

- Appreciate the different family network, particularly the tendency of grandmothers and aunts to care for children.
- Don't assume a missed appointment means the patient will not return for treatment. Often family and cultural duties take precedence.
- Cultural sensitivity is crucial, for you, receptionists and other staff.
- Don't touch a patient, particularly of the opposite sex, without seeking permission and explaining what you are doing.
- Be aware that patients may not be comfortable with direct questions about their family and health.
- Don't be too stern or authoritative during a consultation.
- Be accepting, respectful and non-judgmental.

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## Practice tips

- Anaemia is common in Indigenous children—be on the lookout for it. Consider giving pyrantel embonate or mebendazole in a hookworm endemic area.
- Asthma is common—consider it in coughing children.
- In children with failure to thrive, consider insufficient food, urinary tract infection, GIT infection or parasites and recurrent illness.
- Beware of diarrhoea in children—attend to fluid and electrolyte replacement.
- Think pelvic inflammatory disease in a woman of child-bearing age presenting with abdominal pain. Be watchful for penicillinase-producing *Neisseria gonorrhoeae* (although it remains uncommon in Indigenous communities).
- Consider the possibility of rheumatic fever or glomerulonephritis with *S. pyogenes* throat infection and treat with an optimal course of antibiotics (e.g. single injection of benzathine penicillin).
- In tropical areas, consider diseases such as melioidosis, dengue and Ross River infection.
- Promote immunisation programs.
- In the fitting or aggressive patient, alcohol withdrawal is the commonest cause, but consider the possibility of petrol sniffing.

- Kidney failure is common: look for it if proteinuria, diabetes, hypertension, general debility or recurrent infections.
- Serum creatinine measures are also useful. A level of <150 mmol/L is regarded as a safe limit for kidney function.
- Consider urine albumin–creatinine ratio (ACR) testing in adults to detect and monitor early kidney disease. As kidney disease has a progressive nature, regular monitoring is important.<sup>19</sup> Kidney function must be monitored at least annually.
- Medroxyprogesterone acetate (Depo-Provera) and Implanon are very useful contraceptive agents but always adhere to guidelines for informed consent.
- Because adherence to medication may be a problem with some patients, once-a-day therapy is recommended where possible.
- Point-of-care laboratory equipment (HbA1c, urine ACR) is very helpful for monitoring diabetic patients as it can be used in remote communities by trained health workers.

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## 128 Refugee health

*A refugee is a person who owing to a well founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion is outside the country of his or her nationality and is unable or owing to such fear is unwilling to avail himself of the protection of that country.*

THE UNITED NATIONS CONFERENCE OF PLENIPOTENTIARIES ON THE STATUS OF REFUGEES AND  
STATELESS PERSONS 1951<sup>1</sup>

Caring for people from refugee backgrounds is stimulating, challenging and rewarding work for GPs. A patient-centred approach is crucial, gaining an understanding of the diversity and trauma of each individual. Building therapeutic relationships and working through problems over time can make a big impact on the long-term health and successful settlement for people of refugee backgrounds.

According to UNHCR, a refugee is ‘someone who is unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion’. Asylum seekers ‘are persons who have sought protection as a refugee but have not yet received a decision’.<sup>1</sup>

At the end of 2019 there were 79.5 million displaced people worldwide, of which 45 million were internally displaced, 26 million were refugees and 4.2 million were asylum seekers.<sup>2</sup> In 2018–2019, over 18 000 people from refugee backgrounds arrived in Australia on humanitarian visas.<sup>1</sup> During this period most of the humanitarian entrants came from the Middle East, Asia and Africa. In 2020 in the Australian community there were over 17 000 asylum seekers on bridging visas (without the possibility of family reunion);<sup>3</sup> 50 000 awaiting review of their protection claim, including over 2700 without visas;<sup>4</sup> 543 were in community detention, 514 remained in restrictive detention on the Australian mainland and 331 remain in offshore processing facilities.<sup>4,5</sup> These numbers and regions of origin vary with time. At the time of writing, new arrivals were suspended due to COVID-19.

Experiences of trauma are almost universal in people from refugee backgrounds. Trauma may accumulate across the lifespan from adverse childhood experiences (see FIGURE 128.2 ), trauma in the country of origin, during flight and after arrival in Australia. Trauma may have profound and long-reaching physical and psychological consequences. It can affect symptom presentation, the patient–doctor relationship and your patients’ ability to engage in management plans.



**FIGURE 128.1** Initial health contact with a refugee family

*Photo courtesy Dr Joshua Davis*

## Communication

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Good communication and a relationship of trust are fundamental to refugee health care. Work with trained professional interpreters where required, show empathy and allow for time. Focus on the presenting concerns, and gain an understanding of your patient's background and health beliefs. While GPs of a similar background or the same first language have an advantage in understanding their patients, all GPs can successfully work with people from refugee backgrounds by cultivating an attitude of care and curiosity (see FIGS 128.2 and 128.3 ).



**FIGURE 128.2** Distressed Syrian children escaping across the border to Turkey

Source: kafeinkolik/Shutterstock



**FIGURE 128.3** A Bhutanese family ceremony at home

Image courtesy Dr Christine Boyce, Menuka Thapa and Debaki Thapa

**Table 128.1** Traumatic experiences for people from refugee backgrounds

Country of origin/transit	Resettlement stress
Flight or forced separation	Housing problems and homelessness
War trauma, bombing and other conflict	Employment difficulties
Being subject to or	Financial difficulties

Being subject to or witnessing torture	Financial difficulties
Mock execution	Barriers accessing government services
Imprisonment and/or solitary confinement	Change in role and family structure
Sexual assault	Racism
Food and water scarcity	Social isolation
Homelessness	Adaption to a new culture
Untreated illness	Grief at family separation or bereavement
Illness and/or death of family members	Survivor guilt
Family breakdown or violence	Pressure to send money or assist family overseas
Physical and emotional abuse	Witnessing overseas trauma and war through family or the media
Lack of legal assistance	
Loss of household, education and vocation	
Loss of family and social structure	
Uncertain and difficult life in transit countries	
Refugee camps, detention centres	

Working with a professional interpreter is essential for patients with limited or no English proficiency.<sup>6</sup> The national Translating and Interpreting Service (TIS) provides GPs with free phone or on-site interpreters. Consider the level of language proficiency needed to understand the content of your consultation, and organise an interpreter if it is clear the communication is not adequate, even if you are part of the way through the consultation. Explain that confidentiality applies with interpreters and enquire if a particular gender or dialect is preferred. The patient's name can be kept confidential from interpreting agencies and, even the telephone interpreter, to enhance the patient's sense of security.

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The individual's culture (and the clinician's own culture and biases) must be acknowledged and respected, but not assumed—it is appropriate to ask about cultural beliefs and preferences for treatment, based on what is acceptable in the patient's previous experience and community.<sup>7</sup>

The principles of trauma-informed care are essential for safe and effective care of refugees and asylum seekers.<sup>8</sup> It is usually unnecessary and undesirable to inquire in detail about traumatic

experiences, especially during initial consultations (detailed questioning may be experienced as an interrogation and re-traumatise the client). A general understanding of the possible difficulties experienced is sufficient to enable quality care.

Consider your patient's level of health literacy. Take the time to explain management plans and the Australian health care systems, including appointments, prescriptions and referrals for investigations or specialist opinions. This may be assisted by using translated health information, including pictorial, audio and video resources, and engaging with families and local community groups.

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Teach-back is a useful technique by which GPs can ask patients to explain what they have understood of the consultation.<sup>9</sup> This is particularly useful when working with interpreters, checking management plans and in promoting safe use of medications.

## Access to health care

Be aware of barriers to accessing health care for refugees and asylum seekers in your practice.<sup>10,11</sup> These include language barriers, financial constraints, conflicting priorities, lack of time and transport, as well as different expectations of medical care or lack of trust between doctor and patient. Difficulties with public hospital outpatient appointments and misunderstandings are common and may lead to serious adverse outcomes.

## Common conditions

While people from refugee backgrounds have similar health problems to the Australian community, their countries of origin, journeys to Australia and settlement challenges also bring about unique health problems. TABLE 128.2 shows the prevalence of common conditions in Australian refugees in the past 10 years. It should be noted there are gaps in our data as post-arrival screening is not universal and some problems emerge later.

**Table 128.2** Prevalence of conditions in recently arrived refugees to Australia (from 2009 to 2019)

Conditions	% ranges by region of birth		
	Middle East	Africa	Asia
<i>Common physical conditions</i>			
Susceptibility to vaccine preventable diseases	*	++++	++
Anaemia	+	+	+
Haemoglobinopathies (e.g. thalassaemia, sickle-cell)	+	+	+

anaemia)			
Iron deficiency	+++	+	+
B12 deficiency	++	+	+
Vitamin D deficiency	++++	+++	++
Musculoskeletal pain	++	*	*
Gastrointestinal complaints	*	++	*
Oro-dental disease	++++	++	*
<i>Common mental health conditions</i>			
Anxiety/psychological distress	++	++	+
Depression	++	++	++
PTSD	++	+	++
<i>Common infections</i>			
Latent TB	++++	+++	+
<i>Helicobacter Pylori</i>	+	++++	++
Hepatitis B	+	+	+
<i>Less common infectious diseases which are important to diagnose</i>			
Malaria	0	++	+
HIV	*	+	0
Hepatitis C	*	+	+
Schistosomiasis	+	++	+
<i>Strongyloides</i>	+	*	+
Sexually transmitted infections	+	+	+
Giardia and other stool pathogens	+	+	+
TB disease	*	+	*
<i>Risk factors for chronic disease</i>			
Hypertension	+	+	*
Diabetes	+	+	*
Smoking	++	*	*
Obesity	*	+++	*

*Middle East includes Syria, Iraq and Afghanistan; Africa includes Sub-Saharan Africa, West Africa, East Africa and Sudan; Asia includes Myanmar, Thailand, Pakistan and West Papua.*

Key	Percentage range
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*	no recent data available
+	>0 to 25%
++	>25 to 50%
+++	>50 to 75%
++++	>75 to 100%

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Source: References for prevalence data available from [marion.bailes@gmail.com](mailto:marion.bailes@gmail.com) on request

## Mental health

The mental health effects of trauma in refugees are wide ranging and long lasting. A strong therapeutic relationship informed by trauma-sensitive care, which is patient led, and allows sensitive assessment over time, is the foundation to care.

Resettlement difficulties cannot be overemphasised as a contributor to psychological stress. Newly arrived humanitarian entrants are often socially isolated and bereft of their usual family and social supports, and their fledgling communities often lack the capacity to support them. Those with intact family and social support tend to recover more quickly.

Asylum seekers continue to suffer profound and ongoing uncertainty as to their future. They suffer the trauma of having to prove their experiences to disbelieving or hostile government agencies with variable access to Medicare, work rights, case support and legal support. Detention and temporary visas cause well-documented severe, and often irreparable, psychological illness.

Refugees and asylum seekers may be remarkably resilient and have variable experiences and episodes of mental illness. Common problems are listed in

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[TABLE 128.2](#). People of refugee backgrounds may recover and settle extremely quickly once the basics of safety (housing, adequate income, the address of physical and psychological health issues, education and training for themselves and their children) have been established. Others may require long-term care with GPs or specialist mental health and/or trauma services.

## Iron deficiency

Iron deficiency is common in people from refugee backgrounds, particularly children and women of child-bearing age in whom universal new arrival screening is recommended. In Australian-born children with mothers of refugee backgrounds, consider screening for iron deficiency and check for excessive milk intake and developmental problems. Also check iron studies for anyone with fatigue, a history of poor nutrition, chronic gastrointestinal infections or anaemia on screening FBE. Iron deficiency is easily treated with education about dietary sources and oral replacement. Consider iron infusion in those with intolerance to oral replacement or severe iron deficiency.

## Vitamin D

Vitamin D deficiency is common in people from refugee backgrounds of all ages. Causes include lack of exposure to sunlight, darkly pigmented skin and low levels in breast milk. Children and adolescents are at particular risk due to rapid growth. Most children and adolescents are asymptomatic but check for signs of rickets, looking for leg bowing, delayed walking, muscle aches and leg weakness. Blood levels of < 50 nmol/L require treatment,<sup>12</sup> which may be given in daily, weekly, monthly or 6-monthly Stoss doses if compliance is difficult. Adequate calcium intake is also important.

## Vitamin B12

It is important to recognise and treat vitamin B12 deficiency to prevent neurological complications. Screening is recommended for people from Bhutan, Afghanistan, Iran and the Horn of Africa or those with food insecurity or vegans within 6 months of arrival.

## Haemoglobinopathy

Genetic disorders such as sickle-cell disease, alpha and beta thalassaemia and G6PD deficiency are more common in people from refugee backgrounds. Affected people are usually asymptomatic carriers. Hb electrophoresis should be performed in pre-pregnancy screening or if microcytic or hypochromic anaemia persists after correcting for iron deficiency.

## Hepatitis B

The rate of hepatitis B infection in people from refugee backgrounds varies but is generally higher than that of the Australian-born community. Infection is usually asymptomatic, so screening with HBsAg, HBsAb and HBcAb is recommended for all people of refugee background, even some years after arrival if not already performed. Those with positive HBsAg should have further investigations and their household and sexual partners should be screened. Those who are not immune should have hepatitis B vaccination completed, and household and close contacts of those with infection need their immunity checked post vaccination.

## Malaria

Malaria is common in many refugee source countries and some countries of refugee and asylum seeker transit. A single screening thick and thin film with a rapid diagnostic test (RDT) is recommended for those travelling from or through a country with endemic malaria within 3 months of arrival. If a person from a refugee background presents with a fever of unknown origin within 12 months of travel from an endemic area, malaria should be considered and urgent 3x thick and thin films and malaria RDT ordered.

## Schistosomiasis

Schistosomiasis is a chronic parasitic infection acquired from swimming or bathing in endemic fresh water in Africa, South-East Asia, parts of the Middle East and South America. There are gastrointestinal and urinary tract forms, which often remain asymptomatic until end organ damage. Screening with schistosoma serology is recommended in people from countries of high prevalence.<sup>11</sup> Treatment with praziquantel is usually well tolerated. Ensure further investigation and follow-up of positive cases according to guidelines.<sup>13</sup>

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## **Strongyloides**

*Strongyloides* is an intestinal nematode, common in refugees with a prevalence up to 11% in some groups. It is transmitted by contact with infected soil or surface water and can persist asymptotically for decades. Mild symptoms include diarrhoea, recurrent abdominal pain, skin or respiratory symptoms. If immunocompromised, it may cause fulminant infection and death. Screening with *Strongyloides* Ab is recommended for all. Positive cases need further investigation with stool samples. Treatment is a short course of ivermectin according to weight, then follow-up serology at 6 and 12 months.

## **Intestinal parasites**

Gastrointestinal parasites are common in new arrivals from high prevalence backgrounds. Pre-departure empirical treatment with albendazole is common. If there are gastrointestinal symptoms or eosinophilia despite empirical treatment, test stool microscopy and treat appropriately.

*Note:* Albendazole should not be used in the first trimester of pregnancy or for those with CNS symptoms and/or a travel history compatible with neurocysticercosis.

## **Tuberculosis (TB)**

TB is a common infection in refugee source countries with active and latent (asymptomatic) forms. Active TB is screened for prior to immigration to Australia in humanitarian entrants and is most common in the first 5 years post immigration. If people from refugee backgrounds present with night-sweats, fevers, persistent cough, haemoptysis, chronic bone pains or unexplained symptoms, have a high index of suspicion for active TB.

It is recommended to screen for latent TB post arrival in all who would benefit from chemoprophylaxis,<sup>13</sup> which decreases the risk of reactivation of latent TB into the active form. Screening is with Tuberculin Skin Test (Mantoux) or IGRA. Those with positive results require examination for signs of active TB, CXR and referral for consideration of chemoprophylaxis, which is usually isoniazid for 6–9 months.

## **Blood-borne viruses**

HIV and Hepatitis C are uncommon in people from refugee backgrounds in Australia, but given

their significance and treatment options, both are recommended to be included in universal screening.<sup>13</sup>

## Sexually transmitted infections

Screen for STIs in those with risk factors. A sexual history should be taken sensitively and privately, with the knowledge sexual assault is common in women of refugee backgrounds.

### *Helicobacter Pylori* infection

People immigrating from non-Western countries have a higher prevalence of Helicobacter infections than the Australian population.<sup>14</sup> These may present with upper gastrointestinal symptoms, anorexia, weight loss or failure to thrive in children. Investigate those with symptoms or a family history of gastric cancer with Helicobacter faecal Ag or urease breath test, and treat according to guidelines.

## Immunisation

Almost all people from refugee backgrounds arriving in Australia need catch-up vaccination. All immunisation records, including those from overseas and pre-departure records, should be reviewed and updated into the Australian Immunisation Register. Check antibodies for hepatitis B, rubella in child-bearing-aged women and varicella in those  $\geq 14$ . All other immunisations which are not documented according to the Australian schedule for the patient's age should be updated with a catch-up vaccines schedule. See the Australian Immunisation handbook for how to develop a catch-up schedule (<https://immunisationhandbook.health.gov.au/catch-up-vaccination>).

## Chronic disease

Some refugee source countries have a high incidence of chronic non-communicable disease (see TABLE 128.2). This includes obesity, type 2 diabetes, cardiovascular disease, hyperlipidaemia, hypertension, chronic lung disease and musculoskeletal complaints. People of refugee backgrounds from high prevalence countries should be screened early for diabetes and cardiovascular disease, particularly if they have additional risk factors such as increased BMI or waist circumference. Culturally tailored management and active follow-up is important in chronic disease prevention and care.

## Developmental and other disabilities

There has been an increase in arrivals with significant disabilities to Australia. Both children with developmental delay and adults with intellectual disability may have a significant delay to their diagnosis and management. Further paediatric and specialist assessment and early referral for additional support is recommended.

## Hearing, vision and oral health

Hearing and vision impairment and dental caries are common in people from refugee backgrounds. Clinical assessment of vision, hearing and dental health is recommended for all. Referral for routine dental care for all is recommended. Optometry review is recommended for African patients > 40 years and others > 50. Early referral for optometry and audiology for those with symptoms is recommended.

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## Post-immigration health assessment

People from refugee backgrounds have varying screening prior to arrival in Australia. It is recommended all people of refugee background have comprehensive post-arrival health assessments, preferably within 1 month of arrival (see [FIGURE 128.1](#) ). The usual approach to history taking should be followed with an additional emphasis on psychosocial and migration history and screening for common conditions. See [TABLE 128.3](#) .

**Table 128.3** Refugee health assessment

### History

- Presenting problem/s, patient's concerns
- Past medical history, including NCDs, e.g. cardiovascular, diabetes
- Family history, medications, allergies
- Migration history and pre-migration health information (including documented immunisations)
- Past infection or contact with TB, malaria, parasites and blood-borne viruses
- Review of systems (particularly respiratory and gastrointestinal)
- Hearing, vision and dental problems
- Disabilities
- Lifestyle/risk factors: nutrition, vitamin D risk, e.g. dark skin, lack of sun exposure smoking, alcohol, recreational drugs (consider regional use, e.g. sheesha, khat)
- Psychosocial/mental health settlement stressors (see [TABLE 128.1](#) ) sleep, appetite, energy, mood, interests and ADLs, memory, concentration, 'suddenly fearful' relationships/family functioning
- Child/adolescent health: add developmental history, education, nightmares, enuresis
- Women's health: add pregnancies/births, contraception, breastfeeding, cervical and breast screening, female circumcision/traditional cutting

## Physical examination and conditions to consider

- General: fever (malaria), pallor (anaemia), BP (hypertension)
- Nutritional status and growth, BMI, waist–hip ratio, percentiles (children), under- or overweight
- ENT (chronic infections, hearing impairment)
- Skin: rash (parasites, fungal); BCG scar
- Oro-dental (caries, vitamin deficiencies)
- Goitre (iodine deficiency)
- Rickets (vitamin D deficiency)
- Cervical, axillary and inguinal lymphadenopathy (TB and HIV)
- Cardiorespiratory exam (TB, COPD, CVD, RHD)
- Signs of chronic liver disease (malaria, HBV, schistosomiasis, TB, HIV)
- Musculoskeletal deformities; scars (accidents, injuries, torture)
- Visual acuity (e.g. refractive errors, cataract, glaucoma)
- Appearance, affect and behaviour (mental health issues)

## Investigations

All:

- FBE, HBs sAg, HBsAb, HBcAb, *Strongyloides* Ab
- HIV,  $>/=15$ , if unaccompanied minor or clinical concerns  $<15$
- Latent TB screening TST (Mantoux) or IGRA if  $</=35$  or  $>35$  intending to rx

Age/risk based:

- Varicella serology  $>14$  if no known Hx disease
- Rubella Ab women of child-bearing age
- Ferritin women, children and men with risk factors
- Vitamin D level, also check Ca, PO<sub>4</sub> and ALP in children if risk of deficiency
- B12 level, arrival  $<6$  months from area of food insecurity, e.g. Afghanistan, Horn of Africa
- Fasting lipids +/or glucose/HbA1c  $>35$  consider if high prevalence country or other RF
- Syphilis serology, urine/vaginal swab chlamydia/gonorrhoea PCR, if risk STIs or request
- Helicobacter stool Ag or breath test, upper GI symptoms or Fam Hx gastric cancer
- Stool micro, if no recent albendazole, or abdominal pain/diarrhoea/eosinophil

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Abbreviations: NCDs = chronic non-communicable disease; ADLs = activities of daily living

## Impact of COVID-19

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COVID-19 has further disadvantaged people from refugee backgrounds in Australia. There have been barriers to accessing translated information, fears of going out and racism. Barriers to usual care have increased as has psychological distress and financial difficulties.

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Many asylum seekers are facing destitution. There was no data about the prevalence of COVID-19 in people of refugee backgrounds in Australia at the time of writing.

## Role of general practitioner

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The GP is ideally placed to facilitate long-term care for patients of refugee backgrounds and their families. Allow for time, work with interpreters and consider the impact of your patient's background on their presenting problem. Complete refugee health assessments, ensure follow-up and preventive health care and coordinate specialist and settlement services when needed. Take an incremental, patient-led approach to management and foster greatly valued therapeutic relationships.

### Practice tips: ASSSK

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- Ask about: country of origin, preferred language, year of arrival, need for an interpreter, visa type (refugee/woman at risk/orphan/spousal visa or asylum seeker)
- Settlement and access to services: How is settlement going, e.g. housing, financial, education and training? Other household/family members/children? What services or agencies are assisting you? Could I have their contact details?
- Screening, physical health issues and specialist visits: Is health screening required? If my client is not newly arrived, should I screen for common conditions? Other medical services involved, especially hospital outpatient/procedures.
- Psychosocial issues, separation and support: screen for mental health related issues, consider the impact of separation from/death of family and friends as a cause of presentation/illness.
- Support for client and clinician: What support does my client need? E.g. social worker, case support, MCHN. What support do I need? E.g. websites, colleagues, ID opinion.
- **Kindness: 'Every clinical encounter can be an opportunity for healing.'**

## Resources

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Australian Refugee Health Practice Guide. Primary care for people from refugee backgrounds.  
<http://refugeehealthguide.org.au>

Australian Government Department of Health and Ageing. Catch-up vaccination. In: *Australian Immunisation Handbook*. Available from: <https://immunisationhandbook.health.gov.au/catch-up-vaccination>

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## 129 Travellers' health and tropical medicine

*Our lot is a perilous age ... but where shall we fly to escape from pestilences that come and pestilences that do not come, from ships that bring us yellow fever, from cattle diseases that can only be exterminated by exterminating the cattle, from infectious patients whose pulses must be felt with a pair of tongs and their chests explored with tarred stethoscopes.*

JACOB BIGELOW, 1860

### Principles of pre-travel health care

- Advise the patient to plan early—at least 8 weeks beforehand.
- Register with [Smartraveller](#) (provided by the Australian Department of Foreign Affairs and Trade (DFAT)).
- Advise a dental check before departure.
- Allow adequate time for consultation (e.g. 30–45 minutes).
- Individualise advice.
- Provide current information.
- Provide written as well as verbal advice.
- Provide a letter concerning existing medical illness and treatment.
- Encourage personal responsibility.

#### Key facts and checkpoints

- The main diseases facing the international traveller are traveller's diarrhoea

(usually relatively mild) and malaria, especially the potentially lethal *Plasmodium falciparum* malaria.

- Register with [Smartraveller](#) (provided by the Australian Department of Foreign Affairs and Trade (DFAT)).
- Most cases of traveller's diarrhoea are caused by enterotoxigenic *Escherichia coli*, *Shigella* sp. and *Campylobacter* species.
- Enteroinvasive *E. coli* (a different serotype) produces a dysentery-like illness similar to *Shigella*.
- Traveller's diarrhoea is contracted mainly from contaminated water and ice used for beverages, washing food or utensils, or cleaning teeth.
- Poliomyelitis is endemic in at least 20 countries and thus immunisation for polio is still important.
- One bite from an infected mosquito during a single overnight stop in a malaria area can result in a possible lethal infection.
- Infections transmitted by mosquitoes include malaria, yellow fever, Rift Valley fever, Japanese B encephalitis, chikungunya, Zika and dengue fever. Avoiding their bites is excellent prevention.
- Every year approximately 1000 Australians catch malaria while travelling overseas.
- Malaria is a dusk-till-dawn risk only, but bites from daytime mosquitoes can cause dengue.
- *P. falciparum* malaria is steadily increasing, as is resistance to newer antimalarials.
- It is important for GPs to consult a travel medicine database to obtain specific information about 'at risk' countries.
- Avoid tattooing, ear-piercing, acupuncture or any skin puncturing while overseas.
- The commonest causes of death in travellers overseas are trauma (26%), particularly traffic accidents, and homicide (16.9%).
- Travellers visiting family and relatives (TVFR) in some countries are at risk of contracting preventable travel-related illnesses.

## Gastrointestinal infections

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The commonest problem facing travellers is traveller's diarrhoea but other important diseases caused by poor sanitation include hepatitis A and worm infestations, such as hookworm and schistosomiasis.

Contamination of food and water is a major problem, especially in third world countries.

Reputable soft drinks, such as Coca-Cola, should be recommended for drinking. Indian-style tea, in which the milk is boiled with tea, is usually safe, but tea with added milk is not. The food handlers can be infected and the water used to wash food may be contaminated.

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## Traveller's diarrhoea

Traveller's diarrhoea is a special problem in Mexico, Nepal, India, Pakistan, South-East Asia, Latin America, the Middle East and Central Africa and its many colourful labels include 'Bali Belly', 'Gippy Tummy', 'Rangoon Runs', 'Tokyo Trots' and 'Montezuma's Revenge'. It occurs about 6–12 hours after taking infected food or water.

The illness is usually mild and lasts only 2 or 3 days. It is unusual for it to last longer than 5 days. Symptoms include abdominal cramps, frequent diarrhoea with loose, watery bowel motions and possible vomiting. Very severe diarrhoea, especially if associated with the passing of blood or mucus, may be a feature of *Shigella* sp. or *Campylobacter* sp. infections and amoebiasis.

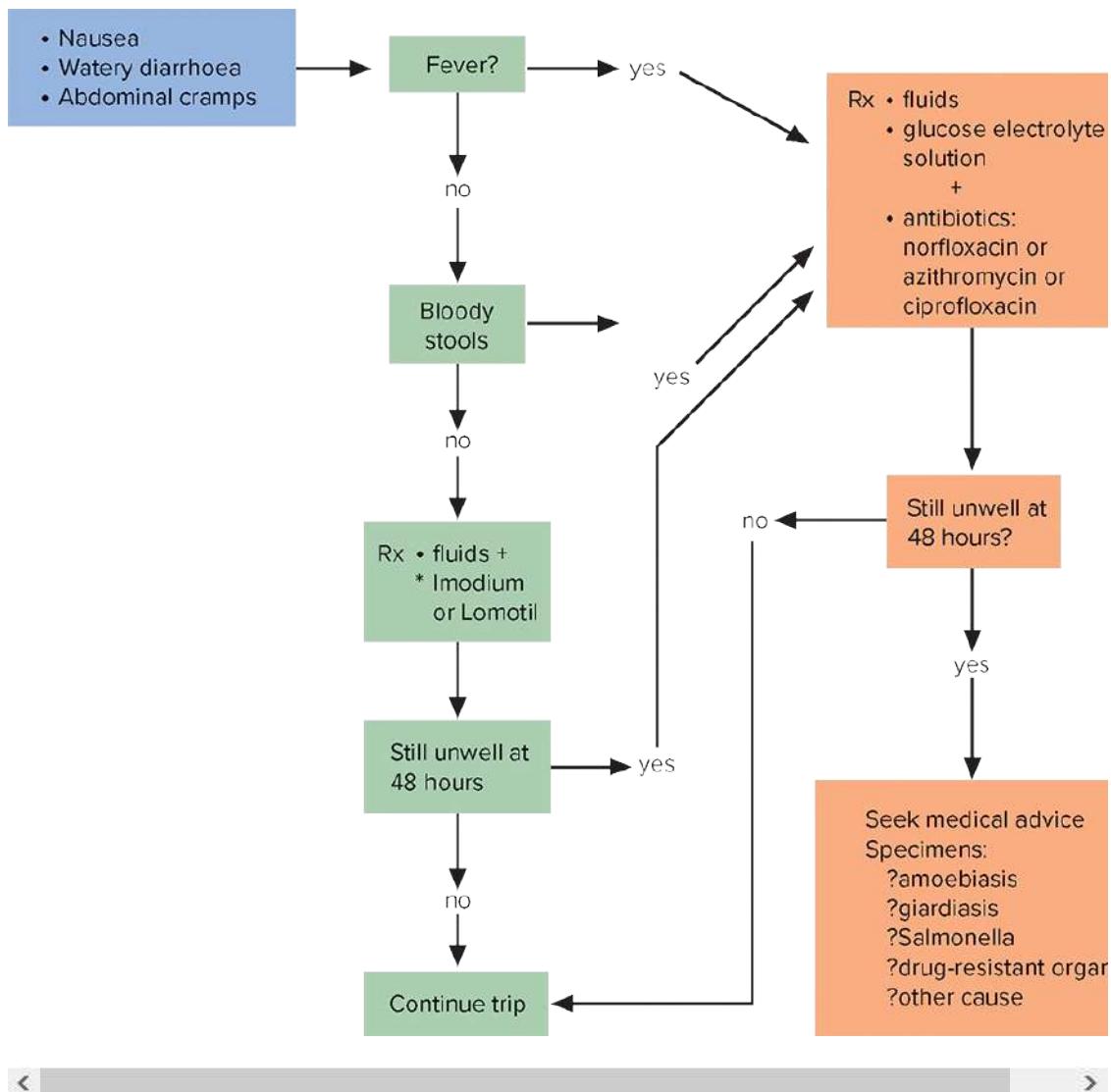
Traveller's diarrhoea is caused by a wide variety of organisms but mainly enterotoxigenic *E. coli* (*ETEC*), *Campylobacter* sp., *Shigella* sp. and *Salmonella* sp. Travellers are infected because they are exposed to slightly different types or strains of *E. coli* from the ones they are used to at home.<sup>1</sup>

Norovirus is a common cause on cruise ships.

### Treatment<sup>1</sup>

Chemoprophylaxis is not recommended in healthy travellers.

Refer to FIGURE 129.1 .<sup>1,2</sup>



**FIGURE 129.1** Algorithm for adult travellers with acute diarrhoea

Source: Locke<sup>1</sup>

The key factor in treatment is rehydration.

## Mild diarrhoea

- Maintain fluid intake—consider Gastrolyte.
- Consider antimotility agents (judicious use: if no blood in stools)—avoid in children.

loperamide (Imodium) 2 caps statim, then 1 after each unformed stool (max. 8 caps/day)

or

diphenoxylate with atropine (Lomotil) 2 tablets statim, then 1–2 (o) 8 hourly

Imodium is the preferred agent.

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## Moderate to severe diarrhoea<sup>1</sup>

- Consider admission to hospital if severe (toxic and febrile).
- Attend to hydration.
- Patient can self-administer antibiotic—e.g. single dose norfloxacin or azithromycin (especially in India, Nepal and Thailand).
- Loperamide in adults.
- Antibiotic: azithromycin, ciprofloxacin or norfloxacin (usually 3 days).

*Note:* There is increasing resistance to doxycycline and cotrimoxazole, especially in South-East Asia.

## Persistent diarrhoea

Any travellers with persistent diarrhoea after visiting less-developed countries, especially India and China, may have a protozoal infection such as amoebiasis or giardiasis. If the patient has a fever and mucus or blood in the stools, suspect amoebiasis. Giardiasis is characterised by abdominal cramps, flatulence and bubbly, foul-smelling diarrhoea persisting beyond 2 to 4 days. Take three specimens of faeces for analysis. In some cases serology may be helpful (e.g. amoebiasis). Consider subsequent development of irritable bowel syndrome.

### Treatment

- Giardiasis: tinidazole or metronidazole
- Amoebiasis: metronidazole or tinidazole

Patients can self-administer these drugs and carry them if visiting areas at risk, but they can have a severe disulfiram-like adverse reaction with alcohol.

## Preventive advice

The following advice will help prevent diseases caused by contaminated food and water. These ‘rules’ need only be followed in areas of risk such as Africa, South America, India and other parts of Asia. Only drink purified water and only eat well-cooked food.

- Purify all water by boiling for 10 minutes. Adding purifying tablets is not so reliable, but if the water cannot be boiled some protection is provided by adding PurTabs (chlorine) or iodine

(2% tincture of iodine), which is more effective than chlorine—use 4 drops of iodine to 1 litre of water and let it stand for 30 minutes.

- Avoid ice in your drinks unless known to be safe. Drink only boiled water (supplied in some hotels) or well-known bottled beverages (mineral water, 7-Up, Coca-Cola, beer).
- Brush your teeth using purified water.
- Avoid fresh salads or raw vegetables (including watercress). Salads or uncooked vegetables are often washed in contaminated water. Bananas and fruit with skins are safe once you have peeled and thrown away the skin but care should be taken with fruit that may possibly be injected with water.
- Be wary of dairy products such as milk, cream, ice-cream and cheese.
- Avoid eating raw shellfish and cold cooked meats.
- Avoid food, including citrus fruits, from street vendors.
- Drink hot liquids wherever possible.
- Use disposable moist towels for hand washing.
- Vaccines against ETEC are in development.

### Golden rule for preventing diarrhoea

If you can't peel it, boil it or cook it—don't eat it.

## Malaria

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### General aspects

- Travellers to all tropical countries are at some risk of this protozoal infection.
- Malaria is endemic in 102 countries;<sup>3</sup> 2.3 billion people are at risk, with 500 million affected every year.
- The risk is very low in the major cities of Central and Southern America and South-East Asia but can be high in some African cities.
- In humans, malaria is caused by four species of plasmodium:

*Plasmodium vivax* and *P. ovale*—tertian malaria

*P. falciparum*—malignant tertian malaria

*P. malariae*—quartan malaria

*P. knowlesi*—presents like vivax and falciparum: rare but can be serious

- Malaria is either benign (vivax, ovale) or malignant (falciparum).
- Resistance to many drugs is increasing:

The lethal *P. falciparum* is developing resistance to chloroquine and the antifolate antimalarials (Fansidar and Maloprim).<sup>3</sup>

Resistance is now reported to mefloquine and artemether.

Resistance is common in South-East Asia, Papua New Guinea (PNG), northern South America and parts of Africa.

- Chloroquine is used infrequently as it is only effective in limited areas of the world.
- The long-awaited vaccine will make all the complex drug management much simpler. However, it still appears to be many years away despite considerable research.
- Patients who have had splenectomies are at grave risk from *P. falciparum* malaria (PFM).
- People die from malaria because of delayed diagnosis, delayed therapy, inappropriate therapy and parasite–host factors.
- It is recommended that pregnant women and young children do not travel to malarious areas (if possible).
- Practitioners should follow updated recommended guidelines (e.g. WHO therapeutic guidelines (antibiotic)).



**DxT** fever + chills + headache → malaria

## Malaria risk assessment

The risk of catching malaria is increased by:

- being in a malaria area, especially during and after the wet season
- a prolonged stay in a malaria area, especially rural areas, small towns and city fringes
- sleeping in unscreened rooms without mosquito nets over the bed

- wearing dark clothing with short-sleeved shirts and shorts
- taking inappropriate drug prophylaxis
- an incomplete course of prophylaxis

## Malaria prevention

Travellers should be advised that malaria may be prevented by following two simple rules:

1. avoid mosquito bites
2. take antimalarial medicines regularly

In order to avoid mosquito bites, travellers are advised to:

- keep away from rural areas and avoid outdoor activities between dusk and darkness
- sleep in air-conditioned or properly screened rooms
- use insecticide sprays to kill any mosquitoes in the room or use mosquito coils at night
- smear an insect repellent on exposed parts of the body; an effective repellent is diethyl-m-toluamide (Muskol, Repellem, Rid)
- use mosquito nets (tuck under mattress; check for tears)
- impregnate nets with permethrin (Ambush) or deltamethrin
- wear sufficient light-coloured clothing, long sleeves and long trousers to protect whole body and arms and legs when in the open after sunset
- avoid using perfumes, cologne and after-shave lotion (also attract insects)

## Important considerations in malaria prophylaxis

1. Minimise exposure to mosquitoes and avoid bites.
2. Know areas of risk:
  - tropical South America (southern Mexico to northern half South America)
  - tropical Africa (sub-Saharan to northern South Africa)
  - Nile region, including remote rural Egypt
  - Southern Asia, especially tropical areas

3. Know areas of widespread chloroquine resistance:
- Asia, tropical South America (rare north of Panama Canal), sub-Saharan, East Africa
4. Consider several factors:
- intensity of transmission
  - season and length of stay
  - itinerary:
    - urban: hotel
    - urban: non-hotel
    - rural: housing
    - rural: backpacking
  - resistance patterns
  - host factors
    - age
    - pregnancy
    - associated illness
    - compliance
5. Know the antimalarial drugs (see TABLE 129.1 ).
6. Balance risk benefit of drug prophylaxis: drug side effects versus risk of PFM.
7. Visiting areas of PFM does not automatically require the use of potentially harmful drugs.<sup>4</sup>
8. Those at special risk are pregnant women, young children and the immunocompromised. Advise against travel.
9. No drugs give complete protection.

**Table 129.1** Common drugs used for malarial prophylaxis<sup>2,3,5</sup>

Adult dosage	Children's dose	Comments
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<b>Doxycycline*</b>	100 mg each day, 1–2 days before, during, 4 weeks after	>8 years only 2 mg/kg/day up to 100 mg	Photosensitivity reactions
<b>Mefloquine (Lariam)* In non- resistant areas</b>	250 mg (1 tab), once weekly, same day each week, 2– 3 weeks before, during, 4 weeks after	Not recommended <45 kg; >45 kg as for adults	Avoid use in resistant areas, e.g. Greater Mekong Subregion  Side effects: dizziness, 'fuzzy' head, blurred vision, neuropsychiatric  Beware of beta blockers
<b>Atovaquone + proguanil (Malarone)*</b>	250 mg/100 mg (1 tab) per day with food 2 days before, during, 7 days later	Paediatric formulation: 62.5 mg/25 mg 11–20 kg: 1 tablet/day 21–30 kg: 2 tablets/day 31–40 kg: 3 tablets/day >40 kg: 1 adult tab/day	Avoid in pregnant women or women breastfeeding infants <11 kg  Avoid in severe kidney impairment  Side effects: GIT upset, headache, dizziness, myalgia—others

\*chloroquine-resistant areas

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## Chemoprophylaxis

Refer to WHO guidelines ([www.who.int/ith/en](http://www.who.int/ith/en)).

### Guidelines

- Accommodation in large, air-conditioned hotels in most cities of South-East Asia (dusk–dawn) for <2 weeks: no prophylaxis required.
- For low-risk travel (urban: dusk–dawn) in areas of high resistance for <2 weeks: doxycycline

is adequate; use a treatment course of Malarone if necessary (see TABLE 129.2 ).

- Chloroquine is no longer recommended because of the global spread of resistance.
- For short- and long-term travel to rural areas of high resistance (e.g. South-East Asia including Thailand, Kenya, Tanzania, Ecuador, Venezuela, Brazil): doxycycline daily alone or mefloquine (once a week). Atovaquone and proguanil (Malarone) is also very useful for short-term travel.

**Table 129.2** Drugs used for uncomplicated chloroquine-resistant malaria (presumptive breakthrough where professional medical care unavailable, i.e. emergency self-treatment)<sup>2,5</sup>

	Adult dose	Children's dose
Artemether/lumefantrine (Riamet)	4 tablets at 0, 8, 24, 36, 48, 60 hours	Only if >12 years, >35 kg
Atovaquone/proguanil (Malarone) (if not used for prophylaxis)	4 tablets daily for 3 days	11–20 kg: 1 tablet 21–30 kg: 2 tablets 31–40 kg: 3 tablets

## Summary of malaria recommendations<sup>2,5</sup>

### 1. PFM area:

mefloquine 250 mg/week

*or*

doxycycline 100 mg/day

*or*

atovaquone + proguanil

### 2. Multidrug-resistant area:

Malarone for prophylaxis

+

standby treatment: Malarone or artemether + lumefantrine (Riamet)

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## Specific infectious diseases and immunisation

Protection from many types of infection is available through immunisation. All travellers should be immunised against tetanus, polio and diphtheria, and measles. Protection against tetanus requires an initial course of three injections followed by a booster every 10 years.

Vaccinations are required for special circumstances. Yellow fever vaccination is a legal requirement for any travellers returning from a yellow fever-endemic area. Cholera is not usually required.

Some travellers may be exposed to tuberculosis, hepatitis, plague, rabies, typhoid, typhus and meningococcal infection. Outbreaks of measles and coronavirus are also cause for concern. Immunisation against these is available and recommended for those at risk. Smallpox has now been eradicated from the world and therefore smallpox vaccination is no longer required for any traveller.

Japanese B encephalitis presents as a special problem to the traveller.

TABLE 129.3 outlines a summary of recommendations to consider.<sup>6,7</sup>

**Table 129.3** Summary of preventive measures and vaccinations<sup>6,7</sup>

### All travellers, all destinations

Tetanus toxoid and diphtheria booster  
if >10 years since last dose  
if >5 years for third world travel  
give DT <10 years of age and dT >10 years of age

### Routine vaccination for all Australians (National Schedule)

Tetanus, diphtheria, pertussis  
Hepatitis B  
*Haemophilus influenzae*  
Measles, mumps, rubella  
Influenza\*\*  
Pneumococcal disease\*\*

Poliomyelitis  
Rotavirus  
Varicella

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### Selected vaccinations based on risk

Cholera  
Hepatitis A  
Japanese B encephalitis  
Meningococcal disease\*  
Rabies  
Tick-borne encephalitis  
Tuberculosis (BCG if Mantoux -ve)  
Typhoid fever  
Yellow fever\*

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#### Other:

Preventive measures against gastrointestinal infections, mosquito bites, malaria (where applicable), sexually transmitted infections

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\*legal requirement in some countries

\*\*recommended for older travellers in particular

DT = diphtheria/tetanus combined, diphtheria at a higher dose for children. dT = booster diphtheria/tetanus with a lower diphtheria tetanus for adolescents and adults.

## Compulsory immunisations

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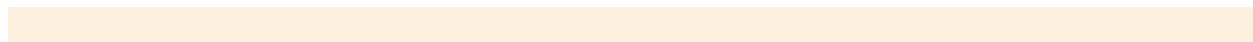
The two vaccinations that may be required before visiting ‘at risk’ areas are yellow fever and meningococcus.

### Yellow fever

Yellow fever is a serious viral infection spread by *Aedes* mosquitoes and, like malaria, is a tropical disease.

Milder cases may present with flu-like symptoms and relative bradycardia (Faget sign) and albuminuria. Severe cases experience these symptoms with abrupt fever then prostration, jaundice and abnormal bleeding from the gums and possibly haematemesis. Diagnosis is by ELISA testing.

Yellow fever vaccination, which is the only WHO-required vaccine, is essential for travel to or through equatorial Africa and northern parts of South America, and for re-entry to Australia from those countries.





**DxT** fever + bradycardia + jaundice → yellow fever

One injection only is required and the immunisation is valid for 10 years. Children aged less than 9 months should not be given this vaccine. It should not be given within 3 weeks of cholera vaccine.

*Note:* It is important to check specific country requirements in the WHO book on vaccination requirements.<sup>8</sup>

According to the WHO, a certificate against yellow fever is the only certificate that should be required for international travel. The requirements of some countries are in excess of international health regulations. However, vaccination against yellow fever is strongly recommended to all travellers who intend to visit places other than the major cities in the countries where the disease occurs in humans.

## **Meningococcal infection**

Meningitis due to this organism is a contagious lethal disease. It is common in Nepal, Mongolia, Vietnam and parts of Africa and Asia, especially in the dry season. Travellers trekking through the Kathmandu valley of Nepal and those attending the Haj pilgrimage to Saudi Arabia are at special risk and should have the vaccine. However, some countries require immunisation for entry.

## **Voluntary immunisation**

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Precautions against the following diseases are recommended for those travellers who may be at special risk.<sup>2</sup>

### **Hepatitis A, B**

Hepatitis A is a common problem in rural areas of developing countries. There is a declining level of antibodies to hepatitis A in developed countries and adults are at special risk so one or two doses of hepatitis A vaccine should be given. A blood test for hepatitis A antibodies can be carried out to determine a person's immunity.

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### **Prevention**

The rules of avoiding contaminated food and water apply (as for traveller's diarrhoea). Hepatitis A vaccine is given as a course of two injections.

Hepatitis B is endemic in South-East Asia, South America and other developing countries. Vaccination is recommended, especially for people working in such countries, particularly those

in the health care area or those who may expect to have sexual or drug contact. If patients have a ‘negative’ HBV core IgG titre, then vaccination would be worthwhile (three doses: 0, 1 and 6 months). Hepatitis E has a high mortality rate in pregnant women.

The usual approach for non-immunised people is to give the combined hepatitis A and B vaccine (Twinrix) as a course of three injections.

## **Typhoid**

Typhoid immunisation is not required for entry into any country but is recommended for travel to third world countries where the standards of sanitation are low. It should be considered for travellers to smaller cities, and village and rural areas in Africa, Asia, Central and South America and Southern Europe.

The parenteral (subcutaneous) vaccine can be used but the single dose typhim Vi vaccine or the oral vaccine, which have fewer side effects, are generally preferred. The oral vaccine, which is given as a series of three or four capsules, appears to afford protection for about 5 years but is contraindicated in the immunocompromised.

## **Cholera**

Cholera vaccination is not officially recommended by the WHO because it has only limited effectiveness. It is advisable for health care workers or others at risk entering an endemic area. Cholera is given as an oral vaccine (Dukoral) over 1 week prior to exposure. It is not recommended in children under 5 years or pregnant women.

## **Japanese B encephalitis**

This mosquito-borne flavivirus infection presents a real dilemma to the traveller and doctor because it is a very severe infection (mortality rate 20–40%) with high infectivity and high prevalence in endemic countries.

The disease is prevalent during the wet season in the region bounded in the west by Nepal and Siberian Russia and in the east by Japan and Singapore, especially in Nepal, Myanmar, Korea, Vietnam, Thailand, China, eastern Russia and the lowlands of India. Rice paddies and pig farms are areas of risk. The usual preventive measures against mosquito bites are important.



**DxT** febrile illness + vomiting + stupor → Japanese B encephalitis

## **Rabies**

Rabies vaccination for the rhabdovirus is recommended for some international aid workers or

travellers going to rabies-endemic areas for periods of more than 1 month or even for short periods of working with affected animals in those areas. The vaccination can be effective after the bite of a rabid animal, so routine vaccination is not recommended for the traveller. Affected animals include dogs, cats, monkeys, camels and feral (wild) animals. A traveller who sustains a bite or scratch or even is licked by an animal in countries at risk should wash the site immediately with soap or a detergent, and then seek medical help. The prebite vaccination does not remove the need for postexposure vaccination.



**DxT** painful bite + paraesthesia + hydrophobia (pain with drinking) → rabies

## Plague

Plague (Black death) caused by the Gram-negative bacterium *Yersinia Pestis* is still prevalent in rodents in countries such as Vietnam, Brazil, Peru, Ecuador and Kenya. The three most endemic countries are Democratic Republic of Congo, Madagascar and Peru. Rats and fleas have been implicated in transmission, but spread from person to person via lice or coughing is now considered more likely. Although not compulsory, vaccination is recommended for those engaged in field operations in plague areas and rural health workers who may be exposed to infected patients. Two doses are given to adults (three to children <12 years) and a booster every 6 months.

## Special problems

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### Prevention of sexually transmitted infections

Casual sexual contacts place the traveller at risk of contracting a serious, perhaps fatal, sexually transmitted infection (STI). The common STIs, especially prevalent in South-East Asia and Africa, are *Chlamydia*, non-specific urethritis (NSU), gonorrhoea (especially penicillin-resistant strains), hepatitis B, genital warts, genital herpes and syphilis. HIV infection is a rapidly increasing problem, with heterosexual transmission common in Africa and in South-East Asia. Unusual STIs such as lymphogranuloma venereum, chancroid and Donovanosis are more common in tropical developing countries. A practical rule is to assume that all 'at risk' travellers are both ignorant and irresponsible and advise accordingly.

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### Exposure to STIs

If a patient has had unprotected intercourse and is at definite risk of acquiring an STI, such as penicillin-resistant gonorrhoea or NSU, the following may be appropriate:<sup>1,4</sup>

- ceftriaxone 250 mg IM (as a single dose)

- doxycycline 100 mg (o) for 10 days or azithromycin 1 g (o) statim

## Drugs

Possession of and trafficking in drugs is very hazardous and many people are held in foreign prisons for various drug offences. The penalty for carrying drugs can be death.

Countries that currently may enforce the death penalty are China, Iran, Malaysia, Saudi Arabia and Singapore. Travellers should be warned about taking cannabis while in a foreign country, as it can cause profound personality changes in the user.

*Drug addicts should under no circumstances travel.* Young travellers should be wary about accepting lifts or hitchhiking in countries ‘at risk’.

## Pregnancy and travel

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Most international airlines do not allow passengers to travel after the 36th week of pregnancy and may require a doctor’s certificate after 28 weeks. Air travel is contraindicated in the last month of pregnancy and until the 7th day after delivery. The past obstetric history should be taken into account. The same health risks apply except that most antimalarial tablets and vaccinations are not recommended. Live vaccinations (measles, rubella, influenza) are generally contraindicated<sup>8</sup> but the WHO considers it safe to have polio vaccine. Administration of killed or inactivated vaccines, toxoids and polysaccharides is permitted during pregnancy. Yellow fever vaccine is considered safe after the 6th month. As a general rule pregnancy and travel to third world countries do not mix and pregnant women should be advised not to travel to these countries. Avoid travel if possible in Zika-affected areas.

Tetanus immunisation is important as protection is passed on to the child during early infancy. Immunoglobulin can be safely given as prevention against hepatitis.

The antimalarial drugs chloroquine, quinine and proguanil (with 500 mcg folic acid) may be given to pregnant women but doxycycline is contraindicated.

## Children and travel

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Although children, including infants, are good travellers and adapt well, their resistance, especially to heat and infections, is lower. A child can suffer from acute dehydration very rapidly.<sup>8</sup> Air travel is not recommended for infants of less than 7 days or premature infants.

The change in atmospheric pressure on landing can cause distressing ear pain, so taking a bottle during descent is recommended.

In tropical areas it is important to keep children well hydrated and they should wear loose cotton clothing. A good guide to the health of children is the amount and colour of their urine. If it is scanty and concentrated they are not getting sufficient fluid.

Most vaccines (diphtheria, tetanus, poliomyelitis, BCG) can safely be given in the first few weeks of life. Measles is common overseas and it is worthwhile considering it even under 12 months. Yellow fever vaccine should not be given under 12 months, hence the importance of protection against mosquito bites. Malaria prophylaxis is important. Chloroquine, proguanil and quinine may be given safely to infants. However, as a rule young children should be discouraged from travel.

## Fitness to fly

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Patients with these problems should avoid flying<sup>8,9</sup> or be assessed for fitness:

- upper airways congested by infection, including influenza, e.g. within 6 weeks of severe acute respiratory illness
- acute gastroenteritis
- severe respiratory disease (COPD, chronic bronchitis, pneumothorax)
- recent thoracic surgery
- cystic fibrosis
- pulmonary tuberculosis (people should not fly until rendered non-infective)
- past history of respiratory problems while flying (dyspnoea, chest pain, confusion)
- unstable heart failure
- severe anaemia (below 7.5 g/dL)
- pregnancy beyond 200 days (28 weeks) (up to 36 weeks if necessary)
- previous violent or unpredictable behaviour
- within 7 days of a myocardial infarction
- within 3 days of a cerebrovascular accident
- within 5–10 days of major surgery
- brain tumour or recent skull fracture
- recent eye surgery
- severe or poorly controlled hypertension

- poorly controlled epilepsy

Special precautions are required by travellers with the following problems:

- *Colostomy*. Patients should wear a large colostomy bag and take extra bags.
- *Varicose veins*. Such patients should wear supportive stockings and exercise frequently.
- *Plaster casts*. Those with broken limbs in plaster should be careful of swelling.
- *Pacemakers*. Those with pacemakers may have a problem with X-rays at some overseas airports. Mention it to security officials before passing through security equipment.
- *Epilepsy*. Medication should be increased on the day of travel.
- *Diabetics*. Diabetics should discuss their therapy and control with their doctor. They should carry sweets.

## Prevention of DVT

There is a risk of DVT in any person flying on long international flights. Risk factors include: increasing age, clotting tendency (i.e. thrombophilia), past history of DVT, family history of DVT, smoking, obesity, varicose veins, dehydration, significant illness, recent major surgery and oestrogen therapy (see [CHAPTER 122](#) ).

Prevention is by:

- keeping hydrated—drink ample fluids but avoid alcohol and caffeine drinks
- in-flight exercises, such as foot pumps, ankle circles, knee lifts
- compression stockings (class 18–20)
- medication for those at risk, e.g. thrombophilia, Clexane 80 mg SC 12 to 24 hourly (if no contraindication and normal renal function); use one dose for travel to South-East Asia and two doses for travel to Europe

## **Travel sickness**

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The main symptoms of travel sickness are nausea, vomiting, dizziness, weakness and lethargy. Early signs are pallor and drowsiness, and sudden silence from an active, talkative child.

### Medication for travel sickness

Many medicines are available for travel sickness. They include hyoscine, various antihistamines and other phenothiazine derivatives, all of which can cause drowsiness; although a problem for drivers, this sedative effect may be helpful for children or for those travelling long distances by

plane.

Phenothiazine derivatives that provide appropriate anti-labyrinthine activity include prochlorperazine (Stemetil), promethazine hydrochloride (Phenergan) and promethazine theoclinate (Avomine).

Combination antihistamine and hyoscine preparations for travel sickness include Travacalm and Benacine.

Hyoscine comes in tablet form, either alone or in combination and in the popular adhesive patches.

## Recommended medications

### Car travel: adult passengers and children

- dimenhydrinate (Dramamine)

*or*

promethazine theoclinate (Avomine)

*or*

hyoscine (Kwells)

These preventive oral preparations should ideally be taken 30–60 minutes before the trip and can be repeated 4–6 hourly during the trip (maximum 4 tablets in 24 hours).

- hyoscine dermal discs (Scop)

If available, one of these adhesive patches should be applied to dry, unbroken, hairless skin behind the ear, 5–6 hours before travel and left on for 3 days. Wash the hands thoroughly after applying and removing the disc—be careful of accidental finger-to-eye contact.

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### Sea travel

Sea travel generally poses no special problems apart from motion sickness and the possibility of injuries in the aged. The larger the ship, the less likely the problem. Those prone to sea sickness are advised to take anti-emetics 60 minutes before sailing and for the first 2 days at sea until they obtain their ‘sea legs’. However, the use of hyoscine transdermal delivery systems is recommended for convenience.

Experienced seamen’s ‘tricks’:

- always keep looking to the horizon

- plug one ear with cotton wool or Blu-Tack
- drink ginger drinks, e.g. ‘dry ginger’, ginger beer
- chew gum

## Severe sea sickness

The standard treatment is promethazine (Phenergan) 25 mg IM injection. If injections are not possible, prochlorperazine (Stemetil) suppositories can be used.

## The aged

Generally the elderly travel well but should take safeguards to avoid falls. The chief surgeon on P&O’s flagship recommends that elderly people should bring the following:

- a letter from their doctor stating diagnosis and medication
- a spare set of spectacles
- a spare set of dentures
- a walking stick (if appropriate)

## Altitude sickness<sup>10</sup>

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High altitudes pose special problems for people who live at low altitude, especially if they have heart and lung disease. The severity depends on altitude, the speed of ascent, the temperature and level of activity. The high altitudes of Africa (Kilimanjaro, Kenya), India, Nepal (Himalayas), the Rockies of Canada and the US, and the Andes of South America provide such problems. It is usually safe to trek under 2500 m altitude but rapid ascent beyond this commonly precipitates altitude sickness. Serious altitude sickness occurs at 3500–5800 m.

## Syndromes

1. Acute mountain sickness (mild to severe)
2. High-altitude pulmonary oedema
3. High-altitude cerebral oedema

## Clinical features

- Usually within 8–24 hours of exposure
- Frontal headache (worse in morning and when supine)

- Malaise, fatigue, anorexia, nausea, insomnia

*More severe:* fluid retention (peripheral or facial oedema), dyspnoea, vomiting, dry cough, dizziness.

*Serious:* marked dyspnoea, central cyanosis, neurological symptoms and signs, e.g. ataxia, changed mental status.

## Prevention

- Careful acclimatisation with gradual ascent<sup>9</sup>
- Spend 2–3 days at intermediate altitudes
- Ascent rate less than 400–500 m per day above 3000 m (that is, try not to sleep at an altitude 400–500 m higher than that of the previous day)
- Ample fluid intake (more water than usual)
- Avoid alcohol
- Acetazolamide (Diamox) 250 mg 8 hourly the day before ascent; continue 3–6 days (deaths from mountain sickness have still occurred while on this drug)

## Treatment

- Immediate (urgent and rapid) descent to below 2000 m
- Oxygen
- Dexamethasone (e.g. 8 mg (o), IV or IM statim, then 4 mg, 6 hourly)

## Travellers' medical kit

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If a person intends to travel for a long time the following represents a comprehensive medical kit. It should not be regarded as an alternative to seeking appropriate medical help if it is available. Typical examples of general items are included in brackets.

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## Materials

- Alcohol swabs
- Bandaids and Elastoplast dressing strip
- Bandages (2 cotton gauze, 2 crepe × 10 cm)
- Pocket torch

- Steri-Strips or ‘butterfly strips’ (to patch small cuts)
- Sterile gauze and cotton wool
- Sterile gloves
- Thermometer
- Scissors and tweezers
- Safety pins
- Water purification tablets or iodine solution

## Topical items

- Antifungal cream
- Chlorhexidine/cetrimide antiseptic cream (Savlon)
- Condoms
- Corticosteroid cream (e.g. hydrocortisone)
- Insect repellent containing diethyl-m-toluamide (DEET, Muskol, Repellem or Rid)
- Insecticide spray
- Mosquito net repellent solution: permethrin (Ambush—ICI)
- Nasal spray or drops
- Stingose spray (for bites and stings)
- Strepsils
- UV antisunburn cream (factor 30+)

## Medication checklist

The medications below marked with \* usually require a prescription.

- Antibiotics\*

amoxicillin + clavulanate forte

norfloxacin 400 mg (6 tablets for 3 days)

azithromycin (for children)

- Antacid tablets—for heartburn or indigestion
- Antimalarials\*—where appropriate (including malaria emergency self-treatment)
- Diamox tablets\* for acute mountain sickness
- Fasigyn\* 2 g or Flagyl\* 2.4 g—for amoebiasis or giardiasis
- Laxative (Senokot)
- Imodium\* or Lomotil\*—for diarrhoea
- Motion sickness tablets (Avomine, Kwells or Phenergan)
- Paracetamol tablets—for fever or pain
- Sleeping tablets\* (temazepam, promethazine)
- Rehydration mixture (Gastrolyte)
- Throat lozenges
- EpiPen—if history of anaphylaxis

## The returned traveller

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We are more likely to encounter tropical diseases in the traveller returning from countries where these disorders are endemic. Many of these diseases are likely to be encountered in newly arrived refugees (see [CHAPTER 128](#) ). The diseases include bacterial infections such as tuberculosis (a huge problem), plague, melioidosis, leprosy, typhoid/cholera and zoonoses. Other infections to be considered are parasitic, *Rickettsia* and myriad viral infections including haemorrhagic fevers, various types of encephalitis, yellow fever, polio, trachoma, hepatitis, lyssavirus such as rabies and bat bite infections, dengue and influenzas.

It is worth reviewing the various protozoal and helminthic parasitic infections that need to be considered in the sick returned traveller.<sup>11</sup> The helminths (worms) include cestodes (tapeworms), trematodes (flukes) and nematodes (roundworms).

- *Protozoal infections:* African trypanosomiasis (sleeping sickness), American trypanosomiasis (Chagas disease), amoebiasis, babesiosis, coccidioidosis and microsporidiosis, cryptosporidiosis, giardiasis, leishmaniasis—cutaneous and visceral (kala-azar), malaria, toxoplasmosis, trichomonas
- *Cestodes (tapeworms):* Cysticercosis (*Taenia solium*, *T. saginata*), echinococcus (hydatid disease)

- *Trematodes (flukes)*: Schistosomiasis (bilharziasis), clonorchiasis, paragonimiasis
- *Nematodes (roundworms)*: Ascariasis, enterobiasis (pinworm), *Dracunculus medinensis* (Guinea worm), filariasis, hookworm, larva migrans (cutaneous and visceral), strongyloidiasis, trichinosis (*Trichinella spiralis*), trichuriasis (whipworm)

## Problems in the returned tropical traveller

### Red flags in the returned traveller

- Mental confusion/other CNS signs
- Respiratory distress
- Appears 'septic'
- Hypotension
- Haemorrhagic features
- Pallor/anaemia

## Gastrointestinal symptoms

### Mild diarrhoea

- Stool microscopy and culture
- Look for and treat associated helminthic infestation (e.g. roundworms, hookworms)

### Moderate or prolonged (>3 weeks) diarrhoea

Usually due to *Giardia lamblia*, *Entamoeba histolytica*, *Campylobacter jejuni* (especially South-East Asia), *Salmonella*, *Yersinia enterocolitica* or *Cryptosporidium*.<sup>12</sup>

- Stool examination (three fresh specimens):

microscopy

wet preparation

culture

- Faecal Multiplex PCR (if available)

- Treat pathogen (see guidelines under diarrhoea in [CHAPTER 34](#) )

Non-pathogens such as *Escherichia coli* and *Endolimax nana* are often reported but do not treat specifically.

*Note:* Consider exotic causes such as schistosomiasis, strongyloidiasis and ciguatera in unusual chronic post-travel ‘gastroenteritis’.

## Persistent abdominal discomfort

This common syndrome includes bloating, intestinal hurry and borborygmi, and often follows an episode of diarrhoea. Usually no pathogens are found on stool examination. However, giardiasis can be difficult to detect and an empirical course of tinidazole (2 g statim) is worthwhile. Any persistent problem then is a type of postinfective bowel dysfunction or irritable bowel. Reassurance is important.

## Rash/other skin lesions

- Maculopapular: consider dengue, HIV, typhus, syphilis, arbovirus infections, leptospirosis, Q fever
- Petechiae: viral haemorrhagic fevers, leptospirosis, dengue
- Rose spots: typhoid
- Eschar: typhus (louse-borne, tick and scrub), anthrax
- Chancre: African trypanosomiasis, syphilis

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## Fever

- Causes range from mild viral infections to potentially fatal cerebral malaria (see [TABLE 129.4](#) ) and meningococcal septicaemia.
- An Australian study of fever in returned travellers<sup>13</sup> revealed the most common diagnosis was malaria (27%) followed by respiratory tract infection (24%), gastroenteritis (14%), dengue fever (8%) and bacterial pneumonia (6%). The commonness of malaria was supported by results from the GeoSentinel Surveillance Network.<sup>14</sup>
- The common serious causes are malaria, typhoid, hepatitis (especially A and B), dengue fever, amoebiasis and tuberculosis.
- Most deaths from malaria have occurred after at least 3 or 4 days of symptoms that may be mild. Death can occur within 24 hours. Factors responsible for death from malaria include delayed presentation, missed or delayed diagnosis (most cases), no chemoprophylaxis and old age.

- Refer immediately to a specialist unit if the patient is unwell.
- Be vigilant for meningitis and encephalitis.
- Be vigilant for amoebiasis—can present with a toxic megacolon, especially if antimotility drugs are given.
- If well but febrile, *first-line screening tests*:
  - full blood examination and ESR
  - thick and thin films
  - liver function tests
  - urine for micro and culture
- Refer immediately if malaria is proven or if fever persists after a further 24 hours.

**Table 129.4** Fever and malaise in the returned traveller: diagnostic strategy model

**Note:** All fever in a returned traveller is malaria until proved otherwise!

#### Probability diagnosis

Viral respiratory illness (e.g. influenza, including coronavirus)  
 Malaria  
 Hepatitis (may be subclinical)  
 Gastroenteritis/diarrhoeal illness  
 Dengue

#### Serious disorders not to be missed

Malaria  
 Tuberculosis  
 Typhoid/paratyphoid  
 Encephalitis  
 Viral haemorrhagic diseases  
 Meningococcal meningitis  
 Melioidosis  
 Amoebiasis (liver abscess)  
 HIV seroconversion illness

#### Pitfalls (often missed)

Ascending cholangitis

Infective endocarditis

Cytomegalovirus

Epstein–Barr virus

Dengue fever

Lyme disease

Bronchopneumonia

Ross River fever

Leptospirosis

*Rarities:*

Chikungunya

Legionnaire disease

Schistosomiasis

African trypanosomiasis

Typhus

Yellow fever

Zika virus

Rift Valley fever

Spotted fever

Lassa fever, Hantavirus, Marburg, Ebola and other haemorrhagic fevers

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*Note:* Three causes of a dry cough (in absence of chest signs) are malaria, typhoid and amoebic liver abscess.

### **Seven masquerades checklist**

Drugs (reaction to antimalarials)

Urinary infection

### **Investigations (if no obvious cause)**

Full blood examination

Chest X-ray

TB screening: TST (Mantoux); IGRA

Blood culture

Liver function tests

Urine—micro and culture

Stool—micro and culture

ESR, CRP

Malaria screening: rapid diagnostic test, thick and thin films, spit test

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Acute phase serology (hold pending convalescent serology)

## Malaria

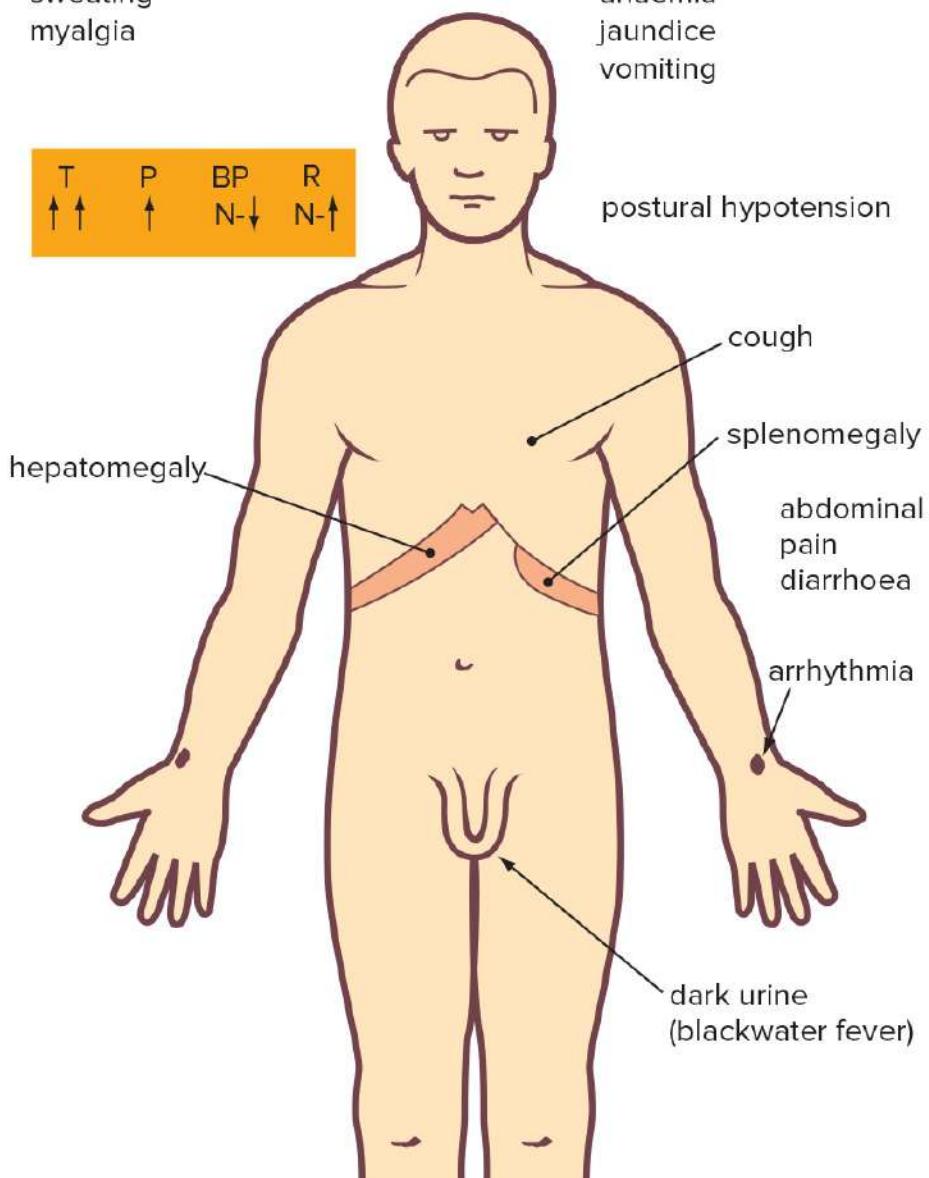
See FIGURE 129.2 .

### Typical features

- headache
- malaise
- fever/chills
- prostration
- sweating
- myalgia

### Other possible features

- cerebral problems
- delirium
- convulsions
- coma
- anaemia
- jaundice
- vomiting



**FIGURE 129.2** Clinical features of malaria

- Incubation period: *P. falciparum* 7–14 days; others 12–40 days
- Most present within 2 months of return
- Can present up to 2 or more years
- Can masquerade as several other illnesses

## Clinical features

- High fever, chills, rigor, sweating, headache
- Usually abrupt onset
- Can have atypical presentations (e.g. diarrhoea, abdominal pain, cough)

## Other features

- Beware of modified infection.
- Must treat immediately. Delay may mean death.
- Typical relapsing patterns often absent.
- Thick smear allows detection of parasites (some laboratories are poorly skilled with thick films).
- Thin smear helps diagnose malaria type.
- If index of suspicion is high, repeat the smear ('No evidence of malaria' = 3 negative daily thick films). Newer tests (e.g. the malaria rapid diagnostic test, polymerase chain reaction [PCR] tests and immune chromatographic test [ICT] card tests for PFM) show promise. Cerebral malaria and blackwater fever are severe and dramatic. The Para check V test (a desktop test) is accurate and needs to be positive before prescribing artemether in some areas. The new malaria spit (saliva) test detects a protein biomarker.

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## Treatment<sup>2,5</sup>

- Admit to hospital with infectious disease expertise. Rule out G6PD deficiency
- Supportive measures, including fluid replacement
- Avoid the same drugs used for prophylaxis
- *Uncomplicated malaria*<sup>2</sup>

artemether + lumefantrine 20 mg + 120 mg (Riamet)

4 tablets with food at 0, 8, 24, 36, 48, 60 hours (i.e. 24 tablets) in 60 hours

*or*

atovaquone + proguanil

*or (combination treatment)*

quinine sulphate 600 mg (o) 8 hourly, 7 days +

doxycycline 100 mg (o) 12 hourly, 7 days

*or*

clindamycin 300 mg (o) tds, 7 days (children, pregnancy)

***complicated (severe):***

artesunate 2.4 mg/kg IV statim, 12 hours, 24 hours, then once daily until oral therapy (Riamet) is possible

*or*

quinine dihydrochloride 20 mg/kg up to 1.4 g IV (over 4 hours) then after 4-hour gap 7 mg/kg IV 8 hourly until improved (ECG/cardiac monitoring)

*then*

quinine (o) 7 days

*Note:* Check for hypoglycaemia. Beware if antimalarial use in previous 48 hours.

## **Typhoid fever**

Incubation period 10–14 days

### **Clinical features**

- Insidious onset
- Headache prominent
- Dry cough
- Fever gradually increases in ‘stepladder’ manner over 4 days or so
- Abdominal pain and constipation (early)
- Diarrhoea (pea soup) and rash—rose spots (late)

- ± Splenomegaly



**DxT** 'stepladder' fever + abdominal pain + relative bradycardia → typhoid (early)

## Diagnosis

- On suspicion—blood and stool culture
- Serology not very helpful

## Treatment

- Azithromycin 1 g (o) for 7 days  
*or*
- Ciprofloxacin 500 mg (o) bd for 7–10 days

## ⌚ Cholera

Incubation period a few hours–5 days

## Clinical features

### Variable

- Subclinical
- Mild, uncomplicated episode of diarrhoea
- Fulminant lethal form with severe water and electrolyte depletion, intense thirst, oliguria, weakness, sunken eyes and eventually collapse



**DxT** fever + vomiting + abrupt onset 'rice water' diarrhoea → cholera

## Diagnosis

Stool microscopy and culture (*Vibrio cholerae*)

## Treatment

- In hospital with strict barrier nursing
- IV fluid and electrolytes
- Azithromycin or ciprofloxacin

## Viral haemorrhagic fevers

These include: yellow fever, Lassa fever, etc., plus dengue fever and chikungunya.

### **Lassa fever, Ebola virus, Marburg virus, Hanta virus**

These rare but deadly tropical diseases usually commence with a flu-like illness, gastrointestinal symptoms with thrombocytopenia, anaemia and, if severe, findings consistent with disseminated intravascular coagulation leading to bleeding and possibly shock and frank haemorrhage. Hanta virus tends to cause respiratory symptoms, including cough, progressing to respiratory difficulty. Seek urgent expert help.

#### **Ebola**

- Incubation period: 2–16 days
- Transmission: direct body contact (body fluids, esp. blood, vomit from affected or dead person), infected animals, contaminated objects (needles, medical equipment)
- Early symptoms: constitutional (fever, malaise, headache), upper respiratory (flu-like, cough, etc.), abdominal (pain, nausea, vomiting, diarrhoea)
- May progress to severe symptoms as above then multiorgan failure
- Diagnosis: PCR, histopathology
- Treatment is supportive, esp. IV fluids

### **Dengue fever<sup>2,4</sup>**

Also known as ‘breakbone’ fever, it is widespread in the south-east Pacific and endemic in Queensland. A returned traveller with myalgia and fever <39°C is more likely to have dengue than malaria. It is commonly misdiagnosed.

#### **Clinical features**

- Mosquito-borne (*Aedes aegypti*) viral infection
- Incubation period 5–6 days
- Abrupt onset fever, malaise, headache, nausea, pain behind eyes, severe backache, prostration

- Sore throat
- Severe aching of muscles and joints
- Fever subsides for about 2 days, then returns
- Maculopapular rubelliform rash on limbs → trunk (hand pressure for 30 seconds causes blanching)
- Petechial rash common (even in absence of thrombocytopenia)
- Generalised erythema with ‘islands of sparing’
- ± Diarrhoea
- The rare haemorrhagic form is very severe; may present with shock, which is usually fatal
- Later severe fatigue and depression (prone to suicide)

*Note:* A large-scale survey of dengue patients showed the symptoms as fever 100%, myalgia 79%, rash 74%, headache 68%, nausea 37%.



**DxT** fever + severe aching (especially headache) + rash → dengue fever

## Diagnosis

- Dengue-specific IgM serology—best on day 5
- PCR
- FBE: leukopenia; thrombocytopenia in haemorrhagic form

## Treatment

- Symptomatic with rest, fluids and analgesics (paracetamol). Avoid antibiotics, aspirin, NSAIDs and corticosteroids

## Prevention

- Avoid mosquito bites—no vaccine available

## Zika virus

Also transmitted by *Aedes aegypti*, it is more common in Central and South America. Most infections are asymptomatic but common symptoms are fever, rash, arthralgia and conjunctivitis

with a dengue-like syndrome. Can cause a Guillain–Barré-like syndrome or cerebral damage (microcephaly) in infants of infected mothers. Diagnosis is confirmed by serology and PCR. Treatment is symptomatic.

## Chikungunya

This is an alpha-viral mosquito-borne infection with a similar clinical picture to dengue fever; it can cause haemorrhagic fever. It is encountered in tropical South-East Asia, Indian Ocean islands and parts of Africa.

## Diagnosis

- Positive serology

## Encephalitis

Encephalitis presents with fever, nausea and vomiting, then progressing to stupor, coma and convulsions. Mosquito-borne cases include Japanese B encephalitis and West Nile fever.

Consider mosquito-borne encephalitis and meningococcal meningitis in a patient presenting with headache, fever and malaise before neurological symptoms such as delirium, convulsions and coma develop.

## Melioidosis

This serious disease with a high mortality is caused by the Gram-negative bacillus *Burkholderia pseudomallei*, a soil saprophyte that infects humans mainly by penetrating through skin wounds, especially abrasions. It is mostly acquired while wading in rice paddies. It is mainly a disease of third world countries and occurs between 20° north and 20° south of the equator, mainly in South-East Asia and including northern Australia. It may manifest as a focal infection or as septicaemia with abscesses in the lung, kidney, skin, liver or spleen. It is called the ‘Vietnamese time bomb’ because it can present years after the initial infection, as seen in Vietnamese war veterans.

## Clinical features

- Fever, headache, cough, pleuritic pain and generalised myalgia



**DxT** fever + pneumonia + myalgia → melioidosis

## Diagnosis

- Blood culture, swabs from focal lesions, haemagglutination test

## Treatment (adults)<sup>2</sup>

- Ceftazidime 2 g IV, 6 hourly
  - or*
- Meropenem 1 g IV, 6 hourly
  - or*
- Imipenem 1 g IV, 6 hourly
- All for at least 14 days, followed by  
oral cotrimoxazole ± doxycycline bd + folic acid for 3 months

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## Prevention

- Traumatised people with open wounds (especially diabetics) in endemic areas (tropical South-East Asia) should be carefully nursed.

## ¶ Plague

### Clinical features

There are basically two forms of plague:

1. bubonic plague—painful suppurating inguinal or axillary lymphadenitis (buboës) (see FIG. 129.3 )
2. pneumonic plague—flu-like symptoms with haemoptysis, septicaemia and a fatal haemorrhagic illness (± buboës)



**FIGURE 129.3** Young Vietnamese woman with a left inguinal bubo

*Photo courtesy Dr RA Cooke*

There is a rapid onset of high fever and prostration with black patches of skin due to subcutaneous haemorrhage.

## Diagnosis

- Serology and smear/culture of buboes

## Treatment

- Streptomycin and doxycycline

## ⌚ Rabies

### Clinical features

Prodromal symptoms can include malaise, headache, abnormal behaviour including agitation and fever. It progresses to either paralytic ‘dumb rabies’ or encephalitic ‘furious rabies’, which involves excessive salivation and excruciating spasms of the pharyngeal muscles on drinking water (in particular). The patient is terrified of drinking water despite a great thirst (hydrophobia).



**DxT** painful/itchy bite + agitation + hydrophobia → rabies

## Diagnosis

- Viral testing

## Treatment

- Post-bite prophylaxis (endemic area)

Wash the wound immediately then clean it. Administer rabies vaccine (if unimmunised) and rabies immune immunoglobulin ASAP (within 48 hours).

## ⌚ Ciguatera

This is a type of food poisoning caused by eating tropical fish, especially large coral trout and large cod, caught in tropical waters (e.g. the Caribbean and tropical Pacific). The problem is caused by a type of poison that concentrates in the fish after they feed on certain micro-organisms around reefs. Ciguatera poisoning presents within hours as a bout of ‘gastroenteritis’ (vomiting, diarrhoea and stomach pains) and then symptoms affecting the nervous system, such as muscle aching and weakness, paraesthesia and burning sensations of the skin, particularly of the fingers and lips. There is no cure for the problem but it can be treated with IV fluids and possibly mannitol infusion or gammaglobulin. It is unwise to eat large predatory reef fish, especially their offal (mainly the liver).

## ⌚ Hansen disease (leprosy)

Hansen disease (Gerhard Hansen, 1869) is caused by the acid-fast bacillus *Mycobacterium leprae*. It is a disorder of tropical and warm temperate regions, especially South-East Asia. It is considered to be transmitted by nasal secretions with an incubation period of 2–6 years. It affects the skin and nerves, especially of the extremities.

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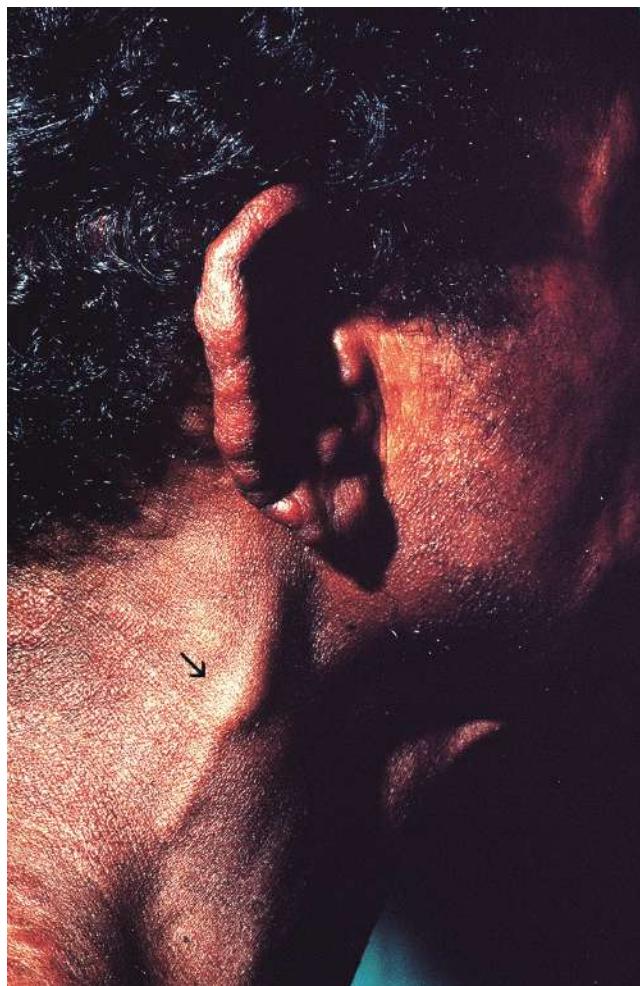
## Clinical features

(WHO 1999)

Diagnosis is one or more of:

- Skin lesions—usually anaesthetic; hypopigmented or reddish maculopapules or annular lesions (see FIG. 129.4 )
- Thickened peripheral nerves with loss of sensation, e.g. ulnar (elbow), median (wrist), common peroneal (knee) and greater auricular (neck); also peripheral neuropathy or motor nerve impairment
- Demonstration of acid-fast bacilli in a skin smear or on biopsy

- It can be localised (tuberculoid) or generalised (lepromatous)



**FIGURE 129.4** Advanced lepromatous leprosy. This patient has multiple nodules on his ear and the greater auricular nerve is markedly thickened.

*Photo courtesy Dr RA Cooke*

## Diagnosis

- Diagnosis is by biopsy, the lepromin test, cultivation of the organisms or by PCR tests.

## Treatment

- Referral to specialists or a specialist centre is advisable for shared care.
- WHO treatment recommendations are multiple drug therapy, e.g. rifampicin, clofazimine and dapsone, but therapy is constantly being evaluated (see: [https://www.who.int/health-topics/leprosy#tab=tab\\_1](https://www.who.int/health-topics/leprosy#tab=tab_1)).

## Scrub typhus

Scrub typhus is found in South-East Asia, northern Australia and the western Pacific. It is caused by *Rickettsia tsutsugamushi*, which is transmitted by mites.

### Clinical features

- Abrupt onset febrile illness with headache and myalgia
- A black eschar at the site of the bite with regional and generalised lymphadenopathy
- Short-lived macular rash
- Can develop severe complications (e.g. pneumonitis, encephalitis)

### Diagnosis

- Serological assays

### Treatment

- Doxycycline 100 mg bd for 7–10 days

## Queensland tick typhus

Queensland tick typhus, which is caused by *Rickettsia australis*, is directly related to a tick bite. The symptoms are almost identical to scrub typhus, although less severe, and the treatment is identical.

## Epidemic louse-borne typhus

Caused by *Rickettsia prowazekii*, this is of very low risk to most travellers. Sporadic outbreaks occur in conditions of overcrowding and poor hygiene, such as in refugee camps or prisons. Onset is variable, but often includes sudden headache, high fever, prostration, myalgia and a characteristic macular rash starting on the upper trunk.

*Treatment:* doxycycline

## Tropical parasitic infections<sup>11</sup>

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Travellers to tropical or subtropical areas are at risk of more unusual infections. Most of these infections are contracted through contaminated food and water, insect bites and walking barefoot on contaminated soil. The risk of such infections is highest in rural areas of countries other than Europe, North America and Australasia. Parasitic infections other than malaria include the following.

## African trypanosomiasis (sleeping sickness)

### Clinical features

#### Stage 1 (haemolymphatic)

- Incubation period about 3 weeks
- Fever, headache and a skin chancre or nodule
- Lymphadenopathy, hepatosplenomegaly

#### Stage 2 (meningoencephalitic)

- Weeks or months later
- Cerebral symptoms including hypersomnolence

### Diagnosis

- Demonstrating trypomastigotes in peripheral blood smear or chancre aspirate

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### Treatment

- Suramin IV
- Infectious disease consultation essential

### Prevention

- Avoid bites of the tsetse fly. If visiting areas of East, Central and West Africa, especially the safari game parks, travellers should use insect repellent and wear protective light-coloured clothing, including long sleeves and trousers.

## Leishmaniasis

### Visceral leishmaniasis (kala-azar)

The parasitic Leishmania, which is transmitted by bites of sand flies and by blood transfusions and IV drug use, is endemic in 88 countries.

### Clinical features

- The haemopoietic system is targeted and presenting features include fever; wasting; ulceration

of the skin, mouth and nose; hepatosplenomegaly; and lymphadenopathy

- Among other signs is hyperpigmentation of the skin, hence the Hindu name kala-azar ('black fever')
- Most cases are subclinical

## Diagnosis

- Serology and tissue biopsy

## Cutaneous leishmaniasis

This may be encountered in travellers and servicemen and servicewomen returning from the Middle East, especially the Persian Gulf, and also travellers returning from Central and South America. The protozoa is transmitted by a sandfly and has an average incubation period of 9 weeks.

## Clinical features

The key clinical finding is an erythematous papule (see FIG. 129.5 ).



**FIGURE 129.5** Cutaneous leishmaniasis in a serviceman after returning from the Middle East

## Diagnosis

- Performing a punch biopsy and culturing tissue in a special medium

## Treatment

- Treatment for extensive lesions is with high-dosage ketoconazole for 1 month.
- Smaller lesions should be treated topically with 15% paromomycin and 12% methyl benzethonium chloride ointment applied bd for 10 days.<sup>15</sup>
- A special vaccine is available in some Middle Eastern countries (e.g. Israel).

## Schistosomiasis (bilharzia)

The infestation is caused by parasite organisms (schistosomes) which target the vasculature of the GIT or genitourinary tract. Its eggs are passed in human excreta, which contaminates watercourses (notably stagnant water) and irrigation channels in Egypt, other parts of Africa, South America, some parts of South-East Asia and China. Freshwater snails are the carriers (vectors).<sup>16</sup>

### Clinical features

- The first clinical sign is a local skin reaction at the site of penetration of the parasite (it then invades liver, bowel, vulva and bladder). This site is known as ‘swimmer’s itch’.
- Within a week or so there is a generalised allergic response, usually with fever, malaise, myalgia, abdominal pain and urticaria.
- A gastroenteritis-like syndrome can occur (nausea, vomiting, diarrhoea) and respiratory symptoms, particularly cough.
- Clinical findings, such as in trypanosomiasis, include lymphadenopathy and hepatosplenomegaly.

### Diagnosis

- Serology
- Detecting eggs in the stools, the urine or in a rectal biopsy

### Treatment

- Praziquantel (may need retreatment)

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### Prevention

- Travellers should be warned against drinking from, or swimming and wading in, dams, watercourses or irrigation channels, especially in Egypt and other parts of Africa.

## Amoebiasis

Amoebiasis (*Entamoeba histolytica*) can be diagnosed in a sick traveller returning from an endemic area with severe diarrhoea characterised by blood and mucus. Complications include fulminating colitis, amoebomas (a mass of fibrotic granulation tissue) in the bowel and liver abscess. Acute amoebic dysentery is treated with oral tinidazole or metronidazole.

## Amoebic liver abscess

### Clinical features

- High swinging fever
- Profound malaise and anorexia
- Tender hepatomegaly
- Effusion or consolidation of base of right chest

There is often no history of dysentery, and jaundice is unusual.

### Diagnosis

- Serological tests for amoeba and by imaging (CT scan)

### Treatment

- Metronidazole and by percutaneous CT-guided aspiration

## Giardiasis

*Giardia lamblia* infection is usually acquired from contaminated drinking water.

### Clinical features

- Often asymptomatic
- Symptoms include abdominal cramps, bloating, flatulence and bubbly, foul-smelling diarrhoea, which may be watery, explosive and profuse.

### Diagnosis

- Three specimens of faeces for analysis (cysts and trophozoites): ELISA/PCR

### Treatment

- Scrupulous hygiene: metronidazole or tinidazole

## Cutaneous myiasis

Myiasis, which refers to the infestation of body tissues by the larvae (maggots) of flies, often presents as itchy ‘boils’. Primary myiasis invariably occurs in travellers to tropical areas such as Africa (Tumbu fly) and Central and South America (bot fly), whereby the fly can introduce the larvae into the skin, or it can be due to secondary invasion of pre-existing wounds. All cutaneous bot fly lesions look like an unusual boil but with a small circular hole. Close inspection of lesions may reveal part or all of the larva. The simplest treatment is lateral pressure and tweezer extraction or place paraffin jelly (Vaseline) or thick ointment over the lesion to induce emergence by restricting oxygen, then apply a topical antibiotic.

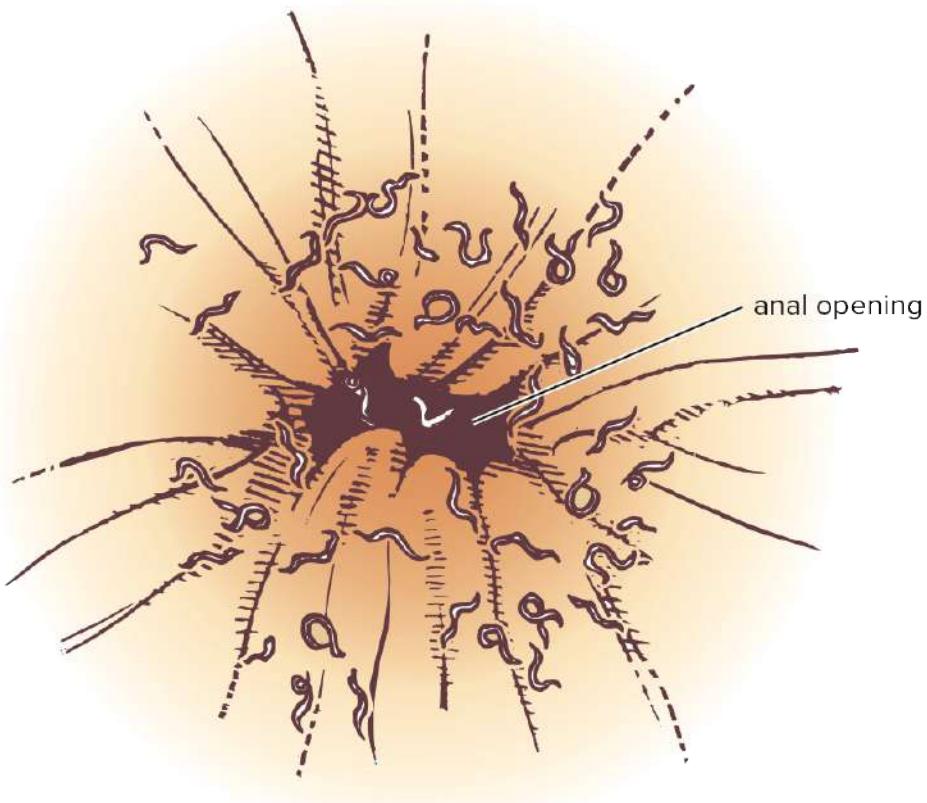
## Worms (helminths)

Worms that inhabit the human intestine can be classified into nematodes (roundworms), cestodes (tapeworms) and trematodes (flukes).

The roundworms, which include pinworm (*Enterobius vermicularis*), whipworm (*Trichuris trichiura*), human roundworm (*Ascaris lumbricoides*), human threadworm (*Strongyloides stercoralis*), hookworm (*Ankylostomiasis*), filariasis and larva migrans are the most prevalent worldwide and are usually asymptomatic in infected people.

## Pinworm

Also known as ‘threadworm’, this is a ubiquitous parasite infesting mainly children of all social classes. They are tiny white worms about 1 cm long that multiply profusely and are spread readily between individuals by close contact (see FIG. 129.6). Virtually all children have been infected by the time they reach high school but at any one time approximately 50% of the 5–10 years age group will harbour pinworms.



**FIGURE 129.6** Pinworms: female worms appearing soon after sleep to lay eggs

### Clinical features (usually asymptomatic)

- Pruritus ani (in about 30% of cases)
- Diarrhoea (occasionally)
- Abdominal pain, mimicking appendicitis

### Diagnosis

- Inspect anus in child about 1 hour after going to sleep (see FIG. 129.6 )
- Collect eggs with adhesive tape on perianal skin early morning—send to laboratory

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### Treatment

### Management (troublesome cases)

- Scrupulous hygiene by family
- Hands should be washed thoroughly after toileting and before handling food
- Clip fingernails short (eggs lodge under nails)
- Patient should wear pyjamas (not nightgowns) and shower each morning
- Bed linen, nightwear and underwear changed and washed in very hot water daily for several days
- Vacuum room of affected person daily
- Have a veterinarian check any pets, especially dogs

### **Medication**

- Any one of pyrantel, albendazole or mebendazole—as single dose orally

pyrantel 10 mg/kg up to 750 mg

*or*

mebendazole 100 mg (child <10 kg: 50 mg)

*or*

albendazole 400 mg (child <10 kg: 200 mg)

- Repeat in 2–3 weeks—both patient and household contacts

## **⌚ Human roundworm**

Adult worms are about 20–40 cm long and are usually acquired from contaminated food and water overseas. Many cases are asymptomatic but come to notice when they emerge from the anus, mouth or nostril (causing anxiety in the family!). Some will present with abdominal discomfort, failure to thrive, intestinal obstruction, cough, anaemia or biliary disease. They may be seen in radiological contrast examinations.

### **Diagnosis**

- By finding eggs in the faeces. The worm is very sensitive to any of the three agents used for pinworm. May give positive faecal occult blood test.

### **Treatment**

- A first-line option is pyrantel 20 mg/kg up to 750 mg orally, as a single dose—to be repeated after 7 days if a heavy infestation.

## Whipworm

These used to be common in Indigenous communities, possibly causing failure to thrive, anaemia, abdominal pain and diarrhoea and rectal prolapse with heavy chronic infestation. The worms are about 1–2 cm long.

### Diagnosis

- Faecal microscopy

### Treatment

- Single large doses of mebendazole or albendazole

## Hookworm

These are found in humid tropical regions but are now uncommon in northern Australia. About 1–1.5 cm long, the parasites are acquired by walking barefoot (or wearing thongs or sandals) on earth contaminated by faeces. The larvae penetrate the skin, travel through the lungs and settle in the small intestine.

### Clinical features

The first sign is local irritation or ‘creeping eruption’ at the point of entry, known as ‘ground itch’, which is often unnoticed. This subsides within 2 days or so, followed 1–2 weeks later by respiratory symptoms, which may be associated with bronchitis and bronchopneumonia. They can cause iron/protein deficiency anaemia in chronic infestation. Hookworm infection is the commonest cause of iron deficiency anaemia in the world.

### Diagnosis

- As with other helminths, diagnosis is by finding eggs on microscopy of faeces

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### Treatment

- A single dose of mebendazole 100 mg bd for 3 days or 400 mg single dose pyrantel or albendazole

### Prevention

- Travellers should be warned to wear shoes and socks in endemic areas to prevent the entry of the larvae into the skin of the feet.

## Human threadworm (*Strongyloides*)

These are tiny parasites (2 mm or so) and have a worldwide distribution. Infestation can cause symptoms such as recurrent abdominal pain and swelling and diarrhoea, skin and respiratory symptoms, with blood eosinophilia. *Strongyloides* can live and reproduce in the body for many years. The problem is aggravated by corticosteroid therapy and may present with a severe infection, such as septicaemia. High-risk people include migrants and refugees from tropical developing countries, returned soldiers, former prisoners of war from South-East Asia and workers or residents in northern Indigenous communities.



**DxT** abdominal pain (low grade) + recurrent diarrhoea + blood eosinophilia  
→ strongyloides

## Diagnosis

- Detecting faecal larvae or duodenal biopsy
- ELISA: highly specific, sensitive

## Treatment

- Ivermectin 200 mcg/kg (o) 2 doses 2 weeks apart (not in children <5 years) or albendazole 200 mg bd for 3 days

Adverse effects are common. Beware of these drugs in pregnancy and children.

## ⌚ Cutaneous larva migrans

Cutaneous larva migrans (creeping eruption) (see FIG 129.7 ) should be suspected in any pruritic, erythematous lesion with a serpiginous eruption on the skin, especially the hands, legs and feet of a person from a subtropical or tropical area. It is caused by the larvae of dog or cat hookworms penetrating and migrating throughout human skin, the larva always being just ahead of the lesion it causes. The diagnosis is based on the classic clinical appearance and by eosinophilia. Biopsy is usually not indicated. The problem is usually self-limiting.



**FIGURE 129.7** Cutaneous larva migrans on the leg: close-up of a serpiginous burrow

## Diagnosis

- Clinical (characteristic appearance), eosinophilia (biopsy usually not indicated)

## Treatment

ivermectin (single dose)

or

albendazole

antihistamines for pruritus

*Note:* This is usually a self-limiting problem.

## Prevention

- As for hookworm. Moist sandy soil contaminated with dog or cat faeces is a common source.

## ⌚ Filariasis

This nematode infection has three main forms which are spread by mosquitoes, biting black flies

and tabanid flies respectively.

1. Lymphatic filariasis causes acute adenolymphangitis and chronic lymphoedema with obstruction of lymph flow. The latter can manifest as a hydrocele, scrotal oedema or elephantiasis, especially of the extremities, genitals and breasts. Diagnosis is by blood film and serology.
2. Onchocerciasis (river blindness) starts as a nodule at the bite site followed by chronic skin disease and eye lesions such as uveitis and optic atrophy. It is the second leading cause of blindness worldwide. Diagnosis is by PCR testing, treatment by ivermectin ± doxycycline.
3. Loiasis (tropical eye worm) due to the *Loa loa* worm causes conjunctivitis, localised angio-oedema and Calabar swellings. Diagnosis is by microscopic examination—microfilariae in blood. Treatment with diethylcarbamazine.

## **Hydatid disease**

Hydatid disease is acquired by ingesting eggs of the dog parasite *Echinococcus granulosus*, which is found in sheep farming areas here and in several countries in Asia. The parasites can migrate anywhere but usually form hydatid cysts in the liver and lungs.

### **Clinical features**

There may be no symptoms although the patient may complain of abdominal discomfort or cystic lesions on the skin and other sites. Rupture of a cyst (usually hepatic) can cause severe anaphylaxis with possible death.

### **Diagnosis**

- Serological tests and ultrasound

### **Treatment**

- Usually surgical removal of a cyst and albendazole

## ***Dracunculus medinensis* (Guinea worm)**

This is the longest nematode. It is transmitted by tiny crustaceans in water.

### **Clinical features**

- Local symptoms include pain and intense itching at the skin ulcer or blister as the worm emerges into the skin

### **Treatment**

- Slow extraction of pre-emerging worms as they exit the skin
- Metronidazole ± corticosteroids

## Patient education resources

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Hand-out sheets from *Murtagh's Patient Education* 8th edition:

- Bacterial meningitis and meningococcus
- Dengue fever
- Malaria
- Rabies
- Travel: air travel
- Travel: guide for travellers
- Travel sickness
- Tuberculosis
- West Nile virus
- Worms
- Zika virus

## Resources

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World Health Organization, International travel and health: [www.who.int/ith/en](http://www.who.int/ith/en)

Travel Doctor-TMVC: [www.traveldoctor.com.au](http://www.traveldoctor.com.au)

Smartraveller (country-specific information provided by the Australian Government):  
<http://smartraveller.gov.au>

Centers for Disease Control and Prevention: [www.cdc.gov/travel](http://www.cdc.gov/travel)

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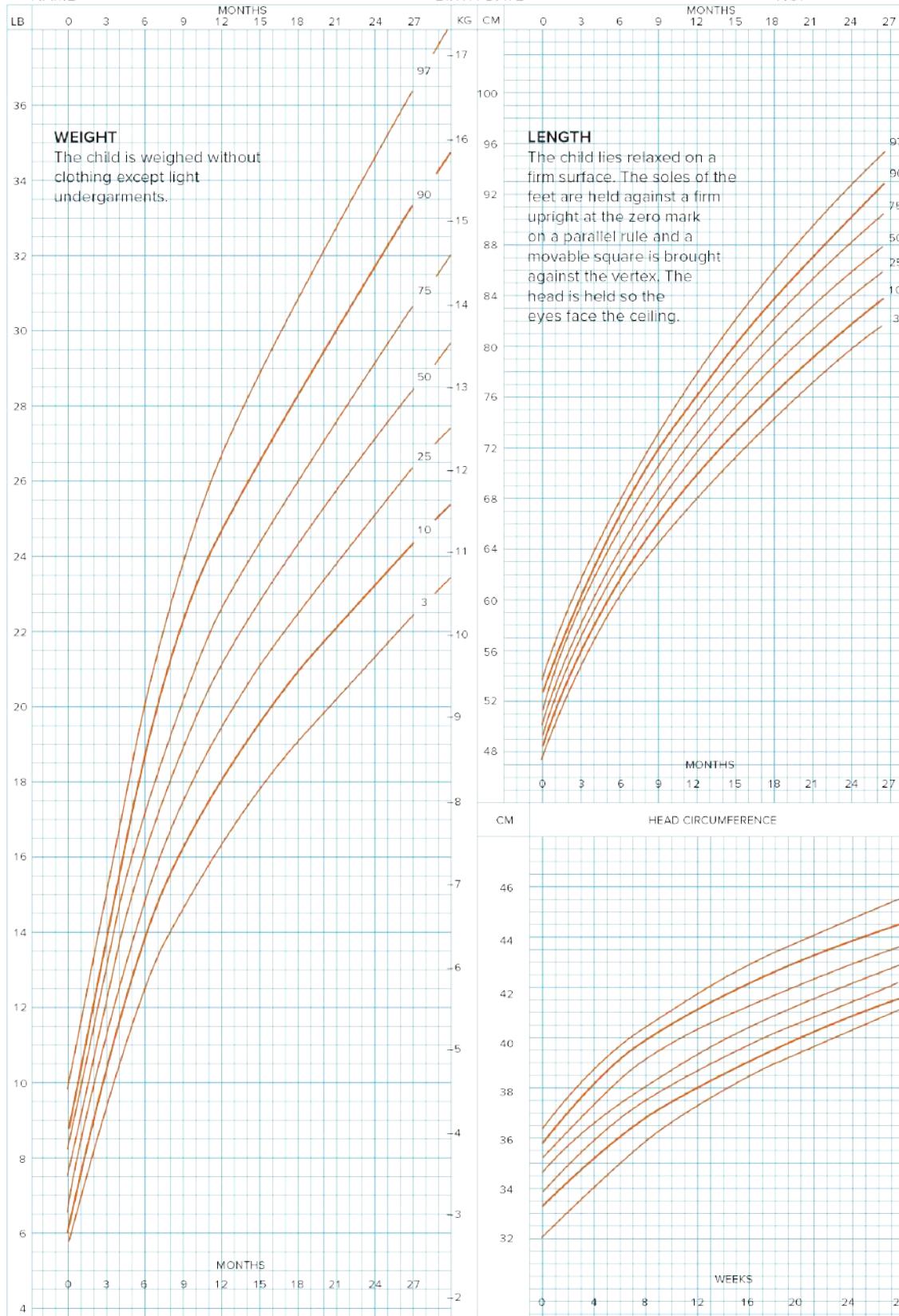
## Appendix I Percentile charts: infant girls

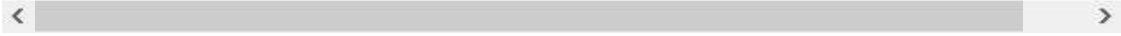
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NAME

**BIRTH DATE**

NO.





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