and 5.3% of women reported new sexual partners while overseas in the preceding five years. This was strongly associated with higher partner numbers and other sexual and health risk behaviours<sup>[9]</sup>.
- The most clinically important and significant sexually transmitted infections (STIs) are [gonorrhoea](#), [syphilis](#), [chlamydia](#) and [HIV](#).

- Any symptomatic patient should be referred to a genitourinary medicine clinic for further management, including screening for other infections and contact tracing.

## **HIV**

HIV is found worldwide. Transmissibility is increased in the presence of other STIs, co-existing TB and lowered immunity. Sub-Saharan Africa and the Far East have been the highest risk areas for transmission through unprotected sex but this can occur anywhere.

- Exposure prophylaxis for HIV is controversial. Three antiretroviral drugs need to be commenced within 72 hours of exposure.
- Initial investigations should also include hepatitis B and C.
- Testing should be repeated at six months.
- If the patient is presenting within two weeks of contact, an active vaccination course for hepatitis B may provide some protection.

## **Causes of tropically acquired fever by incubation period**

Incubation period	Disease
Short (<10 days)	Arboviral infections (dengue, chikungunya) Gastroenteritis, acute (bacterial, viral) Relapsing fever (borrelia) Respiratory infection (bacterial, viral) Rickettsial infection (eg, typhus, Rocky Mountain spotted fever) Malaria ( <i>Plasmodium falciparum</i> , 6-90 days, usually <30 days) Lassa fever, Marburg virus Ebola virus (2-12 days) West Nile virus Cholera Plague Yellow fever (3-16 days) Influenza SARS
Medium (10-21 days)	Bacterial: Brucellosis Enteric fever (typhoid and paratyphoid) Leptospirosis Melioidosis Q fever ( <i>Coxiella burnetii</i> ) Ebola virus Fungal: Coccidioidomycosis Histoplasmosis Chagas' disease, acute Malaria ( <i>P. falciparum</i> ) <i>Trypanosoma brucei rhodesiense</i> (East African/Rhodesian African sleeping sickness) Viral: Cytomegalovirus (CMV), Epstein-Barr virus (EBV), HIV Viral haemorrhagic fever Yellow fever
Long (>21 days)	Bacterial: Brucellosis

TB
Fluke:
Schistosomiasis (acute)
Protozoal:
Amoebic liver abscess
Malaria (including <i>P. falciparum</i> )
<i>Trypanosoma brucei gambiense</i> (West African/Gambian sleeping sickness)
Visceral leishmaniasis
Viral:
HIV, viral hepatitis
Rabies (up to one year)

***Dr Mary Lowth is an author or the original author of this leaflet.***

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## Further reading

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- [Travel Health Pro](#); National Travel Health Network and Centre (NaTHNaC)
- [Greaves D, Coggle S, Pollard C, et al](#); Strongyloides stercoralis infection. *BMJ*. 2013 Jul 30;347:f4610. doi: 10.1136/bmj.f4610.
- [NHS Fit For Travel: Travel health information for people travelling abroad from the UK](#); Health Protection Scotland
- [McAlester C, Cesario SK, Kirkland T](#); Travel Health Implications for Women Traveling Abroad. *Nurs Womens Health*. 2020 Apr;24(2):143–148. doi: 10.1016/j.nwh.2020.01.007. Epub 2020 Feb 26.

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