Screening returning migrants: parasitic/tropical infections


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Infectious diseases associated with migration

- **common infections** *(respiratory tract infections...)*

- **communicable & transmissible infections** *(rubella, measles, HIV, TB, viral hepatitis, syphilis...)*

- **tropical infections** *(typhoid fever in immigrants from the Indian subcontinent, malaria in refugees from southeast Asia, schistosomiasis and filariasis in West Africans and cysticercosis and Chagas disease in Latin Americans...)*
Some facts about tropical infections in immigrants

- Some infections, such as toxoplasmosis and giardiasis, have a worldwide distribution, whereas others such as trypanosomiasis and filariasis remain geographically restricted to certain areas.

- Malaria, giardiasis, Chagas disease, filariasis, intestinal helminths, cysticercosis and schistosomiasis are the main parasitic infections reported among immigrants.

- Some infections, such as malaria, may be life-threatening and others such as American trypanosomiasis or leprosy can lead to chronic disease and/or disabilities.

- Some chronic infections have been associated with an increased risk of neoplasia (chronic urinary schistosomiasis and squamous cell carcinoma of the bladder).

- Immunocompromised patients are at risk for reactivation even many years after the initial exposure (strongyloidiasis, histoplasmosis).

- Some protozoa can be transmitted from mother to child (toxoplasmosis, malaria).

- Some protozoa can be transmitted by blood/organ donation (Chagas dis, malaria).

- Person-to-person transmission of helminths does not generally occur.
March 1997 - November 2009

15,421 migrant records from GeoSentinel clinics identified

7,629 (49.5%) nonrefugee migrants not pre-screened

41 GeoSentinel clinics on 5 continents in 19 countries, including Canada (33% of migrants), Europe (32%), United States (15%), and Australia and New Zealand (13%)

Migrants originated from 153 countries. One-third originated from 6 countries: Burma (Myanmar), Ethiopia, Somalia, Sudan, India, and Bolivia. East Africa, Southeast Asia, West Africa, and South Asia each accounted for ≥10% of the migrants

59% were adults aged 19–39 years; 11% were children, and 7% were aged ≥60 years

9% were seen within the first 3 months of arrival, 58% were seen >1 year after resettlement and 27% >5 years later
The most common diagnoses were

- latent tuberculosis (22%)
- acute and chronic viral hepatitis (17%)
- active tuberculosis (10%)
- malaria (7%)
- HIV/AIDS (7%)
- schistosomiasis (6%)
- strongyloidiasis (5%)
- 5% had no health condition reported

- 1515 (20%) patients were hospitalized: 364 (24%) had active tuberculosis and 264 (17%) had malaria.

- Diagnoses of noninfectious diseases were reported in 1144 migrants (15%).

- There were 13 deaths: related to AIDS (3), tuberculosis (3), AIDS and tuberculosis coinfection (1), cerebral malaria (1), Strongyloides hyperinfection (1), African trypanosomiasis (1), visceral leishmaniasis (1), pneumonia (1), and unknown causes (1).
Selected tropical Infections

- **Malaria** was reported in 7% of migrants, with the greatest proportion in migrants from SE Asia (20%) and West Africa (12%). The most frequent diagnosis in children (20%).

  The majority of malaria cases (85%; P.falciparum [58%] and P.vivax [36%]) were seen within 3 months of arrival. 98 cases seen >3 months after arrival: 45 P.vivax (46%) and 30 P.falciparum (31%). 9 diagnosed >5 years after migration: 3 P. falciparum, 2 P. vivax, 2 P. ovale, 2 P. malariae, and 1 unknown.

- **Schistosomiasis** was diagnosed in 370 of 2804 migrants from Africa (13%); although 48% were diagnosed in the first year, cases continued to be diagnosed up to 10 years after arrival.

- **Strongyloidiasis** reported in 5% of both adults and children, was one of the most common diagnoses in all regions. Nine migrants had *Strongyloides hyperinfection syndrome* (2% of reported cases); 5 were from Asia. Of note, 4 were seen >10 years after resettlement, including one reported 50 years after arrival.
Selected tropical Infections

- **Chagas disease** (170 cases) in migrants from **Bolivia**

- **Filariasis** (145 cases) primarily in adults from **Africa**

- **Neurocysticercosis** (137 cases) of; most were from the **Americas** (107); with the rest from Asia (17), Africa (10), and Eastern Europe (3); 46% were reported >5 years after migration.

- **Echincoccocosis** (99 cases) primarily in adults from **South Asia, Eastern Europe and West Asia**

- **Leprosy** (81 cases), primarily in older patients from **South Asia**.

- **Acute diarrhea, dermatological illness, and respiratory illness** were infrequent diagnoses.
Imported Infectious Diseases in Mobile Populations, Spain

Begoña Monge-Maillo, B. Carolina Jiménez, José A. Pérez-Molina, Francesca Norman, Miriam Navarro, Ana Pérez-Ayala, Juan M. Herrero, Pilar Zamarrón, and Rogelio López-Vélez

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 15, No. 11, November 2009

<table>
<thead>
<tr>
<th>Diagnostic category and disease</th>
<th>Total population, no. (%)</th>
<th>Sub-Saharan Africans, no. (%)</th>
<th>Latin Americans, no. (%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tropical infectious diseases</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filariasis</td>
<td>421 (19.2)</td>
<td>418 (26.7)</td>
<td>3 (0.4)</td>
<td>0.001</td>
</tr>
<tr>
<td>Intestinal parasites</td>
<td>242 (11.0)</td>
<td>162 (10.4)</td>
<td>80 (12.6)</td>
<td>0.15</td>
</tr>
<tr>
<td>Malaria</td>
<td>212 (9.6)</td>
<td>199 (12.7)</td>
<td>13 (2.1)</td>
<td>0.001</td>
</tr>
<tr>
<td>Chagas disease</td>
<td>101 (4.5)</td>
<td>0</td>
<td>101 (15.9)</td>
<td>0.001</td>
</tr>
<tr>
<td>Schistosomiasis</td>
<td>39 (1.8)</td>
<td>38 (2.4)</td>
<td>1 (0.2)</td>
<td>0.001</td>
</tr>
<tr>
<td>Cysticercosis</td>
<td>31 (1.4)</td>
<td>3 (0.2)</td>
<td>28 (4.4)</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Transmissible infectious diseases</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latent tuberculosis</td>
<td>716 (32.6)</td>
<td>596 (61.2)</td>
<td>120 (18.9)</td>
<td>0.001</td>
</tr>
<tr>
<td>Active tuberculosis</td>
<td>107 (4.8)</td>
<td>52 (3.3)</td>
<td>55 (8.7)</td>
<td>0.001</td>
</tr>
<tr>
<td>Hepatotropic virus, acute infection†</td>
<td>31 (1.4)</td>
<td>27 (1.7)</td>
<td>4 (0.6)</td>
<td>0.075</td>
</tr>
<tr>
<td>Hepatotropic virus, chronic infection‡</td>
<td>262 (11.9)</td>
<td>257 (16.4)</td>
<td>10 (1.6)</td>
<td>0.001</td>
</tr>
<tr>
<td>Sexually transmitted infections§</td>
<td>107 (4.9)</td>
<td>92 (5.9)</td>
<td>15 (2.4)</td>
<td>0.002</td>
</tr>
<tr>
<td>HIV infection</td>
<td>97 (4.4)</td>
<td>82 (5.2)</td>
<td>15 (2.4)</td>
<td>0.005</td>
</tr>
<tr>
<td>Leprosy</td>
<td>8 (0.4)</td>
<td>3 (0.2)</td>
<td>5 (0.8)</td>
<td>0.02</td>
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<tr>
<td><strong>Common infectious diseases</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory infections</td>
<td>61 (2.8)</td>
<td>36 (2.3)</td>
<td>25 (3.9)</td>
<td>0.013</td>
</tr>
<tr>
<td>Gastrointestinal bacterial infections</td>
<td>92 (4.2)</td>
<td>69 (4.4)</td>
<td>23 (3.6)</td>
<td>0.705</td>
</tr>
<tr>
<td>Urinary infections</td>
<td>69 (3.1)</td>
<td>45 (2.9)</td>
<td>24 (3.8)</td>
<td>0.135</td>
</tr>
<tr>
<td>Skin infections</td>
<td>80 (3.6)</td>
<td>71 (4.5)</td>
<td>9 (1.4)</td>
<td>0.001</td>
</tr>
<tr>
<td>Infrequent infections</td>
<td>36 (1.7)</td>
<td>20 (1.3)</td>
<td>16 (2.5)</td>
<td>0.025</td>
</tr>
<tr>
<td><strong>Noninfectious diseases</strong></td>
<td>596 (27.1)</td>
<td>430 (27.5)</td>
<td>166 (26.2)</td>
<td>0.978</td>
</tr>
</tbody>
</table>

*Because each patient could have >1 diagnosis, the number of cases can be higher than the number of patients. Percentages have been calculated as number of cases divided by number of patients in each group (total population, sub-Saharan African immigrants, or Latin American immigrants).
†Acute infections with hepatotropic virus caused by hepatitis A virus, hepatitis B virus, hepatitis E virus, cytomegalovirus, and Epstein-Barr virus.
‡Chronic infections with hepatotropic virus were caused by hepatitis B virus, hepatitis C virus, and hepatitis D virus.
§Sexually transmitted infections comprised syphilis, bacterial vaginosis, trichomoniasis, gonococcal urethritis, Chlamydia trachomatis, and genital herpes virus.
Should we screen migrants for parasitic/tropical infections?
practical focus what to screen in travel medical setting

Practical / Technical issues

- **Location of screening**: pre-departure; on-arrival; post-arrival
- **Target population**
  - Screening to all asymptomatic or only to symptomatic migrants?: fever, eosinophilia, abnormal urine, abnormal EKG, etc.
  - Define diseases to screen according to country of origin
  - VFRs screening?
  - Pregnant women screening?
  - Adopted children screening?
  - Immunosuppressed screening?
- **Screening tools**: laboratory test is advised for screening?
- **Treatment** or screening? What drug?
Screening of Imported Infectious Diseases among Asymptomatic Sub-Saharan African and Latin American Immigrants: A Public Health Challenge

![Image](https://i.imgur.com/8.png)

**Demographic characteristic with respect to areas of origin**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total (%)</th>
<th>Sub-Saharan Africans (%)</th>
<th>Latin Americans (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immigrants (%)</td>
<td>700 (100%)</td>
<td>317 (45.3%)</td>
<td>383 (54.7%)</td>
<td></td>
</tr>
<tr>
<td>Male (%)</td>
<td>386 (55.1%)</td>
<td>263 (83%)</td>
<td>121 (31.6%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Median age* (IQR)†</td>
<td>29 (23–36)</td>
<td>27 (21–32)</td>
<td>32 (25–41)</td>
<td></td>
</tr>
<tr>
<td>Median pre-consultation time‡ (IQR)</td>
<td>22 (5–47)</td>
<td>5 (2–10)</td>
<td>42 (25–62)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

*Measured in years.
†IQR = interquartile range (P25–P75).
‡Defined as months elapsed from arrival to Spain to first consultation at Tropical Medicine Unit.

**Infectious diseases diagnoses with respect to areas of origin**

<table>
<thead>
<tr>
<th>Diagnoses</th>
<th>Sub-Saharan Africans (N = 317) N (%)</th>
<th>Latin Americans (N = 383) N (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV infection</td>
<td>7 (2.3%)</td>
<td>1 (0.3%)</td>
<td>0.026</td>
</tr>
<tr>
<td>HBV infection - Negative</td>
<td>81 (27%)</td>
<td>299 (81.7%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Past infection</td>
<td>175 (58.3%)</td>
<td>59 (16.1%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Acute infection</td>
<td>2 (0.7%)</td>
<td>1 (0.3%)</td>
<td></td>
</tr>
<tr>
<td>Chronic infection</td>
<td>42 (14%)</td>
<td>6 (1.6%)</td>
<td></td>
</tr>
<tr>
<td>HCV infection - Negative</td>
<td>289 (96.3%)</td>
<td>353 (97%)</td>
<td>0.192</td>
</tr>
<tr>
<td>HCVAb+ / PCR not done</td>
<td>3 (1%)</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>HCVAb+ / PCR negative</td>
<td>4 (1.3%)</td>
<td>11 (3%)</td>
<td></td>
</tr>
<tr>
<td>HCVAb+ / PCR positive</td>
<td>4 (1.3%)</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Syphilis</td>
<td>7 (2.3%)</td>
<td>5 (1.4%)</td>
<td>0.381</td>
</tr>
<tr>
<td>Latent tuberculosis infection</td>
<td>181 (71%)</td>
<td>89 (32.1%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Intestinal parasites</td>
<td>8 (2.9%)</td>
<td>4 (1.5%)</td>
<td>0.243</td>
</tr>
<tr>
<td>Chagas disease</td>
<td>NP</td>
<td>172 (48.1%)</td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>10 (4.5%)</td>
<td>NP</td>
<td></td>
</tr>
<tr>
<td>Schistosomiasis</td>
<td>8 (5.8%)</td>
<td>NP</td>
<td></td>
</tr>
<tr>
<td>Eosinophilia</td>
<td>42 (13.2%)</td>
<td>53 (13.8%)</td>
<td>0.821</td>
</tr>
</tbody>
</table>

*The percentages have been calculated as number of cases divided by number of patients in whom the test was performed in each group. HIV = human immunodeficiency virus; HBV = hepatitis B virus; HCV = hepatitis C virus; Ab = antibody; NP = not performed.
Travelers visiting friends and relatives (VFR) and imported infectious disease: Travelers, immigrants or both? A comparative analysis
Travel Medicine and Infectious Disease (2014) 12, 88e94

SIGNIFICANTLY MORE FREQUENT

• **VFRs**: malaria, dengue and enteric fever
• **immigrants**: filariasis, Chagas disease, cysticercosis, TB, LTI, chronic viral hepatitis, STI and HIV
• **travelers**: traveler’s diarrhea and intestinal parasites

The most frequent diagnoses observed among VFRs were typical travel-associated infections such as malaria [21.4%], traveler’s diarrhea [4.8%], intestinal parasites [4.6%] and dengue [3.1%]

Asymptomatic chronic infectious diseases, such as latent tuberculosis [16%], chronic viral hepatitis [5.1%] and filariasis [5.1%], probably acquired before migration, were also observed
Should we screen migrants for malaria? (1)

• To whom?
  • *Plasmodium falciparum*: Africa, southeast Asia, India, South America
  • *Plasmodium vivax*: Central America, South America, Asia, Middle East
  • *Plasmodium ovale*: west Africa
  • *Plasmodium malariae*: all tropical areas
  • *Plasmodium knowlesi*: southeast Asia

• When?
  • Most imported cases of malaria, particularly those caused by *P. falciparum* present in the first 3 months after arrival, but can show up even many months after arrival in the host country
  • Within the first 12 months after arrival (consider up to 3 years)
  • An important proportion of immigrants may be asymptomatic on arrival
  • VFR travelers
  • Would prevent misdiagnoses leading to delayed treatment
### Should we screen migrants for malaria? (2)

<table>
<thead>
<tr>
<th><strong>Which laboratory test is advised for screening?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Thick/thin blood smears</td>
</tr>
<tr>
<td>• RDT antigen detection test (sens is low when parasitemia &lt;200/μl)</td>
</tr>
<tr>
<td>• Serology</td>
</tr>
<tr>
<td>• PCR: is, by far, the most powerful tool for such surveillance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Treatment of positive cases?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pre-departure treatment of <em>P. falciparum</em> malaria in asymptomatic immigrants and refugees from certain sub-Saharan countries as a cost-benefit measure.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Transmission?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• No significant risk as competent vectors absent in non-endemic areas.</td>
</tr>
<tr>
<td>• Congenital, transfusional or organ transplantation-associated transmission</td>
</tr>
</tbody>
</table>
Australia

Malaria

- All refugees, including those who have had documented testing and/or treatment for malaria at the time of pre-departure assessment, should be tested for malaria after arrival in Australia (except those who have never resided in or travelled through a region where malaria occurs).
- Testing should be performed both by thick and thin blood films AND an antigen-based rapid detection test.
- All cases of malaria should be treated by or in consultation with a specialist infectious disease service.
- Falciparum malaria in adults resettled in malaria non-receptive areas of Australia may be treated in the outpatient setting if the following criteria are satisfied: asymptomatic or minimally symptomatic, not pregnant, and no indicators of severe malaria (altered consciousness, jaundice, oliguria, severe anaemia or hypoglycaemia, parasite count > 100,000/µL or > 2%, or patient is vomiting or acidotic). (Level IV)
- Cases of malaria in children should be urgently discussed with a paediatric infectious disease service.

Malaria

Do not conduct routine screening for malaria.

Be alert for symptomatic malaria in migrants who have lived or travelled in malaria-endemic regions within the previous three months (suspect malaria if fever is present or person migrated from sub-Saharan Africa). Perform rapid diagnostic testing and thick and thin malaria smears.
Recommendations for Post-arrival Presumptive and Directed Treatment for Malaria for Refugees from Sub-Saharan Africa

- Refugees who have received recommended pre-departure presumptive or directed therapy
- Refugees who have received pre-departure treatment with a recommended antimalarial drug or drug combination do not need further evaluation or treatment for malaria unless they have clinical symptoms.
- Refugees who have not received the recommended presumptive or directed pre-departure treatment

- It is recommended that refugees originating in sub-Saharan Africa who have not received pre-departure therapy with a recommended regimen either receive presumptive treatment on arrival (preferred) or have laboratory screening to detect *Plasmodium* infection.

Post-arrival presumptive anti-malarial treatment

Atovaquone-proguanil (trade name Malarone) or artemether-lumefantrine (trade names Coartem, Riamet) are the medications of choice for presumptive treatment for malaria. Atovaquone-proguanil and artemether-lumefantrine are effective treatment for *P. falciparum* malaria (as well as *P. malariae* and the blood stages of *P. vivax* and *P. ovale*). In addition, there is little parasite resistance to these medications, the treatment regimens are short, and they are generally well tolerated with few adverse effects. All other available medications have higher rates of adverse effects (e.g., mefloquine) or more complex dosing regimens of combination medications (e.g., quinine/quinidine plus a second agent) and are of limited use for presumptive treatment. Therefore, newly arriving sub-Saharan refugees should receive presumptive therapy with atovaquone-proguanil or artemether-lumefantrine (Table 2) on arrival or during their new arrival refugee medical visit.

Refugees from Other Regions

Refugees arriving from Southeast Asia, South Asia, Central Asia, and all areas in the Western Hemisphere generally come from areas with low or absent levels of malaria transmission. In contrast to the situation among refugees from sub-Saharan Africa it is rare for persons from these areas to have asymptomatic or sub-clinical *P. falciparum* malaria infection. In these refugee populations, the risk and cost of post-arrival presumptive treatment currently outweighs the potential benefits. Furthermore, laboratory screening, especially given the issues with sensitivity, specificity and availability of the testing, is not indicated. Therefore, currently, CDC does not recommend presumptive treatment or routine laboratory screening for malaria in refugees from areas other than sub-Saharan Africa. However, any refugee from an endemic area with signs or symptoms of malaria should be receiving diagnostic testing for *Plasmodium* and subsequent treatment for confirmed infections.
Should we screen migrants for intestinal parasitoses? (1)

**To whom?**
- Worldwide but mainly in tropical countries in areas of poor sanitation
- *Giardia* has a worldwide distribution and is the most common infective protozoan parasite identified in humans

**When?**
- Highest rate in recently arrived immigrants. Most of the intestinal parasites will clear without treatment 1-2 years after migration. Screen to those who have arrived within the last 6–12 months or if eosinophilia is detected, regardless of the time since arrival.

**Which laboratory test is advised for screening?**
- 2-3 stool samples, concentration techniques for ova & parasites
- Kinyoum stain
- *Giardia / Cryptosporidium* RDT antigen detection
- Serology (*E.histolytica*)
- PCR
Should we screen migrants for intestinal parasitoses? (2)

- **Mass treatment?**
  - Presumptive treatment with albendazole in immigrants coming from areas at high risk could save money. However, this is not free of potential toxicities and the risk of treatment (especially relevant in Latin American populations with a high prevalence of cysticercosis) or the possibility of not treating certain species correctly.

- **Treatment of positive cases?**
  - *Giardia resistance to metronidazole*

- **Transmission?**
  - Protozoa: risk of food contamination by asymptomatic carriers. Transmission through certain sexual practices possible (Giardiasis, amoebiasis)
  - Soil-transmitted helminths: no significant risk of transmission
Should we screen migrants for strongyloidiasis?

- **To whom?**
  - Mainly in tropical countries

- **When?**
  - At any time after arrival. *S. stercoralis* may persist for decades and can produce future severe manifestations in the presence of immunosuppression or HTLV-1 infection.

- **Which laboratory test is advised for screening?**
  - Classical fecal concentration techniques (Baermann method)
  - Agar plate culture of stool samples
  - Serology (cross reactions)
  - Real time-PCR in stools

- **Treatment of positive cases?**
  - Albendazole or ivermectin? 1 or 2 doses? Risk of ivermectine if *Loa loa*
  - if eosinophilia? Treat and Test OR Test and Treat?
  - if HTLV-1 or immunosupression?

- **Transmission?**
  - No significant risk of transmission
Figure 1. Management of asymptomatic refugees for parasitic infection if they received no pre-departure treatment as of March 1, 2013: Treat and Test OR Test and Treat?

Refugees from Asia and Middle East:
1. Presumptive albendazole OR stool ova and parasites examination x 2 or more \(^1\)
2. CBC with differential \(^2\)
3. Presumptive treatment OR screen and treat for strongyloidiasis

Refugees from Loa loa-endemic areas of Africa:
1. Presumptive albendazole OR stool ova and parasites examination x 2 or more \(^1\)
2. CBC with differential \(^2\)
3. Screen for strongyloidiasis and treat if no contraindications \(^3\)
4. Presumptive treatment OR screen for schistosomiasis

Refugees from non-Loa loa endemic areas of Africa:
1. Presumptive albendazole OR stool ova and parasites examination x 2 or more \(^1\)
2. CBC with differential \(^2\)
3. Presumptive treatment OR screen and treat for strongyloidiasis
4. Presumptive treatment OR screen for schistosomiasis

Treat positive pathogenic parasites detected \(^4\)

Eosinophilia? \(^5\)
- Yes: Re-check total eosinophil count in 3-6 months
- No: Further evaluation only if symptomatic

Eosinophilia? \(^5\)
- Yes: Further evaluation of etiology of eosinophilia
- No: Further evaluation only if symptomatic

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1. Sensitivity varies according to parasite (e.g., very sensitive for Ascaris but may need 7 specimens to reliably exclude Strongyloides) and minimum of two specimens are suggested.
2. CBC: Complete blood count and differential (not recommended as screening test for parasitic infection but routinely obtained on screening for newly arrived refugees)
3. See text for discussion of screening for Loa loa.
4. See DPDx Laboratory Identification of Parasites of Public Health Concern, diagnostic and management assistance may be obtained by contacting Division of Parasitic Diseases at CDC.
5. Eosinophilia = an eosinophil count of >400 per microliter (μL)
**Australia**

**Helminths**

<table>
<thead>
<tr>
<th>Test</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongyloides serology</td>
<td>If positive</td>
</tr>
<tr>
<td></td>
<td>- Ivermectin 200 µg/kg PO as a single dose, repeated 14 days following first dose (Level II)</td>
</tr>
<tr>
<td></td>
<td>- If &lt;5 yrs, do not give ivermectin; refer to paediatric infectious diseases service</td>
</tr>
<tr>
<td>Faeces microscopy</td>
<td>If faeces readily obtainable, OR symptoms present, faeces microscopy followed by directed treatment.</td>
</tr>
<tr>
<td>Full blood count (FBC)</td>
<td>If faeces not readily obtainable, AND patient is asymptomatic: No documented pre-departure albendazole therapy:</td>
</tr>
<tr>
<td></td>
<td>- Empiric single-dose albendazole (≤10kg; 200mg; &gt;10kg; 400mg) (Level I)</td>
</tr>
<tr>
<td></td>
<td>- No eosinophilia: no further treatment or follow-up</td>
</tr>
<tr>
<td></td>
<td>- Eosinophilia: repeat FBC in 8 weeks: if eosinophilia still present, investigate further or specialist referral</td>
</tr>
</tbody>
</table>

**Canada**

**Strongyloides**

Screen refugees newly arriving from Southeast Asia and Africa with serologic tests for *Strongyloides*, and treat, if positive, with ivermectin (first-line therapy) or albendazole (if there are contraindications to ivermectin).
Should we screen migrants for schistosomiasis? (1)

• To whom?
  – Mainly to high-risk sub-Saharan African immigrants
  – *S. mansoni*: Africa, parts of South America
  – *S. hematobium*: Africa, Middle East
  – *S. japonicum*: Indonesia, parts of southeast Asia and China
  – *S. mekongi*: Cambodia, Laos
  – *S. intercalatum*: West and central Africa

• When?
  – At any time after arrival. Sub-clinical infections or low-grade disease can persist for decades after immigration and may cause future morbidity
  – Mainly when eosinophilia or hematuria is detected
Should we screen migrants for schistosomiasis? (2)

**Which laboratory test is advised for screening?**
- Detection of *Schistosoma* eggs in urine or stool samples (sens <50%)
- Biopsy samples from the bladder mucosa, rectal mucosa, and liver
- Antigen detection is only currently available for *S. mansonii*.
- **Specific serology** has a sensitivity and specificity >90% when combining two different techniques (indirect hemagglutination test [IHA] and ELISA), but does not discriminate between species
- PCR in stool, urine, blood and tissue samples (sens>97%, spec >90%).

**Treatment of positive cases?**
- PZQ: 40 or 60 mg/Kg? Praziquantel can reverse previous established hepatic fibrosis. Early screening and treatment could avoid the development of bladder cancer.
- Snail vectors absent

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**Australia**

**USA**

**Canada**

*Schistosoma*

Screen refugees newly arriving from Africa with serologic tests for *Schistosoma*, and treat, if positive, with praziquantel.
**Australia**

**Schistosomiasis**

**Recommendations**

- Schistosomiasis serology should be offered to all recently arrived African and South East Asian refugees.
- Those with negative serology do not require further investigation.
- Those with positive serology should be treated presumptively:
  - praziquantel 40mg/kg in two doses of 20mg/kg, 4 hours apart for refugees from Africa (Level 1);
  - praziquantel 60mg/kg in two doses of 30mg/kg, 4 hours apart for refugees from South East Asia (Level II).
- Those with positive serology should also have faeces and urine examination for schistosoma ova to determine if further follow-up is required (see flow-chart).

**Flow-Chart**

- **schistosomiasis serology**
  - positive or equivocal
    - praziquantel 20mg/kg* at time zero and then 4-6 hours later, after food
    - urinalysis – if dipstick positive for blood, urine microscopy for ova (collect all urine between 12:00 and 15:00)
    - faeces for ova
  - faeces positive for schistosome ova (S. mansoni, japonicum or intercalatum)
    - look for indicators of end-organ damage**
      - if present, do upper abdominal ultrasound and refer to specialist.
      - repeat faeces for ova examination (x 3 specimens) 12 weeks after praziquantel
      - if positive, repeat praziquantel
      - if ova still present 12 weeks after 2nd course of praziquantel, refer to specialist
  - urine positive for schistosome ova (S. haematobium)
    - look for history of recurrent UTIs, or evidence of genital lesions or hydronephrosis
    - renal tract ultrasound
    - if either of above abnormal, refer to urologist for follow up.
    - repeat urine for ova examination 12 weeks after praziquantel
      - if positive, repeat praziquantel.
    - if ova still present 12 weeks after 2nd course of praziquantel, refer to specialist
  - no indicators of possible end-organ damage, repeat faeces negative and eosinophilia resolved (if present)
  - no further follow up

- negative
  - no further follow up

* For patients from SE Asia, use 30mg/kg each dose (60mg/kg in total)

** Indicators of possible end-organ damage:
Any history of chronic liver disease, gastrointestinal haemorrhage, hepatomegaly, splenomegaly, ascites, positive hepatitis B or C serology, thrombocytopenia, low albumin or raised liver enzymes
Should we screen migrants for filariasis?

• To whom?
  – West, central-east Africa, Middle East, Asia, South America, Caribbean, Pacific

• When?
  – At any time after migration as can survive for decades
  – Mainly to those with symptoms and/or eosinophilia

• Which laboratory test is advised for screening?
  – peripheral blood samples extracted at night/day time
  – Immunochromatographic card tests for bancroftian filariasis
  – skin snip samples
  – serology
  – PCR

• Treatment of positive cases?
  – Mass treatment is not indicated as co-infections can occur
  – Risk of ivermectine in Loa loa

• Transmission?
  – Does not occur in areas where vectors are absent
Should we screen migrants for Chagas disease? (1)

• To whom?
  • Latin America (except the Caribbean) migrants
  • those persons born of Latin American mothers
  • Blood / organ donors
  • Pregnant / newborns

• When?
  • Systematic screening for Chagas disease at any time in immigrants from endemic areas is justified as they may be asymptomatic for long periods.
  • There is a risk of fatal cardiac events, and the possible transmission outside endemic areas (vertical and transfusion-related)

• Which laboratory test is advised for screening?
  • Serology
  • PCR
Estimated global population infected by Trypanosoma cruzi, 2009. As a consequence of immigration, Chagas’ disease has overcome the borders of the Latin American endemic countries and has settled in North America, Western Europe and Western Pacific regions.

Sources:
1. OPS/HRM/CDC/425-06 Estimación cuantitativa de la enfermedad de Chagas en las Américas.
Estimated cases of Chagas disease and number of Latin American migrants in the EU/EEA and Switzerland.
Should we screen migrants for Chagas disease? (2)

• Treatment of positive cases?
  • Benznidazole / Nifurtimox: risks and benefits
  • 20–40% will develop visceral involvement, mainly dilated cardiomyopathy and/or enlarged viscera and rarely polyneuropathy. Gastrointestinal involvement is less common (mainly in patients from the Southern Cone). Risk factor for stroke.
  • Immunosuppressed (HIV)
  • Treatment of nonpregnant fertile women to decrease vertical transmission

• Transmission?
  • No significant risk of vector-borne transmission
  • Blood and organ donation
  • Mother-to-child (7%)
Should we screen migrants for cysticercosis?

- **To whom?**
  - Worldwide

- **When?**
  - It is not indicated

- **Which laboratory test is advised for screening?**
  - Serology
  - CAT / MR

- **Treatment of positive cases?**

- **Transmission?**
  - Patients infected with *T. solium* tapeworm may lead to cases of cysticercosis through direct contact or if handled food is contaminated with eggs

Should we screen migrants for cysticercosis?
Other infections which may be detected at the health assessment

*Helicobacter pylori*

Adults with suspected peptic ulcer disease (based on symptoms):
- Non-invasive tests for *H. pylori* infection (e.g. stool antigen or urea breath test)
- If positive, treat as per current guidelines

Children with anorexia, poor weight gain or failure to thrive should be referred to a paediatric refugee health service for assessment

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**Using Stool Antigen to Screen for *Helicobacter pylori* in Immigrants and Refugees from High Prevalence Countries Is Relatively Cost Effective in Reducing the Burden of Gastric Cancer and Peptic Ulceration**

*Thomas R. Schulz*, *Emma S. McBryde*, *Karin Leder*, *Beverley-Ann Biggs*

**Abstract**

*Objectives:* Refugees and immigrants from developing countries settling in industrialised countries have a high prevalence of *Helicobacter pylori* (*H. pylori*). Screening these groups for *H. pylori* and use of eradication therapy to reduce the future burden of gastric cancer and peptic ulcer disease is not currently recommended in most countries. We investigated whether a screening and eradication approach would be cost effective in high prevalence populations.

*Methods:* Nine different screening and follow-up strategies for asymptomatic immigrants from high *H. pylori* prevalence areas were compared with the current approach of no screening. Cost effectiveness comparisons assumed population prevalence's of *H. pylori* of 25%, 50% or 75%. The main outcome measure was the net cost for each cancer prevented for each strategy. Total costs of each strategy and net costs including savings from reductions in ulcers and gastric cancer were also calculated.

*Results:* Stool antigen testing with repeat testing after treatment was the most cost effective approach relative to others, for each prevalence value. The net cost per cancer prevented with this strategy was US$11,800 (assuming 75% prevalence), $13,300 (50%) and $193,900 (25%). A test and treat strategy using stool antigen remained relatively cost effective, even when the prevalence was 25%.

*Conclusions:* *H. pylori* screening and eradication can be an effective strategy for reducing rates of gastric cancer and peptic ulcers in high prevalence populations and our data suggest that use of stool antigen testing is the most cost effective approach.
<table>
<thead>
<tr>
<th>Sub-Saharan African immigrants</th>
<th>Latin American immigrants</th>
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<tr>
<td>Blood count; serum biochemistry; basic urine analysis</td>
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<td>HIV serology</td>
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<td>HBV serology</td>
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<tr>
<td>HCV serology</td>
<td>HCV serology only if risk factors</td>
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<tr>
<td>Syphilis serology</td>
<td>Syphilis serology</td>
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<tr>
<td>TST if &lt;5 years since migration</td>
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<td>Stool analysis for ova and parasites if &lt;6–12 months since migration or eosinophilia</td>
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<tr>
<td>PCR for malaria if &lt;3 years since migration</td>
<td>T. cruzi serology</td>
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<td>Strongyloides serology</td>
<td>Strongyloides serology</td>
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<tr>
<td>Schistosoma serology</td>
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HIV = human immunodeficiency virus; HBV = hepatitis B virus; HCV = hepatitis C virus; TST = Tuberculin Skin Test; PCR = polymerase chain reaction.
Tropical Diseases Screening in HIV+ Immigrant Patients

- Intestinal parasites: Cryptosporidium, Cystoisospora?
- Strongyloidiasis?
- Schistosomiasis?
- Toxoplasmosis?
- Malaria?
- Chagas disease?
- Leishmaniasis?
- Histoplasmosis?
- Cryptococcosis?
Immigrant and Refugee Health

As a world leader in health promotion and disease prevention, CDC works with immigrant, refugee, and migrant groups to improve their health by:

- providing guidelines for disease screening and treatment in the United States and overseas
- tracking and reporting disease in these populations
- responding to disease outbreaks in the United States and overseas
- advising U.S. partners on health care for refugee groups
- educating and communicating with immigrant and refugee groups and partners.

News and Updates

CDC has updated the 2010 Technical Instructions for Physical or Mental Disorders with Associated Harmful Behaviors and Substance-Related Disorders.

As of October 1, 2013, panel physicians in all countries must be using the complete Cultures and Directly Observed Therapy (DOT) Tuberculosis Technical Instructions (CDOT TB Vis).


Guidance for Civil Surgeons and Panel Physicians based on 2010 Recommendations for the Seasonal Influenza (Flu) Vaccine.

New International Adoption Web page: Adopting a child from overseas can be a complicated process, and CDC understands the concerns of adoptive parents, adoption agencies, and advocates. CDC must balance the need to protect the health of immigrant applicants, the needs of U.S.-bound families, and the health of those in the United States. Thus, CDC sets guidelines to protect all these groups from the spread of serious disease. Learn more about medical screening for international adoptees and other immigrants.
Evidence-based clinical guidelines for immigrants and refugees

Kevin Pottie MD MCIsc, Christina Greenaway MD MSc, John Feightner MD MSc, Vivian Welch MSc PhD, Helena Swinkels MD MHSc, Mob Rashid MD, Lavanya Narasiah MD MSc, Laurence J. Kirmayer MD, Erin Ueffing BHSc MHSs, Noni E. MacDonald MD MSc, Ghayda Hassan PhD, Mary McNally DDS MA, Kamran Khan MD MPH, Ralf Buhrmann MDCM PhD, Sheila Dunn MD MSc, Arunmozhí Dominic MD, Anne E. McCarthy MD MSc, Anita J. Gagnon MPH PhD, Cécile Rousseau MD, Peter Tugwell MD MSc; and coauthors of the Canadian Collaboration for Immigrant and Refugee Health

Competing interests: See end of document for competing interests.


Conditions covered in systematic reviews

Infectious diseases
- Measles, mumps, rubella
- Diphtheria, tetanus, polio, pertussis
- Varicella
- Hepatitis B
- Tuberculosis
- HIV
- Hepatitis C
- Intestinal parasites (Strongyloides and Schistosomiasis)
- Malaria

Mental health and maltreatment
- Depression
- Post-traumatic stress disorder
- Child maltreatment
- Intimate partner violence

Chronic and noncommunicable diseases
- Diabetes mellitus
- Iron-deficiency anemia
- Dental disease
- Vision health

Women’s health
- Contraception
- Cervical cancer
- Pregnancy

Key points
- Clinical preventive care should be informed by the person’s region or country of origin and migration history (e.g., forced versus voluntary migration).
- Forced migration, low income and limited proficiency in English or French increase the risk of a decline in health and should be considered in the assessment and delivery of preventive care.
- Vaccination (against measles, mumps, rubella, diphtheria, tetanus, pertussis, polio, varicella, hepatitis B and human papillomavirus) and screening (for hepatitis B, tuberculosis, HIV, hepatitis C, intestinal parasites, iron deficiency, dental pain, loss of vision and cervical cancer) should be routinely provided to at-risk immigrants.
- Detecting and addressing malaria, depression, post-traumatic stress disorder, child maltreatment, intimate partner violence, diabetes mellitus and unmet contraceptive needs should be individualized to improve detection, adherence and treatment outcomes.
The Australasian Society for Infectious Diseases guidelines for the diagnosis, management and prevention of infections in recently arrived refugees: an abridged outline

Ronan J. Murray, Joshua S. Davis and David P. Burgeon on behalf of the Australasian Society for Infectious Diseases Refugee Health Guidelines Writing Group.

Australia and New Zealand have obligations under the 1951 United Nations Convention relating to the Status of Refugees and the 1967 Protocol Relating to the Status of Refugees to assist in the relocation of individuals who are unable to remain in their country of origin. Currently, about 13,000 refugees migrate to Australia each year, with priority regions for individuals needing resettlement including southern and South-East Asia, the Middle East and sub-Saharan Africa.

The Australian Government requires that refugees being considered for migration to Australia undergo a health assessment before being issued with a visa. This assessment includes screening for HIV infection in those aged 15 years or over, and for active tuberculosis infection (including a chest radiograph) in those older than 11 years.

An additional “fitness-to-fly” pre-departure assessment is usually performed shortly before travelling to Australia. Testing for and treatment of malaria and empiric treatment for helminth infection have recently been added to the fitness-to-fly assessment for many sub-Saharan African refugees. However, as refugees bear a disproportionate burden from other acute and chronic infectious diseases that may be undiagnosed or untreated at the time of arrival in Australia, timely post-arrival screening for infectious diseases and other common conditions in all refugees is essential, to ensure not only the health of each refugee but also the public health of the broader Australian community.

In recent years, migrant and refugee health service providers have noted an increase in the number and variety of infectious diseases in newly arrived refugees, particularly in those from sub-Saharan Africa. These infections are often unfamiliar to local medical practitioners, as many are not endemic to Australia. This has led to a degree of uncertainty and concern among refugees, health care providers and the wider community. How should we screen for infection in refugees? What tests should be performed? What should we do with the results? What about catch-up vaccinations? The states and territories have developed their own guidelines and policies, as well as to assist with the post-arrival health assessment.

**ABSTRACT**

- About 13,000 refugees are currently accepted for migration into Australia each year, many of whom have spent protracted periods living in extremely disadvantaged circumstances. As a result, medical practitioners are increasingly managing recently arrived refugees with acute and chronic infectious diseases.
- The Australasian Society for Infectious Diseases has formulated guidelines for the diagnosis, management and prevention of infection in newly arrived refugees. This article is an abridged version of the guidelines, which are available in full at [http://www.asid.net.au/](http://www.asid.net.au/).
- All refugees should be offered a comprehensive health assessment, ideally within 1 month of arrival in Australia, that includes screening for and treatment of tuberculosis, malaria, blood-borne viral infections, schistosomiasis, helminth infection, sexually transmitted infections, and other infections (eg. Helicobacter pylori) as indicated by clinical assessment and assessment of immunisation status, and catch-up vaccinations where appropriate.
- The assessment can be undertaken by a general practitioner or within a multidisciplinary refugee health clinic, with assistance of an interpreter where required. The initial assessment should take place over at least two visits: the first for initial assessment and investigation and the second for review of results and treatment or referral.

MJA 2009; 190: 421-425

**Key general recommendations**

- All refugees should be offered a comprehensive health assessment, ideally within 1 month of arrival in Australia. This should include:
  - screening for and treatment of tuberculosis, malaria, blood-borne viral infections, schistosomiasis, helminth infection, and sexually transmitted infections;
  - testing for and treatment of other infections (eg. Helicobacter pylori) as indicated by clinical assessment, and assessment of immunisation status, and catch-up vaccinations where appropriate.
  - The assessment can be undertaken by a general practitioner or within a multidisciplinary refugee health clinic.
  - An appropriate interpreter should be used where required.

- The initial assessment should take place over at least two visits: the first for initial assessment and investigation and the second for review of results and treatment or referral.
- Psychological, dental, nutritional, reproductive and developmental health issues (which are beyond the scope of these guidelines) should also be addressed at the post-arrival health assessment.

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**Diagnosis, management and prevention of infections in recently arrived refugees**

Australasian Society for Infectious Diseases
Migration and health in the European Union

Edited by
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Roumyana Petrova-Benedict,
Martin McKee

HUMA network
Health for Undocumented Migrants and Asylum-seekers

ACCESS TO HEALTH CARE FOR UNDOCUMENTED MIGRANTS AND ASYLUM SEEKERS IN 10 EU COUNTRIES
LAW AND PRACTICE
Thanks very much for your attention