



RECOMMENDATIONS FOR COMPREHENSIVE POST-ARRIVAL HEALTH ASSESSMENT FOR PEOPLE FROM REFUGEE-LIKE BACKGROUNDS

AUSTRALASIAN SOCIETY FOR INFECTIOUS DISEASES
AND REFUGEE HEALTH NETWORK OF AUSTRALIA

2ND EDITION



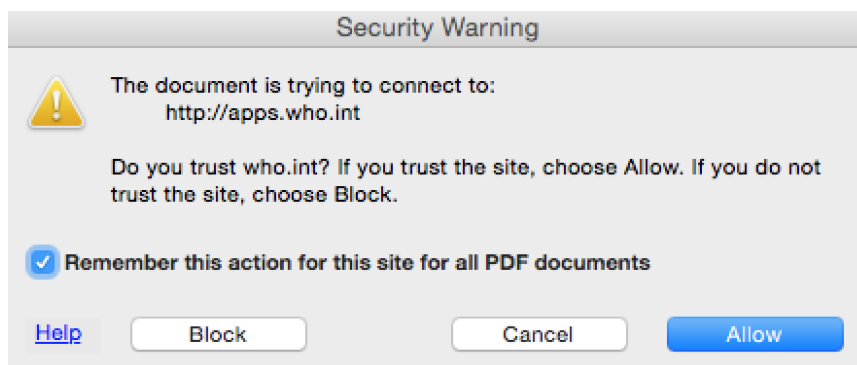
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Endorsed by:

The Australasian Society for Infectious Diseases (ASID)

National Tuberculosis Advisory Committee (NTAC)

Royal Australasian College of Physicians (RACP)

The Australasian Chapter of Sexual Health Medicine (AChSHM – RACP)

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DEFINITIONS

Asylum seeker is a person who has left their country and applied for protection as a refugee.¹

Bridging visas are temporary visas that allow people to remain lawfully in Australia while their visa applications are being assessed.²

Community detention is a form of immigration detention that allows asylum seekers to live in the community while seeking to resolve their immigration status. People in community detention do not hold a visa; therefore, they do not have the same rights as a person on a visa living in the community.³

Held detention is the term used for detention in any type of locked immigration detention facility (in Australia this includes immigration detention, immigration transit accommodation, immigration residential housing, or alternative places of detention). This term also applies to offshore immigration detention facilities.³

Humanitarian Programme is the Australian migration stream supporting resettlement of refugees and people in refugee-like situations.³ The Humanitarian Programme has two components: 'Offshore Resettlement' – for people outside Australia in need of humanitarian assistance, including 'Refugee' and Special Humanitarian Programme categories, both providing permanent resident status; and 'Onshore Protection' – for people already in Australia who are found to be refugees.⁴

Refugee is someone 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/her nationality, and is unable to, or owing to such fear, is unwilling to avail himself/herself of the protection of that country, or who, not having a nationality and being outside the country of his former habitual residence, as a result of such events, is unable or, owing to such fear, is unwilling to return to it'.⁵

Separated children are children separated from both parents, or from their previous legal or customary primary caregiver, but not necessarily from other relatives. These may, therefore, include children accompanied by other adult family members.⁶

Unaccompanied children (also called unaccompanied minors) are children who have been separated from both parents and other relatives and are not being cared for by an adult who, by law or custom, is responsible for doing so.⁷

In this document, the term **refugee-like** is used to describe people who have been found to be refugees under the United Nations Refugee Convention, who hold an Australian or Humanitarian visa, and also people from refugee-like backgrounds who have entered under other migration streams including asylum seekers. 'Refugee-like' acknowledges that people may have had refugee experience in their countries of origin, but do not have formal refugee status.

INTRODUCTION

Nadia Chaves, Jan Williams, Joanne Gardiner, Sahema Saheri, Georgia Paxton

BACKGROUND

By the end of 2014, there were more than 59.5 million forcibly displaced people worldwide, the highest displacement on record. This number included 19.5 million refugees, with more than half aged under 18 years, and 1.8 million asylum seekers.¹

Each year, Australia accepts around 13,750 refugees through the offshore Humanitarian Program,⁸ although this number will increase to 18,750 by 2018-19. In 2015 Australia moved to accept an additional 12,000 refugees over 2015-16 in response to current conflicts in Syria. There are also more than 30,000 asylum seekers who arrived by plane or boat who are currently in Australia awaiting visa outcomes.⁹

People from refugee-like backgrounds may have experienced significant human rights violations, trauma, torture, disruption of basic services, poverty, food insecurity, and extremely difficult living conditions, compounded by prolonged uncertainty. These circumstances place them at increased risk of complex physical and mental health conditions, including communicable and vaccine-preventable diseases. After arrival in Australia a significant number of people from refugee-like backgrounds face barriers to accessing healthcare, including: language, financial stress, competing priorities in the settlement period, and difficulties understanding and navigating the Australian healthcare system. Most people will require the assistance of an interpreter for clinical consultations.¹⁰⁻¹²

In Australia, all asylum seekers arriving by boat are subject to either on or offshore mandatory immigration detention. The majority have experienced restrictions on work rights after being released into the community, and face multiple barriers to accessing healthcare.¹³

Recommendations revision and development process

The first Australian recommendations for refugee health assessment were published in 2009 by the Australasian Society for Infectious Diseases (ASID).¹⁴ At the time of writing, more than 60% of humanitarian entrants were from Sub-Saharan Africa and the guidelines were primarily intended to assist specialists and primary care doctors to diagnose, manage and prevent infectious diseases. Since this time, there have been changes in refugee-source countries, with more arrivals from the Middle East and Asia and fewer from Sub-Saharan Africa, an increase in the numbers of asylum seekers arriving by boat, and a complex and changing asylum seeker policy environment.

In this context, a review of the 2009 ASID refugee health recommendations was undertaken to ensure clinical relevance for health professionals caring for the current cohorts of refugees and asylum seeker patients in Australia, and to include advice on equitable access to healthcare, regardless of Medicare or visa status. The domain and scope of the recommendations are outlined in table 1.1. This document is intended for healthcare providers who care for people from refugee-like backgrounds, including general practitioners (GPs), refugee health nurses, refugee health specialists, Infectious Diseases (ID) physicians and other medical specialists.

The development and revision process involved an interdisciplinary Expert Advisory Group (EAG) composed of ID and general physicians, GPs, public health physicians, a paediatrician and a refugee health nurse. Priority health conditions were based on Australian and international

data and published consultations with communities from refugee-like backgrounds.¹⁵ ASID, the Royal Australian College of General Practitioners (RACGP) Refugee Health Special Interest Group (RHSIG), the Refugee Health Network of Australia (RHeaNA) and the Victorian Foundation for the Survivors of Torture and Trauma (VFST) were also consulted on topics and process. As a result of the consultation process, the revised recommendations include eight new chapters. Most topics were written by three authors, including an ID or general medical specialist, a GP and a paediatrician. Each topic was also reviewed by an external expert in the field and by the refugee health nurse subcommittee. In total, 43 health professionals from seven states and territories contributed to the content. The guideline development process is outlined in table 1.2.

Key recommendations were developed by the chapter authors with the EAG, and were based on reviews of the available evidence, using systematic reviews where possible. Unless stated otherwise, recommendations have been determined by consensus (determined as 85% of EAG in agreement). Where sufficient published evidence was identified, evidence-based recommendations (EBR) are provided using the National Health and Medical Research Council (NHMRC) process.¹⁶ Each chapter underwent topic review and multiple cycles of feedback between authors and external expert reviewers. The entire guidelines were submitted to external stakeholders for review prior to publication, and feedback was incorporated by the EAG into the final version.

For the first time, these guidelines include a summary of available Australian prevalence data on conditions detected on post-arrival health assessment in refugee-like populations ([appendix one](#)). This summary provides detail on 39 studies including more than 30,000 people from refugee-like backgrounds from primary care, primary and tertiary care refugee and asylum seeker health services, and detention centres around Australia, presented by age and region of origin. There is no universal post-arrival health screening model, and thus no population level data. Another limitation is referral bias – conditions referred to specialist services (i.e. latent tuberculosis) may be over-represented; whereas, conditions that might be managed in primary care may be under-represented. However, the majority of data are from primary refugee health services, and most studies include information on a range of conditions.

Current pre-departure screening for refugees (offshore Humanitarian Programme entrants to Australia)

All permanent migrants to Australia, including migrants who enter through the offshore Humanitarian Programme, have a pre-migration Immigration Medical Examination (IME) within 3–12 months of departure. The IME includes:^{17,18}

- Full medical history and examination.
- Chest x-ray (CXR) in those aged 11 years and older (and in younger children if indicated).
- Interferon gamma release assay (IGRA) or tuberculin skin test (TST) in children 2–10 years (if they are applying for a Humanitarian or onshore protection visa, OR from a high tuberculosis (TB) prevalence country, OR declare previous household contact), with further investigation for TB if positive (starting in 2016).
- Urinalysis in those 5 years and older (and in younger children if indicated).
- Human immunodeficiency virus (HIV) testing in those 15 years and older (and in younger children if indicated), all unaccompanied humanitarian minors, or where hepatitis C virus (HCV) infection is identified.
- Hepatitis B surface antigen (HBsAg) in pregnant women, unaccompanied minors; those aged 15 years and over and intending to study or work as a doctor, dentist, nurse or paramedic; and those aged 15 years and over applying for an onshore protection visa.

- Hepatitis C antibody tests in those aged 15 years and over and intending to study or work as a doctor, dentist, nurse or paramedic; or applying for an onshore protection visa.
- Syphilis testing in those aged 15 years and older and applying for either an onshore or offshore protection visa.
- Other tests as clinically indicated.

Humanitarian entrants are also offered voluntary pre-Departure Health Checks (DHC) within 72 hours of their intended departure for Australia. Not all humanitarian entrants undergo a DHC, as it depends on the visa subtype and port of embarkation. The DHC includes:^{19 20}

- A physical examination.
- Malaria rapid diagnostic testing (RDT) on blood, and treatment if positive, generally with three days of oral artemether/lumefantrine (based on location).
- Empirical treatment for intestinal helminths with a single dose of albendazole in all those aged 12 months and older (unless pregnant).
- CXR in those with a history of TB or latent TB infection (LTBI) or clinical suspicion of active TB.
- Measles, mumps, and rubella (MMR) vaccination in those aged 9 months to 54 years (unless pregnant).
- Yellow fever (YF) vaccine where relevant (based on location).
- Polio vaccination where relevant (based on location).

Extended screening will be implemented for the Syrian cohorts, with additional review of mental health and additional immunisations (MMR, polio vaccination and diphtheria-tetanus-pertussis vaccination – in the form of hexavalent or pentavalent vaccine in children <10 years – check available paperwork).

People seeking asylum who arrive by boat generally receive a health assessment on arrival in immigration detention. The detention health services provider completes this assessment. There is no published information on the format of detention health screening; however, assessment appears to have included: CXR in those 11 years and older, and screening bloods in those aged 15 years and older (screening for syphilis, hepatitis B (HBV), HCV and HIV; and screening with full blood examination (FBE), liver function test (LFT), blood sugar level (BSL) testing, urinalysis and pregnancy testing where clinically indicated). Prior to mid-2014, children had very limited detention health screening. After this time they had health assessments similar to adolescents and adults, with the addition of ferritin, vitamin D levels, strongyloides serology, and malaria testing and schistosoma serology where clinically indicated. Clinical experience suggests the management of health conditions detected on the detention health assessments varied depending on access to healthcare in detention, or may have been deferred while awaiting transfer to community-based arrangements.

Asylum seekers arriving by plane may not have had any health screening or healthcare in Australia and will not have had a pre-departure IME.

We recommend a full health assessment be offered to all newly arrived people from refugee-like backgrounds as soon as practical after arriving in Australia (ideally within one month) to ensure early and proactive intervention.

While these recommendations are based on expert opinion and clinical evidence, screening and management of certain conditions may vary depending on particular jurisdiction requirements.

Offering newly arrived individuals a full health assessment is a positive step towards optimising health, and addresses health inequity through the provision of ‘catch up’ immunisation, as well as diagnosis and treatment of unmanaged chronic conditions.

Changes from the previous 2009 ASID refugee health guidelines

- Greater emphasis on principles of person-centred care (see below).
- Specific inclusion of asylum seekers and other people from refugee-like backgrounds (the previous guidelines only considered refugees).
- Consideration of a broader range of source countries – reflecting the changing demographic of the intake.
- The inclusion of prevalence data from Australian refugee health screening.
- Risk-based, rather than universal screening for selected conditions (including HCV, schistosomiasis and sexually transmissible infections (STIs)).
- New recommendations for non-infectious conditions, including non-communicable diseases (NCDs), vitamin D deficiency and anaemia.
- Additional sections on mental health, oral health, vision, hearing, and women’s health based on information found in the comprehensive ‘Promoting refugee health: A guide for doctors, nurses and other healthcare providers caring for people from refugee backgrounds’.²¹
- A practical reference table on skin infections.

Principles of person-centred care for people from refugee-like backgrounds

Most people from refugee-like backgrounds do not speak English as a first language and will be unfamiliar with the Australian healthcare system. It is essential to offer an interpreter at every consultation if required. It is **never** appropriate to rely on family members or friends. In situations where the interpreter is known to the patient, such as in rural areas, or with smaller language groups, a telephone interpreter may be more appropriate.¹² Telephone interpreting should be used where the patient expresses a preference for this format, and can be useful for sensitive information to preserve anonymity. Gender issues should also be taken into consideration when working with interpreters, particularly in regard to women’s health.²² Use of an interpreter has been shown to improve quality of care, improve access to healthcare, reduce unnecessary stress on families, and reduce health expenditure.

Box 1A: Information on interpreters

The Commonwealth Telephone Interpreter Service (TIS) provides free immediate and pre-booked phone or face-to-face interpreters for general practitioners and medical specialists seeing patients with permanent residency or some classes of temporary visas receiving Medicare-rebatable services delivered in private practice. Gender preference for interpreters can be requested.

- **For pre-booked interpreters book online:** <https://www.tisnational.gov.au/>
- **For immediate telephone interpreters:** Doctors’ Priority Line 1300 131 450.
- **For details on eligibility:** <https://www.tisnational.gov.au/en/Agencies/Frequently-Asked-Questions-for-agencies>

While these guidelines make specific clinical recommendations for the diagnosis, investigation and management of health conditions, **health assessment is voluntary**, and the importance of informed consent and a client’s right to decline or defer care should not be overlooked. Clients may have limited health literacy, different expectations of the health system and they may have competing priorities in the early settlement period. It is important to ensure that clients understand that positive test results **will not** adversely affect their settlement status or asylum claim, and that they cannot be deported as a consequence of any results of a refugee health assessment.

Some clients may have difficulty understanding information about health issues, treatment options and the health system in Australia. Health providers should work with interpreters where required, and may need to use a range of strategies including visual and written aids, translated resources and 'teach-back'²³ techniques to improve communication, understanding and health literacy. Engagement of bicultural workers can also improve use of, and access to health services.²⁴

By definition people from refugee-like backgrounds have fled their country of origin. Many have lost family members through death or separation; they may have experienced physical or sexual violence, torture or trauma. As a consequence, or for religious and cultural reasons, some clients may have a gender preference for their healthcare provider – and interpreter. People may have had negative pre-migration experiences with health professionals, and may fear or mistrust authority figures.

Health providers should consider the impact of settlement and social circumstances on healthcare, including: financial limitations, transport difficulties, housing, education, employment, social isolation and childcare. Cultural practices and religious beliefs may also influence health and health service access. Consider individual preferences, needs and values, and ensure that the person's values guide clinical decisions.

Box 1B: Person-centred care principles

ASK

A – Ask the client

- Country of origin/transit countries/ethnic background
- When did the person arrive in Australia? Visa type, time in detention
- Preferred language, languages spoken
- Occupation or access to education overseas
- Current stressors: housing security and conditions, financial stress, education/training/work-related stress
- Interpreter preference - work with on-site or telephone interpreting in consultations whenever needed; consider gender preference for healthcare provider or interpreters
- Priorities – determine the relative health needs and competing personal needs
- Assist people to make appropriate health decisions given their condition, circumstances, needs, values and wishes

S – Screen

- Offer comprehensive health assessment for medical and psychosocial issues
- Ensure informed consent and understanding of health assessment by using health literacy strategies such as 'teach-back' techniques
- Determine screening tests done pre-migration and since arrival in Australia

K – Kindness

- Coordinate and integrate care – work with the person, their case manager, nurse, doctor and other family and friends if appropriate to provide the best care. There may be benefit in seeing family groups together, especially for families with several children
- Longer appointments and reminder phone calls or SMS reminders the day prior to the appointment are preferable
- Consider social issues; housing, financial security, education, social supports
- Ensure sensitivity and a 'universal precautions approach' to a possible pre-migration history of trauma or gender-based violence. Be aware that many clients have been separated from family members and that some family members may still live in danger
- Offer clients up to date information about health services and how to access and navigate services

Key recommendations for using these guidelines

1. Adhere to principles of person-centred care (box 1B) – ASK.
2. Offer all people from refugee-like backgrounds a comprehensive health assessment and management plan, ideally within one month of arrival in Australia. This can be offered at any time after arrival if their initial contact with a GP or clinic is delayed.
3. A refugee or other humanitarian entrant who has been in Australia for less than 12 months may be eligible for a Medicare rebate for a health assessment (Item 701, 703, 705 or 707). Current eligible visa subclasses include: 200, 201, 202, 203, 204, 070, 695, 786, 866, PRE immicard, PL056 or M56). http://www.health.gov.au/internet/main/publishing.nsf/Content/mbsprimarycare_mbsitem_refugees
4. Complete a full history and examination (table 1.3) as part of the assessment – this will guide investigations. The refugee health assessment tool also provides a comprehensive guide to history and examination. <http://refugeehealthnetwork.org.au/refugee-health-assessment-tool/>
This tool will be updated in the near future to reflect these recommendations.
5. Except where stated, investigation for clinical conditions should be tailored based on individual risk factors, source and transit countries, and history and examination findings. To assist in this, table 1.4 lists the top 20 countries of origin of refugees and asylum seekers to Australia and includes country-specific recommendations for screening for malaria, schistosomiasis and hepatitis C. These guidelines can therefore be applied to health assessments for people from a variety of refugee-source countries including Syria.
6. People from refugee-like backgrounds may have physical and/or psychological evidence of torture and trauma. The methods of documenting (and managing) these findings are outside the scope of these guidelines. Please refer to the Istanbul protocol (<http://www.ohchr.org/Documents/Publications/training8Rev1en.pdf>) for further details.
7. Medical practitioners should be cautious about writing legal or formal reports to assist clients in their asylum applications without further advice, including legal advice. Medical documentation may be included as evidence for asylum applications by Department of Immigration and Border Protection (DIBP) (<http://www.rilc.org.au/Home/Home.htm>). For up to date information about asylum seekers, see www.asrc.org.au.
8. Other issues which are important, but are not included in these guidelines:
 - a) Screening for developmental delay and behavioural issues in children, and assessment of intellectual disability or cognitive dysfunction at any age. The Royal Children's Hospital have a comprehensive guide to these issues in children: <http://www.rch.org.au/immigranthealth/clinical/developmental-assessment/>
 - b) Pre-travel advice prior to visiting friends and relatives.
See www.cdc.gov for destination-specific pre-travel health requirements.
 - c) Screening for disability <http://refugeehealthnetwork.org.au/learn/screening-assessing-and-diagnosing-disability/>
9. Tables 1.5 and 1.6 outline recommendations for infectious and non-infectious conditions respectively. Table 1.7 provides a short checklist to guide investigations.

Table 1.1: Domain and scope of the recommendations	
Population	People from refugee-like backgrounds, who have been living in refugee-like circumstances – including people who have arrived on humanitarian visas, people who have applied for asylum or those who have entered the country with other visas (e.g. family visas)
Timeframe	First comprehensive assessment: focus on ‘newly arrived’ but also intended for people of refugee-like background who have not had a previous health assessment. Note: to claim the Medicare benefits schedule (MBS) refugee health assessment, the service must be provided within 12 months of the person’s arrival in Australia or their grant of substantive visa
Intervention	Targeted case finding, identification of unwell patient, referral pathways, follow up, initial management
Professionals	GPs, refugee health nurses, refugee health specialists, ID trainees, specialists and other health professionals who work with people from refugee-like backgrounds

Table 1.2: Guideline development process
1. Formation of EAG consisting of refugee health professionals: two ID physicians, an ID/general physician, two GPs, a public health physician, a general paediatrician and a refugee health nurse
2. List of priority conditions determined by the working group in consultation with refugee health specialists and RACGP RHSIG clinicians. Conditions based on previous ASID refugee health guidelines, with the inclusion of a number of additional conditions
3. Template for topics designed by EAG (appendix two)
4. Each topic assigned a primary specialist author with paediatrician and primary care or specialist co-authors. Twenty-eight authors from seven states and territories were involved in writing the first drafts
5. First drafts reviewed by members of editors’ working group to ensure consistency with template and the rest of the guidelines. Revised by primary author group
6. Second drafts reviewed by thirteen external expert review authors and revised by primary author group
7. Third drafts reviewed by EAG and refugee health nurse subcommittee
8. Fourth drafts reviewed by stakeholders: ASID, the National Tuberculosis Advisory Council (NTAC), the Australasian Chapter of Sexual Health Medicine (AChSHM), RHeaNA, Royal Australian College of General Practitioners Refugee Health Special Interest Group, Royal Australasian College of Physicians (RACP), RACP Australasian Chapter of Sexual Health Medicine (AChSHM), Victorian Foundation for the Survivors of Torture and Trauma, Multicultural Centre for Women’s Health, Asylum Seeker Resource Centre, Ethnic Communities Council of Victoria, and community members
9. Comments from stakeholders returned to authors for review
10. Final version written by EAG and endorsed by ASID, NTAC, RACP, RACP AChSHM

Table 1.3: Considerations for history and examination	
At all times adhere to person-centred care principles (box 1B)	
Medical history	<p>Past medical history, family history, medications, allergies</p> <p>Determine screening tests completed pre-migration and since arrival in Australia</p> <p>Infectious diseases</p> <p>Consider history of or contact with TB, malaria, HBV, HCV, HIV, parasitic infections, respiratory symptoms, gastrointestinal symptoms, sexual history, immunisation history (written documentation, BCG scar, natural infection including HBV and varicella, previous reactions to vaccinations)</p> <p>Non-infectious diseases</p> <p>Hearing, vision, dental problems</p> <p>Pregnancy, perinatal and postnatal history (all children; adolescents where relevant)</p> <p>Growth (all children/adolescents)</p> <p>Nutrition (food access, current nutritional status)</p> <p>Risk factors for low vitamin D</p> <p>Development, education history (children/adolescents)</p> <p>Disability and adaptive function</p> <p>Injuries and accidents</p> <p>Women's health, FGM/C</p> <p>Other: e.g. thyroid, CVD, diabetes, COPD, smoking, alcohol intake, substance use</p>
Mental health and social and emotional wellbeing	<p>Assess mental and emotional health and wellbeing</p> <p>Consider sleep, appetite, mood, anxiety, behaviour, friends, schooling, enuresis and nightmares (children and adolescents)</p> <p>It is generally not advisable to ask directly about a client's experience of torture or trauma, especially in the first few visits. A useful form of questioning might be: 'Some people have had very difficult experiences in their country or during their journey. Do you have any physical problems or pains at the moment that you are worried about or that you think may be related to your previous experiences?' (See mental health chapter 18, and table 1.6 for links to tools). Refer to box 1B for further details on social history</p>
Examination	<p>Skin conditions, including hair and nails, BCG scar</p> <p>Fever – exclude malaria</p> <p>Visual acuity</p> <p>ENT examination, particularly for middle ear disease, dental caries</p> <p>BP, BMI, nutritional status – weight/height/head circumference (children), waist/hip ratio, anaemia, other micronutrient deficiencies</p> <p>Cervical, axillary and inguinal lymphadenopathy – consider TB and HIV</p> <p>Cardiorespiratory exam – consider TB, COPD, murmurs, CVD</p> <p>Hepatosplenomegaly – consider chronic malaria, chronic liver disease including HBV, schistosomiasis, TB, HIV</p> <p>Neurology – consider gait, tone, power, reflexes and coordination</p> <p>Evidence of torture or other injuries</p>

TB- tuberculosis, HBV-hepatitis B, HCV-hepatitis C, HIV- human immunodeficiency virus, BCG- Bacille Calmette Guerin, NCD-non-communicable diseases, FGM/C-female genital mutilation/cutting, CVD-cardiovascular disease, ENT-ear, nose throat, BP-blood pressure, BMI-body mass index

Table 1.4: Top 20 countries of origin for refugees and asylum seekers^{25,26}, and country-specific recommendations for malaria, schistosomiasis and hepatitis C screening^a

Country of birth	Malaria ²⁷	Schistosomiasis ²⁸	Hepatitis C ²⁹ (Note: those with risk factors for HCV should be tested regardless of country of origin)
Afghanistan	No	No	No
Bangladesh	Yes	No	No
Bhutan	Yes	No	No
Burma	Yes	Yes	No
China	No	No	No
Congo	Yes	Yes	Yes
Egypt	No	Yes	Yes
Eritrea	Yes	Yes	No
India	Yes	Yes	No
Iran	No	No	No
Iraq	No	Yes	Yes
Lebanon	No	No	No
Pakistan	Yes	No	Yes
Somalia	Yes	Yes	No
Sri Lanka	Yes	No	No
Stateless ^b	Yes	Yes	No
Sudan	Yes	Yes	No
Syria	No	Yes	Consider
Vietnam	No	No	No

^a There are regional variations in the prevalence of these conditions within some countries. We have taken the conservative approach of recommending screening for all people from an endemic country rather than basing the recommendation on exact place of residence.

^b 'Stateless' in this table refers to people of Rohingya origin.

Malaria link: <http://www.who.int/ith/en/>

and: http://apps.who.int/neglected_diseases/ntddata/sch/sch.html

Hepatitis C reference: Lavanchy D. Evolving epidemiology of hepatitis C virus. Clin Microbiol Infect. 2011 Feb;17(2):107–15.

Table 1.5: Testing and management recommendations for infectious conditions						
Who should be tested	Condition	Test	Details	Result	Management	
All	Eosinophilia	FBE*		Eosinophilia >0.6 x 10 ⁹ /L or > reference range	Investigate and treat causes of eosinophilia, including intestinal parasites, strongyloides, schistosomiasis	
	Hepatitis B	HBsAg, HBcAb, HBsAb Note**: write 'Query chronic hepatitis B' on request slip		HBsAg positive***	Arrange clinical assessment, blood tests, abdominal ultrasound Vaccinate non-immune household contacts and sexual partners Test for and vaccinate against hepatitis A (see immunisation chapter 12)	
	Strongyloidiasis	Strongyloides serology		Strongyloides serology positive or equivocal	Stool microscopy for OCP Check for eosinophilia Treat with ivermectin 200mcg/kg (≥15kg) on day 1 and 14 Refer pregnant women or children <15kg to specialist	
	HIV	HIV serology	≥15 years (<15 years if unaccompanied minor or clinical concerns)	HIV serology positive***	Refer to local HIV care provider	
	LTBI	Exclude active TB infection*** if suspicion of active infection refer to TB services Ensure appropriate infection control precautions				
		TST or IGRA. Note**: check Medicare for IGRA rebates TST is preferred to IGRA in children <5 years	Offer test with intention to treat All ≤35 years; if >35 years varies with risk factors and jurisdiction	Positive IGRA or TST	Refer to TB services for CXR and consideration of LTBI preventive therapy: Isoniazid – 10mg/kg up to 300mg daily for 6–9 months	
	Varicella immunisation status	Varicella serology	≥14 years if no history of natural infection	Varicella non-immune	Vaccination as per Australian Immunisation Handbook (exclude pregnancy)	
Rubella immunisation status	Rubella serology	Women of childbearing age	Rubella non-immune	Vaccination as per Australian Immunisation Handbook (exclude pregnancy)		
Other immunisations	No routine serology required, check for written immunisation record			Catch-up vaccination as per Australian Immunisation Handbook (consider pregnancy) – so people are immunised equivalent to an Australian-born person of the same age		
Risk-based	Schistosomiasis	Schistosoma serology	Residence in and/or travel through endemic areas	Schistosomiasis serology positive or equivocal	Treat with praziquantel in two doses of 20mg/kg, 4 hours apart, orally (40mg/kg total, no upper limit) Stool microscopy for ova Dipstick for haematuria. If positive – end urine microscopy for ova (ideally collected between 10am – 2pm) If positive for ova on urine or stool, evaluate further for end-organ disease with ultrasound and LFTs Seek advice from a paediatric specialist on treatment of children <5 years	
	Malaria	Malaria RDT AND thick and thin blood films	Travel from/through an endemic malaria area within 3 months of arrival if asymptomatic, or within 12 months if symptoms of fever	Positive test***	Unwell patients and those with <i>P. falciparum</i> malaria should be admitted to hospital urgently. Treat in consultation with ID specialist Children, pregnant women, and people with low immunity are at particular risk	

Table 1.5: Testing and management recommendations for infectious conditions

Who should be tested	Condition	Test	Details	Result	Management
	Hepatitis C	Hepatitis C Ab	From region of high prevalence (≥3%), or other risk factors	Anti-Hepatitis C Ab positive***	HCV RNA test. If positive, refer to a doctor accredited to treat HCV for further assessment. Test for and vaccinate against hepatitis A (see immunisation chapter 12)
	STI	NAAT test – self-collected low vaginal sampling or first past urine and consideration of throat and rectal swabs for <i>Chlamydia trachomatis</i> and <i>Neisseria gonorrhoea</i> syphilis serology	Known or suspected risk factors or on request (see text) Syphilis serology should be offered to unaccompanied and separated children <15 years	Regardless of test result:	Offer women a pregnancy test and contraception as appropriate (see women’s health chapter 17) Provide education about safer sex and condom use
Chlamydia positive***				Azithromycin 1g orally as a single dose, OR doxycycline 100mg orally 12 hourly for 7 days. Treat anorectal chlamydia with doxycycline 100mg orally 12 hourly for 7 days or azithromycin 1g orally as a single dose with a repeat dose a week later	
Gonorrhoea positive***				Take samples for gonorrhoea culture before treatment Ceftriaxone 500mg in 2mL of 1% lignocaine IMI PLUS azithromycin 1g orally Repeat NAAT and culture for test of cure for gonorrhoea 2 weeks after treatment	
Syphilis positive***				Parenteral penicillin (if not previously treated) in the context of a sexual health or ID unit	
	<i>Helicobacter pylori</i>	<i>H. pylori</i> stool Ag or breath test	High risk groups: family history gastric cancer, AND/OR symptoms/signs of dyspepsia or peptic ulcer disease	Ag or stool test positive	Treat as per ATG (Gastrointestinal) ³⁰ Follow up with repeat test at least 4 weeks after treatment If first line therapy is unsuccessful refer to specialist for second line medication Refer to specialist for consideration for endoscopy irrespective of <i>H. pylori</i> status if ‘red flags’ (anorexia, weight loss, dysphagia, gastrointestinal bleeding or abdominal mass), or, if symptoms of dyspepsia and age >50 years
	Intestinal parasites	<p>Check for eosinophilia</p> <p>If documented pre-departure albendazole therapy</p> <ul style="list-style-type: none"> No eosinophilia and no symptoms – no investigation or treatment required. Eosinophilia - perform stool microscopy for OCP followed by directed treatment. <p>If no documented pre-departure albendazole therapy, depending on <i>local resources and practices</i> there are two acceptable options:</p> <ol style="list-style-type: none"> Empiric single-dose albendazole therapy (age >6 months, weight <10kg; 200mg; ≥10kg; ≥400mg). If eosinophilia at baseline re-check in 8 weeks. If eosinophilia persists perform stool microscopy for OCP. OR Perform stool microscopy OCP followed by directed treatment. Recheck eosinophils and stool microscopy OCP at 8 weeks after directed treatment. Refer if unable to find cause of eosinophilia. <p>Treat pathological helminths with albendazole (age > 6 months, weight <10kg; 200mg; ≥10kg; 400mg) for 3 days, except for <i>Ascaris lumbricoides</i>, which only requires 400mg as a single dose (200mg in children >6 months and <10 kg). Mebendazole is an option for some parasites.</p> <p>Treat <i>Giardia lamblia</i> with tinidazole 2g as a single dose (50mg/kg children, maximum 2g) or metronidazole 2g daily for 3 days (30mg/kg/dose children, maximum 2g).</p>			

FBE – full blood examination, HIV – human immunodeficiency virus, HBV – hepatitis B virus, sAg – surface antigen, cAb – core antibody, sAb – surface antibody, TB – tuberculosis, LTBI – latent TB infection, TST – tuberculin sensitivity test, IGRA – interferon gamma release assay, CXR – chest x-ray, RDT – rapid diagnostic test, ID – infectious diseases, HCV RNA – hepatitis C virus ribonucleic acid, STI – sexually transmissible infections, NAAT – nucleic acid amplification test, MCS – microscopy culture and sensitivity, OCP – cysts, ova, parasites.

* FBE is also performed as an investigation for anaemia, this is listed in table 1.5

** Check Medicare Benefits Schedule (MBS)/Pharmaceutical Benefits Schedule (PBS) criteria

*** Notifiable diseases

Under Medicare, there is an upper limit on the number of pathology services payable in a single episode requested by a GP. This is referred to as coning. If more than three items are requested, MBS will only pay for the three most expensive items. This may impact on the ability of some GPs to undertake post-arrival refugee screening. It is recommended individual GPs discuss this issue with their local pathology provider.

Table 1.6: Testing and management recommendations for non-infectious conditions				
Who should be tested	Condition	Diagnostic test	Result	Management or referral pathway
All	Anaemia	FBE	Low Hb (age and sex dependent)	Investigate and treat causes of anaemia
Women and children, men where risk factors are present	Iron deficiency	Ferritin	Ferritin <15µg/L in adults Check reference ranges for children	Investigate and treat causes Treat with iron supplementation if iron <15µg/L (or <reference range for children) and/or when clinical and haematological features indicate iron deficiency anaemia Educate about iron-rich diet and avoid excessive dairy intake in children
People with risk factors for low vitamin D Note* write risk factors: e.g. dark skin, lack of sun exposure/covering clothing	Low vitamin D	25-hydroxy vitamin D Also calcium, phosphate and ALP in children	Vitamin D level <50nmol/L	Treat to restore levels to the normal range with either daily dosing or high dose therapy, ensuring adequate calcium intake and paired with advice about sun exposure and self-management
If arrival <6 months with history of food insecurity, or, if vegan diet.	Vitamin B12 deficiency	Serum active vitamin B12 (holotranscobalamin)	Serum active B12 if <35pmol/L or < reference range in children	Treat if <35pmol/L or <reference range for children with oral or IM supplementation Exclude concomitant folate deficiency Consider Helicobacter pylori infection
Women and female adolescents where relevant	Cervical cancer Breast cancer Contraception Antenatal/ perinatal care	As with all women: offer standard preventive screening as per Australian guidelines http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/cervical-screening-1 http://www.health.gov.au/antenatal Consider pregnancy and breastfeeding in women of childbearing age when planning immunisation, post-arrival screening, and treating positive screening test results. Be aware and sensitive to a possibility of a history of sexual violence and/or sexual abuse and associated physical and mental health consequences As with any women – be aware of the possibility of intimate partner violence Be aware of clinical issues, terminology and legislation related to FGM/C Ensure gender concordant care including interpreter preference		

Table 1.6: Testing and management recommendations for non-infectious conditions				
Who should be tested	Condition	Diagnostic test	Result	Management or referral pathway
As per Australian guidelines but consider screening earlier if risk factors	NCD in adults	Screen for hypertension, obesity, CVD, diabetes, COPD, dyslipidaemia, breast/cervical/bowel cancer, smoking, alcohol use and substance use Refer to http://www.racgp.org.au/your-practice/guidelines/redbook/ In children: record BMI and blood pressure		
All	Dental caries and oral health concerns	Refer to public dental services		
All	Visual impairment	Visual acuity testing in adults and adolescents For children: StEPS or similar program http://www.kidsfamilies.health.nsw.gov.au/current-work/programs/programs-and-initiatives/steps-statewide-eyesight-preschooler-screening/		
African descent >40 years, all others >50 years	Glaucoma	Refer to optometrist for ocular health checks for glaucoma screening		
All	Hearing impairment	Refer for review if concerns about hearing		
All	Mental health, social and emotional health	An assessment of emotional wellbeing and mental health should be part of post-arrival health screening. It is generally not advisable to ask specifically about people's experience of torture and trauma, especially in the first visits, however the potential impacts on psychological health should be assessed. Consider suicide risk assessment in people where mental health concerns are evident or suspected. Consider functional impairment, behavioural difficulties and developmental progress as well as mental health symptoms when assessing children, or the impact of parent's mental health status on child wellbeing. Consider using resources such as the SDQ in children or HEADSS screening for adolescents http://www.rch.org.au/clinicalguide/guideline_index/Engaging_with_and_assessing_the_adolescent_patient/		
All	Disability	Not covered within these guidelines – refer for assessment and ongoing management		
Children and adolescents	Developmental delay or learning concerns	See further information: http://www.racgp.org.au/your-practice/guidelines/redbook/preventive-activities-in-children-and-young-people/ http://www.rch.org.au/immigranthealth/clinical/developmental-assessment/		

FBE-full blood examination, Hb-haemoglobin, ALP- alkaline phosphatase, IM-intramuscular, FGM/C- female genital mutilation/cutting, CVD-cardiovascular disease, COPD-chronic obstructive pulmonary disease, BMI- body mass index, STEPS-statewide eyesight pre-schooler screening, SDQ – strengths and difficulties questionnaire, HEADSS-home, education/employment, activities, drugs, sexuality, suicide/depression.

*Check Medicare Benefits Schedule (MBS)/Pharmaceutical Benefits Schedule (PBS) criteria.

Under Medicare, there is an upper limit on the number of pathology services payable in a single episode requested by a GP. This is referred to as **coning**. If more than three items are requested, MBS will only pay for the three most expensive items. This may impact on the ability of some GPs to undertake post-arrival refugee screening. It is recommended individual GPs discuss this issue with their local pathology provider.

All	FBE	
	HBsAg, HBsAb, HBcAb. Write: 'Query chronic hepatitis B?'	
	Strongyloides serology	
	HIV serology (≥ 15 years or unaccompanied minor)	
	TST or IGRA (depends on risk factors and local jurisdiction, check Medicare for IGRA rebates, TST preferred for children < 5 years)	
	Varicella serology (≥ 14 years if no known history of disease)	
	Visual acuity and review for glaucoma in Africans > 40 years and others > 50 years	
	Dental review	
	Hearing review	
	Social and emotional wellbeing/mental health	
	Disability	
	Developmental delay or learning concerns (children and adolescents)	
	Preventive health as per RACGP, consider screening earlier for NCDs	
	Catch-up immunisations	
Risk-based	Rubella serology (women childbearing age)	
	Ferritin (women and children, men where risk factors present)	
	Vitamin D (write risk factors e.g. dark skin, lack of sun exposure). Also check Ca, PO ₄ and ALP in children.	
	Vitamin B12 (arrival < 6 months, food insecurity, vegan, from: Bhutan, Afghanistan, Iran, Horn of Africa)	
	NAAT first pass urine or self-obtained low vaginal swabs for gonorrhoea or chlamydia) (risk of STIs)	
	Syphilis serology (risk of STIs, unaccompanied minor)	
	Helicobacter pylori stool antigen or breath test (gastric cancer family history, upper GI symptoms)	
	Stool microscopy (OCP) (no pre-departure albendazole or persisting eosinophilia after albendazole treatment)	
Country-based	Schistosoma serology	
	Malaria thick and thin films and RDT	
	Hepatitis C Ab (also screen if risk factors)	

FBE – full blood examination, HBsAg – hepatitis B surface antigen, sAb – surface antibody, cAb – core antibody, HIV – human immunodeficiency syndrome, IGRA – interferon gamma release assay, NCDs – non-communicable diseases, NAAT – nucleic acid amplification test, STI – sexually transmissible infections, RDT – rapid diagnostic test, TST – tuberculin skin test

LINKS

Refugee health assessment tool

<http://refugeehealthnetwork.org.au/refugee-health-assessment-tool/>

Using an interpreter

<http://www.ceh.org.au/knowledge-hub/>

Toolkit for health literacy

<http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/healthlittoolkit2.html>

Information on teach-back

<https://www.youtube.com/watch?v=x78UIq-yNHY>

Patient-centred care: Improving quality and safety through partnerships with patients and consumers. Australian commission on safety and quality in healthcare 2011

http://www.safetyandquality.gov.au/wp-content/uploads/2012/03/PCC_Paper_August.pdf

Health literacy, a summary for clinicians. Australian commission on safety and quality in healthcare

<http://www.safetyandquality.gov.au/wp-content/uploads/2015/07/Health-literacy-a-summary-for-clinicians.pdf>

Easidose, a visual prescribing aid

www.easidose.com

Refugee Health Network of Australia

<http://www.refugeehealthaustralia.org/>



 **PART A:**
INFECTIOUS DISEASES



■ CHAPTER 1: TUBERCULOSIS

Justin Denholm, Marion Bailes, Josh Francis

RECOMMENDATIONS

- Offer tests for latent TB infection (LTBI) to all people aged ≤ 35 years. Children 2-10 years may have had tests for LTBI as part of pre-departure screening.
- Screening and preventive treatment for LTBI people >35 years will depend on individual risk factors and jurisdictional requirements in the particular state or territory.
- Offer LTBI testing with the intention to offer preventive treatment and follow up.
- Use either the Tuberculin Skin Test (TST) or blood Interferon Gamma Release Assay (IGRA) to screen for LTBI.
- TST is preferred over IGRA for children <5 years of age.
- A positive TST is induration of ≥ 10 mm in adults and children from refugee-like backgrounds; or ≥ 5 mm in the setting of severe malnutrition, HIV infection, immunosuppression, or in children who are recent contacts of active TB cases.

- Ensure that a CXR has been performed during the migration process for those aged ≥ 11 years as per screening guidelines. If so, a post-arrival CXR is not required unless TST or IGRA are positive, or there are respiratory symptoms suggestive of active pulmonary TB disease.
- Refer individuals with a positive TST or IGRA to specialist TB services for assessment and exclusion of active TB, and consideration of treatment for LTBI.

OVERVIEW

Tuberculosis is a relatively uncommon infection in Australia. In 2013, the overall incidence of active TB was 5.5/100,000 population per year; however, nearly 90% of cases occur in overseas-born Australians, with a rate of 18.4/100,000 compared to 0.7/100,000 in non-indigenous Australian-born people.^{31–33} Although people born in India, the Philippines, China and Nepal make up more than half of the overseas-born cases of active TB in Australia, the highest rates are in people born in humanitarian source countries.³⁴

Immigrants born in high-incidence countries, including people from refugee-like backgrounds, are identified as high priority candidates for screening and treatment for LTBI.^{32,35} Post-arrival screening and LTBI treatment in those from a refugee-like background can prevent TB transmission in the community and limit the numbers of cases and deaths from TB.³⁶ Australia's National TB Advisory Committee (NTAC) supports this approach.³³

Transmission of TB occurs through inhalation exposure of aerosolised droplets from people with active respiratory TB. Often this is a household contact or family member, but often no specific exposure is identified. In most exposed people, infection is contained locally, without progression to active TB, with the organism remaining in a state of latency – LTBI. Active TB may be primary disease (occurring directly after initial infection) or reactivation disease (occurring after a latent period that may last many years). Primary disease is more common in children; reactivation disease is more common in adolescents and adults. For people with LTBI, the lifetime risk of active TB is 5–10%.³² The lifetime risk of TB reactivation for immigrant children less than 5 years of age has been estimated to be 17% and the lifetime risk of those with untreated HIV infection is estimated to be 100%.³⁷ The risk of developing active TB following exposure is greatest in the 12–18 months following exposure.³⁸ Thus if TB infection has been acquired in the period immediately prior to travel (e.g. in crowded living conditions, including refugee camps), people are at greatest risk of progressing to active TB soon after arrival in Australia. Australian data from 2003–2012 show 85% of active TB in overseas-born children was diagnosed within 5 years of arrival;³⁵ however, other population data have found nearly 50% of cases of active TB occur more than 5 years after arrival.³⁴

Although pulmonary disease is the most common presentation of active TB in adults and children, non-pulmonary active TB represents a higher proportion of all TB cases in immigrants compared to Australian-born people³⁴ and active TB can present in almost any organ.

LTBI is common in children and adults from a refugee-like background in Australia. Australian studies of resettled refugee cohorts have reported prevalence figures for LTBI ranging from 7–71%.^{39–49} Australian data suggest the prevalence of active TB is generally <2% in adults from a refugee-like background,^{43,48,50} and 0–5% in children (see [appendix one](#)).^{44,45,47,51}

HISTORY AND EXAMINATION

Review the migration pathway, previous TB screening,^{17,18} and any past history of TB, TB treatment, or contact with active TB. Clarify the DHC¹⁹ in offshore arrivals, as the DHC includes live viral vaccines (LVV), which may influence the timing and interpretation of the TST if this test is used for screening.

Offshore humanitarian arrivals and those who have been in detention centres aged 11 years and older (at the time of arrival/detention) will have had a CXR, and children aged 2–10 years applying for humanitarian or onshore protection visas, or, from high TB prevalence countries will have had an IGRA or TST and further investigations if positive (from 2016). Asylum seekers arriving by plane are unlikely to have had a CXR and may not have had screening for active TB or LTBI.

LTBI is by definition asymptomatic and non-infectious.

Classic clinical symptoms of active pulmonary TB include chronic cough and haemoptysis. However, active TB may present with non-specific symptoms, including fever, malaise and weight loss or failure to thrive/poor growth in children, night sweats and lymphadenopathy. In the early stages of active pulmonary TB, respiratory symptoms may be absent.⁵²

Consider comorbidities that might affect risk for disease progression (e.g. low vitamin D, HIV infection), tolerance for preventive treatment (e.g. hepatitis with older age), or ability to access health services (e.g. literacy, household location, competing priorities).

INVESTIGATION

Ensure active TB has been excluded, through history, examination, and CXR and other investigations where appropriate.

If active TB is suspected refer for urgent specialist assessment and ensure appropriate infection control precautions. Neither TST nor IGRA should be used to exclude active TB in adults or children.

All people from a refugee-like background aged ≤ 35 years, including children, should be screened for LTBI, ideally within one month of arrival in Australia, unless screening has been completed pre-departure. However, the risk of developing active TB persists (even decades after arrival), and screening should be offered at whatever stage individuals are identified and assessed.⁵³

Testing for LTBI should be performed with the intention to offer preventive treatment, taking into account the risks and benefits of preventive treatment; however, practice differs between different jurisdictions, and some states and territories will screen all new arrivals, including those over 35 years.

Investigation for LTBI is completed with either the TST or (blood) IGRA. TST is preferred to IGRA for children less than 5 years of age.

There is no indication to perform both tests. Neither test is 'gold standard' and individual factors may determine which test is preferred⁵⁴ e.g. IGRA testing may be preferable in people with a history of BCG vaccination after infancy (BCG >1 year old) and/or people who have had the BCG vaccine more than once. In HIV-infected adults IGRA tests perform similarly to TST in identifying latent TB.⁵⁵ Logistic factors may also influence testing decision, with IGRA requiring blood sampling, while TST requires a return visit for test reading, and should not be completed within 4 weeks of LVV. Testing may not be available outside hospitals or TB services. IGRA is not currently Medicare-rebatable unless the person is immunosuppressed.

A positive TST is considered to be induration of $\geq 10\text{mm}$ in recent immigrants from high TB prevalence countries (i.e. many adults and children from refugee-like backgrounds); or $\geq 5\text{mm}$ in the setting of severe malnutrition, HIV infection, immunosuppression or in children who are recent contacts of active TB. A positive IGRA is defined by the manufacturer's guidelines.*

MANAGEMENT AND REFERRAL

People with a positive TST or IGRA should be referred to clinicians with experience in TB for assessment and repeat CXR (for radiological signs of current or past TB), unless there is a recent (within 3 months) CXR available for review. Baseline LFTs should be performed prior to commencing treatment for LTBI.

Treatment for LTBI is only undertaken after active TB has been excluded, and should be administered by experienced clinicians, in communication with a coordinated TB service. Treatment of LTBI has been shown to significantly reduce the individual risk of subsequent active TB,³² and LTBI treatment is recommended unless contraindicated. Relative contraindications include liver disease, older age and in patients where adherence is likely to be problematic.

The first line preventive treatment of LTBI is 6–9 months of isoniazid (10mg/kg up to 300mg daily, pregnancy category A).^{32,37}

Shorter course regimens, particularly those including rifamycins (pregnancy category C), are also effective.³²

Treatment is generally well tolerated, although adverse effects including hepatotoxicity are well described, especially in people over 35 years, and/or people with pre-existing liver conditions.⁵⁶ A study of newly arrived refugees in Australia found high rates of LTBI treatment acceptance.⁵⁷ When people are offered LTBI treatment, it is essential they understand the difference between LTBI and active TB, the pros and cons of treatment, and the duration of treatment. Provide language appropriate (and/or visual) information on treatment and side effects, and check patient understanding through teach-back techniques where possible.

While treatment of LTBI is recommended and should be encouraged, it is not compulsory and people should be reassured that their visa status/asylum claim will not be affected if they decide not to proceed.³² In this situation, advise patients to seek early review for symptoms of active TB, and consider CXR 6–12 monthly for 2 years if there is a high index of suspicion of recent exposure (within 2 years).

People receiving LTBI treatment should be reviewed regularly to reinforce understanding of treatment and side effects, and to encourage adherence. They should be educated to stop their isoniazid and to contact their healthcare providers immediately if they develop adverse treatment effects (i.e. rash, anorexia, nausea, vomiting, abdominal discomfort, persistent fatigue and weakness, dark-coloured urine, pale stools or jaundice). Isoniazid can cause peripheral neuropathy in people who are malnourished. This can be prevented by concomitant administration of pyridoxine (6.25–25mg/day, by age, not per kg). People with baseline abnormal liver function should have routine periodic laboratory testing, an asymptomatic rise in LFTs is not uncommon (10–20%), and may not require treatment cessation.³²

* For the TST: a **false negative result** may occur with very recent exposure, active TB, immunosuppression, HIV, malignancy, viral infection, in older adults, and within 4 weeks of LVV (consider pre-departure screening in offshore arrivals). A **false positive result** may occur as a result of exposure to non-tuberculous Mycobacteria or previous BCG immunisation (particularly if given after early infancy); however, in practice, it is usually advisable to disregard the BCG when interpreting the TST.

For IGRAs: A **false negative result** may occur with very recent exposure, TB disease, and immunosuppression, although IGRA are less likely to be a false negative in HIV compared to the TST. A **false positive result** may occur with some non-tuberculous Mycobacteria. An **indeterminate result** can be due to a low positive control or a high negative control. In this situation the IGRA can be repeated once, and/or a TST considered.

SPECIAL CONSIDERATIONS IN CHILDREN⁵⁸

Following exposure to TB, children may develop either LTBI or uncontrolled primary infection. Young children have the greatest risk of developing active TB after exposure, and also have the greatest risk of developing severe/disseminated TB, including TB meningitis.^{38,59}

Clinical indicators of active TB are often subtle in children and a careful history and examination is required, including measurement of growth parameters. Symptoms include chronic cough, malaise, and weight loss/failure to thrive.⁶⁰

All children should be screened for LTBI and assessed for clinical features of active TB. TST is the preferred test for latent TB in children under 5 years. IGRA testing in this age group is associated with an increased proportion of indeterminate results.⁶¹

New pre-departure TB screening protocols for children applying for humanitarian visas were introduced at the end of 2015 (IGRA or TST testing for children aged 2-10 years with follow-up of positive results). If screening results are available and valid (i.e. a positive or negative result for those who had IGRA testing), and children are reviewed soon after arrival, children do not need repeat LTBI testing unless there are additional clinical risk factors. Repeat testing (and ideally test using TST in those < 5 years) in children with indeterminate or failed IGRA testing. Ensure testing for LTBI in children who have not had previous LTBI screening, or where results are not available. Children <2 years will not have had pre-arrival LTBI screening and should be screened using TST on arrival.

Neither TST nor IGRA should be used to exclude active TB in children, but a positive result on either test indicates TB infection. All children with a positive TST or IGRA should be referred to clinicians with experience in TB for assessment to review/complete a CXR. Children aged <11 years who arrived before the end of 2015 will not have had a CXR as part of offshore/detention screening. From 2016, children aged 2-10 years with positive pre-arrival LTBI screening will have had a CXR prior to arrival.

All children with LTBI (where active TB has been excluded) should be offered preventive treatment for LTBI.

All children <5 years with current/recent household contact with active pulmonary TB should be discussed urgently with local TB programs, irrespective of any available screening test results.

Children who have recent contact with active TB cases should be managed by a specialist TB service. Those without previous screening will typically have a baseline TST, and if negative (after active TB is excluded) commence isoniazid until a repeat TST at 3 months ('break of contact' to look for TST conversion) when further decisions are made around ongoing management. Management of children who have had prior screening will depend on the clinical scenario.

The investigation and treatment of active TB and LTBI in children should be undertaken by specialist paediatric and TB services with experience in the management of paediatric TB. Coordinated management of all family and household contacts by the same service is recommended, and has been shown to improve treatment adherence.⁶²

CONSIDERATIONS IN PREGNANCY AND BREASTFEEDING⁶³

Consider pregnancy when organising a CXR in women of childbearing age. CXR may be deferred in asymptomatic pregnant women. Neither pregnancy nor breastfeeding is a contraindication to the use of isoniazid (category A) preventive therapy in the setting of individuals at risk of progression to active TB. Infants are at significantly higher risk of developing active TB following TB exposure, and preventing active disease in women with young children is a priority. Pregnant or breastfeeding women with suspected active TB should be referred urgently to a specialist TB service.

LINKS AND RESOURCES

Calculator to determine risks of TB reactivation versus risks of isoniazid.

<http://www.tstin3d.com/>

Translated resources for LTBI

<http://www.nlm.nih.gov/medlineplus/languages/tuberculosis.html>

Easidose, a visual prescribing aid

www.easidose.com



■ CHAPTER 2: MALARIA

Christine Phillips, Josh Francis

RECOMMENDATIONS

- Investigations for malaria should be performed on anyone who has travelled from/through an endemic malaria area within 3 months of arrival if asymptomatic, or within 12 months if symptoms of **fever** (regardless of any pre-departure malaria testing or treatment).
- Test with both thick and thin blood films AND an antigen-based rapid diagnostic test (RDT), as RDT alone is not significantly sensitive to detect all non *P.falciparum* infections.
- All people with malaria should be treated by, or in consultation with, a specialist ID service. Discuss diagnoses urgently with an infectious disease service. Patients with malaria may deteriorate quickly, especially children, pregnant women and those with low immunity.
- Admit all patients with falciparum malaria to hospital, at least for the initial part of their treatment. Experienced clinicians may treat individuals with non-falciparum or non-severe falciparum malaria infection as outpatients if they are in a non-malaria receptive area.

OVERVIEW

Malaria is a mosquito-spread parasitic protozoal infection caused by the genus *Plasmodium*. Of the five species of human malarial parasites, *Plasmodium falciparum* is the most common and dangerous. One-third of malaria imported to Australia occurs in migrants coming through Papua New Guinea and India.⁶⁴

Malaria is endemic in many refugee-source countries, and some transit countries (see table 2.1). All refugees to Australia from malaria-endemic regions are offered a voluntary Departure Health Check (DHC), which includes an RDT for malaria (and treatment if positive) in the 72 hours prior to departure.¹⁹ Previous issues with documentation of DHC treatment and sub-optimal anti-malarial therapy have been resolved.⁶⁵ Treatment is now with WHO-recommended artemether/lumefantrine and should be documented on a health manifest that accompanies the individual. Diagnoses of malaria in people from refugee-like backgrounds have decreased since the introduction of pre-departure screening for malaria.⁶⁶

A list of countries with significant malaria risk is provided in table 2.1. Detailed, up-to-date information on malaria by country is available from: <http://www.map.ox.ac.uk/explore/countries>.

Australia was declared free from endemic malaria in 1981. However, much of Australia north of latitude 19°S remains receptive to malaria, due to the presence of patent mosquito vectors (*Anopheles* spp.).⁶⁷ This has been a constant threat to Australia's 'malaria-free' status.^{68,69} Therefore, the detection and treatment of malaria in individuals arriving into Australia from malaria-endemic areas is of significant public health importance.

Malaria has been diagnosed in 4–10% of refugee cohorts from Sub-Saharan Africa in Australian studies,^{41,50,70} but is uncommon in audits of newly arrived Iraqi⁷¹ or Karen refugees.^{43,48} Malaria has also been diagnosed in people arriving by boat off the coast of Darwin.⁷² Thus, there is a rationale for re-screening people from refugee-like backgrounds from malaria-endemic areas on arrival, with enhanced vigilance for malaria in people with a febrile illness.⁷³

HISTORY AND EXAMINATION

Malaria must be considered in any patient who has visited a malarious area and presents with a febrile illness, even months after arriving in Australia. Other symptoms of malaria include headache, nausea, chills, sweating, diarrhoea and malaise.

Severe malaria requires urgent referral to a hospital. Symptoms, signs and laboratory features of severe malaria include any degree of altered consciousness, jaundice, oliguria, severe anaemia or hypoglycaemia, parasite count >100,000/μL or >2%, or, if patient is vomiting or acidotic. Conversely, individuals with long-term acquired immunity and low-grade parasitaemia may be asymptomatic.⁷⁰

INVESTIGATIONS

The 'gold standard' test for the diagnosis of malaria remains the thick and thin blood film examination for malaria parasites by light microscopy. A combination of blood films and RDT has relatively high sensitivity for the detection of *P. falciparum* infection. RDTs are frequently used in Australian laboratories to supplement blood film examination. The RDT for falciparum malaria may remain positive up to 28 days post treatment (see 'Patients with pre-departure screening test' below).

Mixed infections with more than one *Plasmodium* species are not infrequent⁷⁴ and can usually be identified from the blood films. Malaria PCR is available in reference laboratories and should be considered to rule out sub-microscopic parasitaemia e.g. such as in patients who may have acquired immunity to malaria and/or in whom the efficacy of treatment given is uncertain. Some individuals can harbour sub-patent infections (i.e. blood film negative) with very low levels of detection for prolonged periods of time;⁷⁵ these patients may become febrile as their immunity wanes and PCR-based testing (available in reference laboratories) may be required to exclude sub-patent infection.

If a patient has symptoms consistent with malaria but negative initial blood films and/or RDT result, repeat blood films should be performed in an attempt to demonstrate malarial parasites.⁷⁴ Additional investigations in an unwell patient with malaria should be directed to detecting anaemia, acute kidney injury, abnormal liver function, hypoglycaemia or a metabolic acidosis.

MANAGEMENT AND REFERRAL

Refer to table 2.2 for all management.

Plasmodium falciparum malaria

All patients with falciparum malaria should be referred urgently to a physician with experience in the management of malaria. Children with malaria should be discussed urgently with a paediatric ID physician. Children and people with low immunity who have malaria may deteriorate quickly.

Current Australian recommendations suggest that all patients with falciparum malaria should be admitted to hospital, at least for the initial part of their treatment,⁷⁶ although it is possible to treat individuals with non-severe malaria infection entirely as outpatients.^{65,70,77} Patients with asymptomatic or uncomplicated falciparum malaria who are able to tolerate oral medication should be treated with oral artemisinin-based combination therapy (ACT).^{76,77} The only ACT product available in Australia at present is artemether-lumefantrine (Riamet®), which is available on authority prescription for suspected or proven falciparum infection. For further treatment guidelines refer to table 2.2. For severe malaria refer to hospital immediately and seek expert advice.

Plasmodium vivax, malariae or *ovale* malaria

Patients with confirmed vivax, malariae or ovale malaria (or where the parasite cannot be determined) should also have artemether-lumefantrine treatment, although this preparation is only available via the PBS for falciparum malaria and patients should be prescribed the medication via a hospital pharmacy.

Patients with severe non-falciparum malaria should be referred immediately to hospital for expert advice.

In patients with *P. vivax* or *P. ovale* infection; hypnozoite eradication therapy (or 'radical cure') should be attempted, to reduce the likelihood of subsequent relapses.⁷⁶ Hypnozoite eradication involves a weight-based, generally two-week course of primaquine, available via application through the Special Access Scheme (SAS). Health workers should pay careful attention to adherence, and be aware of the risk of relapse. Before commencing primaquine, all patients should be screened for Glucose-6-Phosphate Dehydrogenase (G6PD) deficiency, because of the risk of haemolysis for these patients. Primaquine is contra-indicated in patients with severe G6PD deficiency, but may be used with caution, and under supervision in those with mild deficiency.

Patients with positive pre-departure screening test

Refugees with a positive malaria result on pre-departure DHC screening are treated with a three-day course of ACT before departure, according to the protocol of the International Organization for Migration (IOM). This treatment is not monitored, and adherence should be checked with the patient (or their parents, in children). Thick and thin blood film testing after arrival is recommended. The RDT may stay positive for up to four weeks after successful treatment, so is of limited use in this situation. A negative blood film does not exclude sub-patent malaria.

A person who has tested positive at the pre-departure screen but in whom there is uncertainty regarding adherence to pre-departure treatment remains at risk of recurrent symptomatic illness, and should be retreated.

Follow-up

Patients should be assessed one month post treatment and have follow-up blood films performed to ensure that the infection has been successfully treated. Asymptomatic recrudescence and relapse can occur despite initial eradication of infection and full adherence. Artemisinin resistance has been reported in some areas of the Greater Mekong Subregion (Thailand, Vietnam, Cambodia, Laos and Myanmar (Burma))⁷⁸ resulting in reduced efficacy of ACT against *P. falciparum*. Seek expert advice if ACT resistance is suspected.

For patients with malaria caused by *P. falciparum* who are being treated in malaria-receptive regions of northern Australia, a **single dose** of primaquine is recommended to reduce the risk of transmission to local mosquitoes (see table 2.2).

Be aware that delayed relapse for all strains of malaria can occur up to one year after leaving the endemic area. Have a low threshold for re-investigating for malaria in any person with fever.

CONSIDERATIONS IN PREGNANCY AND BREASTFEEDING

Pregnant women with malaria are at increased risk for severe malaria, severe anaemia, and delivery of a low birth weight infant. Anti-malarials that are considered effective and can be used in all stages of pregnancy include atovaquone-proguanil (category B2), clindamycin (category A) and quinine sulphate (category D, but has been used safely for malaria in pregnancy).⁷⁶ We recommend the combination of quinine and clindamycin for pregnant patients. Clindamycin is not subsidised on the PBS for malaria treatment. Treatment should, at least initially, be given as supervised inpatient therapy. Pregnant women with severe malaria may require treatment with intravenous artesunate (as for severe malaria in non-pregnant patients) guided by expert advice.

The above medications are contained in very low levels in breast milk, and are considered safe for infants. Breastfeeding women should receive standard doses of anti-malarial treatment recommended for all adults, with the exception of doxycycline (category D). Before taking primaquine (if required), **both** the infant and the mother should be tested for G6PD deficiency.

Table 2.1 Countries and territories with malarious areas. From International Travel and Health, World Health Organisation 2015 update. <http://www.who.int/ith/en/>

* = P. vivax risk only

Afghanistan	Gabon	Oman
Algeria*	Gambia	Pakistan
Angola	Georgia*	Panama
Argentina*	Ghana	Papua New Guinea
Azerbaijan*	Greece*	Paraguay*
Bangladesh	Guatemala	Peru
Belize	Guinea	Philippines
Benin	Guinea-Bissau	Russian Federation*
Bhutan	Guyana	Rwanda
Bolivia, Plurinational state of	Haiti	Sao Tome and Principe
Botswana	Honduras	Saudi Arabia
Brazil	India	Senegal
Burkina Faso	Indonesia	Sierra Leone
Burundi	Iran, Islamic Republic of	Solomon Islands
Cambodia	Iraq*	Somalia
Cameroon	Kenya	South Africa
Cape Verde	Korea, Democratic People's Republic of*	Sri Lanka
Central African Republic	Korea, Republic of*	Sudan
Chad	Kyrgyzstan*	South Sudan
China	Lao People's Democratic Republic	Suriname
Colombia	Liberia	Swaziland
Comoros	Madagascar	Syrian Arab Republic*
Congo	Malawi	Tajikistan
Congo, Democratic republic of the	Malaysia	Thailand
Costa Rica	Mali	Timor-Leste
Cote d'Ivoire	Mauritania	Togo
Djibouti	Mayotte	Turkey*
Dominican Republic	Mexico	Uganda
Ecuador	Mozambique	United Republic of Tanzania
Egypt	Myanmar	Uzbekistan*
El Salvador	Namibia	Vanuatu
Equatorial Guinea	Nepal	Venezuela, Bolivarian Republic of
Eritrea	Nicaragua	Viet Nam
Ethiopia	Niger	Yemen
French Guiana	Nigeria	Zambia
		Zimbabwe

Table 2.2 Malaria therapy – from Therapeutic Guidelines: Antibiotic v15⁷⁶

Severe malaria (or if patient unable to tolerate oral therapy)

Refer urgently to ID physician for hospital management.

Uncomplicated malaria

artemether+lumefantrine tablets 20+120mg

adult and child more than 34kg: 4 tablets per dose (child 5–14kg: 1 tablet; 15–24kg: 2 tablets; 25–34kg: 3 tablets) orally with fatty food or full-fat milk at 0, 8, 24, 36, 48 and 60 hours, making a total adult dose of 24 tablets in 6 doses

OR

atovaquone+proguanil tablets 250+100 mg (adult formulation)

adult and child more than 40kg: 4 tablets per dose (child 11–20kg: 1 tablet; 21–30kg: 2 tablets; 31–40kg: 3 tablets) orally with fatty food or full-fat milk (to ensure adequate absorption of atovaquone), daily for 3 days

OR THE COMBINATION OF

quinine sulfate 600mg (adult less than 50kg: 450mg) (child: 10mg/kg up to 600mg) orally, 8-hourly for 7 days

PLUS EITHER

doxycycline 100mg (child 8 years or older: 2mg/kg up to 100mg) orally, 12-hourly for 7 days (which can start after day 1 of quinine therapy)

OR (for pregnant women or children younger than 8 years)

clindamycin 300mg (child: 5mg/kg up to 300mg) orally, 8-hourly for 7 days.

For patients with malaria caused by *P. falciparum* (either alone or with other species) acquired from the **Greater Mekong Subregion (Thailand, Vietnam, Cambodia, Laos and Myanmar (Burma))** and who respond slowly to artemether+lumefantrine (ie persisting parasitaemia after 72 hours of therapy), switch to oral quinine sulfate plus either doxycycline or clindamycin as above, for 7 days.

For patients with malaria caused by *P. falciparum* who are being treated in malaria-receptive regions of northern Australia, a single dose of primaquine is recommended to reduce the risk of transmission to local mosquitoes. Add: primaquine 15mg (child: 0.25mg/kg up to 15mg) orally, as a single dose.

Hypnozoite eradication therapy

First exclude G6PD deficiency in all

For *P. vivax* infection use concurrently:

primaquine 30mg (child: 0.5mg/kg up to 30mg) orally, daily, or if nausea occurs 15mg (child: 0.25mg/kg up to 15mg) orally, 12-hourly. Treat for a minimum of 14 days or, in adults more than 70kg, until a total cumulative dose of 6mg/kg is reached

For *P. ovale* infection use concurrently:

primaquine 15mg (child: 0.25mg/kg up to 15mg) orally, daily for 14 days

If a relapse of malaria occurs despite treatment with primaquine, seek expert advice.

Links

Easidose, a visual prescribing aid

www.easidose.com



■ CHAPTER 3: HUMAN IMMUNODEFICIENCY VIRUS (HIV)

Chris Lemoh, Marion Bailes, David Isaacs

RECOMMENDATIONS

- Offer HIV testing to all people aged ≥ 15 years, as prior negative tests do not exclude the possibility of subsequent acquisition of HIV.
- Routine HIV screening of children < 15 years is not warranted except in unaccompanied or separated minors. Screening should also be completed in children < 15 years where risk factors or potentially associated conditions have been identified (see text).

OVERVIEW

HIV remains an infection of global importance. In 2013, there were approximately 2.1 million new infections, including 240,000 children, and around 1.5 million people died of Acquired Immune Deficiency Syndrome (AIDS)-related causes. New HIV infections have been declining globally since 2001, but HIV epidemiology is dynamic. The region with the largest number of people living with HIV is still Sub-Saharan Africa, where adult HIV prevalence in several countries remains high.^{79,80}

Australia has a relatively small HIV disease burden, with fewer than 27,000 people living with HIV, and 1,200 new HIV infections diagnosed annually, including approximately 200 cases previously diagnosed overseas. Around half of the people diagnosed with HIV in Australia each year are born overseas. The highest rates of HIV diagnosis are amongst people born in Sub-Saharan Africa and South East Asia. These regions are also over-represented amongst heterosexually acquired cases of HIV and late HIV diagnoses.^{81–84}

Currently available HIV treatments are not curative, but can suppress viral replication and prevent immunological deterioration, achieving near-normal life expectancy.⁸⁵

Delayed diagnosis of HIV leads to missed opportunities for prevention through behaviour modification to reduce the risk of transmission. Delayed diagnosis also means delayed treatment. Early treatment gives better health outcomes, and is now seen as another important strategy to reduce transmission risk.^{82,86–91}

Australian HIV testing guidelines recommend diagnostic testing when HIV infection is clinically suspected, including in people with opportunistic infections such as TB. Guidelines also recommend offering an HIV test to people with demographic or epidemiological risk factors for HIV exposure (such as history of sex between men or being born in or having travelled to a high-prevalence country); people diagnosed with another STI or blood-borne infection; and people with a history of events indicating risk of sexual or blood-borne infection. HIV tests are also recommended for all pregnant women.⁹²

Historically, many of the regions from which people flee persecution are also regions of high HIV prevalence, such as Sub-Saharan Africa and South East Asia. Australian immigration policy requires HIV testing of all permanent visa applicants aged 15 years and older, including those applying for humanitarian (refugee) visas. Negative tests done prior to migration do not exclude the possibility of subsequent acquisition of HIV before migration to Australia, particularly in high-prevalence regions.

People who have arrived as asylum seekers may also have been exposed to HIV in source or transit countries, including during incarceration or through sexual relationships with members of sub-populations with high HIV prevalence, such as people who inject drugs and sex workers.⁸⁰ Asylum seekers in detention undergo screening for blood-borne viruses (in children this screening has been in place since mid 2014). Asylum seekers arriving by plane may not have had previous HIV testing, although an Immigrant Medical Examination (IME) (including screening for blood-borne viruses in those aged 15 years and older) is required if they are granted a substantive visa.

The prevalence of HIV in people from refugee-like backgrounds arriving in Australia is low and the pre-test probability of an HIV infection in a pre-screened individual from a low-prevalence country is minimal.^{39,41,43,48} Other guidelines have therefore suggested limiting re-testing to people from high-prevalence countries,⁹³ in particular those from Sub-Saharan Africa, and there were different opinions within the EAG regarding this recommendation. However, given the possibility of HIV acquisition in the interval between pre-departure testing and arrival in Australia, the serious consequences of delayed diagnosis after migration for individual and public health, and that risk behaviours may be difficult to identify when consulting with a new arrival,^{41,93–95} the EAG recommends offering an HIV test to all people aged 15 years and over. Screening should also be completed in children <15 years where maternal status is unknown, in unaccompanied minors, if risk factors or potentially associated conditions have been identified.

HISTORY AND EXAMINATION

Primary HIV infection may be asymptomatic, but is usually accompanied by a self-limiting illness producing infectious mononucleosis-like symptoms: fever, rash and generalised lymphadenopathy. Following primary infection, an asymptomatic phase lasts a median of 5 years before advanced immunodeficiency occurs, leading to the development of opportunistic infections and unusual malignancies associated with AIDS.⁹⁶

INVESTIGATIONS

If a decision is made to offer HIV testing, obtaining informed consent is essential. In brief, the practitioner offering the test needs to ensure that the patient understands: what HIV infection is and how HIV is transmitted; the benefits of knowing their HIV status; the availability of effective treatment and support in the event of a positive diagnosis; and that patient privacy and confidentiality regarding testing and results will be protected.⁹² The patient has the right to decline testing.

The practitioner should request 'HIV serology' on the pathology request form. The initial test performed by the laboratory will be a combined HIV antibody/p24 antigen enzyme-linked immunosorbent assay (ELISA) test. As with all serological tests, a 'window period' exists during which a person infected with HIV may return a negative or indeterminate test. However, the window period for current testing kits has narrowed to two to three weeks after infection, and almost all people tested will have seroconverted within six weeks after infection. If the initial ELISA is positive, the laboratory performs a confirmatory Western blot. The Australian HIV testing policy currently recommends a three-month window period.⁹²

MANAGEMENT AND REFERRAL

If HIV serology is performed and is negative, a brief post-test discussion should cover the ongoing importance of safe sex, both in Australia (with a reminder that HIV occurs in Australia) and if travelling overseas.

If HIV positive, a post-test discussion should cover: the good prognosis on treatment, patient confidentiality, partner notification, and contact tracing. Referral to specialist services is important, including referral to culturally appropriate peer support organisations. Depending on the state and territory, HIV treating doctors may be ID or immunology physicians, sexual health specialists or a GP with S100 prescribing privileges (see links). Consider referring for counselling and psychosocial support.

It is now recommended that all people diagnosed with HIV should be offered treatment once the diagnosis is confirmed.⁹⁷ Treatment of HIV infection requires combination therapy with multiple antiretroviral drugs, which suppress viral replication, and enable immune recovery. There is greater urgency to initiate treatment at lower CD4 counts. Treatment is urgent at a CD4 count ≤ 200 cells/ μ L or below, or at the diagnosis of an opportunistic infection or other 'AIDS-defining illness', since the median survival without treatment is around 18 months.⁹⁸ At this level of CD4 count, prophylaxis against opportunistic infections may also be required.⁹⁹

FOLLOW UP

HIV infection is a chronic illness. Successful management requires patient empowerment and a holistic approach to long-term health and wellbeing.¹⁰⁰ Adherence to antiretroviral treatment is of critical importance, but must be managed in the context of other physical and psychosocial conditions that both impact upon and are affected by, HIV infection and its treatment.

Immunisation in people with HIV

As with all people from refugee-like backgrounds, catch-up vaccinations are essential, unless there is a record of previous immunisation. However, live vaccinations such as MMR or varicella should not be administered if the CD4 count is ≤ 200 cells/ μ L. The timing of such vaccinations should be discussed with the HIV care provider. Those who are not immune to hepatitis B require a higher dose of hepatitis B vaccination to achieve immunity: four double doses at 0, 1, 2 and 6 months (for adults, two normal adult doses of 20 μ g, i.e. 40 μ g on each visit; for children, a single adult dose of 20 μ g on each visit).

Immunocompromised HIV patients who receive influenza vaccine for the first time should receive 2 vaccine doses, at least 4 weeks apart, and 1 dose annually thereafter.¹⁰¹ Pneumococcal vaccine is also recommended.^{101–103}

CONSIDERATIONS IN PREGNANCY AND FOR CHILDREN

Prevention of mother-to-child transmission

It is important for health workers caring for women living with HIV to initiate discussion about family planning and reproductive health early in the therapeutic relationship.¹⁰⁴

The rate of HIV transmission from mother to child in the absence of treatment is approximately 25%, occurring mainly at delivery or via breastfeeding.¹⁰⁵ A mother on effective HIV treatment with an undetectable viral load in pregnancy has a transmission risk to her infant of less than 0.1%.¹⁰⁶ Also, effective combination therapy can suppress viral replication to a degree where breastfeeding is no longer contra-indicated.¹⁰⁴

Diagnosis in infants and children

HIV infection may be diagnosed in newborn children using PCR. If HIV is not detected in the infant's blood by PCR, this effectively excludes HIV infection.¹⁰⁶ However, maternal HIV antibodies may be detectable for up to 18 months in the blood of an infant born to a mother living with HIV, even in the absence of infant HIV infection. In infants born to women with HIV, serology should be performed at 18 months to confirm the infant is truly uninfected.

HIV-infected infants and children may present with failure to thrive or with opportunistic infections such as TB or *Pneumocystis jiroveci* pneumonia. Australian migration regulations do not require HIV testing for refugees and other immigrants aged under 15 years, unless specific risk factors are present, they are unaccompanied minors, or the child is migrating for adoption by an Australian citizen.^{18,83} This is reasonable, given that young children are unlikely to acquire HIV infection in the absence of maternal HIV infection or medical procedures early in life. Risks of sexual acquisition in older children exist if there is a history of sexual activity (which may also occur in children in the context of sexual abuse or sexual violence). Therefore, we recommend screening of infants and young children for HIV if individual risk factors are identified through history/testing or if there is identification of another condition (such as STI, active TB or an opportunistic infection).⁴⁵ Unaccompanied or separated children should also be screened for HIV.

Antiretroviral therapy in children

Timely diagnosis of paediatric HIV infection is important, as infants may experience rapid disease progression and develop serious opportunistic infections in a shorter timeframe than adults. However, with effective treatment, children acquiring HIV at or soon after birth may expect to grow to a healthy adulthood. Specialist paediatric HIV services exist in all states and territories.

LINKS

AIDS Action Council of the ACT (AACACT)

<http://www.aidsaction.org.au>

AIDS Council of NSW (ACON)

<http://www.acon.org.au>

Australasian Society for HIV Medicine (ASHM)

<http://ashm.org.au>

Australian Federation of AIDS Organisations (AFAO)

<http://www.afao.org.au>

Australian GLBTIQ Multicultural Council (AGMC)

<http://www.agmc.org.au>

Easidose, a visual prescribing aid

www.easidose.com

HIV AIDS Legal Centre

<http://halc.org.au/>

HIV Management in Australasia (2009)

<http://www.ashm.org.au/ResourcesOld/Pages/1976963322.aspx>

Living Positive Victoria

<http://www.livingpositivevictoria.org.au>

MOSAIC Blood Borne Virus Support Service (Relationships Australia, South Australia)

<http://www.rasa.org.au/services/adult-health-wellbeing/mosaic-blood-borne-viruses-support-services/>

Multicultural Health and Support Service (MHSS)

http://www.ceh.org.au/our-programs/our_programs_mhss

Multicultural HIV and Hepatitis Service (MHAHS)

<http://www.mhahs.org.au/>

Northern Territory AIDS and Hepatitis Council (NTAHC)

<http://www.ntahc.org.au>

Positive Life SA

<http://www.hivsa.org.au>

Positive Women Victoria

<http://www.positivewomen.org.au>

Scarlet Alliance (Australian Sex Workers Association)

<http://www.scarletalliance.org.au>

Straight Arrows

<http://straightarrows.org.au>

Tasmanian Council on AIDS, Hepatitis and Related Diseases (TasCAHRD)
www.tascahrd.org.au

UNAIDS
<http://www.unaids.org>

Victorian AIDS Council/Gay Men's Health
<http://www.vac.org.au>

Western Australian AIDS Council
<http://www.waaid.com>



■ CHAPTER 4: HEPATITIS B VIRUS (HBV)

Jennifer Maclachlan, Benjamin Cowie, David Isaacs, Joshua S Davis

RECOMMENDATIONS

- Offer testing for hepatitis B virus (HBV) infection to all.
- A complete HBV blood test includes HB surface antigen (HBsAg), HB surface antibody (HBsAb), and HB core antibody (HBcAb).
- If HBsAg is positive, further assessment and follow up with clinical assessment, abdominal ultrasound and blood tests is required (see text).
- Household and sexual partners of people who are HBsAg positive should be offered testing, and vaccination if they are susceptible to HBV.
- If HBsAg positive, test for and vaccinate against hepatitis A

OVERVIEW

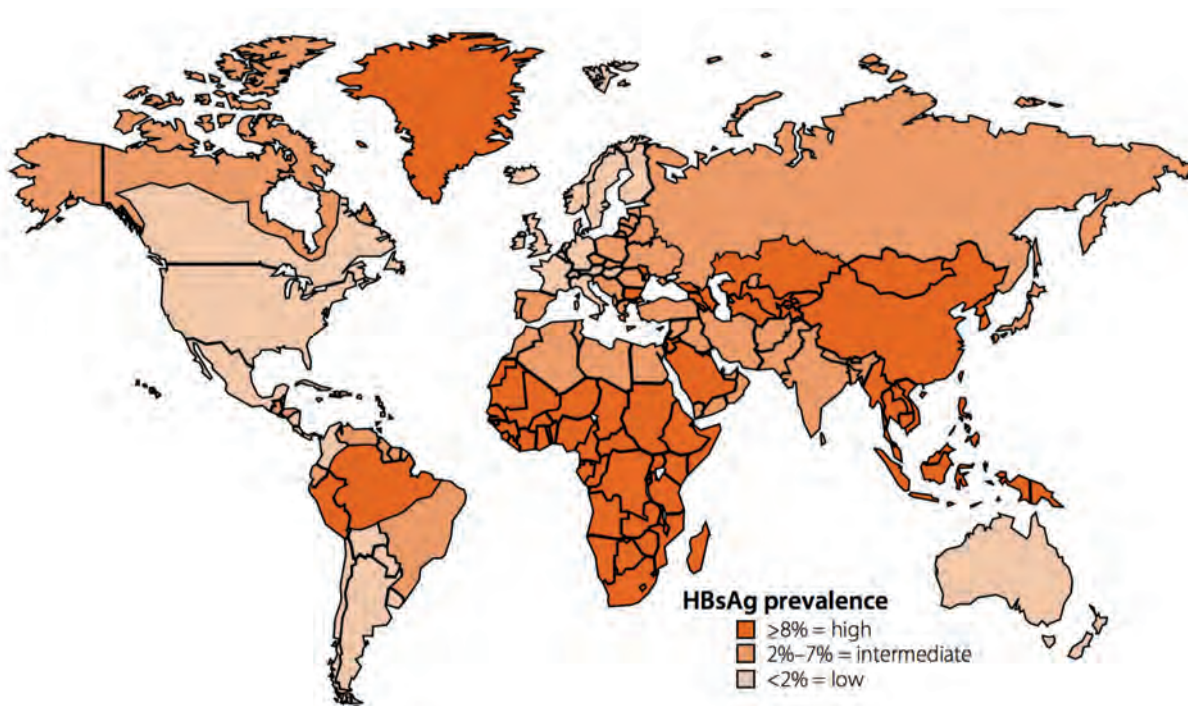
Approximately 1% of the Australian population – 220,000 people – are living with chronic HBV; however, it is estimated nearly half remain undiagnosed. People born overseas represent the majority of individuals with hepatitis B in Australia. Approximately 90% of the world's population live in areas where the prevalence of chronic HBV in the population is 2% or higher, including the majority of source countries for Australia's humanitarian intake.

A number of studies have assessed the prevalence of chronic HBV in refugees based on routine screening. Rates vary, but are significantly higher than the prevalence in the Australian population. Examples include predominantly Sub-Saharan African refugee cohorts in Melbourne (22%¹⁰⁷ and 8%¹⁰⁸) and Sydney (4%⁴⁵), and from the Migrant Health Unit in WA (5%⁴¹). High prevalence has also been found among Burmese refugees (14%⁴⁸ and 10%⁴³), and those from the Mekong region (8–9%¹⁰⁹). See [appendix one](#) for more information.

Since chronic HBV is a) generally asymptomatic; b) endemic in nearly all current countries of origin of people from refugee-like backgrounds, and c) has effective treatment and vaccination available, we have recommended universal testing.

Figure 4.1: Global Prevalence of Hepatitis B, 2012

Source: B Positive: All you wanted to know about hepatitis B¹¹⁰



* For multiple countries, estimates of prevalence of hepatitis B surface antigen (HBsAg), a marker of chronic HBV infection, are based on limited data and might not reflect current prevalence in countries that have implemented childhood hepatitis B vaccination. In addition, HBsAg prevalence might vary within countries by subpopulation and locality. Adapted from: World Health Organisation, Introduction of hepatitis B vaccination into child immunization services. WHO. 2001.

Chronic HBV is usually asymptomatic; however, if left undiagnosed and unmanaged it can cause advanced liver disease and/or liver cancer in up to 1 in 4 people. Appropriate management and treatment significantly reduces these risks; and diagnosis also provides an opportunity to offer vaccination to contacts at risk of exposure.

INVESTIGATIONS

Serology testing for HBV infection should include hepatitis B surface antigen (HBsAg), hepatitis B surface antibody (HBsAb or anti-HBs) and hepatitis B core antibody (HBcAb or anti-HBc). All three tests are rebatable by Medicare if the request specifies 'query chronic HBV' (or similar). Testing all three markers allows a complete picture of hepatitis B status, including clarification of infection, and immunity, and whether immunity has developed in response to vaccination or infection. All tests should be performed with the informed consent of the individual, or their legal guardian where relevant (e.g. parents providing consent for children).

Figure 4.2: Serology interpretation for hepatitis B

Source: Decision Making in Hepatitis B (ASHM resource)

HBsAg	positive	Chronic HBV infection
anti-HBc	positive	
anti-HBs	negative	
HBsAg	positive	Acute HBV infection *(high titre)
anti-HBc	positive	
IgM anti-HBc*	positive	
anti-HBs	negative	
HBsAg	negative	Susceptible to infection (vaccination should be recommended)
anti-HBc	negative	
anti-HBs	negative	
HBsAg	negative	Immune due to resolved infection
anti-HBc	positive	
anti-HBs	positive	
HBsAg	negative	Immune due to hepatitis B vaccination
anti-HBc	negative	
anti-HBs	positive	
HBsAg	negative	Various possibilities including: distant resolved infection, recovering from acute HBV, false positive, 'occult' HBV
anti-HBc	positive	
anti-HBs	negative	

MANAGEMENT AND REFERRAL

Further testing and management is required for all people diagnosed with chronic HBV, alongside culturally appropriate counselling about their diagnosis, treatment options, and ways to minimise the impact of HBV on their health and reduce transmission to others. **There is no such thing as a 'healthy carrier'**. All people with chronic HBV infection need lifelong monitoring, as HBV infection is a dynamic process. Consultation with a clinician experienced in the management of viral hepatitis is recommended. Consider the patient's language proficiency and the use of an interpreter when discussing HBV diagnosis, management and treatment. Use visual material if the patient has low literacy skills (see resources below).

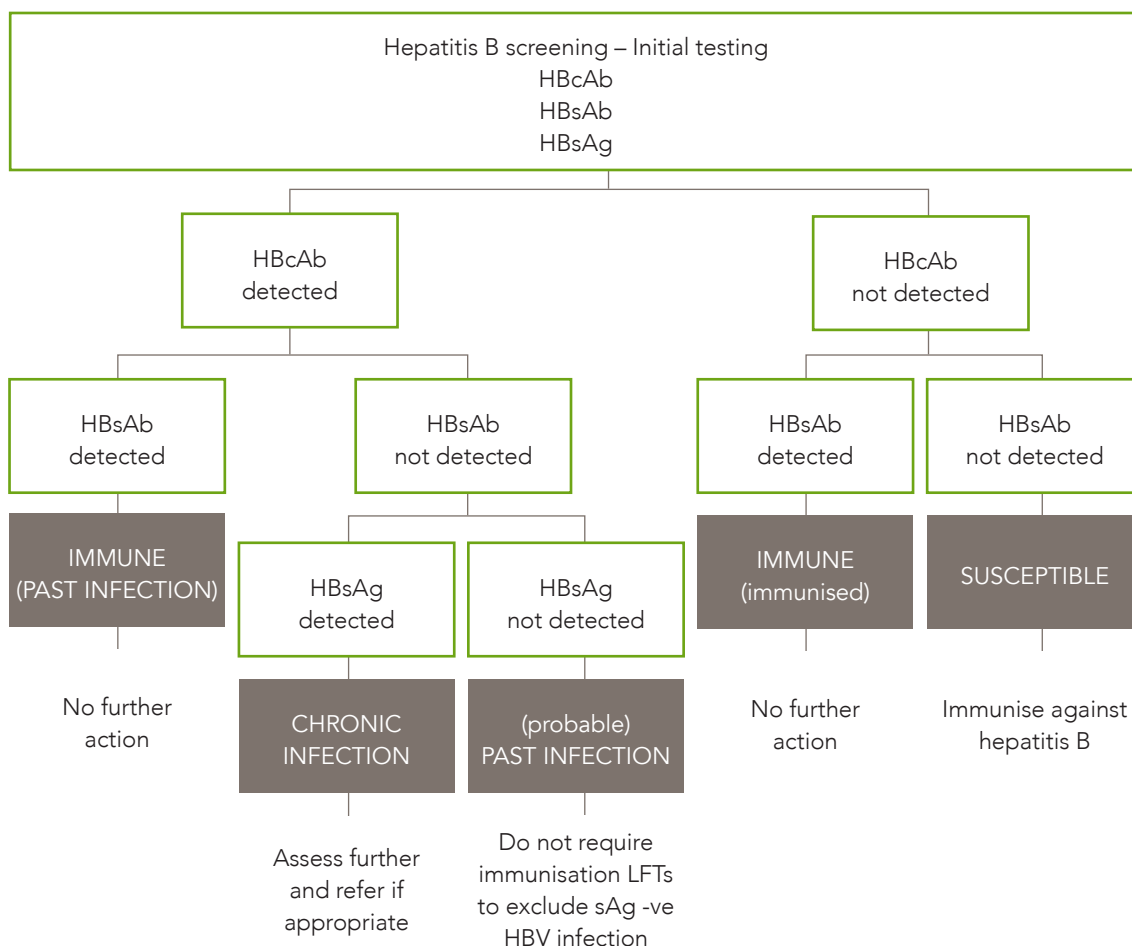
All those who are HBsAg positive should have:

- 1) Counselling regarding the natural history, how to protect others from infection, the need for lifelong monitoring and the avoidance of hazardous alcohol consumption.
- 2) A targeted history and physical examination, looking for symptoms or signs of chronic liver disease.
- 3) Baseline LFTs, HBV viral load, HB eAg and eAb, FBE, iron studies, INR, UEC and upper abdominal ultrasound.
- 4) Serology for hepatitis A virus (HAV), hepatitis C virus (HCV), hepatitis delta virus (HDV) and HIV if not already completed.
- 5) A repeat consultation once these results are available, to decide on a management plan, and whether specialist referral is needed.
- 6) The following patients should be referred to a specialist (ID physician, gastroenterologist or GP with accreditation to prescribe HBV medications):
 - i) anyone suspected to have cirrhosis (based on clinical signs of chronic liver disease, imaging findings, low platelets or albumin, high bilirubin or INR)
 - ii) raised ALT (>19IU/L for women or >35IU/L for men, > reference range for children) AND HBV viral load >2,000 IU/ml
 - iii) current pregnancy
 - iv) those with co-infection with HIV, HCV or HDV (in addition to HBV)
 - v) those with extra-hepatic manifestations of HBV (such as vasculitis or glomerulonephritis).
- 7) All others with HBV should have a management plan made, which should include a clinical review and a blood test for LFTs every 6 months and HBV viral load every 12 months.
- 8) The following patients with chronic HBV infection should be offered surveillance for hepatocellular carcinoma (HCC), with 6 monthly ultrasound and serum Alpha Fetoprotein (AFP):
 - i) African people over age 20 years
 - ii) Asian females over age 50 years
 - iii) Asian males over age 40 years
 - iv) anyone with proven or suspected cirrhosis
 - v) anyone with a family history of HCC in a first or second-degree relative.
- 9) People with HBV who are non-immune to hepatitis A should be vaccinated against HAV.

For people from refugee-like backgrounds who remain susceptible to HBV infection (i.e. negative serology for HBsAg, HBsAb and HBcAb), vaccination against hepatitis B is recommended at all ages.

Household and sexual partners of people with hepatitis B infection should be tested for HBV and vaccinated if they are susceptible to HBV infection. Serological testing (to confirm HBV immunity) is recommended for sexual partners and household or other close household-like contacts of people who are infected with hepatitis B, 4–8 weeks after completion of the primary vaccination course.

Figure 4.3: Testing algorithm for hepatitis B



CONSIDERATIONS IN PREGNANCY AND BREASTFEEDING

All pregnant women should be screened for hepatitis B, and if they are HBsAg positive, they should be appropriately assessed, including hepatitis B viral load testing, ideally at 18–24 weeks of pregnancy. It is important that women who are diagnosed with hepatitis B antenatally are referred to a viral hepatitis specialist during pregnancy and that they engage in ongoing monitoring and care following delivery.

If a woman is HBsAg positive, her infant should receive hepatitis B immunoglobulin (HBIG) in addition to standard birth dose of monovalent hepatitis B vaccination, to reduce the risk of HBV transmission. HBIG and hepatitis B vaccination can be given concurrently to the infant (administered in different sites). HBIG should preferably be given within 12 hours of birth, and should be given within 48 hours. Hepatitis B vaccination should preferably be given within 24 hours and should

be given within 7 days. Infants should go on to complete routine hepatitis B vaccination. Antiviral treatment to further reduce risk of vertical transmission is increasingly used in pregnant women with a high viral load (>107 IU/ml). Caesarean section is not recommended as an intervention to reduce the risk of perinatal hepatitis B transmission.

Breastfeeding is safe in women with chronic HBV, and does not increase the risk of transmission to the infant.

CONSIDERATIONS FOR CHILDREN

All children born in Australia should receive a full course of hepatitis B immunisation, which includes a dose within 24 hours of birth, and subsequent vaccinations at 2, 4 and 6 months (i.e. four doses of hepatitis B vaccine within the first year of life).

Children born to mothers with chronic HBV should have hepatitis B immunoglobulin (HBIG) at the time of birth in addition to the routine hepatitis B immunisation schedule as above. All children whose mothers have chronic HBV should subsequently be tested for HBsAg and HBsAb to determine if they have been infected, at 3–12 months after their vaccination is complete (i.e. after 9 months of age). Serology should not be checked before 9 months of age (to avoid detection of HBsAb from HBIG given at birth).

Children with chronic HBV typically have minimal liver damage and rarely require treatment; however, this is not always the case. All children with chronic HBV should therefore be referred to a paediatric viral hepatitis specialist for ongoing assessment and management. Children typically have very high viral load. Basic advice about preventing transmission related to normal childhood activities (e.g. cleaning blood spills, covering scrapes and scratches, not sharing toothbrushes) and immunising household contacts (and checking seroimmunity) is essential.

LINKS

The Hepatitis B Story (a pictorial guide aimed at those from culturally and linguistically diverse backgrounds)

<https://svhm.org.au/home/health-professionals/specialist-clinics/g/gastroenterology/resources>

National Hepatitis B Testing Policy

<http://testingportal.ashm.org.au/hbv>

HepBHelp

<http://www.hepbhelp.org.au/>

Decision making in HBV

<http://www.ashm.org.au/resources/Pages/1976963402.aspx>

B Positive 2014

<http://www.hepatitisb.org.au/>

CDC Yellow Book – Hepatitis B

<http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/hepatitis-b>

ASID Management of Perinatal Infections 2014

<http://www.asid.net.au/documents/item/368>

Australian Immunisation Handbook

<http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home>



■ CHAPTER 5: HEPATITIS C

Jennifer Maclachlan, Benjamin Cowie, David Isaacs, Joshua S Davis

RECOMMENDATIONS

- Offer testing for hepatitis C (HCV) to people if they have:
 - risk factors for HCV (see text)
 - lived in a country with a high prevalence (>3%) of HCV (see table 5.1)
 - an uncertain history of travel or risk factors.
- Initial testing is with anti-HCV test (HCV Ab). If this is positive, request an HCV RNA test.
- If positive, refer to a doctor accredited to treat HCV for further assessment.

OVERVIEW

In Australia, more than 230,000 people (over 1% of the population) are estimated to be living with chronic HCV.¹¹¹ The majority of these people have a history of injection drug use. However, other priority populations include people who have been incarcerated; recipients of blood, tissues or organs before universal mandatory screening of blood donors in relevant countries; people with tattoos, skin piercings or those who have undergone other cultural practices involving skin penetration or scarring; and people born in countries with a high HCV prevalence. The National Hepatitis C Testing Policy recommends offering testing to all people in these groups.

People from refugee-like backgrounds should be offered screening if they have a history of any of these risk factors, and/or have ever lived in countries with a high prevalence of HCV.²⁹ If a person's travel or risk history is uncertain, they should be offered screening for HCV. In a number of refugee-source countries, such as Syria, accurate prevalence information is not available, and there have been reports of disruption to screening or surveillance for blood-borne viruses. A number of Australian seroprevalence studies have demonstrated a higher prevalence of HCV in refugees, including in those from the Mekong region (3-8%¹⁰⁹), Burma (2.8%⁴⁸), and Sub-Saharan Africa (4%¹⁰⁷), although other studies have reported a similar prevalence to the Australian population (e.g. 1% in selected African migrants¹⁰⁸).

Table 5.1 Countries endemic for Hepatitis C^{29,40,43,48,112}

Country by region	Seroprevalence of HCV (%)	Country by region	Seroprevalence of HCV (%)
Angola	5	Kazakhstan	3.2
Armenia	4	Kuwait	3.1
Azerbaijan	4	Kyrgyzstan	4
Bolivia	4.7	Liberia	3
Burkina Faso	5.2	Malawi	6.8
Burundi	11.3	Mali	3.3
Cambodia	4.1	Mongolia	10.7
Cameroon	13.8	Mozambique	3.2
Chad	5	Niger	3.2
Congo	5.5	Pakistan	5.9
Cote D'Ivoire	3.3	Romania	4.5
Democratic Republic of Congo	6.4	Russia	4.1
Egypt	14	Rwanda	4.9
Estonia	5	Senegal	3
Gabon	9.2	Tajikistan	4
Georgia	6.7	Tanzania	3.2
Guinea	5.5	Togo	3.3
Guinea-Bissau	4.7	Trinidad & Tobago	3.9
Haiti	4.4	Turkmenistan	4
Indonesia	3.9	Uganda	6.6
Iraq	3.2	Ukraine	4
Italy	3.2	Uzbekistan	6.5

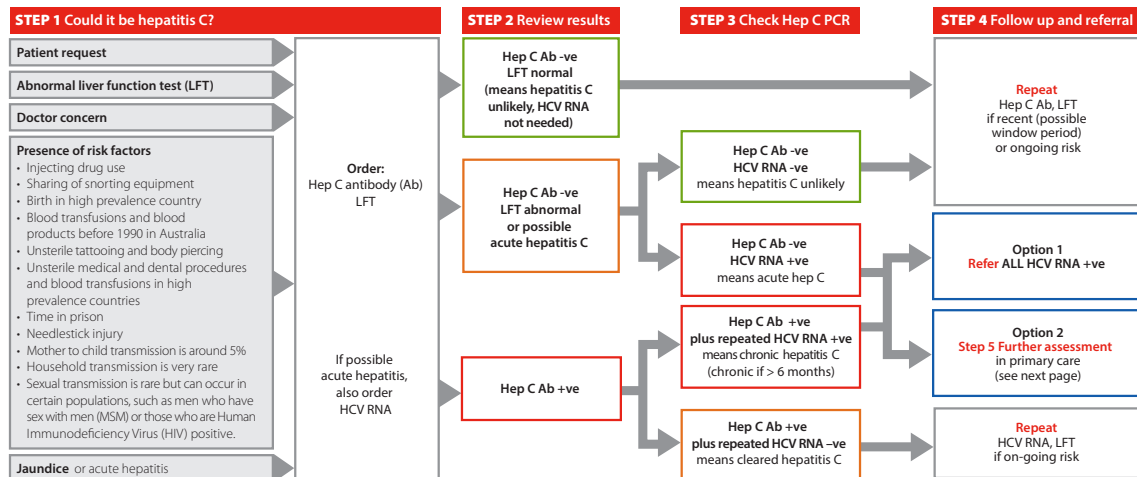
Chronic HCV is usually asymptomatic; however, if undiagnosed and unmanaged, it can cause advanced liver disease and/or liver cancer. HCV treatment is in a stage of rapid development, with new, highly effective and well-tolerated curative treatments becoming available, emphasising the need for early detection and proactive management. These treatments do not include interferon injections, and have minimal side effects.

INVESTIGATIONS

The initial diagnostic test for HCV is an anti-HCV antibody test. Except in neonates, who acquire maternal antibody passively, a positive result indicates prior exposure to HCV. Approximately 80% of people who are anti-HCV positive will have chronic HCV infection. Chronic HCV infection is confirmed by HCV RNA PCR testing. All tests should be performed with the informed consent of the individual, or their legal guardian where relevant (e.g. parents providing consent for children).

Figure 5.1: Hepatitis C testing and management algorithm

Source: Decision Making in Hepatitis C (ASHM resource)



MANAGEMENT AND REFERRAL

If HCV serology **AND** HCV PCR are both positive, the patient has confirmed HCV infection.

All those who have confirmed HCV infection should have:

- 1) Counselling regarding the natural history, how to protect others from infection, the need for lifelong monitoring and the avoidance of hazardous alcohol consumption.
- 2) A targeted history and physical examination, looking for symptoms or signs of chronic liver disease.
- 3) Baseline LFTs, FBE, iron studies, UEC and upper abdominal ultrasound.
- 4) HCV genotype testing (this is Medicare-rebatable and can be requested by any doctor, not only specialists).
- 5) Serology for HAV, HBV (HBsAg, HBsAb and HBcAb), Hepatitis delta virus (HDV) and HIV if not already done.
- 6) A repeat consultation, once these results are available, to decide on a management plan and whether specialist referral is needed.
- 7) The following patients should be referred to a specialist (ID physician, gastroenterologist or GP with accreditation to prescribe HCV medications):
 - a. proven or suspected cirrhosis
 - b. suspected extra-hepatic manifestations (e.g. glomerulonephritis, lichen planus, porphyria cutanea tarda)
 - c. the patient is ready to consider being treated for their HCV
 - d. co-infection with HBV or HIV.
- 8) The following patients with chronic HCV infection should be offered surveillance for hepatocellular carcinoma, with 6 monthly ultrasound and serum AFP:
 - a. anyone with proven or suspected cirrhosis
 - b. anyone with a family history of HCC in a first or second-degree relative.
- 9) People living with hepatitis C should be vaccinated against hepatitis B if they are susceptible to HBV infection (HBV vaccine is funded for this indication in many jurisdictions), and they should be offered vaccination against hepatitis A virus (HAV) if they are susceptible to HAV.

From 2016, treatment for most people with HCV involves 12 weeks of all-oral combination therapy, with few adverse effects and a >90% chance of cure. Such therapy is available to those with access to Medicare, via the PBS from 1/3/2016.

CONSIDERATIONS IN PREGNANCY AND BREASTFEEDING

The risk of HCV transmission from mother to child is approximately 3-5%. Neither the mode of delivery nor breastfeeding appears to affect this risk of HCV transmission. Note: HCV testing is not part of routine antenatal screening.

Current treatments for HCV infection are either known to be unsafe or have not been adequately tested to determine safety in pregnancy and while breastfeeding.

If a woman is diagnosed with HCV infection antenatally it is important to ensure the obstetric services are aware of her diagnosis. Seek specialist advice where concerned, and arrange ongoing follow up and management after delivery. Unnecessary instrumentation (such as fetal scalp electrodes and instrumental deliveries) should be avoided. Higher risk of mother-to-child transmission of HCV has been reported in the setting of maternal HIV co-infection.

CONSIDERATIONS FOR CHILDREN

Children born to mothers living with HCV infection should be tested at 12-18 months of age for anti-HCV antibody, to determine if they have acquired infection, with subsequent HCV RNA testing in children who are antibody positive to assess for chronic infection. Children with HCV infection should be referred to a paediatric viral hepatitis specialist for ongoing management.

LINKS

National Hepatitis C Testing Policy

<http://testingportal.ashm.org.au/hcv>

Decision Making in HCV

available from <http://www.ashm.org.au/resources>

CDC Yellow Book – Hepatitis C

<http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/hepatitis-c>

ASID Management of Perinatal Infections 2014

<http://www.asid.net.au/documents/item/368>



■ CHAPTER 6: SCHISTOSOMIASIS

Joshua S Davis, Christine Phillips, Vanessa Clifford

RECOMMENDATIONS

- Offer blood testing for schistosomiasis serology if people have lived in/travelled through endemic countries (including Africa, parts of South East Asia and the Middle East, see text).
- If serology is negative, no follow up is required.
- If serology is positive or equivocal:
 - Treat with praziquantel in two doses of 20/mg/kg, 4 hours apart, orally. (40mg/kg total, no upper limit) (EBR – A)
 - Perform stool microscopy for ova.
 - Perform urine dipstick for haematuria, and end-urine microscopy for ova if haematuria.
- If positive for ova on urine or stool, evaluate further for end-organ disease with ultrasound and LFTs. See flow-chart for further details.
- Seek advice from a paediatric specialist on treatment of children <5 years.

OVERVIEW

Schistosomiasis is a chronic parasitic infection caused by flukes of the genus *Schistosoma*. The infection is acquired through contact with infective cercariae in fresh water (e.g. swimming or bathing) that have been released by an intermediate snail host in fresh water. Schistosomiasis affects 200 million people worldwide and is estimated to cause over 200,000 deaths per year in Africa.¹¹³ Urinary schistosomiasis is caused by *Schistosoma haematobium*, which is found in Africa, the Middle East, Corsica, France, and intestinal schistosomiasis is caused by *S. mansoni*, *S. intercalatum*, *S. japonicum*, and *S. mekongi*, which are found in Africa, South America and South East Asia.¹¹⁴

Epidemiology in common countries of origin

Africa has the highest prevalence of schistosomiasis of any region, accounting for approximately 95% of affected people worldwide.¹¹³ Schistosomiasis is much less common in South East Asia, although it is prevalent in China (along the Yangtze River), the Philippines, parts of the Mekong River valley (Laos, Myanmar [Burma], Vietnam) and Indonesia. In the Middle East, there are residual foci of schistosomiasis in the Arabian Peninsula, including in Syria. Table 6.1 shows a list of countries where schistosomiasis is endemic.

Table 6.1 Countries endemic for schistosomiasis ^{28,39,43,108,115,116}

Angola	Gambia	Oman
Benin	Ghana	Rwanda
Brazil	Guinea	Santa Lucia
Burkina Faso	Guinea-Bissau	Sao Tome and Principe
Burma	Indonesia	Saudi Arabia
Burundi	Iraq	Senegal
Cambodia	Kenya	Somalia
Cameroon	Lao People's Democratic Republic	South Africa
Central African Republic	Liberia	South Sudan
Chad	Libya	Suriname
China	Madagascar	Swaziland
Congo	Malawi	Syria*
Côte d'Ivoire	Mali	Togo
Democratic Republic of the Congo	Mauritania	Uganda
Egypt	Mozambique	United Republic of Tanzania
Equatorial Guinea	Namibia	Venezuela (Bolivarian Republic of)
Eritrea	Niger	Yemen*
Ethiopia	Nigeria	Zambia
Gabon	Philippines	Zimbabwe

*These countries have had significant decreases in disease incidence due to WHO control programmes, but disease is still prevalent.

Seroprevalence data from post-arrival refugee screening

Many centres in Australia currently screen people from refugee-like backgrounds for schistosomiasis using serology and, in some cases, stool and urine testing. Most screening data come from African refugees, in whom schistosomiasis is common. Positive schistosomiasis serology has been found in 37% of African refugees arriving in Newcastle NSW,¹¹⁵ 38% arriving in Hobart,¹¹⁶ and 12% in Melbourne.¹⁰⁸ Fewer data are available on seropositivity in non-African refugees, with seropositivity in 9% (57/632) of Karen adults and 4.6% (23/504) in Karen children arriving in Melbourne,⁴³ and 18% of 110 Asian refugees arriving in Darwin.³⁹ These patients were part of population screening programmes for all new arrivals and thus are likely to be representative of the population as a whole.

Stool prevalence data from post-arrival refugee screening

In contrast to serological screening, screening based on stool microscopy is less sensitive and leads to a much lower rate of diagnosis. Western Australian data for all arrivals in 2003 and 2004, showed 3-7% of 1,633 African refugees had schistosome ova in stool, but none of 146 South East Asian refugees.⁴¹ Similarly, in a large study of 4,370 refugees arriving in Minnesota, USA, schistosomiasis was diagnosed on faecal specimens in 5.6% of African refugees but none from South East Asia.¹¹⁷

Rationale for screening

Schistosomiasis is a chronic disease that is generally asymptomatic until the late stages, when there is significant end-organ damage. Treatment is safe, simple and generally highly effective. The consequences of not diagnosing and treating chronic schistosomiasis range from none (in a light infection) to early mortality from portal hypertension, renal failure or bladder malignancy. There can also be substantial morbidity and long-term cost to health services as a result of intestinal polyposis, oesophageal varices, hydronephrosis, and urogenital fibrosis. Adult worms can live within venous plexuses for 20-30 years (mean 7 years) after the patient has left an endemic area. Thus, schistosomiasis meets all the usual criteria for health screening: available and effective diagnostic tests and treatment, a long asymptomatic phase, cure with early detection and treatment, and high prevalence.

HISTORY AND EXAMINATION

Most infected individuals are asymptomatic and are therefore unlikely to seek treatment. Symptoms of chronic infection may include abdominal pain, bloody diarrhoea or cystitis/haematuria, or rarely, genital sores. See 'Management' for evaluation of end-organ damage related to schistosomiasis.

INVESTIGATIONS

Examination of stool and/or urine for ova is the 'gold standard' diagnostic method for schistosomiasis; however, ova will only be identified if there are multiple specimens submitted and there is a high burden of egg excretion.¹¹⁸ It is also logistically difficult and not cost-effective to collect and process multiple stool samples on an initial health assessment visit. For these reasons, **serology is the recommended screening test**, with stool and/or urine microscopy for schistosome ova only in people with positive serology.

The reported sensitivity and specificity of serology varies with the method used.¹¹⁹ In general, modern methods are highly sensitive and specific. For example, the Institute for Clinical Pathology and Medical Research (ICPMR), the parasitology reference laboratory for New South Wales, uses

an in-house ELISA with extracted egg antigens from *S. mansoni*. This technique has had excellent reported results in other centres, with sensitivity for chronic infection with *S. mansoni* of 93.3% and specificity of 98.2%.¹²⁰ However, the sensitivity is not as good for non-mansoni species, with an estimated sensitivity of 90% for *S. haematobium* and 50% for *S. japonicum* and *mekongi*.¹²¹

Serology can remain positive after effective treatment, or after the infection has run its course. Thus it is a highly sensitive test (for African forms at least), but cannot reliably differentiate between current and past infection.¹¹⁴ Most people living in endemic areas are repeatedly infected due to bathing or washing in contaminated water sources until they leave the area or effective local control measures are put in place. This, combined with the fact that worms can survive for decades, means it is likely that the majority of people from schistosoma endemic areas with positive serology have current infection.

Schistosomiasis is a differential diagnosis for unexplained eosinophilia, and screening should be completed in people of refugee-like background with eosinophilia who have spent time in endemic areas.

MANAGEMENT

Praziquantel (40 mg/kg in two divided doses of 20mg/kg, taken four hours apart, pregnancy category B1) has excellent cure rates in schistosomiasis acquired in Africa, South East Asia and South America and is generally safe and well tolerated.¹²²

Doctors and nurse practitioners can prescribe praziquantel for schistosomiasis through the PBS under streamlined authority arrangements. Each 600mg tablet can be readily divided into four, allowing dosages to be delivered to the nearest 150mg, or quarter of a tablet. Use Easidose (www.easidose.com) to explain medication dosing.

Table 6.2: Conversion of praziquantel tablet quantities corresponding to one 20mg/kg bodyweight dose¹²³

Body weight (kg)	Tablet Quantity
20—25	$\frac{3}{4}$
26—33	1
34—41	$1\frac{1}{4}$
42—48	$1\frac{1}{2}$
49—56	$1\frac{3}{4}$
57—63	2
64—70	$2\frac{1}{4}$
71—78	$2\frac{1}{2}$
79—86	$2\frac{3}{4}$

The previous version of this¹²⁴ and other guidelines recommended a higher dose of praziquantel (60mg/kg in 2-3 divided doses) for schistosomiasis acquired in Asia. However, this recommendation was based on very weak evidence, and a recent international randomised controlled trial (RCT) found that 40mg/kg resulted in comparable cure rates to 60mg/kg in patients with schistosomiasis from Africa, the Philippines and Brazil.¹²⁵ Hence we recommend a uniform dose of 40mg/kg in two divided doses in all patients regardless of their area of origin.

Mild adverse effects occur with praziquantel in 5-30% of patients - these include nausea, dizziness, headache, diarrhoea and pruritus. Discuss potential side effects with patients.

These symptoms may be immune reactions to the dying worms rather than direct adverse effects of the drug.¹²⁶ There is a theoretical concern of precipitating seizures in patients with neurocysticercosis (encysted *Taenia solium* parasites in the central nervous system). However this complication is very rare and it has not been reported in Australian refugee clinics to date. Routine cerebral imaging to exclude concurrent neurocysticercosis prior to praziquantel is not indicated. However, in a person with unexplained seizures, fundoscopy (for retinal lesions of neurocysticercosis) and cerebral imaging should be performed. Patients with possible neurocysticercosis should be referred to an ID specialist prior to praziquantel treatment.

Follow up

If serology is positive, examine stool for schistosome ova. See flow chart (figure 6.1) for treatment and follow-up recommendations. This is not as a screening test, but as a risk-stratification tool, to detect patients with high worm burdens (in whom treatment failure is more likely with a single episode of treatment). Similarly, only people with positive serology and macro- or microscopic haematuria (using dipstick urinalysis) should have their urine tested for ova.

Patients with positive stool or urine microscopy for schistosome ova should have further follow up (see figure 6.1). This includes repeat stool or end urine microscopy to document cure, and evaluation for end-organ damage, including LFTs in those with positive stool microscopy. For *S. mansoni* infection, people with features of hepatic impairment should have imaging with liver ultrasound to exclude 'pipe-stem' fibrosis, a well-recognised complication of chronic *S. mansoni* infection. Features of liver impairment include: any history of chronic liver disease, ascites, gastrointestinal haemorrhage, chronic hepatitis B or C infection; examination findings of hepatomegaly, splenomegaly, ascites or peripheral oedema; or positive hepatitis B or C serology, thrombocytopenia, low albumin or raised liver enzymes. If a patient has features of liver impairment, they should be referred to a specialist ID physician.

For *S. haematobium* infection, all patients with ova in urine should have a physical examination for genital disease and a renal tract ultrasound to exclude bladder and renal pathology. People with macroscopic haematuria, recurrent UTIs, abnormalities on imaging or genital disease should be referred to a urologist for consideration of cystoscopy and further follow up.

After successful treatment of schistosoma infection, ova may be excreted for weeks. Therefore, delay repeat stool or urine examination to document cure for at least 8 weeks after treatment. If stool or urine remains positive for ova despite a course of praziquantel, treatment should be repeated. If stool or urine remains positive for ova more than 8 weeks after a second course of praziquantel, refer to an ID physician.

Do not repeat serology post treatment as this may stay positive for years.

Do confirm adherence to treatment as tablets and dosage are quite confusing and treatment may need to be re-explained (and re-prescribed if not taken the first time).

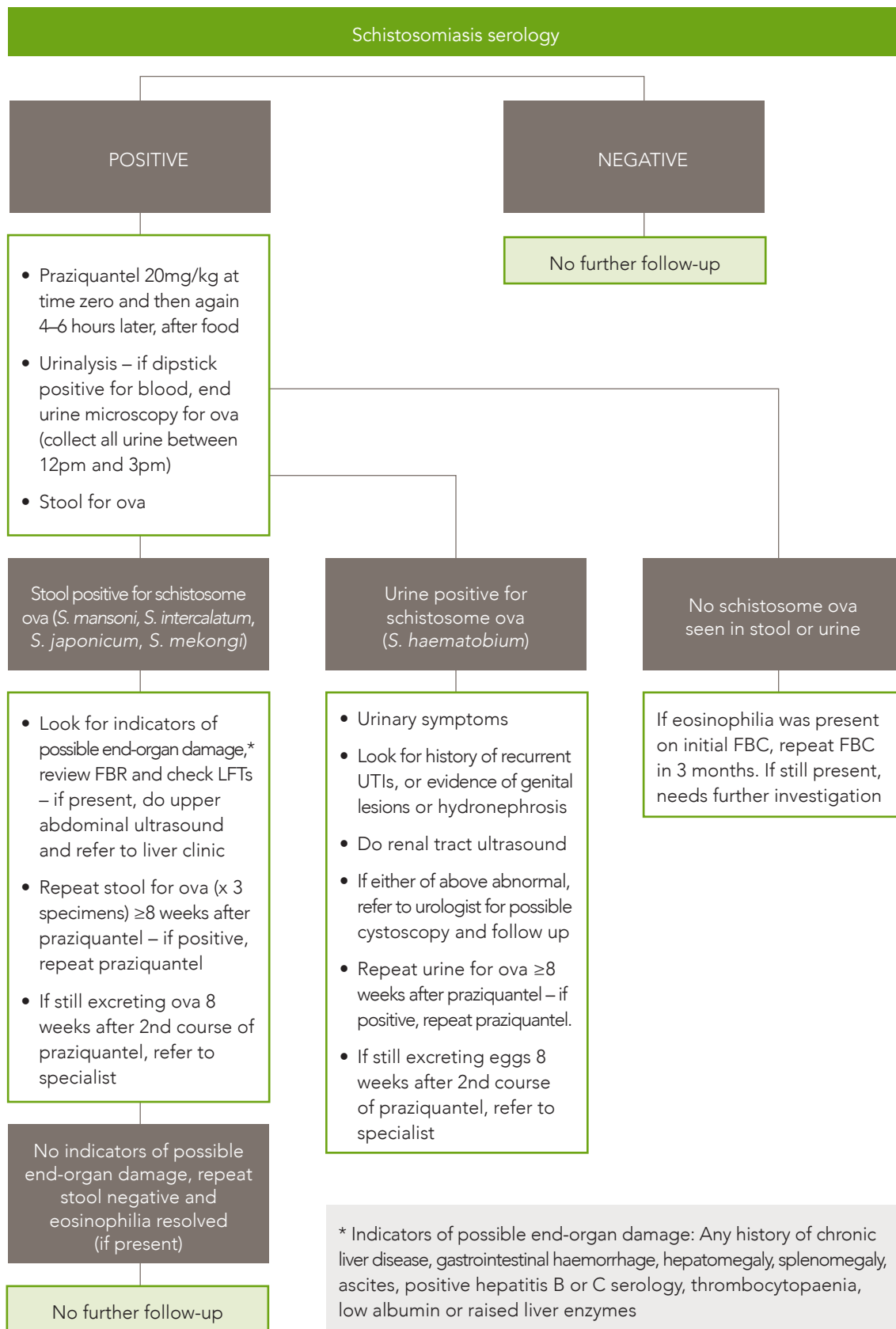
CONSIDERATIONS FOR CHILDREN

Children should be evaluated and treated as per the flow chart in the same way as adults (figure 6.1). Since the consequences of residual infection (e.g. growth delay, cognitive impairment) may be more significant in children, there should be a low threshold for referral to a paediatric ID specialist, especially if eosinophilia has not resolved and/or ova are still detectable in urine or stool after the first course of treatment. In addition, consultation with a specialist is recommended for children <4 years, as the safety and efficacy of praziquantel in this age group is not as well established,¹²⁷ although praziquantel has been used in children as young as 12 months in mass eradication campaigns.

PREGNANCY AND BREASTFEEDING

Praziquantel is a category B1 drug for use in pregnancy. There is controversy about whether women with asymptomatic schistosomiasis should be treated during pregnancy; however, there is a risk of loss to follow up if treatment is deferred until after pregnancy. There is emerging evidence about the safety of praziquantel in pregnancy¹²⁸ and no convincing evidence of teratogenicity. The WHO now recommends that pregnant women in endemic areas are included in mass treatment programmes. We recommend that praziquantel treatment for asymptomatic schistosomiasis is withheld during the first trimester, but either offered subsequently (after discussing the risks and benefits with the patient), or administered after delivery. There is no evidence of praziquantel causing harm to infants of breastfeeding mothers, and thus we also recommend that praziquantel treatment is offered to lactating mothers where indicated.

Figure 6.1 Management of schistosomiasis





■ CHAPTER 7: STRONGYLOIDIASIS

Beverley-Ann Biggs, Margaret Kay, Aesen Thambiran

RECOMMENDATIONS

- Offer blood testing for strongyloides serology to all people.
- If serology is positive or equivocal:
 - check FBE for eosinophilia and perform stool microscopy for ova, cysts and parasites
 - treat with ivermectin 200mcg/kg (≥ 15 kg) on day 1 and 14
 - perform follow-up serology at 6 and 12 months post- treatment. Also, repeat eosinophil count and/or stool sample if the initial tests were abnormal
- Refer pregnant women or children < 15 kg for specialist management.

OVERVIEW

Strongyloides stercoralis, an intestinal parasitic nematode, is estimated to infect at least 370 million people worldwide, although prevalence studies are heterogeneous both within and between countries.¹²⁹ Strongyloidiasis can occur without any symptoms, but may also present as a potentially fatal hyper-infection or disseminated infection. The most common risk factors for these complications are immunosuppression caused by corticosteroids, and infection with human T-lymphotropic virus (HTLV) or HIV. A definitive diagnosis of strongyloidiasis can be made by microscopic identification of larvae in stool, but multiple fresh samples and concentration techniques are required to achieve reasonable sensitivity. Given the ease of screening with serological testing, the availability of effective short course treatment, and the long-term risk of morbidity and mortality from disseminated infection, active post-arrival screening of high-risk groups has been previously recommended.^{93,124,130}

Strongyloidiasis is endemic in many countries, with high prevalence particularly noted in Africa, Asia and South America.¹³¹ In refugees settling in Western countries in the last decade, the highest prevalence has been documented in those from South East Asia and Africa. Prevalence in refugee-like populations depends on country of origin and the migration journey, and recently high rates have been reported in Latin American refugees (61%) with eosinophilia in Madrid¹³² and in Iraqi children (13%) settling in New York.¹³³ Strongyloidiasis is endemic in some parts of Australia¹³⁴ and is common in refugee and immigrant populations from high-prevalence areas.¹³⁵ Published Australian surveys have reported prevalence estimates ranging from 1–33%.^{39,43,48,108} In Hazara refugees settling in rural Australia, the prevalence has been <5% (personal communication M. Sanati-Pour). See [appendix 1](#) for more information.

Transmission of strongyloides occurs through contact with soil or surface water containing infectious (filariform) larvae. Larvae enter through the skin, travel to the lungs via the blood stream, and penetrate the alveolar spaces. They then move to the pharynx, are swallowed, and mature to adult worms in the small intestine. Eggs hatch and the resulting early larval stage (rhabditiform) pass out in the faeces and either moult twice to become filariform larvae, or become free-living adult males and females that mate and produce rhabditiform larvae. The latter normally develop into infective filariform larvae in the environment. In some patients rhabditiform larvae mature to the infectious filariform stage within the intestine and invade colonic mucosa or perianal skin to cause 'autoinfection'. In an individual with a normal immune system the numbers of circulating larvae are controlled, but the infection may persist for decades. Those with depressed cell-mediated immunity are at risk of disseminated infection with large numbers of circulating larvae (hyper-infection syndrome).¹³⁶

HISTORY AND EXAMINATION

Most infected individuals are asymptomatic, or, have minimal symptoms and are therefore unlikely to seek treatment.

Recent infection may be associated with 'ground itch' or pruritic rash at the site of larval penetration. A slowly moving cutaneous linear eruption (larva currens) associated with migration of larvae under the skin is also characteristic of recent infection. Urticarial skin rashes may occur around the buttocks and hips, and purpuric skin lesions, angioedema and erythroderma have also been reported.

Intestinal symptoms include intermittent watery diarrhoea, nausea, vomiting, abdominal pain and weight loss.¹³⁰ Pulmonary symptoms with dry cough, dyspnoea, and wheezing, with or without eosinophilia (similar to Loeffler's syndrome) may be associated with larval penetration of alveolar spaces. Asthma and repeated episodes of fever, cough and/or dyspnoea (pneumonitis)

may occur in some patients. A history of larva currens, the rash associated with strongyloidiasis, is rarely volunteered, but may emerge with specific questioning ([Skin infections – chapter 11](#)).

Chronic strongyloidiasis may be complicated by secondary gram-negative septicaemia and/or meningitis. In patients with impaired cell-mediated immunity (after corticosteroids, cytotoxic agents, malignancy, malnutrition etc.), the combination of immunosuppression and autoinfection may lead to massive larval invasion of the lungs and intestinal tract ('**hyper-infection syndrome**' or '**disseminated strongyloidiasis**'). HTLV-1 and, to a lesser extent, HIV are also risk factors for disseminated infection because of immunosuppression. Patients with disseminated disease may present with abdominal pain and distension, intestinal obstruction, shock, pulmonary and neurologic complications and septicaemia. Eosinophilia may be absent due to immunosuppression.¹³⁷ Disseminated strongyloidiasis and the rapidly progressive hyper-infection syndrome have a poor prognosis with a mortality rates of >60%.^{138,139} Hyper-infection may occur many years after resettlement in Australia.

INVESTIGATION

Strongyloidiasis is usually asymptomatic. Therefore screening with serology should be offered to all people from refugee-like backgrounds. In addition, the diagnosis of strongyloidiasis should be considered if there are clinical signs and symptoms, or unexplained eosinophilia. The sensitivity and specificity of *Strongyloides stercoralis* serology is reported to be up to 94.6% and 99.6% respectively, depending on the assay used.¹⁴⁰ However, as there is no gold standard test for comparison, these are estimations only.

Limitation of tests

Serology may overestimate the prevalence of disease due to cross-reactivity with other nematode infections. Therefore a single stool examination is recommended following a positive serological result to investigate further for other infections.

Eosinophilia has a poor predictive value for detecting strongyloides infection ranging from 25% to 83% in different series.^{141–143}

Stool microscopy is insensitive for detecting strongyloides infection unless multiple fresh, warm samples are examined.^{144,145} The sensitivity is higher in patients with hyper-infection syndrome because of the large number of larvae present. Harada-Mori and agar plate methods increase detection rates significantly. The main value of stool microscopy is that it can be used to monitor response in the first few months after treatment and to exclude co-existing enteric pathogens.

MANAGEMENT AND REFERRAL

Caution

Hyper-infection syndrome is a medical emergency and admission to hospital, management of sepsis and treatment with ivermectin should be initiated as soon as possible.¹³⁷

If serology is positive or strongyloides larvae are identified on stool microscopy, treat with ivermectin 200 µg/kg (≥15kg) at day 1 and 14 (two doses total).

Four studies have compared the efficacy of a single oral dose of 200 µg/kg of Ivermectin with two oral doses of 200 µg/kg given either on consecutive days or two weeks apart. In one study, two doses of ivermectin was more efficacious than a single dose (100% v 77% cure, respectively)

whereas in the other three studies the efficacy was similar (>93%) for both regimens.¹³⁰ However, as the efficacy of ivermectin against extra intestinal larvae is uncertain, we advise two doses of ivermectin two weeks apart to increase the number of larvae exposed to the drug in the gastrointestinal tract during the autoinfection cycle. This approach is supported in other recommendations.^{93,130} Albendazole has been shown to have inferior efficacy in comparison to ivermectin in numerous studies, although longer duration of therapy (400mg twice daily for 7 days) has increased efficacy (63%¹⁴⁶) and may be used in patients in whom ivermectin is contraindicated, including in younger children.

Table 7.1: Conversion of ivermectin tablet quantities corresponding to 200mcg/kg bodyweight dose¹²³

Stromectol® blister pack	
Dosage in strongyloidiasis	
Bodyweight (kg)	Dose (number of 3mg tablets)
15-24	1
25-35	2
36-50	3
51-65	4
66-79	5
≥ 80	Approx. 200mcg/kg

In persons from West or Central Africa co-infected with *Loa loa*, ivermectin can also cause encephalopathy and other severe adverse reactions. Those with neurocysticercosis or a history of seizures may be at risk of acute encephalopathy as a result of ivermectin treatment.⁹³ Consider referral to a specialist prior to ivermectin treatment if *Loa loa* or neurocysticercosis are suspected (a history of migratory subcutaneous swellings; 'eye-worm', or seizures; unexplained lymphadenopathy; unexplained eosinophilia).

Follow up

Serology is currently the best measure of treatment efficacy available as there is a decline in antibody titre after treatment. Decline in serological titres after effective treatment may be seen in many cases but can take 12 months or longer with current tests available in Australia. Therefore, serological testing should be repeated at 6 months and repeated at 12 months after treatment.^{144,147} Follow up serology should preferably be done in the same laboratory and in parallel with previous specimen where available. Seroreversion can be considered proof of cure.

Full blood counts for eosinophilia and stool microscopy for larvae are too insensitive for assessment of treatment efficacy. Patients who remain seropositive despite adequate treatment should be referred for specialist management.

CONSIDERATIONS FOR CHILDREN

Ivermectin has an excellent safety record, but safety data is too limited to support its use in pregnancy or in children <15kg.

Avoid albendazole in children <6 months and adjust dosing for children <10kg.

CONSIDERATIONS IN PREGNANCY AND BREASTFEEDING

Ivermectin is a category B3 drug in pregnancy. It is considered safe in breastfeeding.

Albendazole is teratogenic in the 1st trimester of pregnancy (category D drug). In the 2nd and 3rd trimesters, it has not been shown to be associated with congenital abnormalities. Albendazole appears safe during breastfeeding,⁷⁶ it passes into breast milk however systemic concentrations in the mother are low, except when used for hydatid disease or neurocysticercosis.

LINKS

<http://www.cmaj.ca/content/suppl/2010/06/07/cmaj.090313.DC1/imm-para-8-at.pdf>

<http://www.health.state.mn.us/divs/idepc/refugee/guide/index.html>

<http://www.cdc.gov/parasites/strongyloides/>



■ CHAPTER 8: INTESTINAL PARASITES

Beverley-Ann Biggs, Margaret Kay, Aesen Thambiran

RECOMMENDATIONS

- Check for eosinophilia
- If documented pre-departure albendazole therapy:
 - no eosinophilia and no symptoms – no investigation or treatment required.
 - eosinophilia - perform stool microscopy for ova cysts and parasites (OCP) followed by directed treatment.
- If no documented pre-departure albendazole therapy, depending on *local resources and practices* there are two acceptable options:
 1. empiric single-dose albendazole therapy (age >6 months, weight <10kg; 200mg; ≥10kg; 400mg). If eosinophilia at baseline re-check in 8 weeks. If eosinophilia persists perform stool microscopy for OCP.OR
 2. perform stool microscopy OCP followed by directed treatment. Recheck eosinophils and stool microscopy OCP at 8 weeks after directed treatment.

- Refer if unable to find cause of eosinophilia.
- Refer if unable to find cause of eosinophilia.
- Treat pathological helminths with albendazole (age > 6 months, weight <10kg; 200mg; ≥10kg; 400mg) for three days, except for *Ascaris lumbricoides*, which only requires 400mg as a single dose (200mg in children >6 months and <10 kg). Mebendazole is an option for some parasites.¹³⁶
- Treat giardiasis with tinidazole 2g as a single dose, (50mg/kg in children, maximum 2g), or metronidazole 2g daily for three days (30mg/kg in children, maximum 2g).¹⁴⁸
- In people with positive stool microscopy, follow up with stool microscopy at 2-4 weeks after treatment and re-treat if necessary.
- Refer refractory cases to an ID specialist.

Avoid albendazole (class D) and mebendazole (class B3) in pregnancy, both can be used during lactation.¹⁴⁹

OVERVIEW

Background

Intestinal parasite infections are common in low resource and rural communities. The largest disease burden is caused by the soil-transmitted helminths (STH), with an estimated 2 billion people, or 30% of the world's population, infected globally.¹⁵⁰ Infections are common in tropical and subtropical areas, especially in Sub-Saharan Africa, the Americas, China and East Asia. The main species are *Ascaris lumbricoides*, *Trichuris trichiura* and the hookworms (*Necator americanus* and *Ancylostoma duodenale*). *Giardia lamblia* is a protozoan parasite that also commonly causes infection in these settings.

The prevalence of pathogenic stool parasites in people from refugee-like backgrounds reflects their socio-demographic and environmental circumstances, their countries of origin and transit, and availability of therapy.^{151,152}

In a study of 26,956 African and South East Asian refugees between 1993 and 2007, at least one nematode was found on stool microscopy in 20.8% of 4,370 people who had not received pre-departure albendazole.¹¹⁷ In the 22,586 people who received pre-departure albendazole, only 4.7% had nematode infection.^{117,153} In 99 recent immigrants in New York, 40% had pathogenic parasites detected in stool.¹⁵⁴ Australian prevalence data are summarised in appendix one, most studies have found the prevalence of pathogenic stool parasites is between 15–40%^{39,41,43,48,51,108,135,155–159} and the most common pathogen is *Giardia*.

Screening

Previous ASID guidelines recommended stool microscopy if this was readily obtainable, or where symptoms were present.¹²⁴ One stool sample will detect 90% of parasites.¹⁶⁰

The voluntary Departure Health Check (DHC) has been implemented since 2005, and is now in place for most source countries¹⁹ for Australia's offshore Humanitarian Programme intake. The uptake of the DHC is unclear; however, many offshore arrivals will have received albendazole as part of the DHC. The current guidelines consider the introduction of the DHC and recent data on the impact of albendazole on the prevalence and patterns of intestinal parasites.^{117,153}

HISTORY AND EXAMINATION

Most patients are asymptomatic.¹³⁶ Symptoms due to intestinal parasites may include diarrhoea, cramping and abdominal pain.

INVESTIGATION

Offer all an FBE to look for eosinophilia.

People **with documentation** of pre-departure albendazole treatment **do not** require screening for faecal parasites unless they are symptomatic or if they have eosinophilia.

In people **with no documentation** of pre-departure albendazole there are two acceptable options, depending on **local resources and practices**:

1. Give empiric single-dose albendazole therapy (>6 months, <10kg; 200mg; ≥10kg; 400mg). This will be effective against many of the common parasites (see below). If they have eosinophilia at base line, re-check at 8 weeks post treatment. If eosinophilia unresolved, refer to specialist.

OR

2. Perform stool microscopy for OCP. Obtain at least one fresh or fixed specimen delivered promptly to the laboratory. If there is a delay with delivery, stool should be in preservative (SAF). Laboratories are funded through Medicare for one OCP exam in seven days.

Common pathogenic parasites

For further information about individual parasites refer to the Centers for Disease Control and Prevention (CDC) website. <http://www.cdc.gov/parasites/>

Common non-pathogenic parasites

These may be found in stool but no further action needs to be taken:

Entamoeba coli

Entamoeba hartmanii

Entamoeba gingivalis

Endolimax nana

Iodamoeba butschlii

Dientamoeba fragilis

Blastocystis hominis (note: rarely implicated as a pathogen, discuss with ID)

Chilomastix mesnili

Trichomonas hominis

MANAGEMENT AND REFERRAL

Note: Albendazole is available at some refugee health and specialist hospital clinics, or on the PBS via streamlined authority for treatment of tapeworm and hookworm.

Hookworm (*Ancylostoma duodenale*, *Necator americanus*)

Albendazole 400mg daily for three days orally if weight \geq 10kg (200mg daily if $>$ 6 months and $<$ 10kg).

Albendazole has been shown to be superior to mebendazole, but single dose treatment has suboptimal efficacy for hookworm infection.^{161–164} Treat any concurrent iron deficiency (see chapter 13).

Round worm (*Ascaris lumbricoides*)

Albendazole 400mg orally if weight \geq 10kg (200mg $>$ 6months weight $<$ 10kg) as a single dose.^{161,162} Corticosteroids are occasionally required in pulmonary ascariasis.

Whipworm (*Trichuris trichiura*)

Albendazole 400mg orally for three days orally if weight \geq 10kg (200mg daily if $>$ 6 months and $<$ 10kg).

A three-day treatment regime had an efficacy of 83% in an RCT involving 175 children in Gabon.¹⁶³ Single dose therapy has low efficacy for trichuriasis.^{161,164}

Giardia lamblia

Treatment is with tinidazole 2g orally as a single dose (50mg/kg in children, maximum 2g), or metronidazole 2g daily for three days (30mg/kg in children, maximum 2g) (efficacy $>$ 90%).^{136,148}

Albendazole 400mg daily for five days is probably as efficacious as metronidazole 500mg three times daily for five days, with fewer side-effects.¹⁶⁵

Caution: Albendazole

Albendazole should be used with caution in patients who have symptoms and/or a travel history compatible with neurocysticercosis (such as epilepsy, central nervous system (CNS) symptoms, subcutaneous nodules, *Taenia solium* positive in faeces or serology) as treatment with albendazole alone can exacerbate CNS disease.

Follow-up

Repeat stool microscopy for OCP 2–4 weeks post therapy. Retreat if ova still present. Refer refractory cases for specialist management.

CONSIDERATIONS FOR CHILDREN, AND FOR PREGNANT AND BREASTFEEDING WOMEN

Albendazole is a class D drug. It should **not** be used in the 1st trimester of pregnancy. WHO recommends use in 2nd and 3rd trimester.¹⁶⁶ In women who are breastfeeding pyrantel is an alternative to albendazole.

Avoid albendazole in children \leq 6 months, and give 200mg dose if $>$ 6months and $<$ 10kg.

Avoid mebendazole in pregnancy (class B3).

Australian therapeutic guidelines state both albendazole and mebendazole can be used during lactation.⁷⁶

Seek specialist advice if uncertain, and refer children $<$ 2 years for specialist review if concerned.

LINKS

World Health Organisation

http://www.who.int/intestinal_worms

Antimicrobial Therapy

<http://www.sanfordguide.com>

Sheorey H, Biggs, BA. Clinical Parasitology: a Practical Handbook for Medical Practitioners and Microbiologists. Melbourne: Erudite Medical Books 2nd ed. 2014.

<http://www.eruditemedicalbooks.com>

Easidose, a visual prescribing aid

www.easidose.com



■ CHAPTER 9: HELICOBACTER PYLORI

Thomas Schulz, Margaret Kay, Sarah Cherian

RECOMMENDATIONS

- Routine screening for *Helicobacter pylori* (*H. pylori*) infection is not recommended (EBR – C3).¹⁶⁷
- Screening with either stool antigen or breath test is recommended in adults from high-risk groups. High-risk groups include those with a family history of gastric cancer^{168,169} (EBR 1a, B), or, symptoms and signs of peptic ulcer disease, or dyspepsia (for both adults and children) (EBR 1b, A).¹⁶⁷
- Patients with *H. pylori* infection and dyspepsia who are aged over 50 years, or who have anorexia, weight loss, dysphagia, vomiting, GI bleeding or an abdominal mass could be considered for further assessment, including endoscopy irrespective of *H. pylori* status.
- Treat as per Australian Therapeutic Guidelines Gastrointestinal.³⁰
- Follow up at least 4 weeks after treatment with repeat diagnostic test.
- Patients with unsuccessful first line therapy need referral to a specialist to access second line medications.

OVERVIEW

Approximately half of the world's population is infected with *H. pylori*.¹⁷⁰ The prevalence of *H. pylori* in studies in lower and middle income countries ranges from 40–100%; however, substantial heterogeneity exists within ethnic and socioeconomic groups.^{170,171} *H. pylori* infection is usually acquired in early childhood and prevalence increases with age.¹⁷⁰ Transmission is thought to occur from person-to-person, presumably via the oral-oral and/or faecal-oral routes.¹⁷² Risk factors for infection include increasing age, family infection status, ethnicity, geographical prevalence and socioeconomic conditions (including poverty and overcrowding).^{173,174} Colonisation persists for decades and is potentially life-long, leading to chronic gastrointestinal inflammation, peptic ulcer disease and gastrointestinal malignancy.

Based on seroprevalence surveys, infection rates in adults are as high as 52–94% in populations in developing countries,¹⁷⁵ compared to 30–40% in Caucasian Australians.^{176,177} Infection rates are higher in both rural and urban Indigenous populations.¹⁷⁸

People from refugee-like backgrounds and immigrants settling in Western countries often have high rates of *H. pylori* infection (72–93%)^{179,180} compared to the local population.¹⁷⁹ In Canada, being born overseas and migrating after 20 years of age were both shown to be risk factors for *H. pylori* infection.¹⁸¹ In one study more than 80% of African children from refugee backgrounds had positive stool antigen tests on arrival in Australia,¹⁸⁰ reflecting the high prevalence of infection in countries of origin and transit.

H. pylori is a major aetiological agent in the development of gastric cancer.¹⁷⁰ Eradication of *H. pylori* has been shown to reduce progression to precancerous changes in the stomach¹⁸² and to reduce the risk of developing gastric cancer by approximately one third.¹⁸³ *H. pylori* is also associated with peptic ulceration and dyspepsia.

Currently, neither *H. pylori* nor gastric cancer screening are recommended for people who are asymptomatic. Most guidelines recommend testing based on symptoms.^{184–186} It is, however, recognised that detection based on symptoms will miss a significant burden of *H. pylori* infection¹⁷⁹ and gastric cancer.¹⁸⁷ The refugee population is very diverse and the risk of subsequent gastric cancer development is poorly defined. A strategy of screening all arrivals is not currently recommended due to increasing rates of antibiotic resistance and reduced efficacy of first line treatment¹⁸⁸. Eradication of *H. pylori* may also have potential negative health effects.¹⁸⁹

The significance of paediatric *H. pylori* infection and its relationship to gastrointestinal symptoms, extra-gastrointestinal manifestations and subsequent risk of malignancy in adulthood remain controversial.¹⁹⁰

INVESTIGATIONS

There are a number of testing modalities for the detection of *H. pylori*. Stool antigen testing is relatively inexpensive,¹⁹¹ and monoclonal enzyme immunoassay (EIA) testing has a sensitivity of 94% and specificity of 97%.¹⁹² It is also convenient, as stool collection may be required to assess for parasitic infections or other conditions.¹⁹³

Breath testing is a rapid, non-invasive test with a high sensitivity (95%) and specificity (98%),¹⁹⁴ but is more expensive (Medicare benefit 66900 \$66),¹⁹¹ difficult in young children, and may not be readily available.

Serology while cheap and widely available has a sensitivity of 92%, and a specificity of only 83%, depending on the test kit used.¹⁹⁵ Antibody levels decline slowly after eradication of *H. pylori* infection. A positive serology result may reflect past rather than current infection and serology is therefore **not** recommended as screening for current *H. pylori*.¹⁶⁸

Gastroscopy with biopsy and culture remains the gold standard for *H. pylori* and related disease detection as it allows direct visualisation of the stomach and duodenal mucosa, and provides an opportunity to obtain biopsies for pathological examination as well as *H. pylori* culture and susceptibility testing.¹⁸⁴ It is however costly, has procedural risks for the patient, and is logistically challenging, especially for patients being managed in a primary health setting.

For most patients either a breath test or stool antigen test will be suitable and either of these tests should also be used to demonstrate effective eradication post therapy.

For accurate breath test and stool antigen results, adults and children need to cease antibiotics 4 weeks, and proton pump inhibitors (PPIs) 2 weeks, prior to the test.¹⁹⁶

In adults aged less than 50 years with dyspepsia and no 'red flag' symptoms (anorexia, weight loss, dysphagia, vomiting, gastrointestinal bleeding or abdominal mass), a reasonable approach would be to perform a non-invasive test for *H. pylori* infection (e.g. breath test or stool antigen), and if positive offer treatment for *H. pylori* infection. The choice of test will depend on factors such as availability, expense, and convenience and age. This 'test and treat' approach is recommended in several consensus guidelines.^{167,168,186} People with 'red flag' symptoms or those over 50 years old should be referred to a specialist.

MANAGEMENT AND REFERRAL (See table 9.1)

Current Australian guidelines recommend a seven-day course of acid suppression therapy with either a proton pump inhibitor (PPI), combined with amoxicillin (pregnancy category A) and clarithromycin (pregnancy category B3) (see table 9.1).¹⁴⁹ Longer courses of treatment (14 days) are recommended in children.

For patients with beta-lactam hypersensitivity, metronidazole (pregnancy category B2) is suggested as an alternative to amoxicillin. The importance of adherence to the relatively complex dosing schedule and completing the full course of treatment should be explained carefully to the patient with the help of an interpreter as needed. Use Easidose (www.easidose.com) and teach-back to aid understanding of treatment.

Table 9.1: Treatment of <i>H.pylori</i> ⁷⁶		
First line treatment ^a	Drug therapy	Duration
Adults	Proton pump inhibitor (PPI) ^b PLUS Clarithromycin 500mg twice daily PLUS Amoxicillin 1g twice daily Note: in those with penicillin allergy, amoxicillin should be replaced with metronidazole 400mg twice daily	7 days
Children	(1) Esomeprazole 0.4-0.8mg/kg (max 200mg) orally twice daily for 14 days (disperse granules in water) or Lansoprazole 1.5mg/kg (max 30mg) orally twice daily for 7 days (rapid dispersible tablets = place on tongue or swallow whole) or Pantoprazole 1mg/kg (max 40mg) orally twice daily for 7 days (mix granules with apple sauce or small amount of water/orange juice) PLUS (2) Clarithromycin 7.5mg/kg (max 500mg) twice daily orally for 7 days PLUS (3) Amoxicillin 25mg/kg (max 1g) orally twice daily for 7 days Note: use metronidazole if penicillin hypersensitivity 7.5-10mg/kg (max 400mg) twice daily for 7 days	14 days

a. Single-prescription 'combination packs' available in Australia as esomeprazole/amoxicillin/clarithromycin (Nexium HP7®).

b. Options include: omeprazole, esomeprazole, rabeprazole (all 20mg twice daily) lansoprazole (30mg twice daily), or pantoprazole (40mg twice daily).

Follow-up

Treatment of *H. pylori* infection usually results in eradication of the organism and healing of peptic ulcer disease in the majority of patients in clinical trials.¹⁹⁷ However, response rates in non-trial settings may be considerably lower than this due to a range of factors, including increasing antimicrobial resistance.¹⁸⁸ Therefore, all patients treated with *H. pylori* eradication therapy should have follow-up testing with stool or breath test to ensure eradication has been successful.¹⁶⁸

In patients with endoscopically documented peptic ulcer disease or a documented history of complicated ulcer disease, non-invasive testing (breath test or stool antigen test) should be performed at least four weeks after completion of therapy to determine the efficacy of *H. pylori* eradication therapy. This allows documentation of treatment response and determination of the risk of recurrence.¹⁶⁷

The persistence of dyspeptic symptoms after *H. pylori* eradication therapy does not always correlate with treatment failure. If symptoms persist for several months despite documented eradication of *H. pylori* infection, endoscopy should be considered and other diagnoses sought.

If one treatment course is unsuccessful in eradicating *H. pylori* then first check compliance with the prescribed medication. If the patient has taken the treatment course as directed then second line therapies should be recommended.

Second line combination therapies include at least one medication that will require special access prescribing and therefore a specialist referral is necessary. Suggested combination therapies include 10 day triple therapy with PPI/amoxicillin/levofloxacin, PPI/amoxicillin/rifabutin, or 7–14 day quadruple therapy with PPI/bismuth/tetracycline/metronidazole.¹⁴⁹ Failure of second line therapy requires consideration of endoscopy and antibiotic sensitivity testing.

CONSIDERATIONS FOR CHILDREN

Children share many of the adult risk factors for *H. pylori* acquisition and the prevalence of active *H. pylori* infection in this group is high.^{175,198} The association between *H. pylori* infection and gastrointestinal symptoms in childhood is unclear, and routine screening of all refugee children is not justified or recommended.^{185,199–201} Children with chronic abdominal pain or anorexia should have other common causes of their symptoms considered in addition to *H. pylori* infection. These include somatic manifestations of post-traumatic stress disorder, constipation, unfamiliarity with food, and other infections, including tuberculosis, helminths (e.g. schistosomiasis) and malaria as well as other causes of recurrent abdominal pain of childhood.¹⁶⁷

H. pylori infection is more reliably associated with iron deficiency in children than adults.¹⁹⁹ In a child with persistent iron deficiency (where other common causes have been excluded and/or appropriately managed), *H. pylori* infection should be sought and treated if present.^{182,185}

The diagnosis of active *H. pylori* infection in children is challenging, and the issues are often compounded in recently arrived refugees. Urea breath testing is often impractical or difficult to access;²⁰⁰ however, stool antigen testing using ELISA has excellent sensitivity and specificity in children^{202,203} and is now the current diagnostic method of choice. *H. pylori* serology **should not** be used for screening or for assessment of *H. pylori* eradication in children.

Endoscopy under general anaesthesia needs to be considered in any child with 'red flag symptoms' as per adult recommendations; however the incidence of peptic ulcer disease is lower in children.

Treatment of children with *H. pylori* infection is similar to that of adults, with amoxicillin, clarithromycin and a proton-pump inhibitor given for 14 days in weight-based schedules.^{185,200} Metronidazole is often not well tolerated by children and resistance may occur. Repeat testing to document eradication of *H. pylori* infection is generally indicated using non-invasive methods.¹⁸⁵ Referral to a paediatric gastroenterologist is warranted if there are persistent symptoms following a trial of *H. pylori* eradication or development of concerning symptoms (e.g. weight loss, haematemesis or melena, refractory iron deficiency).

Screening and treatment in children to prevent long-term consequences of *H. pylori* is not recommended, in part due to high rates of re-infection, particularly in the very young.²⁰⁴

Family eradication treatment (where a paediatric index case is identified) is also not routinely recommended, but can be considered if re-infection occurs.

CONSIDERATIONS IN PREGNANCY AND BREASTFEEDING

It is preferable to defer treatment of *H. pylori* until the completion of pregnancy. Esomeprazole is category B3; however, omeprazole (also B3) is preferred because of more safety data. Amoxicillin (category A), metronidazole (category B2), and clarithromycin (category B3) are considered safe to use if needed ([see appendix three](#)).

If symptoms are problematic then treatment with a combination of amoxicillin, clarithromycin and omeprazole is reasonable. This is the standard combination pack however replacing the esomeprazole with omeprazole at the same doses.

Esomeprazole, omeprazole are compatible with breastfeeding. Amoxicillin and clarithromycin are considered compatible with breastfeeding but may cause diarrhoea in the infant.

LINKS

Easidose, a visual prescribing aid
www.easidose.com



■ CHAPTER 10: SEXUALLY TRANSMISSABLE INFECTIONS

Aesen Thambiran, Mitchell Smith, Vanessa Clifford
(For other STIs – HIV chapter 3, HBV chapter 4, HCV chapter 5).

RECOMMENDATIONS

- A sexual health history should be completed sensitively, with awareness of gender issues, and with reassurance and careful explanations.
- Offer an STI screen to people with a risk factor for acquiring an STI or on request (see text). Universal post-arrival screening for STIs for people from refugee-like backgrounds is not supported by current available evidence.
 - Syphilis serology should be offered to unaccompanied and separated children <15 years.
 - Children <15 years should be offered screening for other STIs including HIV and syphilis if there are clinical concerns (see text for details).
- A complete STI screen includes a self-collected swab or first pass urine Nucleic Acid Amplification Test (NAAT) and consideration of throat and rectal swabs for chlamydia and gonorrhoea, and serology for syphilis, HIV ([chapter 3](#)) and hepatitis B ([chapter 4](#)).

- Asymptomatic patients with positive syphilis serology should be treated, unless there is documented prior treatment of treponemal infection. Treat syphilis with parenteral penicillin in consultation with a sexual health or ID unit.
- Specimens for *Neisseria gonorrhoea* microscopy and culture should be taken before treatment is instituted. Treat gonorrhoea with ceftriaxone 500mg in 2mL of 1% lignocaine IMI, plus azithromycin 1g orally.⁷⁶ Repeat NAAT and culture for test of cure of gonorrhoea two weeks after treatment.
- Treat chlamydia with azithromycin 1g orally as a single dose, or, alternatively, doxycycline 100mg orally 12 hourly for 7 days.⁷⁶
- Treat anorectal chlamydia with doxycycline 100mg orally 12 hourly for 7 days or azithromycin 1g orally as a single dose with a repeat dose a week later.²⁰⁵
- Offer women a pregnancy test and contraception, as appropriate ([women's health chapter 17](#)).
- An STI screen provides an opportunity for education about safer sex and condom use.

* Chlamydia testing is consistent with the current National STI Strategy²⁰⁶ and Australasian Sexual Health Alliance (ASHA) guidelines.²⁰⁵

OVERVIEW

The potential health impacts of STIs include multi-organ damage and congenital effects from syphilis, while chlamydia and gonorrhoea can cause infertility and a risk of ectopic pregnancy. Maternal gonorrhoea and chlamydia can lead to severe neonatal conjunctivitis. There are personal health and public health reasons to detect these infections in individuals regardless of background and to limit their transmission in the community.

Gender-based violence is common in women and girls in conflict zones and refugee camps,^{207,208} although men may also experience sexual violence, and also face barriers to disclosing this information. Once settled in Australia women may be at increased risk of sexual violence²² and sexual assaults have been reported in both onshore and offshore immigration detention centres.^{209,210}

People may not be aware of STIs or their partners' STI status or may be unable to negotiate a monogamous relationship with their partner and may be unaware of their risk of acquiring STIs. This can occur in any relationship, including new or longstanding relationships, where people have returned from overseas having married a new partner, and in adolescents. It is important to be aware of situations that may have led to an STI acquisition, such as sexual assault, and that these circumstances may not be disclosed. In addition, due to limited access to health education, both adolescents and adults may have poor understanding of sexual health and limited knowledge of contraception or safe sex practices.

The previous ASID guidelines recommended universal screening in adults for chlamydia and gonorrhoea;¹⁴ however, since this time, there have been more published data on STI prevalence in resettled refugee populations. Despite the apparent risks, there is a low reported prevalence of chlamydia (0.8-2.0%)^{43,48,159,211} and gonorrhoea (0%)^{43,48,159,211} infections in newly arrived refugees settling in Australia and in other developed countries^{48,159,211-214} Therefore, the current available evidence does not support universal screening of newly arrived people from refugee-like backgrounds for chlamydia and gonorrhoea, and favours a risk-based approach to screening. ^a

a. Some members of the EAG recommended offering universal STI screening in adolescents and adult because of the sensitivities of obtaining a sexual history in people from refugee-like backgrounds, particularly at an initial visit, and the difficulties in ensuring that previous syphilis has been adequately screened and treated. However, given available prevalence data, the panel did not consider that this was indicated. Furthermore, STI testing should be performed with informed consent, and hence universal screening does not obviate the need to discuss STI risks with the patient.

Syphilis infection has a higher incidence in many parts of Africa and Asia and has been diagnosed in refugees settling in Australia (prevalence 1.5-8%).^{41,108} Until 2014, only a proportion of refugee applicants had syphilis screening overseas as part of their visa medical examination, which was recommended for those living in 'camp-like conditions.'¹⁷ Routine syphilis screening is now part of the Australian immigration medical examination for humanitarian entrants aged 15 years and over.¹⁸ Additionally, asylum seekers aged 15 years and older are screened and treated for syphilis in immigration detention facilities after arrival.

HISTORY AND EXAMINATION

Discussion of sexual health and STIs can be challenging where there is low English proficiency and low health literacy. Furthermore in some cultures, open discussions about sexuality and sexual health are discouraged and there are demarcations between men's and women's issues. Individuals may feel deeply embarrassed to discuss sexual health with a health practitioner. Feelings of shame, guilt and fear may decrease the likelihood of patients asking for STI testing. People who identify as lesbian, gay, bisexual, transgender or intersex (LGBTI) may be reluctant to disclose/discuss this with health providers, especially if they experienced persecution in their country of origin.

Questions about sexual health should be asked sensitively, and reassuring the patient that health professionals understand these questions may be culturally unfamiliar can be helpful. It is important to explain need for screening, obtain informed consent, clarify that results will have no impact on residency status, and that confidential treatment, care and counselling is available if needed.²¹⁵ Recognise the potential sensitivities around gender differences between doctor and patient – the best advice is to ask the patient about what is acceptable to them. Pelvic examination in women should be undertaken only if clinically necessary, ensuring that the woman feels comfortable with the provider and that time has been taken to build rapport and trust. Offer a chaperone and to also consider the gender of the interpreter whether onsite or via telephone.

STIs are often asymptomatic. Women may have local symptoms such as dysuria, urethritis, vaginal discharge, pelvic pain, dyspareunia, inter-menstrual or post-coital bleeding, or they may present with sequelae such as complaints of infertility. Men may have dysuria, urethral discharge or testicular pain. Anorectal symptoms include discharge, irritation, painful defecation and disturbed bowel function. Gonorrhoea or chlamydia can also present with purulent conjunctivitis.

Syphilis is usually asymptomatic; however, symptoms can range from the chancre of primary infection, to the generalised rash of secondary syphilis, to signs of tertiary disease such as aortic pathology and neurological manifestations.

Taking a sexual history from a person from a refugee-like background is an opportunity to build trust and create a safe environment in which the person may disclose an experience of sexual violence. However, most patients will not volunteer violence, in particular if family members or friends are accompanying clients. The patient needs not only to feel assured that what will be shared will remain confidential, but also that in risking the discussion about violence, there will be resources and opportunities to obtain help for this. Interpreter confidentiality and privacy is a further issue to consider, and offering a telephone interpreter is useful to preserve anonymity.

There may be cultural pressures affecting disclosure of family violence, and additional vulnerabilities related to migration status. Asylum seekers on bridging visas and those in community detention sign a code of conduct, potentially acting as a powerful negative disincentive to disclose family violence. Consider intimate partner violence in all relationships, including for those who identify as LGBTI.

INVESTIGATION

People from refugee-like backgrounds should be offered individualised STI screening which takes into account past screening and risk assessment.

Offer STI testing to:^{205,206}

- Anyone with symptoms or a recent history of STI symptoms.
- Individuals who have had more than one recent partner or who have recently changed partners (this may not always be volunteered).
- Pregnant women.
- People living with HIV.
- People who inject drugs.
- Sex workers, and people who are clients of sex workers.
- Men who have sex with men (MSM) and those who identify as LGBTI.
- Adults and adolescents with a history of being incarcerated, including in immigration detention centres.
- Anyone who is interested in, or who would like an STI screen.
- Woman who present opportunistically for a well women's check or PAP smear.
- Anyone disclosing a history of sexual assault or gender-based violence.

In addition any sexually active person aged 15–29 years should be offered chlamydia screening in accordance with the National STI Strategy.²⁰⁶

The most significant risk factor for HIV and syphilis infection in minors is maternal infection. Therefore unaccompanied or separated children should be tested for HIV and syphilis.

Tests to offer in an STI screen:

- **First pass urine** for *Chlamydia trachomatis* and *Neisseria gonorrhoea* nucleic acid amplification test (NAAT). This is non-invasive and highly sensitive.
- **Self-obtained Lower Vaginal Swabs (SOLVS)** is the optimal sampling method in women for *Chlamydia trachomatis* and *Neisseria gonorrhoea*. While it should be offered, this method may not be culturally acceptable to women from refugee-like backgrounds and first void urine should be offered if patient declines SOLVS. See link below for instructions on how client can self-obtain samples.²⁰⁵
- **Rectal and throat swab** for NAAT if at risk of infection at those sites. Offer test to all MSM, following sexual assault (at those sites) or to anyone with symptoms suggestive of infection. Gonococcal throat infections can occur in the setting of unprotected oral sex and patients may be unaware of this risk.
- **Swab** for microscopy, culture and sensitivity for *Neisseria gonorrhoea* from any site with pus.
- **Syphilis serology**

Consider offering tests for other sexually transmissible infections including: hepatitis B ([chapter 4](#)), HIV ([chapter 3](#)), hepatitis C (if MSM, [chapter 5](#)).

MANAGEMENT AND REFERRAL

Syphilis

Venereal syphilis, when found through screening of asymptomatic recent arrivals, is usually *late latent disease of low infectivity*. Ask if there is a history of previous treatment with parenteral penicillin.

Interpretation of serological tests for treponemal infection can be quite complex. Seek advice from a sexual health or ID physician whenever there is any concern or doubt. Infection with various subspecies of *Treponema* can also cause yaws, bejel or pinta. As it is rarely possible to determine with certainty which type of treponemal infection has resulted in positive serology in an asymptomatic patient, such patients should always be treated, unless there is documented prior treatment of treponemal infection. Treatment is with parenteral penicillin (pregnancy category A) and is usually best done in the context of a specialised sexual health or ID unit. The sexual health service will monitor treatment response with the RPR serological test at 3, 6 and (if necessary) at 12 months.²⁰⁵ Note that the specific treponemal tests (e.g. TPHA) tend to remain positive lifelong, even after successful treatment.

Gonorrhoea

Wherever possible, patients with a positive NAAT test for *N. gonorrhoea* should have microscopy and culture of genital (cervical, vaginal, urethral) and/or throat swabs if discharge is present, and/or first pass urine, before treatment is instituted.

Treatment is generally with ceftriaxone 500mg in 2mL of 1% lignocaine IMI, plus azithromycin 1g orally as a single dose.^{76,205} For pharyngeal, anal or cervical infection, test of cure (NAAT) should be performed two weeks after treatment is completed.²⁰⁵ Microscopy and culture should also be repeated to assess for antibiotic resistance. These samples can be collected at the time of NAAT test of cure sample collection to save the patient having to return again.

Chlamydia

Current treatment is with azithromycin 1g orally as a single dose, or doxycycline 100mg orally 12 hourly for 7 days.^{76,205} Treat anorectal chlamydia with doxycycline 100mg orally 12 hourly for 7 days or azithromycin 1g orally as a single dose with a repeat dose a week later.²⁰⁵

Test of cure is not routinely recommended, except for pregnant women or those with rectal chlamydia. In these situations, NAAT should be done at least four weeks after treatment.²⁰⁵

Other STIs

Detailed guidance on the conditions above and on other STIs is available from the Australasian STI Management Guidelines for Use in Primary Care²⁰⁵ and the Australian Therapeutic Guidelines.⁷⁶ Advice can also be sought from a sexual health service or physician.

Contract tracing of sexual partners (and children in the case of syphilis), where relevant and appropriate, should be discussed with the patient and attempted by the treating clinician. Seek specialist advice if unsure or in complex cases e.g. new HIV diagnosis. The Australasian Contact Tracing Manual <http://ctm.ashm.org.au/>²¹⁶ offers comprehensive assistance. If working with a telephone interpreter, offer to keep your patient's name confidential.

HIV testing should be performed in all people diagnosed with an STI (see [HIV chapter 3](#))

Regular review during therapy provides an opportunity to confirm adherence with treatment, to review contact history and to give further sexual health education. If indicated, further testing may need to be undertaken for HIV after the three-month window period (see [HIV chapter 3](#)) and for other STIs at the three-month visit if not undertaken at first presentation.

Consider offering immunisation for human papilloma virus for women, girls and boys in appropriate age or risk groups (see [immunisation chapter 12](#)).

Consider offering cervical cancer screening, pregnancy testing and assess for contraceptive needs ([women's health chapter 17](#)).

Consider referral for follow up of trauma associated with a history of sexual assault or gender-based violence.

An STI screen provides an opportunity for education about safer sex and condom use. It is important to inform individuals that an STI screen is not comprehensive, infections such as herpes simplex and HPV are not routinely screened for and thus the need for barrier contraception should be emphasised to minimise future risk.

Gonorrhoea, chlamydia and syphilis are notifiable diseases.

CONSIDERATIONS IN PREGNANCY AND BREASTFEEDING

Doxycycline (Pregnancy category D) should not be used in pregnancy or during breastfeeding. Azithromycin (Pregnancy category B1) can be used for treatment of chlamydia and gonorrhoea.

Syphilis detected during antenatal screening should always be managed by a specialist; treatment is with penicillin (Pregnancy category A). Infants should be referred to a paediatrician for testing and follow-up.

CONSIDERATIONS FOR CHILDREN AND ADOLESCENTS

Although children and adolescents from refugee-like backgrounds are at risk of having experienced sexual abuse and/or assault, families rarely volunteer this information. However, if such information is disclosed, or if an STI is suspected for other reasons, e.g. vaginal discharge, genital ulcers or undiagnosed chronic lower abdominal pain, seek advice from a service experienced in managing child sexual abuse, and consider mandatory reporting obligations. Other non-STI causes of genital symptoms in girls need to be considered, including pinworm infection and, occasionally, female genital mutilation/cutting (FGM/C, see [Women's health – chapter 17](#)).

Unlike adults, children under 15 years are not routinely tested for HIV as part of the pre-migration or detention screen unless they are unaccompanied or separated minors; and they are not tested for syphilis.

Adolescent sexual health is frequently missed, but should be included in a post-arrival assessment. Adolescents should be seen alone for part of the consultation once rapport is established. Explaining this is routine in the Australian healthcare system and seeking permission from both the adolescent and their parent/carers is helpful in facilitating this process. Adolescent sexual health is often approached using the HEADDSS framework;²¹⁷ and adolescents frequently value the opportunity to ask questions of health providers.²¹⁸ This form of consultation is also an opportunity for health promotion and to improve sexual health literacy.

Most adolescents can be treated for common STIs using standard adult doses. Seek specialist advice (including for assessment of child protection issues for younger children). Child and adolescent refugees who have a positive treponemal serology result should be discussed with or referred to a paediatric ID physician. If the patient is a child and the biological mother's treponemal test is negative, congenital syphilis can usually be excluded.

Doxycycline should not be used in children less than 8 years of age. Seek specialist advice.

LINKS

http://www.stipu.nsw.gov.au/wp-content/uploads/SELF_TESTING_CARD.pdf

http://www.mcwh.com.au/downloads/publications/MCWH_CommonThreads_BestPracticeGuide_WEB.pdf

Sexual assault hotline (interpreters available)

<https://www.1800respect.org.au/get-help/>

Easidose, a visual prescribing aid

www.easidose.com

Australasian Contact Tracing Manual

<http://ctm.ashm.org.au/>



■ CHAPTER 11: SKIN INFECTIONS

Kasha Singh, Rebecca Dunn, Gillian Singleton, Georgia Paxton

RECOMMENDATIONS

- The skin should be examined as part of the initial physical examination.
- Management will depend on findings; differential diagnoses will depend on area of origin.

OVERVIEW

Skin infections may be common in some groups of people from refugee-like backgrounds. There are limited prevalence data, but skin complaints were the sixth most frequent problem amongst newly arrived African refugee patients less than 15 years old in Melbourne in 2005, affecting 10% of patients in that group.¹⁰⁸

Non-infectious conditions may have skin manifestations (e.g. nutrient deficiency, inflammatory conditions (eczema/dermatitis), insect bites, pigmentation changes (vitiligo, post inflammatory hypo/hyperpigmentation), psychodermatoses, medication side effects). Also consider skin manifestations of traditional medicine procedures (cupping, coining) and scars from injury or torture.

Common rashes and skin infections may have a different appearance in dark skin compared to light skin. Erythema may be subtle or not visible in dark skin.

The following table lists skin presentations, and outlines infectious and other diagnoses to consider along with associated findings, investigations and management.^{219,220} Many of these diagnoses are extremely rare; they are included as a reference base for this reason. Inspection of skin is part of routine post arrival health screening examination. Investigations are guided by the clinical presentation.

Key points to note with drug treatment are:

- Albendazole is pregnancy category D – exclude pregnancy prior to use and provide advice about contraception prior to therapy. Dosage for albendazole changes for young children (200mg for patients >6months and <10kg).
- Ivermectin is not used in children <15kg and is relatively contraindicated in pregnancy (category B3).
- Griseofulvin is only used in children >2years and is relatively contraindicated in pregnancy (category B3).

Table 11.1 Skin Infections					
RASH	DIAGNOSIS	GEOGRAPHY AND RISK FACTORS	RASH/LESION DISTRIBUTION AND CHARACTERISTICS	ASSOCIATED FINDINGS	INVESTIGATIONS AND MANAGEMENT
PRURITIC WITH MIGRATORY LESIONS	<p>Larva currens (<i>Strongyloides stercoralis</i>)</p> <p>http://www.dermnetnz.org/arthropods/strongyloidiasis.html</p> <p>http://www.cdc.gov/parasites/strongyloides/index.html</p>	<p>Tropical and subtropical</p> <p>W Africa, SE Asia, central and tropical Australia, Caribbean</p> <p>Rural settings with poor sanitation (soil transmission).</p>	<p>At penetration site (usually feet), then spread to buttocks/waist. Recurrent episodes (weeks to months apart lasting days) cause perianal or central ('nipples to knees') eruption with serpiginous urticaria that move at a rate of several cm/hour, then generalized intense itch. Acute, episodic or chronic urticaria may occur. Disseminated strongyloidiasis (hyper-infection syndrome) may cause widespread petechial/purpuric rash.</p>	<p>Mostly asymptomatic. May have intermittent diarrhoea, abdominal pain, nausea, vomiting, fever, cough, wheeze.</p> <p>Hyper-infection syndrome may occur in immunosuppressed individuals.</p>	<p>FBE for eosinophilia. Refer to Strongyloides chapter 7.</p>
	<p>Cutaneous Larva migrans (dog/cat hookworm)</p> <p>http://www.dermnetnz.org/arthropods/larva-migrans.html</p> <p>http://www.cdc.gov/parasites/zoonotichookworm/index.html</p>	<p>Worldwide, especially tropical and rural areas. Children/others with frequent contact with soil (via animal faeces).</p>	<p>Lesions within days of exposure – pruritic red papules at penetration site, usually 1-3 lesions, 2-3 mm wide, that spread mm – cm per/day forming pruritic serpiginous tracks. Usually self-limiting, lasting 4-8 weeks.</p>	<p>Rare.</p> <p>Eosinophilic enteritis and pneumonitis may occur.</p>	<p>Clinical diagnosis. Self-limiting, however treatment alleviates symptoms. (Level B)</p> <p>If >15kg: Ivermectin (AUTHORITY) 200mcg/kg orally once.</p> <p>If >10kg: Albendazole (AUTHORITY) 400mg (over 6m, <10kg: 200mg) orally with fatty food, once daily for 3 days.</p> <p>Antihistamines and topical steroids may also be used with anthelmintic to manage itch.</p>
	<p>Gnathostomiasis</p> <p>http://www.vacunasyviajes.es/vacunasyviajes/Gnathostomiasis_Atlas.html</p> <p>http://www.cdc.gov/parasites/gnathostoma/index.html</p>	<p>Endemic SE Asia, Central/S America, some parts of Africa. Infection through undercooked freshwater fish or poultry.</p>	<p>Localized swellings lasting 1-2 weeks with oedema, pain, itch, erythema. Creeping eruption may occur with migrating larvae. Onset 3-4 weeks after ingestion but may occur months-years later.</p>	<p>CNS, ocular gastrointestinal or genitourinary symptoms if larval migration to these sites occurs.</p>	<p>Specialist review.</p> <p>FBE for eosinophilia.</p> <p>Clinical diagnosis.</p>
	<p>Loiasis</p> <p>http://www.dermnetnz.org/arthropods/filariasis.html</p> <p>http://www.cdc.gov/parasites/loiasis/index.html</p>	<p>Endemic W/Central Africa (Nigeria, Democratic Republic Congo (DRC), Uganda)</p> <p>Deerfly transmission.</p>	<p>Localized angioedema, transient/migratory, may be warm and itchy/painful 'Calabar swellings'. May recur multiple times per year, lasting days to weeks; worms can survive for > 10 years.</p>	<p>Worms may be observed crossing conjunctiva.</p>	<p>Specialist review.</p> <p>FBE for eosinophilia.</p> <p>Day (10am - 2pm) thick/thin blood films, pan filarial antigen (non-specific). Specific serology not readily available.</p>

RASH	DIAGNOSIS	GEOGRAPHY AND RISK FACTORS	RASH/LESION DISTRIBUTION AND CHARACTERISTICS	ASSOCIATED FINDINGS	INVESTIGATIONS AND MANAGEMENT
PAINLESS MIGRATORY LESIONS	Paragonimiasis (Lung fluke) http://www.cdc.gov/parasites/paragonimus/index.html	Asia (especially E Asia), W Africa, Americas Food borne infection from raw or undercooked crab/ crayfish.	Infections may be associated with painless, migratory subcutaneous swellings of various sizes or tender, firm, mobile nodules often on lower abdominal wall, inguinal area and proximal lower extremities.	Typically causes pulmonary disease (haemoptysis, chest pain and shortness of breath), also ectopic cerebral and abdominal infection. May mimic pulmonary TB	Specialist review. FBE for eosinophilia. Chest x-ray.
PRURITIC PAPULAR, VESICULAR OR PUSTULAR RASH	Onchocerciasis http://emedicine.medscape.com/article/1109409-overview http://www.cdc.gov/parasites/onchocerciasis/index.html	Sub-Saharan Africa (especially Nigeria, DRC), SW Arabian peninsula, Latin America; 20-50% prevalence in endemic regions. Blackfly transmission.	Rash onset may be 1-3 years after transmission, variable appearance and changes over time. Initially generalized itch with 1-3mm papules, vesicles or pustules (buttocks/shoulders), followed by larger (3-9mm) papules often hyper-pigmented with blotchy erythema. Subcutaneous nodules containing adult worms (0.5-3cm diameter) occur later, often deep (not palpable), over iliac crests/pelvic girdle. Hyper/depigmentation (patchy) 'leopard skin' over anterior shin (adults). Skin thickening, lichenification, atrophy may occur.	Regional lymphadenopathy, weight loss, musculoskeletal pain. Eye involvement - blindness (esp. W. Africa).	Specialist review. Skin snips – for technique see: http://www.cdc.gov/parasites/onchocerciasis/health_professionals/ FBE for eosinophilia. Pan-filarial antigen (non specific). Polymerase chain reaction (PCR) and antibody testing not readily available.
	Scabies http://www.dermnetnz.org/arthropods/scabies-imgs.html http://www.cdc.gov/parasites/scabies/index.html	Worldwide, common in schoolchildren, long-term care facilities and communal living.	Burrows are 2-3mm long +/- nodules, generalised rash (typically starts in web spaces hands/feet and spares head/neck except in children, elderly). Papules in flexures, vesicles/pustules on palms, soles, scalp. Nodules may occur along posterior axillary line and on male genitalia. Treatment with topical steroids may lead to atypical appearance. May also cause severe pruritus with no rash, or crusted, hyperkeratotic rash, particularly in immunocompromised.	Secondary bacterial infection.	Clinical diagnosis. See (A) below for practice points regarding treatment.
	Varicella http://www.dermnetnz.org/viral/varicella.html	Worldwide, typically occurs at older age in tropical climates, droplet spread, incubation 10-21 days.	Pruritic rash progressing from maculopapular to vesicular, typically 250 – 500 lesions central distribution, cropping over several days to crusted lesions by 5-10 days. Contagious from 1-2 days prior to rash until crusted. High risk to infants with maternal varicella 5 days prior – 2 days after delivery	Fever, irritability, anorexia, lymphadenopathy, may have pneumonia or central nervous system complications, may be associated with secondary infection.	Clinical diagnosis. No treatment for children if immunocompetent (treat if existing significant skin disease e.g. eczema, or impaired T cell immunity). Adults -greater risk of complications - consider treatment within 72 hours of rash onset with oral guanine analogues (e.g. famciclovir). Aspirin contraindicated due to association with Reyes syndrome in children. Exclude from school. Notifiable disease.

Table 11.1 Skin Infections					
RASH	DIAGNOSIS	GEOGRAPHY AND RISK FACTORS	RASH/LESION DISTRIBUTION AND CHARACTERISTICS	ASSOCIATED FINDINGS	INVESTIGATIONS AND MANAGEMENT
PRURITIC - OTHER	Tinea http://dermnetz.org/fungal/tinea.html	Worldwide. Causative agents (<i>Trichophyton</i> spp., <i>microsporum</i> spp.) vary in different geographic areas. Person-person and animal-human transmission depending on species.	Typically well-demarcated erythematous rings with central clearing, scaling, thickening, fissuring or maceration, +/- nail changes (discolouration/distortion and subungual debris). Pustules may occur. Tinea capitis may present with scaling, 'black dots' (where hairs within lesion break off), areas of alopecia or papulovesicular eruption – more common in younger children. Early lesions are often overlooked and not noticed until alopecia becomes evident. Untreated Tinea capitis can cause scarring and permanent alopecia.	Kerion – boggy inflammatory mass with follicular pustules – hypersensitivity to fungal infection, may occur with fever/local lymphadenopathy. Infection in multiple family members.	Microscopy and culture (scrapings, subungual debris, nail clippings, hair). See (B) below for management practice points. Investigate and treat family members.
	Tungiasis (<i>Tunga penetrans</i>) http://www.dermnetz.org/arthropods/tungiasis.html	Central/South America, India, Pakistan, Sub-Saharan Africa, Sandy conditions.	Due to burrowing flea <i>Tunga penetrans</i> . After penetration the flea expands to ~ 1cm over 2 weeks. Lesions typically on feet, initial white patch with central dark dot, developing into painful pruritic papular or nodular eruptions.	Secondary infection, including more severe infections (tetanus, gangrene).	Clinical diagnosis. Specialist review.
	Myiasis ('Botfly') (infestation by fly larvae (maggots)) http://www.dermnetz.org/arthropods/myiasis.html	Tropical and sub-tropical regions, central/South America, Africa and Caribbean.	Slow enlargement of insect bite to 1-3cm nodule, draining scant serosanguineous fluid. May be associated with Irritation, crawling or episodic pain.	Multiple lesions may be present.	Removal of intact larva is curative e.g. by occlusion of the opening with petroleum jelly and gentle extraction on larval protrusion. One larva is found in each lesion.
NON-PRURITIC [~] ERYTHE-MATOUS	Secondary syphilis http://www.dermnetz.org/bacterial/syphilis.html	Worldwide. For prevalence in Australian refugee cohorts see appendix one .	Variable lesions, typically palms and soles or mucosal surfaces, may be more generalised. Maculopapular, papular, annular, or pustular. Ulceration may occur with immunosuppression. Onset weeks to months after primary lesion, which may be unreported.	Fever, headache, malaise, anorexia, lymphadenopathy, diminished visual acuity, posterior uveitis.	Specialist review. See STI chapter 10 Notifiable disease.
	Measles http://www.dermnetz.org/viral/morbilli.html	Worldwide, infrequent in Australia. Droplet/direct contact spread, incubation 7-18 days	Erythematous blotchy rash, starts at hairline, then moves downwards, becomes confluent. Infectious from 1-2 days before rash to 4 days after rash. May desquamate in second week.	Prodrome fever, conjunctivitis, cough, Koplik spots (white spots on buccal mucosa). Associated with otitis media, pneumonia, encephalitis, and sub-sclerosing pan-encephalitis	Serology – IgM usually detectable 1-2 days after rash, IF, culture, PCR on nasopharyngeal aspirate (NPA) Consider vitamin A in young children or malnourished patients. Exclude from school. Notifiable disease.

Table 11.1 Skin Infections					
RASH	DIAGNOSIS	GEOGRAPHY AND RISK FACTORS	RASH/LESION DISTRIBUTION AND CHARACTERISTICS	ASSOCIATED FINDINGS	INVESTIGATIONS AND MANAGEMENT
NON-PRURITIC HYPOPIGMENTED LESIONS	Leprosy http://www.dermnetnz.org/bacterial/leprosy.html	Asia (Indonesia, Nepal, Sri Lanka, Bangladesh), South America, Pacific, Africa. ²²¹ 8 cases notified in Australia in 2011. ²²²	Prolonged incubation (usually 3-7 years, up to 20 years). Lesions may be raised, flat or nodular; erythematous or hypo-pigmented and can occur anywhere on the skin. Consider leprosy in any hypoaesthetic/anaesthetic rash; altered sensation may precede skin changes. Lumps /swelling may occur on earlobes and/or face.	Thickened, tender peripheral nerves and/or atrophied hand muscles. Keratitis (ophthalmology assessment), nasal ulcers, lymphadenopathy.	Specialist review. Notifiable disease.
	Malassezia infections Pityriasis versicolour http://dermnetnz.org/fungal/malassezia.html	Worldwide	Very common yeast infection of the skin causing flaky discoloured patches on chest and back often associated with hypo or hyperpigmentation. Sometimes scaly and brown but then resolve through to a non-scaly and white stage. Usually asymptomatic but can be mildly itchy.	Not contagious but can affect more than one member of the family.	Usually clinical diagnosis but can be diagnosed using Wood lamp or microscopy with potassium hydroxide. Treatment usually with topical antifungal agents though occasionally oral antifungals are used.
	Other		Onchocerciasis – see above.		
NON-PRURITIC/PAINLESS NODULES	Tertiary syphilis http://www.dermnetnz.org/bacterial/syphilis.html	As above.	Granulomatous, nodular lesions ‘gummas’, ulceration may occur.	Neuro/cardiovascular complications.	Specialist review. See STI chapter 10 Notifiable disease.
	Visceral leishmaniasis	90% of cases occur in India, Bangladesh, Nepal, Sudan and Brazil.	Local, non-ulcerating nodule at site of sand-fly bite. Later onset of skin hyperpigmentation and petechiae.	Hepatosplenomegaly and bone marrow involvement with fever, weight loss, pancytopenia.	Specialist review.
	Subcutaneous cysticercosis (<i>Taenia solium</i>) http://www.dermnetnz.org/arthropods/taeniasis.html	World-wide distribution especially where there is pig rearing.	Multiple painless palpable lesions.		Refer to Intestinal parasites chapter 8.
	Sporotrichosis http://www.dermnetnz.org/fungal/sporotrichosis.html	Farmers, gardeners, agricultural workers.	Red, pink or purple nodule which gradually increases in size and ulcerates, nodules may appear along lymphatic channels. Lesions may be present for years.	Rare pulmonary involvement, arthritis, disseminated disease may occur with immunosuppression.	Specialist review.
	Onchocerciasis	See above.			
	Leprosy	See above.			
	Tuberculosis	See below.			

Table 11.1 Skin Infections					
RASH	DIAGNOSIS	GEOGRAPHY AND RISK FACTORS	RASH/LESION DISTRIBUTION AND CHARACTERISTICS	ASSOCIATED FINDINGS	INVESTIGATIONS AND MANAGEMENT
PAINFUL ULCERATION	Cutaneous amoebiasis http://www.dermnetnz.org/arthropods/amoebiasis.html		Deep seated swelling which ruptures and ulcerates with necrotic base and indurated edges. Typically exude blood and pus.	Scarring and deformity.	Specialist review.
PAINLESS* ULCERATION	Primary syphilis* http://www.dermnetnz.org/bacterial/syphilis.html	As above.	Painless chancre that heals spontaneously in 4-8 weeks; Secondary infection may cause pain.	Local lymphadenopathy.	Specialist review. EIA, not possible to culture, dark field microscopy or PCR of chancre. See STI chapter 10. Notifiable disease.
	Cutaneous leishmaniasis http://www.dermnetnz.org/arthropods/leishmaniasis.html http://www.cdc.gov/parasites/leishmaniasis/index.html	Mediterranean, Middle East (including Syria), Africa, Central Asia, India, Central /S America. Local cases in migrants from (Afghanistan, Pakistan, E/ Sub-Saharan Africa. ^{223,224} Sand-fly transmission.	'Cutaneous leishmaniasis' - Painless plaques, papules or ulcerations 3-6 cm occurring 2-12 weeks after bite on exposed areas. Typically well demarcated, raised and indurated margins +/-satellite lesions, may become chronic or disseminate. 'Mucocutaneous leishmaniasis' - nose and mouth (+/-skin) leading to ulceration and sepsis.		Specialist review. Biopsy.
	Cutaneous tuberculosis http://www.dermnetnz.org/bacterial/tuberculosis.html	Rare even in countries with high incidence (India, China).	Ulceration may occur at primary inoculation site with granular base. Extension of infection from underlying tissues can rarely cause firm nodules which eventually ulcerate ('Scrofuloderma').	Primary infection (lungs, other)	Biopsy for AFB and mycobacterial PCR. Refer to TB chapter 1. Notifiable disease.
	Mycobacteria ulcerans (Buruli ulcer) and other atypical Mycobacterial infections http://www.dermnetnz.org/bacterial/atypical-mycobacteria.html	Africa, South America and Western Pacific Regions.	Painless dermal papule progressing to a nodule on arms or legs which gradually ulcerates with undermined edges revealing whitish-yellow base.	Scarring and deformity.	Mycobacterium ulcerans PCR, histopathology for AFB. Specialist review. Notifiable disease.
LYMPHO-EDEMA/ LYMPHAN-GITIS	Lymphatic filariasis http://www.dermnetnz.org/arthropods/filariasis.html	Tropical, subtropical countries especially SE Asia, Indian subcontinent, Sub-Saharan Africa, Pacific islands, Latin America & Caribbean.	Acute lymphangitis, oedema with subsequent lymphedema. Inflammation spreads peripherally from lymph nodes (compared to bacterial lymphadenitis which spreads centrally).	May be asymptomatic or associated with acute and/or chronic manifestations including fever, orchitis, epididymitis. Chronic lymphoedema. Tropical pulmonary eosinophilia.	Eosinophilia - may exceed 3000/microL. Specialist review- consideration of co-infection (e.g. with onchocerciasis/loiasis) is important.

* (pain may occur with secondary infection of the skin lesions)

MANAGEMENT

(A) Scabies: therapy details

>6 months old:

permethrin 5% cream to dry skin from the neck down especially hands, genitalia; apply under nails with a nailbrush.

Note- In central and northern Australia and in infants and the elderly, scabies above the neck is common and in these populations treatment should also be applied to face and hair (avoiding eyes and mucous membranes).

Leave for >8 hours (e.g. overnight) or 24 hours if previous treatment failure. Reapply to hands if washed. Repeat in 7 days.

OR

benzyl benzoate 25% emulsion (if allergic/permethrin failure) – apply as per permethrin for 24 hours.

For children dilute prior to application 6 months-2 years 1:3 parts water; 2 years-12 years 1:1 part water; If skin irritation occurs in adults dilute as for child 2-12 years.

OR

consider oral ivermectin for crusted scabies and/or treatment in immunocompromised or for treatment of widespread infection in crowded institutional settings.

<6 months old:

permethrin is not approved in this age group but this must be balanced against the morbidity of untreated scabies, therefore recommended treatment is: permethrin 5% to entire body (including scalp but not eyes/mouth); Cover hands (e.g. mittens) so child doesn't suck medication. Leave 8 hours. Repeat in 7 days.

OR

sulphur 10% in white soft paraffin (<2months: sulphur 5% in white, soft paraffin) topically, once daily 2-3 days

OR

crothamiton 10% cream topically daily 2-3 days.

During pregnancy/breastfeeding: permethrin 5% cream is the recommended treatment

(B) Tinea: diagnosis and management

Confirm diagnosis by microscopy and culture prior to treatment with antifungals, particularly systemic agents. Diagnostic samples include skin scrapings, subungual debris, clipped nail or plucked hair. False negative results are common especially with nail clippings due to insufficient specimens, recent antifungals and overgrowth. A trial of therapy may be appropriate.

Topical therapy is appropriate for localized infection (body, limbs, face, interdigital) with:

terbinafine 1% cream/gel daily 1 week

OR bifonazole 1% daily 2-3 weeks

OR clotrimazole 1% bd for 2-4 weeks (continue 2 weeks after symptoms resolve)

OR econazole 1% bd continued 7 days after symptoms resolve

OR ketoconazole 2% topically daily continued 14 days after symptoms resolve

OR miconazole 2% bd for 4 weeks.

Use oral therapy for tinea capitis, palmar or solar tinea or if widespread, unresponsive to topical therapy, recurrent or previously treated with steroids. Tinea unguium usually requires oral treatment.

>40kg: Terbinafine 250mg daily OR fluconazole 150mg once weekly OR itraconazole 200mg oral, twice daily for 1 week (feet/hands) or daily for 1 week (elsewhere). Continue until clinical resolution (2-6 week course).

20-40kg: Terbinafine 125mg/d 2-4 weeks OR Itraconazole 3-5mg/kg daily 4-6 weeks OR fluconazole 6mg/kg/day for 3-6 weeks.

10-20kg: Terbinafine 62.5mg daily 2-4 weeks

Alternatively: Griseofulvin 20-25mg/kg/day for 6-12 weeks.

LINKS

Easidose, a visual prescribing aid

www.easidose.com



■ CHAPTER 12: IMMUNISATION

Georgia Paxton, Gillian Singleton

RECOMMENDATIONS

- Provide catch-up immunisation so people from refugee-like backgrounds are immunised equivalent to an Australian-born person of the same age.
- Written records are considered reliable evidence of vaccination status.
- In the absence of written immunisation documentation, full catch-up immunisation is recommended.
- Routine serology against a range of vaccine preventable diseases (VPD) is **not recommended** to guide catch-up immunisation. Serology for hepatitis B infection and immunity is part of initial health screening. Offer testing for:
 - varicella serology (if ≥ 14 years if there is no history of natural infection)
 - rubella serology (in women of childbearing age).
- Do not presume other providers are completing immunisation catch-up – be opportunistic
 - immunisation is the responsibility of all health providers.

OVERVIEW

People from refugee-like backgrounds are at significant risk of being unimmunised or under-immunised on arrival in Australia, due to their refugee and forced migration experience. Source country immunisation schedules²²⁵ are different to the Australian immunisation schedule,¹⁰¹ meaning no one will arrive fully vaccinated. Humanitarian crises are associated with disruption of health services and immunisation programmes, leading to issues with vaccine access and quality.²²⁶ Humanitarian entrants to Australia may receive polio vaccine prior to departure, and/or limited vaccines as part of the voluntary Departure Health Check (DHC);^{a20} however, other humanitarian entrants may not be immunised and Expanded Programme of Immunisation (EPI) records are not required prior to travel. Asylum seekers will not be immunised prior to travel. Refugee and AS communities are also identified as being 'at-risk' of vaccine preventable diseases (VPD) after arrival,²²⁶ and there have been reported outbreaks of VPD related to refugee index cases.^{227–229}

Although refugees may have received immunisations overseas, most do not have documentation of immunisation. There is often a clear verbal history of vaccinations, although there is debate on the validity of parental/self-recall of vaccination status.^{230–235} Written records are considered reliable evidence of vaccination status if available. In the absence of written immunisation documentation, full catch-up immunisation is recommended.²³⁶

There are limited recent Australian prevalence data on refugee immunisation – available studies show:

- 44–53% of asylum seekers still require catch-up immunisation on release from detention.^{237,238}
- 50–98% of adult refugees from African and Asian source countries have incomplete immunisation according to the Australian schedule.
- 90–98% of child refugees (mixed cohorts) have incomplete immunisation according to the Australian schedule.^{39,108,231,239}

Available data suggest the following prevalence of serological immunity (reviewed in²³⁹):

- **Adults:** Measles 87–95%, Mumps 84–96%, Rubella 62–96%, Tetanus 33–47%, Diphtheria 66%, Hepatitis B 49–60%.
- **Children:** Measles 56–90%, Mumps 60–93%, Rubella 74–85%, Tetanus 52–88%, Diphtheria 45–69%, Hepatitis B 26–66%.

Limited data suggest that immunity to all components of combination vaccines (e.g. serological immunity to all three of measles-mumps-rubella) is much lower.^{43,46,231,240}

Every attempt should be made to provide catch-up immunisation so people from refugee-like backgrounds are immunised equivalent to Australian-born people of the same age.

HISTORY AND EXAMINATION

Assess any existing written immunisation records – overseas records (may require translation), detention health summaries for asylum seekers, other immunisation records, including the Australian Childhood Immunisation Register (ACIR) for children where vaccines were given aged <7 years. The expansion of ACIR to include all children and young people <20 years of age from 2016 will allow improved recording and review of previous immunisations.

Consider vaccines given as part of the DHC for offshore refugee arrivals – Mumps-Measles-Rubella (MMR) in people aged 9 months – 54 years, Yellow Fever (YF) and also Oral Polio Vaccine (OPV)

a In 2016 extended screening will be implemented for the Syrian cohorts, with additional immunisations (MMR, polio vaccination and diphtheria-tetanus-pertussis vaccination – in the form of hexavalent or pentavalent vaccine in children <10 years – check available paperwork)

depending on port of departure – these are all Live Viral Vaccines (LVV).¹⁹ Live attenuated vaccines (LAV), including LVV, should be given simultaneously, or at least 4 weeks apart. DHC immunisation may affect the timing of immunisation catch-up and also the interpretation of tuberculin skin tests (TST).

Assess for a clinical history of varicella infection.

Clarify hepatitis B status (for the individual and their household contacts) from initial post-arrival screening. This test may have been performed as part of pre-departure screening in unaccompanied or separated minors and pregnant women.

Consider the timing of the TST in relation to LAV administration – where TST is used for tuberculosis (TB) screening (i.e. in children). TST should be administered either before, or 4 weeks after LAV.²³⁶

Clarify whether immunisation has been commenced since arrival and if there is a catch-up plan in place. Asylum seekers who have been in held detention may have received some immunisations and they will have a written record.

Assess for any contraindications to immunisation or particular vaccines, completing the pre-vaccination screening checklist and relevant responses (tables 2.1.1. and 2.1.2 in the Australian Immunisation Handbook).²³⁶

- Absolute contraindications include anaphylaxis following a previous dose/any component of the relevant vaccine.
- LAV should not be administered to significantly immunocompromised people. MMR, varicella and zoster vaccines can be administered to people with Human Immunodeficiency Virus (HIV) infection who are mildly immunocompromised, after specialist advice.
- Consider pregnancy in all females of childbearing age, including in adolescents. In general, LAV should not be administered during pregnancy, and women should be advised not to become pregnant within 28 days of receiving a LAV.²³⁶

Assess for the presence of a Bacillus Calmette Guerin (BCG) scar (deltoid, forearm, scapula, both sides and may be elsewhere). BCG vaccination leaves a scar in 92%–100% of recipients in prospective studies^{241–243}

Consider any medical conditions requiring extra vaccine protection including anatomical or functional asplenia, HIV infection or other forms of immunosuppression, severe or chronic medical conditions or hepatitis B (where hepatitis A vaccination is recommended in the absence of immunity).²³⁶ Consider any occupational risk factors requiring extra vaccine protection (e.g. healthcare workers (hepatitis B vaccine, influenza vaccine) or occupational animal exposure/abattoir workers (Q fever).

INVESTIGATIONS

- Hepatitis B serology (see [Hepatitis B- chapter 4](#)) is part of initial post arrival health assessment. Hepatitis B serology is also recommended as part of routine antenatal screening for pregnant women in Australia. Adequate hepatitis B immunity is considered to be hepatitis B surface antibody (HBsAb) $\geq 10\text{mIU/mL}$
- Rubella serology in women of childbearing age - rubella antibody (Ab) is recommended prior to each conception, or early in the pregnancy – rubella Ab titres can fall post vaccination, and previous protective titres are not considered reliable evidence of immunity. Adequate rubella immunity is considered to be an Ab level above the accepted cut-off point for a given commercial assay (the WHO cut-off for adequate immunity is $>10\text{IU/mL}$). Women should be advised of their test result, as it is a clinically significant test.²⁴⁴
- Varicella serology in people aged 14 years and older without a natural history of varicella infection.^{236,245,246}

Routine serology against a range of VPD is not recommended to guide catch-up immunisation.²³⁶ Serology is not available for all vaccines, serological testing may not be reliable for vaccine-induced immunity, and immunity against a particular VPD may not change the vaccines required (with the use of combination vaccines). Serological testing prior to vaccination is cost effective for varicella^{245–247} hepatitis B²⁴⁸ and hepatitis A.^{249,250}

Post-vaccination serology for hepatitis B is recommended for:

- infants born to mothers with hepatitis B
- people at significant occupational risk
- people at risk of severe or complicated hepatitis B disease
- household/sexual/close contacts of people with hepatitis B.

Check HBsAb 4–8 weeks after completing the primary vaccine course (3–12 months after completing the primary vaccine course in infants). If HBsAb <10mIU/mL – exclude Hepatitis B infection (HBsAg and HBcAb) then repeat single booster dose. If HBsAb remains <10mIU/mL 4 weeks after the booster dose, provide 2 further booster doses one month apart. If HBsAb remains <10mIU/mL refer to specialised immunisation service for consideration of intradermal hepatitis B vaccine.

MANAGEMENT

There is high quality evidence and a strong recommendation for immunisation²³⁶ and moderate²⁵⁰ to high²⁵¹ quality evidence and a strong recommendation for catch-up immunisation in refugees.

Develop a catch-up immunisation plan – see table 12.1 and 12.2.

- Determine which vaccines have already been given – written records are considered reliable evidence of previous vaccination.
- Aim for minimum number of visits, and minimum dosing schedules – therefore include vaccines where more doses are required (generally DTP, IPV, Hepatitis B, HPV) in the initial visit (see table 12.2). In general, catch-up immunisation can be provided over 3 visits, across 4 months in adolescents and adults (i.e. by giving the 3rd doses of DT containing and hepatitis B vaccine at the same visit), although recent changes to pertussis dosing and combination meningococcal vaccination may extend this to four visits for children <10 years. Where possible, immunise family members simultaneously to reduce the total number of immunisation visits.
- Give combination vaccines where possible (to reduce the number of needles).
- Consider formulations/licensing and age restrictions.
- Consider recent or pending schedule changes.
- Complete, but do not restart, immunisation schedules if there is written documentation of previous vaccine doses.
- Provide opportunistic immunisation where possible, but do not interrupt other providers' immunisation delivery if catch-up plans are in place.

Provide a written record and a clear plan for ongoing immunisation. It is useful to document which dose is being given e.g. MMR dose 1 of 2.

Vaccination information should be entered into the Australian Childhood Immunisation Register for children and young people <20 years (ACIR is transitioning to become the Australian Immunisation Register – AIR). From late 2016 it will be possible to enter data across the lifespan. This is intended to support changes to immunisation requirements for Centrelink payments, including those for childcare, after-school care, and Family Tax Benefit supplements. Children

will need up-to-date immunisation records, or will need to have a catch-up plan in place, in order for families to access these payments, and refugee-like families may be particularly vulnerable to changes in Centrelink support.

For most vaccines, there are no adverse events associated with additional doses in already immune individuals. Frequent additional doses of DT-containing vaccines and pneumococcal polysaccharide (PS) vaccines (PS vaccines are not part of the catch-up schedule) may be associated with increased local reactions. If large local reactions occur with DT-containing vaccines, review prior to giving further doses, although the benefits of protection may outweigh the risk of an adverse reaction (e.g. protection against pertussis from a booster dose of diphtheria-tetanus-acellular pertussis).²³⁶

For families outside the initial stage of settlement – **remind them to plan early for travel immunisations in the future.** See www.cdc.gov/travel for information on destinations and vaccine requirements.

CONSIDERATIONS IN PREGNANCY AND BREASTFEEDING

LAV (MMR, MMR-Varicella (MMR-V), Varicella Virus (VV), Zoster, YF, BCG, Rotavirus and oral Typhoid) are contraindicated during pregnancy and should not be given for 28 days prior to pregnancy.²³⁶

CONSIDERATIONS FOR CHILDREN

Consider the impact of age and how the child's age relates to the Australian immunisation schedule delivery points (e.g. 9-year-old child who will turn 10 years before completing catch-up – thus changing vaccine formulations; consider which vaccines will be given in the future when the child reaches the schedule age).

Use positioning, distraction and measures to reduce vaccine-associated pain.²³⁶

Children aged <12 months are immunised in the anterolateral thigh or ventrogluteal area, after the age of 1 year vaccines can be given in the deltoid area of the upper arm.¹⁰¹ Usually only 2 injections per limb is practical.

Infants born to mothers with hepatitis B must have a birth dose of hepatitis B vaccine (preferably within 24 hours and definitely within 7 days) and also hepatitis B immunoglobulin (HBIG) – given in separate thighs - see Immunisation Handbook.

LINKS

Australian Immunisation Handbook

<http://www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home>

WHO monitoring – vaccination schedules by country

http://apps.who.int/immunization_monitoring/globalsummary/schedules

Royal Children's hospital – catch up immunisations in refugees

http://www.rch.org.au/immigranthealth/clinical/Catchup_immunisation_in_refugees/

Melbourne Vaccine Education Centre (MVEC)

<http://www.mvec.vic.edu.au/immunisation-references/>

National Centre for Immunisation Research and Surveillance (NCIRS) – Fact Sheets

<http://www.ncirs.edu.au/provider-resources/ncirs-fact-sheets/>

Foreign vaccine products/naming (CDC)

<http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/B/foreign-products-tables.pdf>

Translated immunisation resources:

<http://www.healthtranslations.vic.gov.au/bhcv2/bhcht.nsf/PresentEnglishResource?Open&s=Immunisation>

Table 12.1 Summary of immunisation schedule

Vaccine type	Age, number of doses	Route and dose	Minimum dosing interval (months)	Notes
Diphtheria Tetanus Pertussis (DT-containing)	<4 years 4 or 5 doses DTPa	IM 0.5ml	1,1*,6**	3 doses for primary series then **4th dose at 18 months of age or 6 months after primary course, and 5th dose at 4 years. If the 4th dose is given after the child is 3.5 years the 5th dose is not required. Hexavalent vaccine is available in all jurisdictions, (combining DTPa with IPV/Hib/Hep B). *If using the hexavalent vaccine combined with hepatitis B, the dosing interval changes (2 months between doses 2 and 3, and 4 months between dose 1 and 3). Current recommendations are to separate DTPa/IPV/Hib/Hep B from MenC/Hib; using MenC instead is therefore likely to be more convenient and reduce catch-up visits.
	4-9 years 4 doses DTPa		1,1*, 6**	3 doses for primary series then **4th dose 6 months after primary course. Hexavalent vaccine as above.
	10 years and older 3 doses (dTpa, dT, dT)		1,1	Insufficient safety data on 3 doses of dTpa, therefore recommend dTpa, dT, dT, then 10-year and 20-year booster dTpa. A single dose of dTpa is funded for refugees as the 1st dose of a primary course and a dose is funded for children 10-15 years. dTpa is now available combined with IPV – dTpa-IPV.
Measles Mumps Rubella (MMR) (LAV)	<10 years 2 doses	IM or SC*	1	2nd dose due at 3.5-4 years if <3.5 years at 1st dose MMR is now available combined with Varicella Vaccine (VV) as MMR-V (*given SC) - although MMR-V is not recommended as the 1st dose of MMR containing vaccine in children <4 years, due to increased risk of fever/febrile convulsions.
	10 years and older (born > 1966) 2 doses		0.5ml	1
Inactivated Polioyielitis Vaccine (IPV)	< 4 years 4 doses	Varies** 0.5ml	1,1, varies*	*4th dose required at 4 years if aged <4 years for primary course. Different combination vaccines available, combined with DTPa/Hib/Hep B, also available as dTpa-IPV. Hexavalent vaccine dosing as above.
	4 years and older 3 doses*		1,1	**IPV in combination vaccines given IM, IPV alone given SC. OPV and IPV are considered interchangeable (OPV may have been given prior to travel to Australia from certain countries).

Table 12.1 Summary of immunisation schedule

Vaccine type	Age, number of doses	Route and dose	Minimum dosing interval (months)	Notes
Hepatitis B	<11 years 3 doses	IM 0.5ml	1,2*	Combination vaccines are available, *dosing intervals complex, minimal dosing intervals: 1 month between dose 1 and 2; 2 months between doses 2 and 3; and 4 months between dose 1 and 3.
	11–15 years 2 doses adult formulation	IM 1ml	4	Alternative regimen is 3 doses paediatric formulation (0.5ml) as above.
	16 years and older 3 doses**	IM varies*	1,2**	*Age 16–19 years 3 doses paediatric formulation (0.5ml), 20 years and older 3 doses adult formulation (1ml). **Dosing intervals as above.
Meningococcal C Conjugate (MenC)	Any* 1 dose	IM 0.5ml	-	*Normally given at age 12 months. Disease has bimodal peaks in incidence of <5 years and 15-24 years, catch-up previously funded to 19 years. MenC available combined with Hib (MenC/Hib) - licensed to 9 years, MenC (all ages) also available. Current recommendations are to separate DTPa/IPV/Hib/Hep B from MenC/Hib; using MenC instead is therefore likely to be more convenient and reduce catch-up visits. Additional dosing (of the 4-valent meningococcal [ACWY] vaccine) recommended in asplenia, see Immunisation Handbook.
Haemophilus influenzae type b (Hib)	2–11 months 2 or 3 doses, then booster*	IM 0.5ml	1 or 2, varies*	Not required 5 years and older, but may be given as part of combination vaccines - children aged <10 years will now receive multiple doses of Hib through the use of combination vaccines (DTPa/IPV/Hib/Hep B and also MenC/Hib). Current recommendations are to separate DTPa/IPV/Hib/Hep B from MenC/Hib; using MenC instead is therefore likely to be more convenient and reduce catch-up visits. Hexavalent dosing as above. *Refer to Immunisation Handbook for catch up schedule in younger children – different vaccines require different catch-up schedules with different dosing intervals.
	12–15 months 1 dose then booster* 16–59 months 1 dose		2	

Table 12.1 Summary of immunisation schedule

Vaccine type	Age, number of doses	Route and dose	Minimum dosing interval (months)	Notes
13-valent Pneumococcal conjugate (13vPCV)	<7 months 3 doses	IM 0.5ml	1,1	Required in children <5 years of age, additional doses for children with medical risk factors, including prematurity. *Dosing interval is 1 month for <12 months age or 2 months for 12 months of age and older. People with medical risk factors require extra doses of 13vPCV and 23vPPV (minimum 8 weeks apart) see Immunisation Handbook.
	7–11 months 2 doses		1	
	12–59 months 1 dose		- *	
Varicella (VW) (LAV)	18 months–13 years 1 dose	SC 0.5 ml	-	All children <14 years should have at least one dose of VW, usually given as either VW or MMR-V at 18 months. Prior varicella infection is not a contraindication. If varicella containing vaccine is given <12 months of age, the dose should be repeated at 18 months. MMR-V is not recommended as the 1 st dose of MMR containing vaccine in children <4 years, due to increased risk of fever/febrile convulsions in this setting, and not recommended in those aged 14 years and older.
	14 years and older* 2 doses		1	
Human Papilloma Virus (HPV)	12–18 years 3 doses	IM 0.5ml	1, 3	Complete doses within 12 months. 4-valent vaccines licensed for use in females aged 9–45 years, males aged 9–26 years. Not recommended during pregnancy, can be given during breastfeeding. Recommended for immunocompromised adults (including due to HIV infection) and men who have sex with men (MSM). From 2015, HPV given to all year 7 students.
Rotavirus (LAV)	< 6months, 2 or 3 doses*	Oral, varies*	1	Not usually given as catch-up due to strict age restrictions. *Dosing depends in vaccine type. Rotarix (1 ml): 2 doses at 2 and 4 months of age, 1 st dose must be given <15 weeks, 2 nd dose must be given <25 weeks. Rotateq (2 ml): 3 doses at 2, 4, and 6 months of age, 1 st dose must be given <13 weeks of age, 3 rd dose must be given <33 weeks of age.

Table 12.1 Summary of immunisation schedule

Vaccine type	Age, number of doses	Route and dose	Minimum dosing interval (months)	Notes
Bacillus Calmette Guerin (BCG) (LAV)	<16 years* 1 dose	ID, varies**	-	<p>Recommended in:</p> <ul style="list-style-type: none"> Children <5 years travelling to high prevalence countries (i.e. >40 cases per 100,000 population per year) for >3 months. Neonates with family history of leprosy. <p>*Consider in</p> <ul style="list-style-type: none"> Children <5 years with parents or household visitors from high prevalence countries. Exposure to active pulmonary TB where preventive therapy not possible, or after completion preventive therapy if TST remains negative. Travel to high prevalence area >6 weeks if aged <5 years, >3 months aged 5 years and older or regular travel to high prevalence areas. <p>Only give if no record/scar, no immunosuppression, no evidence TB infection (TST <5mm) and no other contraindications. All individuals, except infants <6 months of age, should undergo a tuberculin skin test (TST; Mantoux) before BCG vaccination. BCG vaccination should be given by trained providers. **Dose is 0.05ml age <12 months, 0.1ml 12 months and older.</p>

LAV – Live attenuated vaccinations marked in red, consider pregnancy and dosing interactions. IM = intramuscular, SC = subcutaneous, ID = intradermal.

Table 12.2: Quick guide to catch-up immunisations

Age	Vaccine Most = 0.5ml Route	Minimum dosing intervals have been used					Notes
		Initial T=0	+ 1 month	+ 2 months	+ 4 months	Subsequent	
All	DT (P) containing IM			Can be given at 2m instead if hepatitis B not required		See note	Age < 4 years – 3 doses then 4 th dose at 18 months or 6 months after primary course and 5 th dose at 4 years. If the 4 th dose is given after the child is 3.5 years the 5 th dose is not required. Usually given as combination vaccine,* if using hexavalent vaccine with hepatitis B, dosing interval = 2 months between dose 2 and 3, and 4 months between dose 1 and 3. Age 4-9 years – 3 doses for primary series then 4 th dose 6 months after primary course, usually given as combination vaccine* as above. Age 10 years and older – dTPa then dT, dT, then booster dTpa after 10 years.
All	IPV IM or SC			As above			4 th dose required at 4 years if aged <4 years for primary course. SC if given as IPV only, IM in combination vaccines. Hexavalent dosing as above.
All	Hepatitis B IM						Age 11–15 years – can be given as alternate 2-dose schedule (adult dose), with 4-month interval. Paediatric dose 0.5ml (0 – 19 years), adult dose 1ml (20 years and older).
Born >1966	MMR IM MMR-V SC						Now available as MMR-V for age <14 years, see below.
All	Varicella SC						<14 years one dose, now available as MMR-V, see below. Age 14 years and older, born after 1992 – 2 doses (check serology first if no history infection).
Born >1987	MenC IM	If using MenC		If using MenC/Hib			Age <10 years, see below.
<5 years	Hib IM						Only <5 years , dosing varies, 2–11 months: 2 or 3 doses then booster, 1–5 years: 1 dose then booster, interval varies. Hexavalent dosing as above. Children <10 years get extra doses due to combination vaccines (see below).
<5 years	13vPCV IM						Only <5 years unless medical risk factors. Dosing varies, <7 months 3 doses, 7–11 months 2 doses, 1–5 years 1 dose.
Born >1981F >1999M	HPV IM					+ 4 months after dose 2	Age 12–15 years, born after 1981 (females) and after 1999 (males), complete dosing within 12 months.
	Combination vaccines* – use where possible. Hexavalent vaccine – DTP-IPV-Hib-Hep B – age <10 years (IM). DTPa-IPV (IM) – age <10 years, also dTpa-IPV (IM) age 10 years and older. MMR-V – age <14 years, not used as first dose MMR age <4 years (SC). MenC-Hib – age <10 years, if possible, not with hexavalent vaccines, OK with DTP-IPV, HBV instead (IM). MenC instead is likely to be more convenient and reduce catch-up visits.					Other notes Offshore entrants may have MMR, +/- OPV & YF, Syrian cohorts may have had additional DT containing vaccines – wait 1 month before other vaccines. Do not give TST within 4 weeks of LVV (including DHC vaccines). Rotavirus not usually catch-up – has to be given before 13–15 weeks. Consider BCG in age <16 years if not given previously – needs negative TST first. All 0.5ml dose except adult HBV vaccine, also used for adolescent catch-up.	
Legend for table 12.2 □ = Give ■ = Give depending on age and numbers of doses required ■ = Dose not required							



 **PART B:**
NON-INFECTIOUS DISEASES



■ CHAPTER 13: ANAEMIA, IRON DEFICIENCY AND OTHER BLOOD CONDITIONS

Nadia Chaves, Georgia Paxton

RECOMMENDATIONS

- Offer screening to all people from refugee-like backgrounds for anaemia and for other blood conditions with a full blood examination (FBE).
- Offer screening for iron deficiency with serum ferritin to all children and to women of childbearing age and consider this in patients with unexplained fatigue.
- Replace iron if ferritin $<15\mu\text{g/L}$ and/or when clinical and haematological features indicate iron deficiency anaemia.
- Educate about iron-rich diet and avoid excessive dairy intake in children
- Investigate and treat causes of anaemia
- Consider screening for vitamin B12 deficiency if arrival <6 months with a history of at least several years of significantly restricted food (especially meat) access e.g. patients from Bhutan, Afghanistan, Iran or the Horn of Africa; or if vegan diet.

- Treat B12 deficiency if serum active B12 <35pmol/L or <reference range for children with oral or IM supplementation. Exclude concomitant folate deficiency. Consider *Helicobacter pylori* infection.

OVERVIEW

There are food security risks in many refugee-source countries,²⁵² as prolonged food deprivation and inadequate access to nutritious food and clean water are common. After arrival in Australia there still may be issues of food insecurity,^{253,254} poor access to healthy foods and consequent under-nutrition. Specific issues include: low weight and/or height-for-age in children, vitamin deficiencies, iron deficiency and anaemia. As well as the potential for under-nutrition, there are increasing problems with dyslipidaemia and obesity and the associated risks of developing non-communicable diseases (NCDs chapter 14). The period of early settlement is a window for health promotion about nutrition.

Anaemia (defined as a low blood haemoglobin concentration with 'normal' ranges depending on gender, age and pregnancy status) has been reported in adults from refugee-like backgrounds in Australia. The prevalence is estimated at 7–20%,^{39,43,45,255} but is greater in young children (23–39%)^{43,255} (appendix one). Anaemia is a major cause of, or a contributor to, morbidity and mortality worldwide. In some settings up to 50% of patients with anaemia are iron deficient.²⁵⁶ Iron deficiency in children from refugee backgrounds in Australia and New Zealand ranges from 17% (36/216)⁴⁵ to 33% (113/343).⁵¹

Iron deficiency anaemia occurs after iron stores become severely depleted. As well as the common causes in the Australian population such as pregnancy, breast feeding, menstrual blood loss, inadequate iron intake, and gastrointestinal blood loss,²⁵⁷ chronic infections such as hookworm, strongyloidiasis, *Helicobacter pylori* infection and chronic malaria can contribute. Iron deficiency, even without associated anaemia, may cause fatigue and hence affect productivity. Women of reproductive age and children are at particular risk of iron deficiency and iron deficiency anaemia because of greater iron requirements. It is important that women have adequate iron stores during their reproductive years, as iron deficiency in pregnancy increases maternal and perinatal mortality, and can cause cognitive and motor delays in children. Side effects of iron supplementation include gastrointestinal symptoms such as nausea, constipation or abdominal pain as well as the potential for overdose in children.^{258–262} In view of the high prevalence of anaemia and iron deficiency in people from refugee-like backgrounds, the fact that iron deficiency is easily treated, as well as published evidence for possible improvements in symptomatic fatigue in women²⁶³ and for psychomotor development in children,²⁶⁴ we recommend screening for anaemia with full blood examination (FBE) in all patients and to consider excluding iron deficiency by determining serum ferritin concentrations in women of child-bearing age, children, and those with fatigue. FBE, rather than purely haemoglobin (Hb), is recommended because red cell characteristics may be useful in determining the type of anaemia, and differential white cell concentrations (e.g. eosinophils) are included.

Other haematological conditions

Congenital neutropenia. Neutrophil concentrations below normal Australian reference ranges occur in 25–50% of persons of African descent and in some groups from the Middle East.²⁶⁵ This is not a pathological condition but rather reflects a different 'normal' range. If the person seems well and has no associated clinical features like fever, gingivitis or skin infections, no further investigation is indicated.

Eosinophilia is defined as an absolute eosinophil count exceeding 0.6×10^9 eosinophils/mm³ and is apparent on FBE. Eosinophilia in this population may indicate the presence of a parasitic infection (see schistosomiasis, [chapter 6](#), strongyloidiasis, [chapter 7](#), and other intestinal parasites, [chapter 8](#)). Note: single-cell intestinal parasites (e.g. giardia) do not cause eosinophilia. Other causes of eosinophilia include allergies and medications.

Inherited anaemias. These include thalassaemias, G6PD deficiency and haemoglobinopathies. These are more common in people from Africa, Asia and the Middle East. Carriers are usually asymptomatic but often have mild microcytic hypochromic anaemia.

Lead toxicity. Elevated serum lead concentrations have been reported in up to 7–25% of people of African refugee-like background^{266,267} and in children from the Thai-Burma refugee camps^{267–270} especially in those aged < 6 years, although rarely to a level requiring chelation therapy. Screening for lead toxicity in Australian refugee populations is **not** recommended routinely but should be considered if there are symptoms of lead toxicity such as learning, memory, behavioural or cognitive dysfunction in children²⁷¹ and when anaemia is unexplained.

Coeliac disease. Although there are no Australian data available in people from refugee-like backgrounds, the rates of coeliac disease in North Africa and the Middle East are apparently similar to rates in Western countries. The disease is rare in Sub-Saharan Africa and in East Asia.²⁷²

Vitamin B12 deficiency has been reported in refugees from Bhutan, Iran, Afghanistan, Iraq and the Horn of Africa in Australia^{156,273,274} especially when there is poor access to food. This does not necessarily correlate with symptoms or even with macrocytosis, and the significance of such apparent deficiency, the requirements for replacing borderline deficiency, the effects of post-migration diets and possible impacts on long-term health in those from refugee-like backgrounds are currently unclear.²⁷⁵

Folate deficiency is uncommon in those from refugee-like backgrounds in Australia^{43,273} but should be considered in new arrivals with food insecurity. As folate deficiency is uncommon in Australia due to the availability of fresh foods and vegetables, and the fortification of some foods, testing is not recommended.

HISTORY AND EXAMINATION

Symptoms of anaemia may be subtle. They include lethargy, irritability, shortness of breath, poor growth, weakness and signs of cardiac failure. There may be a past history of malaria, worm infestations, *Helicobacter pylori* infection, haematemesis or malaena and patients may have occult chronic diseases, such as renal failure. The family history may indicate a predisposition to haemoglobinopathy.

Consider folate or B12 deficiency in those with a history of food insecurity, vegan diets or with symptoms suggestive of cognitive deficit, neurological or neuropsychiatric problems, developmental delay, and, if FBE indicates macrocytic anaemia.

INVESTIGATIONS

Full blood examination (FBE) in all. This is to screen for anaemia, eosinophilia and thrombocytopenia.

Serum ferritin for children and for women of childbearing age, people with vegetarian, especially vegan diets, those with a history of food insecurity, if anaemia is unexplained, and when iron deficiency is suspected clinically or from FBE results. Note: in patients with acute and/or chronic inflammatory and some other conditions, serum ferritin levels of up to 60-100µg/L²⁵⁷ do **not** exclude iron deficiency.

Consider B12 screening in those with suggestive symptoms, macrocytosis, or deemed at risk (e.g. vegan diet). Screening is generally not required for asymptomatic individuals with an adequate diet, or for those living in Australia for >6 months and who consume meat. Request serum B12, if this is abnormal or low a serum active B12 (holotranscobalamin) should be ordered.

MANAGEMENT

If FBE shows microcytic anaemia and/or low ferritin consider and treat underlying causes. Consider common parasitic infections and *Helicobacter pylori* infection. Educate patients and families about iron-rich diets.

Replace iron as per published guidelines.^{257,276} There are a number of formulations of iron and the dosage depends on weight in children. Intermittent oral iron (e.g. once or twice-weekly) is also an option and may reduce side-effects. Discuss side-effects (e.g. dark stools, constipation, gastrointestinal upset), safety and storage with patients and families. Use Easidose (<http://www.easidose.com>) for picture-based dosing, if needed.

If iron-deficiency anaemia does not resolve within three months of oral iron supplementation and in those without a clear explanation for their anaemia, consider gastroscopy and colonoscopy especially in men and post-menopausal women, to exclude occult gastrointestinal bleeding associated with peptic ulceration, polyps, cancers etc.

B12 deficiency. In those with low or equivocal serum B12 concentrations, confirm deficiency by measuring active B12 (serum holotranscobalamin), and treat if the concentration is <35 (pmol/L).²⁷⁷ When B12 supplementation is indicated, consider and treat concomitant folate deficiency. Consider testing for *Helicobacter pylori* infection.^{278,279} Replacement can be oral (cyanocobalamin 50–200 mcg daily, given between meals) or intramuscular (cyanocobalamin or hydroxycobalamin, IM 1000mcg given once).²⁷⁶ Dietary B12 intake following settlement in Australia is usually adequate and so it seems unlikely that ongoing supplementation is required, although this has not yet been studied.

The principles of healthy eating are universal and should be discussed with patients and their families.

Be aware of concurrent micronutrient deficiencies. These are outside the scope of this document but are summarised in the RCH guidelines <http://www.rch.org.au/uploadedFiles/Main/Content/immigranthealth/TE%20V2.htm>

CONSIDERATIONS IN PREGNANCY

Refer to Australian antenatal care guidelines 2015 (<http://www.health.gov.au/antenatal>)

CONSIDERATIONS FOR CHILDREN

Refer to a paediatrician if there malnutrition is suspected. Consider hospital admission if there is anaemia is severe (e.g. Hb < 6g/dl). Severely malnourished children should have anthropometry performed by a dietitian. Once the initial screen has been completed and treatment initiated, growth-monitoring should be offered.

<http://www.rch.org.au/uploadedFiles/Main/Content/immigranthealth/TE%20V2.htm>

LINKS

Easidose, a visual prescribing aid

www.easidose.com

http://www.rch.org.au/immigranthealth/clinical/Iron_deficiency_and_anaemia/

Translated information on iron

<http://www.healthtranslations.vic.gov.au/bhcv2/bhcht.nsf/PresentDetail?Open&s=Iron>

Healthy lifestyle resources

https://www.dhhs.tas.gov.au/__data/assets/pdf_file/0008/91745/Healthy_Lifestyle_resources.pdf



■ CHAPTER 14: CHRONIC NON-COMMUNICABLE DISEASES IN ADULTS

Kate Walker, Nadia Chaves

RECOMMENDATIONS

- Offer screening for non-communicable diseases (NCDs) as per the RACGP red book (<http://www.racgp.org.au/your-practice/guidelines/redbook/>) including screening for:
 - smoking, nutrition, alcohol and physical activity (SNAP) risk factors
 - obesity, diabetes, hypertension, cardiovascular disease (CVD), chronic obstructive pulmonary disease (COPD) and lipid disorders
 - breast, bowel and cervical cancer.
- Assess diabetes and CVD risk earlier for those from regions with a higher prevalence of non-communicable diseases (NCDs) or an increased BMI or waist circumference.
- Although this chapter does not specifically refer to children we recommend recording body mass index (BMI) and blood pressure (BP) in all and offering management if abnormal.

OVERVIEW

Non-communicable diseases (NCDs) include CVD, diabetes, respiratory diseases such as chronic obstructive pulmonary disease (COPD), musculoskeletal diseases and some cancers. There are few published data on the prevalence of NCDs in people from a refugee-like backgrounds in Australia. Some studies report a higher rate of NCDs in some refugee populations.²⁸⁰ There is published evidence that people from refugee-like backgrounds may have an increased prevalence of diabetes,^{280–282} hypertension,^{282–285} dyslipidaemia,^{156,282} musculoskeletal disease, chronic respiratory disease,²⁸⁰ obesity or overweight^{274,280,283,284,286} and CVD,^{282,287} compared to the population of country of settlement.

Conversely, some studies show a reduced prevalence of NCDs in some groups of immigrants living in high-income countries (HICs) compared to the long-term residents: the 'healthy migrant effect.'^{288,289}

The rates of death related to NCDs are increasing in Australia^{290,291} and internationally particularly in low- and middle-income countries (LMIC), including refugee-source countries.^{292,293} Premature death attributable to NCDs in LMIC occurs at a far higher rate than in Australia.²⁹⁴

The major potentially treatable risk factors for the development of NCDs are poor nutrition and low physical activity, which pre-dispose to obesity, excessive alcohol intake, cigarette smoking and hypertension.

There may be additional explanations for the increased prevalence of NCDs. For immigrants moving from a low- or middle-income country to a high-income country (including people from a refugee-like background) these include abdominal obesity, dyslipidaemia, genetic and environmental factors.^{295–297} Experiences of prolonged poverty, forced migration, spent in refugee camps or similar circumstances may also be potential risk factors for developing NCDs. For example, perinatal deprivation or malnutrition is considered to pre-dispose to diabetes and to other NCDs.^{298,299} Post-traumatic stress disorder (PTSD) and depression are associated with hypertension and hyperlipidaemia.³⁰⁰ People from refugee-like backgrounds with NCDs may also be at risk of complex and multiple comorbidities due to poor socioeconomic conditions and concomitant mental illness, as well as inadequate access to preventive and chronic disease care.

Nutrition and obesity

There are few studies investigating risk factors for obesity in people from refugee-like backgrounds specifically but low socioeconomic status, food insecurity, high intake of sugar-sweetened drinks, body image and inappropriate beliefs related to food, stressful family life and depression are all risk factors for obesity in the general community, including those from refugee-like backgrounds.^{288,301,302} Some refugee-background children reportedly assimilate quickly to less healthy Australian diets,³⁰³ and cultural groups may value childhood obesity as a sign of health and success.³⁰⁴ Other refugee-background communities feeling overwhelmed by food choices³⁰⁵ and have limited knowledge and access to information about healthy food options in Australia.³⁰¹

Physical activity

There are few published data on physical activity in people from refugee-like backgrounds. Amongst culturally and linguistically diverse communities, some refugees were less likely to be active or to consider physical activity due to PTSD.³⁰⁶

Diet and exercise requires individualised and culturally sensitive approaches.³⁰⁶

Tobacco, alcohol and other substances

Little is known about the use of substance in refugee-background communities in Australia.^{307,308} A recent review of substance use in people from refugee backgrounds in the USA suggested a 'refugee paradox' much like the 'healthy migrant effect.'³⁰⁹ Nevertheless drug, tobacco and alcohol issues have been identified as specific health issues of concern following consultations with refugee groups in Australia.^{15,310} There are no data on the prevalence of smoking in people from a refugee-like background, and reported prevalence in immigrants varies according to gender, time since migration and country of origin.³¹¹ There are reports of increased smoking behaviour and heavy alcohol use in people from a refugee-like background who experience PTSD.³⁰⁸ Tobacco intake via a water pipe has been reported in those from the Middle East and Africa and has been shown to potentially increase nicotine dependence.³¹² Certain ethnic groups may also use other addictive substances, such as betel nut in Burmese³¹³ and khat in Somali communities.³¹⁴

There are few data on the use of complementary and alternative medicines by people from a refugee-like background.³¹⁵ Over-the-counter medications within some refugee communities have been linked to potential lead poisoning.²⁷¹ As with any patient, obtain detailed history of complementary and alternative medicine use.

HISTORY AND EXAMINATION

- Evaluate for NCDs at initial assessment, then annually, or as opportunities arise.
- Consider prevalence of NCDs in country of origin.²⁹⁴ These may be underestimates in some refugee-source countries, because of infrequent screening and adequate data collection.
- Family history may be unknown; many people from refugee-like backgrounds have experienced family separation and loss.
- Ask about:
 - diet and nutritional status, including the amount of sugar-sweetened drinks (see 'nutrition and obesity' above) processed food and other carbohydrates
 - smoking, alcohol, other substances, prescribed and non-prescribed medications
 - physical activity
 - chest symptoms. e.g. consider COPD in those > 35 years with breathlessness, cough and/or sputum production (after active TB is excluded). Biomass fuel cooking, common in many LMIC is associated with COPD³¹⁶
 - over-the-counter medications, alternative medications and herbal products (e.g. betel nut, khat), illicit substances.
- Examine:
 - weight, height and waist circumference. Calculate BMI. It should be noted that 'normal' values vary between ethnic groups and gender^{317,318}
 - blood pressure
 - nutritional status
 - signs of CVD, COPD, alcohol use, tobacco use.

INVESTIGATIONS

At present there is no evidence to support screening for NCDs in refugee-background people earlier than current Australian guideline recommendations.

We recommend **diabetes and CVD risk assessment from age 35 years** in patients from high prevalence countries and with risk factors such as obesity or hypertension.

- Screen patients without risk factors for **diabetes every 3 years from age 40 years** using the AUSDRISK calculator <http://www.health.gov.au/preventionoftype2diabetes> and with a fasting **blood sugar or HbA1c**.

In people who are obese and/or with high-risk ethnicity (Asian, Middle Eastern, Pacific Islander, Southern European, North or Sub-Saharan African) calculate AUSDRISK and undertake testing **earlier**.

- Calculate **absolute cardiovascular risk, serum cholesterol and other lipids: for patients >45 years, or earlier if risk factors**. http://www.cvdcheck.org.au/index.php?option=com_content&view=article&id=53&Itemid=62

Cardiovascular risk may be increased in South East Asians and southern Europeans. Those with co-morbid PTSD and depression may have dyslipidaemia. These groups may warrant earlier screening.

- Screen for **chronic renal disease** if at increased risk (e.g. because of smoking, hypertension, CVD, obesity, family history, diabetes) with a **urine albumin:creatinine ratio** and **UEC** (urea electrolytes and creatinine) with calculated glomerular filtration rate.
- Offer screening for breast, cervical cancer, colorectal cancer and osteoporosis as per the RACGP red book <http://www.racgp.org.au/your-practice/guidelines/redbook/>
- See [chapter 15](#) regarding low vitamin D.

MANAGEMENT AND REFERRAL

Manage possible or established NCDs and according to current Australian guidelines, as indicated in the links below. Use tailored, patient-centred, explanatory models.

Educate regarding lifestyle risk factors:

- Provide dietary advice, including recommending tap water as the main drink to all patients, irrespective of age.
- Consider discussions about NCDs in all individuals including adolescents especially in unaccompanied or separated minors.
- Take note of cultural and religious impact on diet e.g. Ramadan and diabetes.
- Consider referrals to diabetes nurse educators and dietitians to assist patients to understand and manage their chronic conditions.
- Consider and address social and emotional wellbeing and psychiatric co-morbidities ([Mental health chapter 18](#)).

CONSIDERATIONS IN PREGNANCY

Refer to the Australian antenatal care guidelines 2015 <http://www.health.gov.au/antenatal>

CONSIDERATIONS FOR CHILDREN AND ADOLESCENTS

Although this chapter does not specifically refer to children we recommend recording weight and height, calculating body mass index (BMI) and recording blood pressure (BP) in all children and adolescents and offering management if abnormal.

LINKS

RACGP

<http://www.racgp.org.au/your-practice/guidelines/>

Australian Heart Foundation

<http://heartfoundation.org.au/for-professionals>

Diabetes calculator

<http://www.health.gov.au/preventionoftype2diabetes>

Nutritional guidelines (includes patient resources)

<https://www.nhmrc.gov.au/guidelines-publications/n55>

Chronic obstructive airways disease

<http://lungfoundation.com.au/wp-content/uploads/2015/06/LFA-COPD-X-Concise-Guide-for-Primary-Care.pdf>

Physical activity guidelines

<http://www.health.gov.au/internet/main/publishing.nsf/Content/health-publth-strateg-phys-act-guidelines>

Physical activity assessment

<http://www.health.gov.au/internet/main/publishing.nsf/Content/health-publth-strateg-phys-act-guidelines#apaadult>

Translated information

<http://www.healthtranslations.vic.gov.au/>

<https://www.nlm.nih.gov/medlineplus/languages/languages.html>

<http://www.mhcs.health.nsw.gov.au/publicationsandresources/pdf/publication-pdfs/oth-9450>

https://www.dhhs.tas.gov.au/__data/assets/pdf_file/0008/91745/Healthy_Lifestyle_resources.pdf



■ CHAPTER 15: LOW VITAMIN D

Georgia Paxton, Gillian Singleton

RECOMMENDATIONS

- Check vitamin D status as part of initial health assessment if there are one or more risk factors for low vitamin D.
- People with low vitamin D should be treated to restore their levels to the normal range with either daily dosing or high dose therapy, ensuring adequate calcium intake, paired with advice about sun exposure and self-management.

OVERVIEW

Low vitamin D is a public health issue across the lifespan, and is prevalent in refugee and asylum seeker populations in Australia. Vitamin D is essential for bone and muscle health, and there is increasing evidence of an association between vitamin D status and a range of non-bone health outcomes, despite a relative lack of robust randomised controlled supplementation trials.

Vitamin D refers to both D3 (cholecalciferol) and D2 (ergocalciferol). D3 is produced in the skin through the action of ultraviolet-B radiation (UVB) in sunlight; it is also the most common form in food and the form available in supplements. Small amounts of D2 are found in some plant-based foods. Vitamin D undergoes stepwise hydroxylation in the liver (forming 25OHD), then kidneys (forming the active 1,25(OH)₂D).³¹⁹ 25OHD is the major circulating form and index of vitamin D input, and is used to assess vitamin D status. Normal vitamin D levels are defined as >50 nmol/L at all ages, and during pregnancy and lactation. This level may need to be 10–20nmol/L higher at the end of summer to maintain levels >50nmol/L over winter and spring.^{320,321}

Sunlight exposure is the most important source of vitamin D, and is estimated to provide over 90% of vitamin D in humans.³¹⁹ Skin synthesis varies with skin colour, ultraviolet radiation (UVR) protection (e.g. clothing, shade, sunscreen), time spent outside, latitude, season, time of day, and atmospheric conditions.^{322–327} Adults with dark skin are likely to require three to six times the amount of UVB (compared to someone with light skin) to produce similar amounts of vitamin D, as the skin pigment, melanin, absorbs UVB.³²⁸ There are no data on skin synthesis in children.³²¹ Diet is a poor source of vitamin D for most Australians (limited amounts in some fatty fish, liver, eggs).³²⁰ Neonatal vitamin D levels reflect maternal vitamin D status, and cord blood levels are approximately 65% of maternal levels.³²⁹ Infants also depend on skin synthesis, as breast milk, despite its other benefits, contains very little vitamin D.³³⁰

Risk factors for low vitamin D can therefore be divided as follows:³²¹

- Lack of skin exposure to sunlight, e.g. lifestyle factors, chronic illness, covering clothing, southerly latitude
- Dark skin (Fitzpatrick types V or VI)³³¹
- Conditions affecting vitamin D metabolism and storage (including obesity)
- In infants – maternal vitamin D deficiency, and exclusive breastfeeding combined with at least one other risk factor.

People from a refugee-like background frequently have risk factors for low vitamin D, including dark skin, covering clothing and reduced exposure to sunlight through migration to temperate latitudes.

Available prevalence data show 61–100% in African refugees in Melbourne, Adelaide and Sydney have low vitamin D (<50nmol/L).^{45,155,255,332,333} Low vitamin D is also common in other refugee cohorts wearing covering clothing (Afghani, Iraqi; prevalence 50–70%),^{71,156} and has been found in 33% of Karen refugees.⁴³ Three Australian case series of rickets found 96–98% of children were migrants or born to migrant parents, and almost all children in these series had ethno-cultural risk factors (dark skin, maternal covering clothing).^{334–336} [See appendix one for more information.](#)

Vitamin D screening^{321,337} is recommended in people with one or more risk factors for low vitamin D – and is therefore recommended as part of initial refugee and asylum seeker health screening where risk factors are present.

People with low vitamin D should be treated to restore their levels to the normal range with either daily dosing or high dose therapy,^{321,337} ensuring adequate calcium intake paired with advice about sun exposure and self-management. People with ongoing risk factors should be aware this is a lifelong health issue, requiring ongoing monitoring and management.

HISTORY AND EXAMINATION

History

- Non-specific bony and/or muscular pain; fatigue with exercise
- Irritability, delayed motor milestones (young children)
- Dairy intake, symptoms of low calcium (muscle cramps). Hypocalcaemic seizures are rare beyond 12 months of age
- Sunscreen use, time outside
- Previous vitamin D levels, previous/current treatment (especially with the increased availability of supplementation)
- Family understanding.

Examination

- **Rickets** — deformity in growing bones due to failure of mineralisation of osteoid. Peak incidence during infancy, although deformity reflects age/growth (and can be in any direction).³³⁸ Consider other causes if asymmetrical. Long bone deformity, splaying (wrists, ankles), bossing, delayed fontanelle closure (normally closed by 18 months, 100% by ²³⁻²⁶ months), rachitic rosary
- **Other** — delayed dentition (no teeth by 9 months, no molars by 14 months),³³⁸ enamel hypoplasia.³³⁹

INVESTIGATIONS

Screen people with serum Vitamin D if with one or more risk factors for low vitamin D.^{321,337}

- In adults — measure 25OHD
- In children — measure 25OHD, calcium, phosphate and ALP. Also measure parathyroid hormone (PTH) in those with low calcium intake, symptoms/signs or multiple risk factors.

In recent arrivals: if the initial vitamin D level is normal, repeat at the end of the first winter in Australia. Levels at the start and end of winter can be useful to make a clinical judgement on frequency of dosing.

From 2014, Vitamin D testing only attracts a Medicare benefit if the patient meets certain criteria (these include dark skin and severe lack of sun exposure for cultural/residential/medical reasons, children <16years with rickets, sibling <16 years with vitamin D deficiency, and infants whose mothers have vitamin D deficiency) – **these criteria need to be specified on test requests.**

MANAGEMENT AND REFERRAL

People with low vitamin D should be treated to restore their levels to the normal range with either daily dosing or high dose therapy.^{321,337} D3 is the only form currently available in supplements.

Adults

- Mild deficiency (30–49nmol/L) 1000–2000IU daily for 3 months
- Moderate to severe deficiency (<30nmol/L) 3000–5000IU daily for 6–12 weeks, then 1000–2000IU daily for a further 6–12 weeks (or 50,000IU monthly for 3–6 months).

Children

- There is inadequate evidence to support high dose therapy in children age <3 months, or during pregnancy or lactation³²¹
- Mild deficiency (30–49nmol/L) age ≥1 year 1000-2000IU daily for 3 months (or high dose 150,000IU stat in age 1–18 years)
- Moderate to severe deficiency (< 30nmol/L) age ≥1 year 1000-2000IU daily for 6 months or 3000-4000 IU daily for 6–12 weeks, (or high dose 150,000IU stat and repeat in 6 weeks in age 1–18 years).

Ensure adequate calcium intake. Calcium supplements may be needed if dietary intake is poor (<2 serves dairy daily). See recommended daily intake of calcium for age (<https://www.nrv.gov.au/nutrients/calcium>).

Treatment should be paired with health education and advice about sun protection/sun exposure – encouraging outside activity. People with dark skin can tolerate intermittent sun exposure without sunscreen. Hats/sunglasses are still recommended.

Follow-up bloods at 3 months (earlier in infants with moderate – severe deficiency – at 1 month³²¹). Follow-up bloods should include 25OHD, Ca, PO4 and ALP. Further management may be required if 25OHD is still low.

People with ongoing risk factors for low vitamin D need to understand this is a lifelong health issue. They will require ongoing monitoring, with annual testing and a plan to maintain vitamin D and calcium status through behavioural change where possible, and supplementation where this is inadequate. They may require high dose vitamin D more than once a year. Avoid very frequent testing.

Ongoing vitamin D intake to prevent deficiency

- Infants and children: 400-600IU daily in the absence of sun exposure – in those with ongoing risk factors it is useful to suggest daily supplements over the winter months or consider high dose vitamin D (150,000IU oral) each 6–12 months depending on levels and risk factor profile
- Adults: 600 IU daily for age <70 years, 800IU daily for those aged ≥70 years.

CONSIDERATIONS IN PREGNANCY AND BREASTFEEDING³²¹

Women with one or more risk factors for low vitamin D should have their serum 25OHD levels measured at the first antenatal visit. Women with low levels should be treated to achieve 25OHD levels >50nmol/L

- 25OHD levels between 30–49nmol/L – 1000IU vitamin D3 daily
- 25OHD levels <30nmol/L – 2000IU vitamin D3 daily.

Testing should be repeated at 28 weeks' gestation; in women whose 25OHD levels have corrected to >50nmol/L, a minimum of 600IU vitamin D3 daily should be given throughout the remainder of pregnancy. There is inadequate evidence to support high dose vitamin D during pregnancy.

Lactation:³²¹ breastfeeding women with low 25OHD levels should be started on 2000IU vitamin D3 daily. There is inadequate evidence to support high dose vitamin D during lactation.

CONSIDERATIONS FOR CHILDREN

Screening and treatment for children also follows the guidelines above.

Other considerations:

- Dosing tables are available for children, including infants. http://www.rch.org.au/immigranthealth/clinical/Low_Vitamin_D/#Dosing_table__Management_of_low_vitamin_D
- In exclusively breastfed infants with at least one other risk factor it is usually more practical to start supplements without screening with 400IU daily for at least the first 12 months of life
- Babies on full formula feeds should receive adequate vitamin D from this source. There is inadequate evidence to support high dose vitamin D in children age 3 months
- Children with rickets require the above tests (25OHD, Ca, PO₄, ALP) as well as UEC, X-ray wrist, clinical photos. Also consider Mg, 1,25(OH)₂D and urinary Ca/PO₄/Creatinine
- Clinical photography is useful to monitor bony deformity in children (nutritional rickets usually corrects after treatment of low vitamin D provided the child has adequate calcium and phosphate intake).

Admission/specialist referral

Symptomatic rickets/hypocalcaemia (including tetany, stridor, seizures) requires hospital admission for intravenous calcium infusion with cardiac monitoring and vitamin D. Do not give high dose Vitamin D in the outpatient setting to this group

Children with clinical rickets or abnormal serum calcium require specialist assessment.

LINKS

http://www.rch.org.au/immigranthealth/clinical/Low_Vitamin_D/

https://www.nps.org.au/__data/assets/pdf_file/0020/265322/Fact-sheet-vitamin-D-tests.pdf

<https://www.nrv.gov.au/nutrients/calcium>

Easidose, a visual prescribing aid

www.easidose.com



■ CHAPTER 16: HEARING, VISION AND ORAL HEALTH

Shanti Narayanasamy, Joanne Gardiner, Nadia Chaves

RECOMMENDATIONS

- A clinical assessment of hearing, visual acuity and dental health should be part of primary care health screening for all.
- Test visual acuity for each eye in all people. For people who do not speak English, test visual acuity with E Logmar chart. For children, use LEA symbols chart.
- Children may be referred to StEPS or similar programme, if available <http://www.kidsfamilies.health.nsw.gov.au/current-work/programs/programs-and-initiatives/steps-statewide-eyesight-preschooler-screening/>
- Refer all people of African descent >40 years and all others >50 years for ocular health checks for glaucoma.³⁴⁰
- Refer all for dental review.

OVERVIEW

People from refugee-like backgrounds may not have had an assessment of hearing, vision and oral health in their country of origin.

Hearing

An estimated 80% of people in the world with moderate to profound hearing impairment are from low and middle income countries (LMIC).³⁴¹ Eighty per cent of hearing impairment worldwide is due to chronic suppurative otitis media (CSOM), and 90% of such cases are in the developing world.³⁴² In Australia, rates of CSOM and cholesteatoma in the adult refugee population are much higher than that documented in broader Australian population.³⁴³

Vision

Low vision and blindness are recognised as one of the major public health problems worldwide. Eighty per cent of visual impairment, including blindness, is avoidable. Uncorrected refractive errors and cataract are the leading causes of visual impairment. Other causes of visual impairment include glaucoma, age-related macular degeneration, corneal opacities, diabetic retinopathy, childhood blindness, trachoma and onchocerciasis. Cataract, trachoma, onchocerciasis and glaucoma occur at increased rates in Sub-Saharan Africa and in the least developed countries.³⁴⁴

Oral health

Poor oral health is a significant public health issue and can cause long-term morbidity. Common oral health problems among people from refugee-like backgrounds include dental caries, missing teeth and periodontal disease; less common issues include orofacial trauma or oral cancers.³⁴⁵ Rates of dental caries vary from region of origin; however, a number of studies have reported much poorer oral health for some groups of newly arrived adults and children from refugee-like backgrounds compared to the general population.³⁴⁵⁻³⁴⁹

Oral health may be affected by a number of pre-arrival issues including low fluoride in the country of origin, low socioeconomic status, malnutrition, damage caused to teeth and gums by torture or trauma, and, poor access to dental care and oral health education.³⁴⁹ Post-arrival issues include low oral health literacy, the competing priorities of settlement, suboptimal understanding of dental service access, and the availability of low-cost sugar-rich food. Long waiting lists, costs of private dental service and suboptimal referral processes are also significant barriers to assessment and care. There may also be a discrepancy between self-reported and clinically determined need for dental care.^{349,350}

Miswak, a traditional chewing stick, is a commonly used oral health product in the Middle East and Sub-Saharan Africa. The efficacy of such products has not yet been established, but the healthcare provider should be aware of the potential oral healthcare differences between cultures.³⁵¹

HISTORY AND EXAMINATION

Hearing

Ask the client if they have any concerns about their hearing or problems with their ears including chronic otitis media or discharge. Assess for a family history of deafness, and any exposure to extreme noise, including during conflict situations. Examine the external auditory canals and tympanic membranes. Further examination should be based on the client's presenting symptoms. Hearing impairment may be a cause of, or contributor to learning difficulties.

Vision

Ask the client if they have any concerns about their vision or any other problems with their eyes. Check visual acuity for each eye, using an eye chart. The E Logmar Chart may be used for clients who cannot read English and the LEA Symbols Chart may be used for children.

Children rarely complain of low vision; therefore, all children should be assessed using StePs or a similar programme: <http://www.kidsfamilies.health.nsw.gov.au/current-work/programs/programs-and-initiatives/steps-statewide-eyesight-preschooler-screening/>. Again, visual issues can contribute to learning problems in children and adolescents.

Refer all people of African descent >40 years and all others >50 years for ocular health checks for glaucoma.³⁴⁰ All people with diabetes require an eye examination. People from Pacific Island countries are at increased risk of diabetes.

Oral health

Ask the client if they have any concerns about their teeth and gums. Inspect the oral cavity with a good light, looking for dental caries, missing teeth, gum disease and other potential problems. Ask parents if children have difficulty sleeping or chewing hard foods, as this may be an indicator of chronic pain.

MANAGEMENT AND REFERRAL

Hearing

Refer children and adults with hearing concerns for audiology testing. Access to this will depend on state and territory legislation. Australian Hearing offer hearing checks and other services (eligibility requirements <http://www.hearing.com.au/category/healthprofessionals/>)

Referral to an ENT surgeon or audiology service can be made through a public hospital.

Vision

Ensure adults at risk, (e.g. from Sub-Saharan Africa or Pacific Island countries), and all individuals with visual concerns have had their vision tested through referral to bulk billing optometrist. Spectacle prescriptions can be filled by a subsidised eyewear service. See the Vision Australia website for referral options: <http://www.visionaustralia.org/business-and-professionals/healthcare-and-education-professionals/make-a-referral>

Some states and territories provide subsidised optometry services and glasses for refugees and asylum seekers. <http://refugeehealthnetwork.org.au/optometry/>

Oral health

Regardless of reported symptoms, refer all people from refugee-like backgrounds to a public dental service for review. Provide basic oral health promotion including informing clients of the importance of a healthy diet, twice daily brushing of teeth, flossing to prevent tooth decay, and regular dental review. Discuss the use of age-appropriate toothpaste (0–6 years) with brushing advice. There may be significant difficulties accessing dental services. Some states and territories currently identify people from a refugee-like background as a priority access group, allowing fee exemption and next available appointment for general and denture care.

LINKS

E Logmar and LEA symbols chart

https://www.good-lite.com/cw3/assets/product_full/500044_lg.png

https://www.good-lite.com/cw3/assets/product_full/250411_lg.png

Translated oral health resources

<https://www.dhsv.org.au/professionals/health-promotion-resources/translated-materials>

http://www.swslhd.nsw.gov.au/refugee/oral_health.html



■ CHAPTER 17: WOMEN'S HEALTH

Gillian Singleton, Jan Williams, Georgia Paxton

RECOMMENDATIONS

- Offer women standard preventive screening, taking into account individual risk factors for chronic diseases, bowel, breast and cervical cancer.³⁴⁰
- Offer women antenatal/perinatal care consistent with Australian guidelines.³⁵²
- Consider pregnancy and breastfeeding in women of childbearing age when planning immunisation, post-arrival screening, and treating positive screening test results.
- Offer appropriate life-stage advice and education, including contraceptive advice where needed, to all women, including female adolescents.
- Women and girls are vulnerable to sexual violence during civil conflict and subsequent displacement. Be aware and sensitive to the possibility of a history of sexual violence and/or sexual abuse and associated physical and mental health consequences.³⁵³

- Intimate partner violence (IPV) is more common in countries experiencing war, conflict or social upheaval. As with any women presenting for care in Australia, the possibility of IPV should always be considered, sensitively explored, level of safety assessed and managed empathically.^{354,355}
- Practitioners should be aware of clinical issues, terminology and legislation related to female genital mutilation/cutting (FGM/C) and forced marriage.^{356,357}
- Always define confidentiality, and attempt to integrate women's preferences regarding gender concordant care, including gender preference for interpreters.

OVERVIEW

Female adolescents and women from refugee-like backgrounds may have had limited access to women's healthcare services prior to arrival in Australia, either due to lack of availability in their countries of origin and transit or because of prolonged periods spent in transit camps. Depending on their country of origin, the concept of women's health screening and perinatal care may be unfamiliar, and the rationale, benefits and processes thus may need to be explained with a professional interpreter to enable informed consent.

A comprehensive women's health assessment should be offered respectfully and sensitively. This is an opportunity to build trust and to create a safe environment. Similar to other communities, sensitive aspects of history may not be volunteered by patients until rapport is established, and may not be raised in the presence of other family members. Interpreter rapport is a further factor in building trust in the consultation. It is essential to clearly define the routine role of confidentiality in consultations, including defining interpreter confidentiality. Female adolescents should be seen alone for part of their health consultations once rapport is established. Explaining this is routine in the Australian healthcare system and seeking permission from both the adolescent and her parent/carers is helpful to facilitate this aspect of adolescent healthcare.

It is rarely necessary to perform a breast or pelvic examination at the first visit, unless there is an issue of immediate concern to the patient. It may be appropriate to see the patient over several visits in order to establish trust, to adequately explain the reason for women's health screening and to ensure understanding and informed consent. Practitioners should always offer and provide a female interpreter, or, if requested by the individual, a chaperone for these consultations.

Cultural pressures and expectations as well as additional vulnerabilities related to migration status may influence the health consultation. As an example, women who are seeking asylum who are victims of IPV, as well as facing the many barriers common to all women who are victims of family violence, may struggle to disclose their traumatic experiences because of concerns about potential impacts on their asylum claim.

Confidentiality within the consultation should be emphasised as well as the fact that resources and support are available if violence is disclosed.³⁵⁵ Re-establishing trust is essential to emotional recovery for women who have experienced pre and/or post-migration trauma. Development of a quality therapeutic relationship with a primary care provider can be an important part of this recovery process.

Preventive health

Many women from refugee-like backgrounds are unfamiliar with pap smears and mammography, as well as other aspects of preventive health. Women with a first language other than English in Australia have been found to have lower health screening access rates and poorer quality of health outcomes compared to English speakers.^{358,359}

Explain the benefit and mechanism of these investigations to ensure an informed choice. Use health promotion material such as multilingual patient information sheets, flip charts, anatomical models and diagrams to explain screening tests, basic anatomy and physical functions such as menstruation.³⁶⁰

Women from refugee-like backgrounds may be at increased risk of osteoporosis due to prolonged poor nutrition and/or low vitamin D levels. Standard national guidelines apply for chronic disease (such as type 2 diabetes, ischaemic heart disease and osteoporosis), cervical, breast and bowel cancer screening.³⁴⁰

Screening for STIs also needs to be considered for women at risk, particularly for women who have come from a high-risk environment for, or disclosed exposure to sexual violence or unprotected sex (See [Sexually Transmissible Infections – chapter 10](#)).

Fertility and contraceptive choices

A comprehensive contraceptive and obstetric history is essential. Avoid making assumptions when providing sexual and reproductive healthcare. Some women may have limited knowledge and experience of contraception and are consequently at greater risk of unplanned pregnancy.³⁶¹

Contraceptive choices may be a responsibility shared by both partners. Offer information sensitively and clarify and enhance existing knowledge of emergency, reversible and irreversible contraception. Multilingual resources are available.³⁶²

Avoidance of assumptions is particularly pertinent to the management of unplanned pregnancy. Some women may decline a termination of pregnancy for religious and/or cultural reasons, others will make use of the opportunity; in any case, information regarding referral and clinical options, including medical abortion, should be provided so women can make an informed choice.

Female genital mutilation/cutting

Female genital mutilation/cutting³⁶³ is practised in many humanitarian source countries, although there are no prevalence data on how many women have undergone the procedure prior to arrival in Australia. It is estimated that over 125 million women worldwide have been affected by FGM/C,³⁶⁴ and in some countries the prevalence in women is up to 90%.

FGM/C involves removing normal, healthy genital tissue. The procedure is typically performed in young girls, from infancy to 15 years of age. It is medically unnecessary and has many potential physical and psychological consequences. The risks are related to the type of FGM/C that a woman has undergone. It is important that all primary care providers who see women from countries where this practice is performed are aware of the facts on the procedure, and potential consequences for women and girls.

It is important to be aware that use of the term FGM/C can be offensive to women. This issue should be explored respectfully, ascertaining what term the patient prefers. Other suggested terms such as 'female circumcision', 'traditional cutting' or 'female ritual surgery' may be perceived as being more respectful.³⁶³ For many women, FGM/C is a normal part of their life experience and thus they may be surprised when concerns are raised. Adolescent girls may not be aware that they have undergone the procedure.

There are four different types of FGM/C, ranging from excision of the prepuce to removal of the majority of the external genitalia and narrowing of the introitus (infibulation).³⁶³ Potential consequences depend on the type of FGM/C performed. Many women do not experience difficulties; however some may suffer from difficulty voiding, frequent UTIs, obstructed urinary flow, incontinence, sexual difficulties, urinary and/or faecal fistulae, obstruction during miscarriage and childbirth, intra-partum vaginal and perineal damage, chronic pain and psychological sequelae. Refer to an experienced female GP or sexual health nurse for gynaecological examination, including for pap smears. If women request deinfibulation (surgical opening of a narrowed introitus), facilitate expert gynaecological review – this is considered an urgent rather than routine referral.

Respectful, non-judgemental explanation of medical concerns about risks of FGM/C is important, particularly during pregnancy. Women and their families need to be aware of Australian law concerning FGM/C. It is particularly important that women understand that it is illegal in Australia for their daughters or other female relatives or friends to have this procedure, either in Australia or while overseas. Some families may want their daughters to undergo FGM/C and may wish to take them out of Australia to facilitate the procedure, this is an issue to consider when families seek travel advice for other reasons. Mandatory child protection reporting is required if there is any concern that girls aged less than 18 years of age are at risk of undergoing FGM/C.³⁶⁵ Education programmes to inform and support communities about the negative health consequences of FGM/C are available in several states in Australia.³⁶⁶

Pregnancy care

Women who have a positive pregnancy test or who are planning pregnancy should be offered screening consistent with Australian antenatal care guidelines.³⁵²

Pregnancy planning, preferably in the prenatal period, is very important in women who have had FGM/C, to ensure that health outcomes of both mother and baby are optimised. Assess the type of FGM/C and refer appropriately to ascertain if de-infibulation is required. The external appearance of genitalia is not necessarily an accurate representation of internal narrowing due to the procedure, which may complicate labour. Understanding and managing expectations, which may be divergent from obstetric practice in Australia, such as expectation of re-infibulation following delivery, is important; these concerns should be recognised and addressed as soon as they arise.

Many women from refugee-like backgrounds come from countries where there are high fertility rates and poor access to antenatal and prenatal care. Consequently, pregnancy complications and fetal loss are not uncommon.³⁶⁷ The sense of loss experienced by women from refugee-like backgrounds may increase during pregnancy. Many women are distressed at not being able to follow their traditional cultural practices at this time, where supporting women through pregnancy and childbirth, and raising children is a shared responsibility. Women often feel the absence of relatives acutely and some studies suggest a higher risk of postnatal depression.³⁶⁸

Menopause

Menopause should be considered when taking a history from women aged over 40 years. Menopausal symptoms may be masked by, or attributed to the difficulties of resettlement. Prolonged periods of amenorrhoea due to malnutrition or stress may be mistaken for premature menopause, or mask a slowly returning and/or unexpected fertility. This presentation provides a good opportunity to talk about contraception and preventive health, including the importance of weight-bearing exercise.

Intimate partner violence³⁵⁵

Refugee women often lack knowledge of laws about IPV in Australia, particularly knowledge of what constitutes family violence, and how to access help for this issue. Women can face multiple barriers to disclosing their experience of violence.

Family violence in Australia is not confined to particular socioeconomic or cultural groups – it is pervasive.³⁶⁹ Recognised correlating factors for risk of violence in women include exposure to child abuse or violence as a child, alcohol or drug dependency issues, financial or personal stress and lack of social support. IPV is more common in countries experiencing war, conflict or social upheaval. Some women are more vulnerable to violence, or less able to leave violent relationships, based on factors such as age, rural and remote location, disability, ethnicity, English language ability and being pregnant.

As is the case with any women presenting for healthcare in Australia, the possibility of IPV should always be considered in women from refugee-like backgrounds, sensitively explored, level of safety assessed and managed empathically.^{354,355}

It is useful to screen discreetly for family wellbeing and to interview the woman separately from her partner where possible, giving her an opportunity to raise concerns. Useful questions include: 'Is there a lot of tension in your relationship at the moment?', 'How do you solve arguments if they happen?', 'Do arguments ever get physical at home?', 'Do you feel safe at home?'. Assessing safety is important, as is providing support to develop a safety plan for women and children at risk.

The majority of women who are victims of IPV do not readily disclose their traumatic experiences due to a number of factors including:

- fear of reprisal/worsening violence
- social isolation and financial dependence
- poor self-esteem as a consequence of the violence
- emotional dependence
- being unable to recognise the cycle of abuse/self-blame
- fear of loss of custody of children.

For women from refugee-like backgrounds, disclosure rates are believed to be lower than the rest of the population, and they may face additional complexities such as concerns about potential impact on immigration status, and cultural and religious factors, including risk of social ostracism if disclosure occurs.^{370,371}

Healthcare providers need to be aware of these issues, to approach concerns about IPV sensitively and to review regularly and invest time in the therapeutic relationship as the development of trust is imperative. When a woman is ready, referral to culturally appropriate advocacy, support and legal services can be facilitated.

LINKS

RACGP White book Abuse and violence – working with our patients in general practice Feb 2014.
<http://www.racgp.org.au/your-practice/guidelines/whitebook/chapter-12-migrant-and-refugee-communities/>

Australian antenatal guidelines

<http://www.health.gov.au/antenatal> (contains information on culturally sensitive care and on specific needs of women from refugee-like backgrounds)

The National Education Toolkit for FGM/C awareness

<http://www.netfa.com.au/>

Female genital mutilation Information for health professionals booklet 1997.

<https://www.ranzcog.edu.au/female-genital-mutilation-fgm-booklet.html>

Hach M. Multicultural centre for womens health. Common threads, common practice.

Working with immigrant and refugee communities in sexual and reproductive health.

http://www.mcwh.com.au/downloads/publications/MCWH_CommonThreads_BestPracticeGuide_WEB.pdf

Family planning NSW multilingual audiovisual resource for patients explaining importance of cervical screening

<http://www.fpnsw.org.au/untoldstories>

Cohealth. Helping health professionals to start conversations about female circumcision website.

<http://cohealth.org.au/fgc/>

Jean Hailes Multilingual womens health resources including menopause and PCOS.

<https://jeanhailes.org.au/health-professionals/multilingual-resources>

Women from culturally and linguistically diverse backgrounds

<https://www.beyondblue.org.au/resources/for-me/multicultural-people>

<http://www.health.gov.au/internet/publications/publishing.nsf/Content/clinical-practice-guidelines-ac-mod1~part-a~population-groups~diverse-backgrounds>

<https://www.beyondblue.org.au/resources/health-professionals/perinatal-mental-health>



■ CHAPTER 18: MENTAL HEALTH

Gillian Singleton, Debbie Hocking, Joanne Gardiner, Georgia Paxton

Note: Parts of this section have been adapted from Promoting Refugee Health.²¹ For further information please refer to this guide.

RECOMMENDATIONS

- An assessment of emotional wellbeing and mental health should be part of post-arrival health screening, although concerns in these domains may only emerge over time, as trust and rapport develop.
- It is generally not advisable to ask specifically about people's experience of torture and trauma, especially in the first visits, however the potential impacts on psychological health should be assessed.
- Consider suicide risk assessment in people where mental health concerns are evident or suspected.
- Consider functional impairment, behavioural difficulties and developmental progress as well as mental health symptoms when assessing children, or the impact of parents' mental health status on child wellbeing.

OVERVIEW

Many adults and children from refugee-like backgrounds have experienced trauma, conflict, family separation and significant human rights violations, including torture and physical and sexual violence. A meta-analysis found the population prevalence of reported torture was 21% in refugee adults,³⁷² and available Australian data suggest a high proportion of asylum seekers in detention disclose a history of trauma and torture.³⁷³ Unaccompanied and separated children are recognised as having specific risks and vulnerabilities.^{374–378}

While pre-arrival trauma is well recognised in refugee populations, settlement may also contribute to mental illness, and is often associated with multiple stressors. Navigating life in a new country, language barriers, housing and financial instability, difficulty accessing employment, changes in family roles, and loss of community, country and cultural connections can have additive impacts in terms of risk for mental health. A meta-analysis of risk factors affecting mental health outcomes in refugee groups³⁷⁹ found poorer outcomes were associated with institutional or temporary housing after settlement, restricted economic opportunity after settlement, ongoing conflict in the country of origin, higher education level and higher socioeconomic status pre-arrival, and coming from a rural area. Child and adolescent refugees had relatively better mental health outcomes than adults in this analysis, although parent mental health has a strong influence on child wellbeing.

Asylum seekers may face additional stressors related to their asylum experience – through perilous journeys, time in immigration detention, and living in a state of prolonged uncertainty. There is clear evidence that Australian immigration detention, especially long-term detention, is detrimental to health and mental health at all ages, in the short and long term.^{380–400} Additionally, Australian temporary protection visas have been shown to be associated with worse mental health status when compared to permanent protection visas,^{387,392,401–404} due to restrictions on family reunion, access to employment and/or Medicare, and exposure to ongoing uncertainty.⁴⁰⁴

Widely variable rates of mental health issues are reported in refugee children (reviewed in,⁴⁰⁵ also^{406,407} and adults,^{372,391,408–412}) although there is more information available on the prevalence of Post Traumatic Stress Disorder (PTSD), depression, and anxiety than other mental health diagnoses, and findings are typically specific to cohorts, conflicts and countries of settlement. Like any population, people from refugee-like backgrounds may have conditions such as schizophrenia or bipolar disorder; although, there is little evidence to suggest that these diagnoses are more frequent in refugee-like populations.

The validity of mental health screening in refugee groups has been questioned.⁴¹³ Existing assessment tools, diagnostic approaches and psychological interventions may have limited applicability to refugees and asylum seekers, and caution is required with mental health diagnoses; however, evidence suggests that therapy is beneficial in these groups.^{414–416}

We advise clinical screening for emotional wellbeing and mental disorders as part of the post-arrival screening, and ongoing review for stressors related to the refugee and resettlement experience over time.

Available evidence suggests that both refugees^{405,417–423} and asylum seekers^{424–427} face significant barriers to accessing health and mental health services. A comprehensive post-arrival health assessment offers an opportunity to build trust and rapport, consider risk and resilience, and raise awareness of mental health and supports in Australia. Understanding mental health is also essential to address other health problems, and support adherence to medication and management.

HISTORY AND EXAMINATION

A complete history and examination is outlined in Promoting Refugee Health.²¹

Health consultations and discussion about mental health may be a source of significant anxiety for some individuals. Past experiences influence people's understanding and access to healthcare, and it is important to recognise that people may not have had prior experience of mental health care. Furthermore, in some source countries, authority figures, including health professionals, may have been complicit in torture or other form/s of persecution. It is also important to consider the presence of family members in the room, and issues specific to working with interpreters (see chapter 1, box 1B).

The following areas are useful to explore during initial consultations:

- **Migration history.** Some useful general (and sensitive) questions include:
 - When did you leave your country?
 - Were you forced to leave? What was the situation that led you to leave?
 - What countries were you in before you came to Australia? What were conditions like in those countries? Have you spent time in a refugee camp or a detention centre?
- **Migration status (asylum seekers).** Asylum seekers in Australia experience prolonged delays (i.e. years) in processing their claims for refugee status, which includes frequent changes to immigration policies that directly impact on their day-to-day lives. An insecure and temporary visa status is associated with feelings of powerlessness and inability to plan for the future,^{401,403} with the additional burden of stringent code of conduct requirements,⁴²⁸ denial of work rights⁴²⁹ and/or Medicare, and restrictions on family reunion.⁴³⁰
- **Family composition.** Useful questions include: 'Who is in your family in Australia?' and 'Who is in your family overseas?' rather than trying to construct a genogram. Concern for remaining family overseas may be overwhelming, with significant effects on settlement and wellbeing.
- **Settlement experience, social connections, resources and support.**
- **Current functioning.** It is often useful to ask about appetite, energy, daily activities, memory and concentration, sleep and plans for the future as an entry to more specific mental health symptoms. Asking about approaches to stress management, and coping strategies can also be useful, as it can indicate the extent of the person's (internal and external) resources, and utilisation of these resources.
- **Trauma screening.** It is rarely necessary to ask in detail about a client's trauma and torture history, and it is important to consider the potential for triggering a trauma response. Useful screening questions include:
 - Terrible things have often happened to people who have been forced to leave their countries. I do not need to know the details about what you have been through, but is there anything that has happened that might be affecting you now?
 - Do you think a lot about these things that you've been through?
 - Is it hard to concentrate on other things in your life, or is it hard to get to sleep because of these memories or thoughts, or because of bad dreams or nightmares?
 - Do you worry about going crazy or 'losing your mind'?

- **More specific mental health symptoms.** Enquire about symptoms such as current mood, irritability or anger, sadness, hopelessness, guilt and worthlessness, loss of interest in (previously) enjoyable activities, social withdrawal, anxiety symptoms, panic symptoms/panic attacks, rumination, and intrusive thoughts.
- **Self-harm/suicide risk assessment.** Suicidality can occur independently of mental illness,⁴³¹ and hopelessness has been found to be a stronger predictor of suicidal ideation than a diagnosis of depression.^{432–434} Furthermore, suicidality may present differently in those from diverse refugee-like backgrounds.^{435,436} Religious beliefs and a strong sense of responsibility to one’s family can be particularly potent protective factors, which often precludes intentional and planned acts of self-harm. It is worth noting that asylum seekers are likely to be at greater risk of suicide after a negative refugee determination decision.^{437,438} Therefore in addition to the usual risk assessment questions (i.e., Does the individual have thoughts of harming themselves? Do they have intent, a plan and means to do so?), the following questions may also be useful: ‘Do you ever wish you were dead?’; ‘How often do you have these thoughts... and how long have you been having them? Have they increased or lessened over time?’; ‘Do you worry that you might hurt yourself impulsively, without planning to (e.g. walking in front of a car or train)?’ ‘Do you sometimes find yourself doing things that put you at risk without realising, such as walking across the road without checking to see if there is traffic?’.

Other common presentations in adults include:

- **Somatization** of psychological symptoms including chronic and regional pain syndromes. Pain syndromes, particularly neuropathic pain, can also be the consequence of previous torture and thus should be comprehensively assessed.
- **Concerns about memory and concentration.**
- **Complicated grief,^{439–441} prolonged grief/bereavement,^{439,442} and traumatic grief.⁴⁴³** Common – even adaptive – traumatic/complicated grief reactions in this population may be mistaken for psychotic symptoms, such as visual or auditory hallucinations,^{444,445} and must be considered and assessed carefully within this context.
- **Relationship difficulties** (including family violence, parenting issues). [Refer to chapter 17](#) – Women’s health for further exploration of family violence identification and management.
- **Disorders of addiction,** including gambling or substance abuse.

Culture, mental health literacy, education, language proficiency, education and perceptions of stigma also have profound effects on presentation and access to mental health services.

The Cultural Assessment Tool⁴⁴⁶ is a useful framework that encourages a narrative approach to exploring people’s beliefs and cultural interpretation of illness. Questions from this tool include:

- Why do you think the problem started when it did?
- What do you think your illness does to you?
- What are the main problems it has caused for you?
- How severe is your illness?
- What do you most fear about it?
- What kind of treatment/help do you think you should receive?
- Within your own culture how would your illness be treated?
- How is your community helping you?

- What have you been doing so far?
- What are the most important results you hope to get from treatment?

MANAGEMENT AND REFERRAL

Patients with mental health issues related to torture and trauma should be referred to a specialised torture and trauma service.

Where there is no torture or trauma history, referral to mainstream mental health services may be more appropriate. There are a number of ways to provide assistance while people await review. These include:

- Regular review and providing support to reduce feelings of isolation.
- Exploring and identifying strengths and evidence of resilience.
- Advice regarding regular exercise and good nutrition.
- Advice on sleep hygiene and relaxation strategies.
- Psycho-education about common mental health symptoms and conditions (e.g. social withdrawal, anhedonia, and disturbance of mood, sleep, appetite for depression; intrusive symptoms, avoidance and hyper-arousal for PTSD; physiological responses during panic attacks; transient cognitive difficulties due to anxiety/depression/chronic stress). Normalising symptoms can help to de-stigmatise perceptions of mental illness, and individuals may prefer to manage symptoms themselves unless, or until, significant psychosocial functional impairment and/or subjective suffering is encountered.
- Explaining what is meant by counselling, which may increase the likelihood of the individual accepting a referral in the future. Counselling may be normalised by framing it as a way to help problem-solving processes and increase coping strategies, in addition to it being a confidential space to release 'emotional pressure' independent of family and community relationships.
- Introducing the concept of talking with others – e.g. friends, religious figures, or a counsellor as a way to releasing pent up emotions and stress. Useful analogies can be to get things 'off one's chest' or a pressure cooker valve 'letting off steam', rather than 'bottling things up'. Explaining that counselling may not suit everyone, but that it may help provide strategies to reduce further build up of emotional stress, strengthen emotion regulation, and increase social connectivity, can be a useful strategy.
- Teaching structured problem-solving, and identifying and challenging negative core beliefs using simple cognitive behavioural therapy strategies. Technology such as mobile phone applications may be useful. Whilst most applications are in English, there is at least one ('New Roots') that has been translated. (Refer to Links at the end of this chapter).
- Excluding possible medical contributors to mental health symptoms where relevant (e.g. low B12, thyroid dysfunction).

A list of services for each state and territory is available in the Foundation House Promoting Refugee Health Guideline.²¹

The methods of documenting (and managing) physical and psychological findings of torture and trauma are outside the scope of these guidelines. Please refer to the Istanbul protocol for further details. (<http://www.ohchr.org/Documents/Publications/training8Rev1en.pdf>)

CONSIDERATIONS IN PREGNANCY AND THE PERINATAL PERIOD

The sense of disconnection and loss relating to separation from key family members, supports and culture can be exacerbated during pregnancy and the perinatal period. It is common for women to be distressed by differences between mainstream ante and perinatal care and their traditional cultural practices during this time. Many women of refugee-like background are from cultures where supporting a new mother and raising children is a shared responsibility. Pregnancy and the post-partum period are often times where the sense of loss related to absence of friends and relatives is heightened and thus there is a higher risk of anxiety and postnatal depression.³⁶⁸ This risk appears to be extreme for women who are pregnant and give birth while they are in immigration detention.

Women who have experienced FGM/C face specific physical and psychological risks in pregnancy, which need to be recognised early and addressed. ([Women's Health chapter 17](#)).

Pregnancy is a time where women at risk of family violence may be particularly vulnerable to harm. Women of refugee-like background are not immune to these risks and thus this needs to be considered and sensitively managed^{355,369} ([Women's Health chapter 17](#)).

Recognition of the risks which women of a refugee like background face during this vulnerable time is important, to enable appropriate screening, to facilitate access to care with early referral to culturally and linguistically appropriate services, to enhance social supports and enable access to appropriate health promotion and education resources to optimise outcomes.³⁵²

CONSIDERATIONS FOR CHILDREN AND ADOLESCENTS

Children and young people of refugee-like background are likely to have been exposed to significant trauma prior to their arrival in Australia, and may have additive risk for mental health and developmental concerns through parent mental illness, disrupted family functioning, periods of separation, and the timing of trauma in relation to developmental milestones. Unaccompanied and separated minors have specific vulnerabilities, including increased risk of experiencing violence, sexual abuse or sexual violence, and they may have cumulative risk for mental illness. Children and adolescents experience a similar range of psychological reactions to trauma to adults; however, their clinical presentation reflects their age and development.

Parent mental health influences child mental health, and the impacts of parental distress and/or mental illness on children are significant. For asylum seeker children and adolescents, Australian immigration detention has been found to have profound negative impact on parenting and family functioning,^{209,390,391,395,447,448} and children frequently witness adult distress, mental illness and self-harm in detention.⁴⁴⁹ Children and adolescents in detention are at high risk of mental health problems, including PTSD, anxiety and depression, sleep and behavioural disturbances, and enuresis. Infants born in detention may have severe attachment issues in association with maternal postnatal depression.

Parental well-being is also identified as a key factor in optimising a child's ability to recover from adversity.⁴⁵⁰ Children and adolescents experience settlement through their family circumstances, but also through their interaction with peers, community and education in their new country, and there is increasing recognition of the role of education and schools in supporting child wellbeing.⁴⁵¹⁻⁴⁵⁴

In addition to the areas of history suggested in the earlier section, other points to consider in children and adolescents include: ⁴⁵⁵

- Attachment to parents/caregivers.
- Behavioural difficulties, including irritability or aggression.
- Play and peer relationships, including emergent themes in games or drawing, any difficulties making friends, engaging in play, or joining group activities.
- Difficulties with attention or concentration, hyperactive behaviour, learning difficulties.
- Withdrawal or lack of interest in normal activities; retreating into screen-based play is common.
- Separation issues, including school refusal, watchfulness, and co-sleeping.
- Sleep-related symptoms, including nightmares, intrusive worries or thoughts, disordered sleep routine and fatigue.
- Enuresis and encopresis.
- Difficulties with self-esteem.
- Developmental delay, lack of expected developmental progress or regression.
- Sexualised behaviour, which may indicate that a child or young person has witnessed or been exposed to sexual abuse. Seek advice on child protection concerns and consider reporting requirements.
- Risk taking behaviour in adolescents.

Self-harm or suicidality are extremely rare in younger children, but require urgent review if present at any age.

Consider use of a screening tool for children such as the Strengths and Difficulties Questionnaire (SDQ). HEADSSS screening is useful to elicit key aspects of psychosocial history in adolescents. See below for links.

Management and referral (children and adolescents)

Management and referral of children with mental health concerns follows similar principles to adults. Where mental health difficulties relate to torture/trauma experience, a torture trauma service is an appropriate referral, and in most states and territories these services will provide services for children. Seek specialist paediatric advice early; referral to generalist mental health services may also be appropriate. Also consider (and screen where relevant) for treatable conditions that may cause or exacerbate mental health or behavioural problems, including hypothyroidism, vitamin B12 deficiency and iron deficiency.

General principles of managing children/adolescents experiencing trauma reactions and/or other mental concerns include:

- Addressing mental health issues in the whole family.
- Supporting primary attachments with significant people.
- Maintaining routine and preparing for changes, reassuring children about the future.
- Addressing sleep issues, and maintaining a healthy age-appropriate sleep routine, and limiting screen time.
- Encouraging play in younger children (between children, and between parents and children) and enjoyable activities in older children/adolescents, including sport and exercise.

- Encouraging them to express emotions and asking what they are thinking/feeling.
- Setting realistic goals for behaviour and avoiding overreacting to difficult behaviour during transition periods.
- Promoting engagement with school and community, and also promoting maintenance of first language alongside English language learning.

CHILD DEVELOPMENT

A brief assessment of developmental milestones should be included as part of a comprehensive assessment in children of refugee-like background, specifically eliciting parent concern, excluding sensory impairment (vision and hearing), and ensuring children are linked with age-appropriate services such as Maternal and Child Health Nursing and kindergartens early in the settlement period. Assessment of children with developmental delays or disability will usually require specialist child health input, by paediatricians or through paediatric allied health professionals.

There are limited prevalence data on developmental issues or disability in children of refugee-like background, although they may have multiple risk factors for developmental concerns, and the aetiology of developmental issues is typically multifactorial. Routine neonatal, early childhood, vision and hearing screening are unlikely to have been completed, and children may arrive with significant developmental delays or disability.

Psychological and developmental assessment can be complex, requiring an understanding of second (or later) language acquisition, language transitions in relation to development, relevant medical conditions, the impact of forced migration, trauma, and settlement, and support services available. There are specific challenges with the use of developmental screening tools, language assessments and cognitive assessments for children with English as an Additional Language (EAL). Developmental assessments take time and require close liaison with families and the help of a skilled interpreter. They are usually completed in the specialist child health setting, after referral from primary care. Service guidelines are available.⁴⁵⁶

Adolescence is a developmental stage, for which milestones include emergent autonomy and independence, personal identity and body image, peer relationships and recreational goals, educational and vocational goals, and sexuality. Adolescents of a refugee background face all these transitions in addition to the transitions of resettlement. They are faced with balancing the values/expectations of their parents/cultural background with those of their new peers, while developing their own identity and learning a new language in a new schooling and social system. Adolescents may also make new meaning from past trauma, and present with mental health concerns in relation to trauma in early childhood.

LINKS

Promoting refugee health: a guide for doctors, nurses and other health care providers caring for people from refugee backgrounds.

<http://refugeehealthnetwork.org.au/promoting-refugee-health-a-guide-for-doctors-nurses-and-other-health-care-providers-caring-for-people-from-refugee-backgrounds-3rd-ed/>

Mental health in multicultural Australia

<http://www.mhima.org.au/>

Forum of Australian Services for the Survivors of Torture and trauma services (listed by state and territory)

<https://www.refugeecouncil.org.au/fact-sheets/settlement-services/torture-and-trauma-services/>

http://www.healthtranslations.vic.gov.au/bhcv2/bhcht.nsf/PresentEnglishResource?Open&x=&s=Mental_Health/Illness

<http://www.beyondblue.org.au/resources/health-professionals/clinical-practice-guidelines/asd-ptsd-clinical-practice-guidelines>

<http://refugeehealthnetwork.org.au/mental-health-resources-weblinks/>

<http://refugeehealthnetwork.org.au/refer/mental-health-services/>

New Roots smartphone app - information about and download from:

<http://www.ssi.org.au/news/ssi-news-blog/565-new-roots-using-smartphones-to-help-refugee-men-in-australia>

Children and young people

ANU Australian child and adolescent trauma, loss and grief network - refugee children and families information

<http://earlytraumagrief.anu.edu.au/resource-centre/refugee-children-and-families>

Royal Children's Hospital Melbourne. Immigrant Health service. Developmental assessment page.

<http://www.rch.org.au/immigranthealth/clinical/developmental-assessment/>

Transcultural Mental Health Centre & NSW Centre for the Advancement of Adolescent Health. Adolescent Health: Enhancing the skills in caring for young people from culturally diverse backgrounds. 2nd edn. 2008

http://www.schn.health.nsw.gov.au/files/attachments/complete_gp_resource_kit_0.pdf

Strengths and Difficulties Questionnaire

<http://www.sdqinfo.com/>

HEADSSS screening:

http://www.rch.org.au/clinicalguide/guideline_index/Engaging_with_and_assessing_the_adolescent_patient/

APPENDIX ONE:

Prevalence Tables

Condition	Group	Region				
		Overall (if mixed origins)	Africa	Middle East	Asia	Other
Anaemia	Mixed ages	17% (30/181) ⁽¹⁾ 7% (197/2826) ⁽²⁾ 16.4% (150/913) ⁽³⁾	27% (20/75) ⁽¹⁾ 12% (n=442) ⁽⁴⁾ 19% (45/235) ⁽⁵⁾ 11% (n=215) ⁽⁶⁾ 18% (203/1130) ⁽⁷⁾	6.6% (6/91) ⁽⁸⁾ 20% ⁽⁹⁾	10% (10/106) ⁽¹⁾ 9.2% (102/1113) ⁽¹⁰⁾	
	Children	15% (37/239) ⁽¹¹⁾ 25% (n=251) ⁽¹²⁾	18.1% (33/182) ⁽¹¹⁾ 20% (42/232), 39% (20/51) <5yrs ⁽¹³⁾ 30% (n=128) ⁽⁵⁾ 17% (24/130) ⁽¹⁴⁾	10% (2/20) ⁽¹¹⁾	5.4% (2/37) ⁽¹¹⁾ 11.7% (58/495) ⁽¹⁰⁾	
	Adults		17% (52/312) ⁽¹⁵⁾ 6.5% (3/124) ⁽¹⁶⁾	N/A	5.4% (11/204) ⁽¹⁶⁾ 7.1% (44/618) ⁽¹⁰⁾	
	Pregnancy	5.9% (160/2713) ⁽¹⁷⁾	7.2% (92/1279) ⁽¹⁸⁾	N/A	N/A	
Iron deficiency	Mixed ages		34% (65/189) ⁽⁴⁾ 20% (43/210) ⁽⁵⁾ 15% (166/1130) ⁽⁷⁾	N/A	13.1% (147/1125) ⁽¹⁰⁾	
	Children	17% (36/216) ⁽¹¹⁾ 33% (n=343) ⁽¹⁹⁾ 15% (n=92) ⁽¹²⁾	19.6% (33/168) ⁽¹¹⁾ 19% (45/232), 35% (18/51) of those aged <5yrs ⁽¹³⁾ 42% ⁽¹⁹⁾ 30% (n=128) ⁽⁵⁾ 17% (22/130) ⁽¹⁴⁾	0% (0/20) ⁽¹¹⁾ 50% ⁽¹⁹⁾	11% (3/28) ⁽¹¹⁾ 27% ⁽¹⁹⁾ 14.4% (72/497) ⁽¹⁰⁾	20% (the Americas) ⁽¹⁹⁾
	Adults		14.6% (22/151) ⁽¹⁵⁾	N/A	11.9% (75/628) ⁽¹⁰⁾	
	Pregnancy	N/A	N/A	N/A	N/A	
Low vitamin B12	Mixed ages	16.5% (151/916) ⁽³⁾	6.5% (19/294) ⁽³⁾	24.2% (67/277) ⁽³⁾ 18.4% (16/87) ⁽⁸⁾	19.0% (63/332) ⁽³⁾ 1.5% (12/812) ⁽¹⁰⁾	
	Children		N/A	N/A	1% (4/352) ⁽¹⁰⁾	
	Adults		N/A	N/A	1.7% (8/460) ⁽¹⁰⁾	
	Pregnancy	N/A	N/A	N/A	N/A	

Condition	Group	Region				
		Overall (if mixed origins)	Africa	Middle East	Asia	Other
Low vitamin D	Mixed ages	17% (30/181) ⁽¹⁾	27% (20/75) ⁽¹⁾ 29% (65/225) with <37nmol/L ⁽⁶⁾ 87% (n=216) ⁽²⁰⁾ 86% (969/1130) with <78nmol/L, 7% (78/1130) with <27.5nmol/L ⁽⁷⁾	50% (45/90) with <50nmol/L, 22% with <30nmol/L ⁽⁸⁾	33.3% (375/1125) ⁽¹⁰⁾ 20% (21/104) ⁽¹⁾	
	Children	62% (132/215) ⁽¹¹⁾ 15% (41/?) ⁽¹⁹⁾ 59% (193/328) ⁽²¹⁾ 20% (n=140) ⁽¹²⁾	61% (97/159) ⁽¹¹⁾ 87% (202/232) with <50nmol/L, 44% (103/232) with <25nmol/L ⁽¹³⁾ 2% ⁽¹⁹⁾ 40% (n=128) with <37nmol/L ⁽⁶⁾ 76% ⁽²²⁾	66% (27/41) ⁽¹¹⁾ 20% ⁽¹⁹⁾	50% (5/10) ⁽¹¹⁾ 19% ⁽¹⁹⁾ 36% (180/495) ⁽¹⁰⁾	7% (the Americas) ⁽¹⁹⁾
	Adults		92% (107/116) with <50nm/l, 53% (61/116) with <25nmol/L ⁽²³⁾ 73% (139/191) with <50nm/l, 42% (81/191) with <25nmol/L ⁽¹⁵⁾ 87.8% (43/49) ⁽²⁴⁾ 99% (147/149) ⁽²⁵⁾	N/A	31.1% (195/627) ⁽¹⁰⁾	
	Pregnancy	32.2% (482/1497) with <75nm/l ⁽¹⁷⁾	27.2% (125/459) with <75nmol/L ⁽¹⁸⁾ 80% (66/82) < 22.5 nmol/L ⁽²⁶⁾	N/A	N/A	
Low vitamin A	Mixed ages		0% (0/19) ⁽⁵⁾	N/A	1.1% (10/921) ⁽¹⁰⁾	
	Children		20% (46/232) ⁽¹³⁾ 38% (51/136) ⁽²²⁾	N/A	2% (8/406) ⁽¹⁰⁾	
	Adults		N/A	N/A	0.4% (2/515) ⁽¹⁰⁾	
	Pregnancy	N/A	N/A	N/A	N/A	

Condition	Group	Region				
		Overall (if mixed origins)	Africa	Middle East	Asia	Other
LTBI (TST + unless specified)	Mixed ages	18% (32/176) ⁽¹⁾ 34.3% (995/2992) ⁽²⁾ 51.2% (1040/2033) ⁽²⁷⁾ 31.9% (146/458) ⁽²⁸⁾	20% (15/75) ⁽¹⁾ 25% (24/96) either Mantoux or IGRA ⁽⁵⁾ 53% (861/1626) ⁽²⁷⁾ 23% (256/1130) by IGRA, 11% (126/1130) indeterminate, 74% of these <17yrs ⁽⁷⁾ 33.5% (125/373) ⁽²⁸⁾	47% (97/207) ⁽²⁷⁾ 9.7% (682/7000) ⁽²⁹⁾	IGRA (+) in 21% (169/810) ⁽¹⁰⁾ 17% (17/101) ⁽¹⁾ 39% (57/146) ⁽²⁷⁾ 24.7% (21/85) ⁽²⁸⁾	46% (25/54) (Europe) ⁽²⁷⁾
	Children	32% (71/219) ⁽¹¹⁾ 17% ⁽¹⁹⁾ 25% (81/328) ⁽²¹⁾ 25% (of 98) ⁽¹²⁾	30.8% (52/169) ⁽¹¹⁾ 16% ⁽¹⁹⁾ 17% (38/225) ⁽³⁰⁾ 63% (44/70) ⁽²²⁾ 21% (n=69) ⁽³¹⁾ 7.2% (11/153) IGRA(+), 14.4% (22/153) indeterminate ⁽³²⁾	94% (14/15) ⁽¹¹⁾ 18% ⁽¹⁹⁾	14% (5/35) ⁽¹¹⁾ 24% ⁽¹⁹⁾ IGRA + 16.3% (33/208) ⁽¹⁰⁾	24% (the Americas) ⁽¹⁹⁾
	Adults		55.1% (152/276) ⁽¹⁵⁾ 17% (20/115) ⁽³³⁾	N/A	70.5% (105/149) ⁽³⁴⁾ 22.6% (136/602) ⁽¹⁰⁾	
	Pregnancy	0.4% (12/2713) ⁽¹⁷⁾	N/A	N/A	N/A	
TB disease	Mixed ages	0.6% (1/176) ⁽¹⁾ 2% ⁽²⁾ 0.2% (1/471) ⁽²⁸⁾	2 cases (of ?84) ⁽⁵⁾ 0.7% (8/1130) ⁽⁷⁾	0.16% (11/7000) ⁽²⁹⁾	0% (0/810) ⁽¹⁰⁾	
	Children	1.8% (4/219) ⁽¹¹⁾ 0% ⁽¹⁹⁾ 3.3% (11/328) ⁽²¹⁾ 5.1% (5/98) ⁽¹²⁾	N/A	N/A	0% (0/208) ⁽¹⁰⁾	
	Adults		18.5% (51/276) ⁽¹⁵⁾ 0.9% (1/115) ⁽³³⁾		2.0% (3/149) ⁽³⁴⁾ 0% (0/602) ⁽¹⁰⁾	
	Pregnancy	N/A	N/A	N/A	N/A	

Condition	Group	Region				
		Overall (if mixed origins)	Africa	Middle East	Asia	Other
Hepatitis B	Mixed ages	21% (17/80) ⁽¹⁾ 4.7% (136/2923) ⁽²⁾ 5.4% (107/1974) ⁽²⁷⁾ 5.5% ⁽³⁵⁾ 9.0% (42/467) ⁽²⁸⁾	38% (12/32) ⁽¹⁾ 16% ⁽⁴⁾ 8% (15/184) ⁽⁵⁾ 6.5% (101/1547) ⁽²⁷⁾ 5% ⁽⁶⁾ 8% ⁽²⁰⁾ 17% ⁽³⁵⁾	0% (0/206) ⁽²⁷⁾ 2.5% (172/7000) ⁽²⁹⁾ 1.3% (36/2775) ⁽⁹⁾	9.7% (53/548) ⁽¹⁰⁾ 10% (5/48) ⁽¹⁾ 4.1% (6/146) ⁽²⁷⁾ 8% ⁽³⁵⁾	0% (0/52) (Europe) ⁽²⁷⁾
	Children	3.2% (7/218) ⁽¹¹⁾ 1% ⁽¹⁹⁾	4.3% (7/164) ⁽¹¹⁾ 2% (n=288) ⁽³⁰⁾ 3% (3/110) ⁽²²⁾ 5% ⁽²⁰⁾	0% (0/20) ⁽¹¹⁾	0% (0/34) ⁽¹¹⁾ 3% (n=68) ⁽³⁰⁾ 4.9% (12/243) ⁽¹⁰⁾	
	Adults		19% (32/167) ⁽¹⁵⁾ 6% (7/123) ⁽³³⁾	N/A	14.2% (20/141) ⁽³⁴⁾ 13.4% (41/305) ⁽¹⁰⁾	
	Pregnancy	4.1% (112/2713) ⁽¹⁷⁾	7.7% (99/1279) ⁽¹⁸⁾	N/A	N/A	
Hepatitis C	Mixed ages	3.5% (3/85) ⁽¹⁾ 2.3% (43/1926) ⁽²⁾	3% ⁽⁴⁾ 1.5% (1/68) ⁽⁵⁾ 2% ⁽²⁰⁾ 1.1% ⁽³⁵⁾	1% (68/7000) ⁽²⁹⁾ 0.7% (5/758) ⁽⁹⁾	1.9% (10/519) ⁽¹⁰⁾ 3.8% (5/133) (Burma) ⁽³⁵⁾	
	Children	0.6% ⁽¹⁹⁾	2.0% (n=384) ⁽³⁰⁾ <1% ⁽²⁰⁾	N/A	1.0% (n=108) ⁽³⁰⁾ 0% (0/214) ⁽¹⁰⁾	
	Adults		3.4% (8/233) ⁽¹⁵⁾	N/A	2.8% (4/145) ⁽³⁴⁾ 3.3% (10/305) ⁽¹⁰⁾	
	Pregnancy	0.9% (24/2713) ⁽¹⁷⁾	1.8% (23/1279) ⁽¹⁸⁾	N/A	N/A	
HIV	Mixed ages	0% (0/31) ⁽¹⁾ 2.0% (52/2823) ⁽²⁾ 0% ⁽³⁵⁾	3.9% (52/1349) ⁽²⁾ 2 cases (n=1665?) ⁽²⁷⁾ <1% ⁽⁶⁾ 0% ⁽²⁰⁾ 0% (0/1130) ⁽⁷⁾	0.03% (2/7000) ⁽²⁹⁾ 0% (0/247) ⁽⁹⁾	0% (0/541) ⁽¹⁰⁾ 1.6% (4/251) ⁽²⁾	
	Children	0% ⁽¹⁹⁾ 0% (0/159) ⁽¹²⁾			0% (0/236) ⁽¹⁰⁾	
	Adults		12% (26/215) ⁽¹⁵⁾ NB tertiary referral centre		0.9% (1/117) ⁽³⁴⁾ 0% (0/305) ⁽¹⁰⁾	
	Pregnancy	0.1% (3/2713) ⁽¹⁷⁾	0.2% (3/1279) ⁽¹⁸⁾			

Condition	Group	Region				
		Overall (if mixed origins)	Africa	Middle East	Asia	Other
Syphilis	Mixed ages	1.7% (2/116) ⁽¹⁾ 4.0% (113/2847) ⁽²⁾ 5.0% (99/1986) ⁽²⁷⁾	1.1% (1/89) ⁽⁴⁾ 8.3% (4/48) ⁽⁵⁾ 5.9% (93/1577) ⁽²⁷⁾ 1% ⁽⁶⁾ 4% ⁽²⁰⁾	0.9% (2/211) ⁽²⁷⁾ 0.8% (17/2269) ⁽⁹⁾	0% ⁽¹⁰⁾ 1.4% (2/146) ⁽²⁷⁾	
	Children	0% (0/224) ⁽¹¹⁾ 0% ⁽¹⁹⁾ 0% (0/114) ⁽¹²⁾ 0% (0/404) ⁽³⁵⁾	0% (0/172) ⁽¹¹⁾ <1% ⁽²⁰⁾	0% (1/19) ⁽¹¹⁾	0% (0/33) ⁽¹¹⁾ 0% ⁽¹⁰⁾	
	Adults	3% (23/724) ⁽³⁵⁾	8.5% (26/305) ⁽¹⁵⁾	N/A	1.5% (2/137) ⁽³⁴⁾ 0% (0/541) ⁽¹⁰⁾	
	Pregnancy	2.5% (67/2713) ⁽¹⁷⁾	6.9% (88/1279) ⁽¹⁸⁾	N/A	N/A	
Chlamydia	Adults	2% ⁽³⁵⁾ 0.8% (21/2610) ⁽³⁶⁾	0% (0/58) ⁽¹⁵⁾ 6% ⁽³⁵⁾ 0.8% (11/1459) ⁽³⁶⁾	0.8% (1/216) ⁽³⁶⁾	0% (0/530) ⁽¹⁰⁾ 0% (0/99) ⁽³⁴⁾ 1.0% (9/874) ⁽³⁶⁾	
	Children				1.8% (2/109) 12-17 yrs ⁽¹⁰⁾	
Gonorrhoea	Adults	0% (0/644) ⁽³⁵⁾ 0% (0/2549) ⁽³⁶⁾	0% (0/58) ⁽¹⁵⁾ 0% (0/1459) ⁽³⁶⁾	0% (0/216) ⁽³⁶⁾	0% (0/649) ⁽¹⁰⁾ 0% (0/99) ⁽³⁴⁾ 0% (0/874) ⁽³⁶⁾	
<i>H Pylori</i>	Mixed ages	50% (9/18) ⁽¹⁾				
	Children		82% (149/182) ⁽³²⁾	N/A	N/A	
	Adults		60% (35/58) ⁽¹⁵⁾	N/A	80% (33/41) ⁽³⁴⁾	
	Pregnancy	N/A	N/A	N/A	N/A	

Condition	Group	Region				
		Overall (if mixed origins)	Africa	Middle East	Asia	Other
Malaria	Mixed ages	0.5% (1/183) ⁽¹⁾ 0.7% (8/1068) ⁽³⁵⁾ 6.2% (29/471) ⁽²⁸⁾	5% ⁽⁴⁾ 10.4% (9/86) ⁽⁵⁾ 6% (5/86) ⁽³⁷⁾ 8% (101/1245) ⁽²⁷⁾ 10% ⁽⁶⁾ 10% ⁽²⁰⁾ 3.9% (44/1130) ⁽⁷⁾	0% ⁽²⁷⁾ 0.5% ⁽²⁹⁾ 0% (0/90) ⁽⁸⁾ 0% (0/197) ⁽⁹⁾	0.9% (4/445) ⁽¹⁰⁾ 0% ⁽²⁷⁾	
	Children	5.9% (11/188) ⁽¹¹⁾ 16% (n=202) ⁽¹²⁾	7% (11/156) ⁽¹¹⁾ 9% (4/44) ⁽³⁷⁾ 4% (n=378) ⁽³⁰⁾ 15% ⁽²⁰⁾ 8.7% (16/182) ⁽³²⁾ 9.5% (32/336) ⁽³⁸⁾	0% (0/12) ⁽¹¹⁾	0% (0/20) ⁽¹¹⁾ 1% (n=108) ⁽³⁰⁾ 1.5% (3/207) ⁽¹⁰⁾	
	Adults		2.4% (1/42) ⁽³⁷⁾ 7% (7/100) ⁽¹⁵⁾ 3.5% (57/1609) ⁽³⁹⁾	N/A	0.7% (1/145) ⁽³⁴⁾ 0.4% (1/238) ⁽¹⁰⁾	
	Pregnancy	N/A	N/A	N/A	N/A	
Schistosomiasis	Mixed ages	21.9% (620/2825) ⁽²⁾ 4.8% (99/2068) ⁽²⁷⁾ 22.9% (108/471) ⁽²⁸⁾	14% (11/76) ⁽¹⁾ 24% (2.5% in urine/stool) ⁽⁴⁾ 12% (27/217) ⁽⁵⁾ 6.0% (98/1633) (in stool/ urine) ⁽²⁷⁾ 37% (18.3% in urine/stool) ⁽⁶⁾ 38% ⁽²⁰⁾ 27.7% (298/1130) ⁽⁷⁾	0% (0/207) ⁽²⁷⁾ 1.3% (3/232) ⁽⁹⁾	7.0% (80/1136) ⁽¹⁰⁾ 18% (20/110) ⁽¹⁾ 0% (0/146) ⁽²⁷⁾	0% (0/56) (Europe) ⁽²⁷⁾
	Children	17.9% (37/207) ⁽¹¹⁾ 4% ⁽¹⁹⁾ 27% (n=242) ⁽¹²⁾	22.0% (37/168) ⁽¹¹⁾ 18% (n=389) ⁽³⁰⁾ 5% ⁽²²⁾ 30% ⁽²⁰⁾ 2% (3/?) ⁽¹⁴⁾	0% (0/17) ⁽¹¹⁾	0% (0/22) ⁽¹¹⁾ 0% (n=42) ⁽³⁰⁾ 4.6% (23/504) ⁽¹⁰⁾	
	Adults		41% (84/206) (6.7% in stool/ urine) ⁽¹⁵⁾ 11% (14/124) ⁽¹⁶⁾	N/A	5.4% (8/147) ⁽³⁴⁾ 9% (57/632) ⁽¹⁰⁾	
	Pregnancy	N/A	N/A	N/A	N/A	

Condition	Group	Region				
		Overall (if mixed origins)	Africa	Middle East	Asia	Other
Strongyloides	Mixed ages	5.7% (9/158) ⁽¹⁾ 1.5% (32/2068) ⁽²⁷⁾	33% (7/21) ⁽⁴⁾ 9.1% (6/66) ⁽⁵⁾ 2% (32/1633) (in stool/urine) ⁽²⁷⁾ 8% ⁽²⁰⁾	0% (0/207) ⁽²⁷⁾ 4.5% (125/2753) ⁽⁹⁾	20.8% (202/973) ⁽¹⁰⁾ 0% (0/146) ⁽²⁷⁾	0% (0/56) (Europe) ⁽²⁷⁾
	Children		2% (n=387) ⁽³⁰⁾ 0.8% (1/129) ⁽²²⁾ 3% ⁽²⁰⁾ 1% (1/?) ⁽¹⁴⁾	N/A	1% (n=108) ⁽³⁰⁾ 11.7% (51/436) ⁽¹⁰⁾	
	Adults		17.9% (32/179) ⁽¹⁵⁾ 2% (2/124) ⁽¹⁶⁾	N/A	26.0% (39/150) ⁽³⁴⁾ 36% (82/230) ⁽¹⁶⁾ 28.1% (151/537) ⁽¹⁰⁾	
	Pregnancy	N/A	N/A	N/A	N/A	
Pathogenic stool parasites	Mixed ages	15% (3/20) ⁽¹⁾ 12.1% (251/2068) with Giardia ⁽²⁷⁾	24% not including schistosomiasis, 11% with Giardia ⁽⁴⁾ 16% (30/193) ⁽⁵⁾ 13.2% (216/1633) with Giardia ⁽²⁷⁾ 39% ⁽⁶⁾ 33% ⁽²⁰⁾ 39.3% (444/1130) ⁽⁷⁾	11.2% (10/89) with Giardia ⁽⁸⁾ 4% (8/207) with Giardia ⁽²⁷⁾	17% (175/1027) ⁽¹⁰⁾ 16% (23/146) with Giardia ⁽²⁷⁾	5% (3/56) with Giardia (Europe) ⁽²⁷⁾
	Children	11%, 58% with Giardia ⁽¹⁹⁾	30% ⁽⁵⁾ 19.4% (6/31) with Giardia ⁽²²⁾ 41% ⁽²⁰⁾ 18% (24/133) ⁽¹⁴⁾ 42% (76/182) ⁽³²⁾	N/A	31.2% (122/390) ⁽¹⁰⁾	
	Adults		21% (31/145), 6.9% (10/145) with Giardia ⁽¹⁵⁾ 14.5% (17/117) ⁽¹⁶⁾	N/A	24.1% (33/137) ⁽³⁴⁾ 6.9% (14/204) ⁽¹⁶⁾ 9.7% (53/495) ⁽¹⁰⁾	
	Pregnancy	N/A	N/A	N/A	N/A	

Cohort details

- (1) Johnston, Smith, and Roydhouse (2009-2010 data) – 187 participants from African (n=77) and Asian (110) countries (median age 21yrs, 37% <15yrs of age). Darwin refugee screening service, Darwin, Northern Territory.³⁹
- (2) McLeod (1995-1999 data) – 2992 participants from African (n=1377+), Middle Eastern (1074+), and Asian (259+) countries. Refugee resettlement centre medical clinic, Auckland, NZ.⁴⁵⁷
- (3) Benson et al. (2010-2011 data) – 916 participants from African (n=294), Middle Eastern (277), and Asian (332) countries (33% aged 0-14yrs). Multicentre refugee health clinics in Australia.²⁷³
- (4) Johnson (2005 data) – 442 participants from African countries (58% <20yrs of age). Migrant health service, Adelaide, South Australia.¹⁵⁵
- (5) Tiong (2005 data) – 258 participants from African countries (50% aged 0-14yrs). General Practice, Footscray, Victoria.⁵⁰
- (6) Davis and Webber (2004 data) – 215 participants from African countries (median age 13-17yrs). Newcastle refugee clinic, Newcastle, NSW.⁴⁵⁹
- (7) Banfield et al. (2006-2007 data) – 1130 participants (51% children <17yrs of age). 92% from African countries, 8% from Asian countries (primarily Burma). Migrant Health Unit, Perth, WA.⁴⁹
- (8) Sanati-Pour et al. (2010-2013 data) ¹⁵⁶ – 92 participants from Afghanistan (21% <10yrs of age, 95% <43yrs of age). Rural GP practice, Mildura, Victoria.
- (9) Smith M et al. (2012 - 2014 data) - 2775 participants, new arrivals to Sydney, predominantly Iraqi. New South Wales Refugee Health Service, Sydney, NSW.⁷¹
- (10) Paxton et al. (2006-2009 data) – 1136 (Karen) participants (44% <18yrs of age). General Practice, Werribee, Victoria.⁴³
- (11) Sheikh et al. (2005-2006 data) – 239 children aged 0-17yrs from African (n=187), Middle Eastern (41), and Asian (37) countries. Westmead Children's Hospital, Sydney, NSW.⁴⁵
- (12) Raman et al. (2005 data) – 331 children <14yrs from mostly African and some Middle Eastern countries. Three refugee-specific clinics, Sydney, NSW.⁴⁴
- (13) McGillivray et al. (2000-2002 data) – 232 children aged 0-17yrs from East African countries. Royal Children's Hospital, Melbourne.²⁵⁵
- (14) Rice et al. (2000-2002 data) – 135 children aged 0-18yrs from East Africa. Royal Children's Hospital, Melbourne, Victoria.⁴⁶⁰
- (15) Gibney (2003-2006 data) – 375 adults from African countries. Royal Melbourne Hospital, Melbourne, Victoria.¹⁵⁹
- (16) Caruana et al. (2000 and 2002 data) – 261 adults >15yrs of age from East African countries (n=127) and Cambodia (234). Inner-city community health centres and private GPs, Melbourne, Victoria.¹³⁵
- (17) Gibson-Helm et al. (2002-2011 data) – 2713 women with singleton births from African (n=920), Middle Eastern (1706), and Asian (87) countries. Country of birth used to identify women coming from 'humanitarian-source country' who gave birth at Monash Health (Monash Medical Centre, Dandenong Hospital, and Casey Hospital), Melbourne.⁴⁵⁸
- (18) Gibson-Helm et al. (2002-2011 data) – 1279 women with singleton births from African countries. Country of birth used to identify women coming from 'humanitarian-source country' who gave birth at Monash Health (Monash Medical Centre, Dandenong Hospital, and Casey Hospital), Melbourne, Victoria.⁴⁶¹
- (19) Rungan (2007-2012 data) – 343 children <5yrs of age from African, Middle Eastern, Asian (53% of total) countries and the Americas. Refugee resettlement centre medical clinic, Auckland, NZ.⁵¹
- (20) Cooley (2002-2003 data) – 216 participants (55% aged 0-17yrs) from primarily African countries. Royal Hobart Hospital, Hobart, Tasmania.⁴⁶²
- (21) Gray et al. (2005-2010 data) – 328 children aged 6mos-17.5yrs from African (n=239), Middle Eastern (59), Asian (16), and other (14) countries. Westmead Children's Hospital Refugee Clinic, Sydney, NSW.⁴⁷
- (22) Buttery and Chionh (2005 data) – 193 children aged 0-18yrs from African countries. Royal Children's Hospital, Melbourne, Victoria.¹⁵⁷
- (23) Skull et al. (2000 data) – 116 adults >16yrs old from East Africa. Two inner-city community health centres, Kensington, Victoria.³³³
- (24) Renzaho et al. (2009 data) – 49 adults >20yrs of age from sub-Saharan Africa. Community health centres, Kensington, Victoria⁴⁸
- (25) Benitez-Aguirre et al (2007 data) – 149 adults (North African) South West Sydney, NSW.³³²

- (26) Grover S and Morley R (1999 – 2000) – 82 pregnant women (veiled and/or dark skinned – predominantly African) Royal Women’s Hospital, Melbourne, Victoria.⁴⁶⁴
- (27) Martin and Mak (2003-2004 data) – 2111 participants from African (n=1665), Middle Eastern (214), Asian (149), European (57) countries (overall 41% <14yrs of age). Migrant health unit, Perth, WA.⁴¹
- (28) Trauer and Krause (2006-2009 data) – 471 participants from African (n=382) and South East Asian (87) countries (56.5% <18yrs of age). Centre for Disease Control – Northern Territory (CDC-NT) refugee clinic, Darwin, NT.⁵⁷
- (29) King and Vodicka (2000-2001 data) – 7000 participants from Middle Eastern countries (18% <18yrs of age). Detainees Curtin, Port Headland, Woomera; SA, WA.⁴⁶⁶
- (30) Lucas et al. (2007-2008 data) – 524 children aged 5mos-16yrs from African (n=411) and Asian (113) countries. Princess Margaret Hospital, Perth, WA.⁴⁰
- (31) Jansen and Chionh (2002-2003 data) – 69 children <18yrs of age from East Africa. Royal Children’s Hospital, Melbourne, Victoria.⁴⁶⁵
- (32) Cherian et al. (2006 data) – 193 children <16yrs of age from African countries. Migrant health unit, Perth, WA.¹⁸⁰
- (33) Skull et al. (2000) – 126 adults >16yrs of age from E. African countries. Community health centers, Recruited for immunization study rather than captured from generalized refugee health screening. Kensington, Victoria.⁴⁶
- (34) Chaves et al. (2004-2008 data) – 156 adults (Burmese). Royal Melbourne Hospital, Melbourne, Victoria.
- (35) Evans (2009-2011 data) – 1145 participants of all ages from African and Asian countries. Queensland refugee clinic, Brisbane, Qld.¹¹²
- (36) Hoard and Thambiran (2006-2009 data) – 2610 adults >15yrs of age from African (n=1459), Middle Eastern (216), and Asian (874) countries. Migrant Health Unit, Perth, WA.²¹¹
- (37) Tiong et al. (2005 data) – 86 participants (51% aged 0-18yrs). Royal Children’s Hospital, Melbourne, Victoria.⁵⁰
- (38) Cherian et al. (2005-2006 data) - 336 children aged 0-18 years from African countries. Princess Margaret Hospital, Perth, WA.⁶⁵
- (39) Chih et al. (2003-2005 data) – 1609 adults >16yrs of age from African countries. Migrant Health Unit, Perth, WA.⁷⁴

APPENDIX TWO:

Template

Template sub-headings	Suggested content
Recommendations	<p>Recommendations with levels of evidence</p> <p>NOTE: please include levels and grades of evidence where possible as per NHMRC for all recommendations, or call it a 'consensus based point' or when evidence not available on lit review and when the EAG have consensus for the recommendation.</p> <p>Word limit 2000.</p>
Overview	<p>Impact of disease in the refugee/asylum seeker community screened</p> <p>How is it transmitted?</p> <p>Prevalence in the countries of origin?</p> <p>Who should be screened?</p> <p>Why should we screen? Asymptomatic, easily screened for and treated.</p> <p>Situation re: pre-departure screening and treatment</p>
History and examination	<p>What is the clinical picture if unwell with disease?</p>
Investigations	<p>What to request – e.g.</p> <p>Serology – what to write on form</p> <p>Urine – how to take urine test</p> <p>Faeces – how many samples</p> <p>Other tests- e.g. FBE for eosinophilia</p> <p>Limitations of tests, number of tests to do.</p>
Management and referral	<p>Algorithm as per previous guidelines with dosage of medication, side effects people would be likely to experience,</p> <p>Signs that your patient needs referral</p> <p>When to repeat tests (could be part of algorithm)</p> <p>What tests to repeat – e.g. FBE for eosinophilia</p> <p>Whether or not to repeat serology</p> <p>Who to retreat</p>
Considerations in pregnancy and breastfeeding	<p>May be more appropriate as part of the body of the text or separate.</p>
Considerations for children	<p>May be more appropriate as part of the body of the text or separate.</p>
Links and references	<p>Translated information</p> <p>Links to available guidelines</p> <p>No limit to number of references</p>

APPENDIX THREE:

Definitions of the Australian categories for prescribing medicines in pregnancy

From the Australian Categorisation System for Prescribing Medicines in Pregnancy⁴⁶⁷

Category A

Drugs which have been taken by a large number of pregnant women and women of childbearing age without any proven increase in the frequency of malformations or other direct or indirect harmful effects on the foetus having been observed.

Category B1

Drugs which have been taken by only a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects on the human foetus having been observed.

Studies in animals have not shown evidence of an increased occurrence of foetal damage.

Category B2

Drugs which have been taken by only a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects on the human foetus having been observed.

Studies in animals are inadequate or may be lacking, but available data show no evidence of an increased occurrence of foetal damage.

Category B3

Drugs which have been taken by only a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects on the human foetus having been observed.

Studies in animals have shown evidence of an increased occurrence of foetal damage, the significance of which is considered uncertain in humans.

Category C

Drugs which, owing to their pharmacological effects, have caused or may be suspected of causing, harmful effects on the human foetus or neonate without causing malformations. These effects may be reversible. Accompanying texts should be consulted for further details.

Category D

Drugs which have caused, are suspected to have caused or may be expected to cause, an increased incidence of human foetal malformations or irreversible damage. These drugs may also have adverse pharmacological effects. Accompanying texts should be consulted for further details.

Category X

Drugs which have such a high risk of causing permanent damage to the foetus that they should not be used in pregnancy or when there is a possibility of pregnancy.

LIST OF ABBREVIATIONS

13vPCV	13 valent pneumococcal conjugate vaccine
25(OH)D	25-hydroxyvitamin D
Ab	antibody
ACT	artemisinin-based combination therapy
ADT	adult diphtheria-tetanus
ALP	alkaline phosphatase
AS	asylum seekers
ASID	Australasian Society of Infectious Diseases
BCG	Bacillus Calmette Guerin
BMI	body mass index
BP	blood pressure
Ca	calcium
CALD	culturally and linguistically diverse
CDC	Centers for Disease Control and Prevention
COPD	Chronic obstructive pulmonary disease
CSOM	chronic suppurative otitis media
CVD	cardiovascular disease
CXR	chest Radiography
DHC	departure Health Check
DOT	directly observed therapy
DRC	Democratic Republic Congo
DT	diphtheria-tetanus
DTP	diphtheria-tetanus-pertussis
DTPa	diphtheria-tetanus-acellular pertussis
E	east
EBR	Evidence Based Recommendation
EAG	expert advisory group
ELISA	enzyme linked immunosorbent assay
EPI	Expanded Programme on Immunization
FBE	full blood examination
FGM/C	female genital mutilation/cutting
G6PD	glucose-6-phosphate deficiency

GP	general practitioner
g/dL	grams per decilitre
Hb	haemoglobin
<i>H pylori</i>	<i>Helicobacter pylori</i>
HBIG	hepatitis B immunoglobulin
HBcAg	hepatitis B core antigen
HBsAb	hepatitis B surface antibody
HBsAg	hepatitis B surface antigen
HCV	hepatitis C virus
HCV RNA	hepatitis C virus ribonucleic acid
Hib	Haemophilus influenzae type B
HICs	high income countries
HIV	human immunodeficiency virus
HPV	human papillomavirus
ID	Infectious Diseases
IGRA	Interferon Gamma Release Assay
IM	intramuscular
IPV	inactivated polio virus
IU	international units
LAV	live attenuated vaccines
LMICs	low and middle income countries
LTBI	Latent tuberculosis infection
LVV	live viral vaccines
mcg	micrograms
MenC	meningococcal C
MenCCV	meningococcal C conjugate vaccine
Mg	magnesium
mIU/mL	milli-international units per mL
MMR	measles-mumps-rubella
MMR-V	measles-mumps-rubella-varicella
MSM	men who have sex with men
NAAT	nucleic acid amplification test
NCDs	non-communicable diseases
NEFTA	National Education Toolkit for FGM/C Awareness
NHMRC	National Health and Medical Research Council
OCP	ova, cysts, parasites

OPV	oral polio vaccine
PBS	Pharmaceutical Benefits Scheme
PCR	Polymerase Chain Reaction
PCV	pneumococcal conjugate vaccine
pmol/L	picomoles per litre
PO ₄	phosphate
PPV	pneumococcal polysaccharide vaccine
PS	polysaccharide
PTSD	post-traumatic stress disorder
RACP	Royal Australasian College of Physicians
RACGP	Royal Australian College of General Practitioners
RDT	rapid diagnostic testing
RheaNA	Refugee Health Network of Australia
RHSIG	Refugee Health Special Interest Group
SAS	Special Access Scheme
SC	subcutaneous
SE	south east
SNAP (risk factors)	smoking, nutrition, alcohol and physical activity
SOLVS	Self-obtained Lower Vaginal Swabs
spp	species
STIs	sexually transmissible infections
SW	south west
TB	tuberculosis
TST	Tuberculin Skin Test
UBT	urea breath testing
UEC	urea, electrolytes, creatinine
Vit	vitamin
VFST	Victorian Foundation for the Survivors of Torture and Trauma
VME	visa medical examination
VPD	vaccine preventable diseases
VV	varicella virus
W	west
WHO	World Health Organization
YF	yellow fever
µL	microlitres

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