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# HEALTH CARE FOR ADULT IMMIGRANTS AND REFUGEES: A REVIEW

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**Abstract**

According to human Rights Organization Amnesty International, the terms refugee, asylum seeker, and migrant are used to describe people who have left their countries and crossed borders. The terms are often used interchangeably, but it is important to distinguish between them, as there is a legal difference. Meanwhile, communicable diseases remain a significant world health issue particularly with the global climatic changes. The global climatic change already changed the conditions more suitable for risk spreading of certain zoonotic vector-borne diseases to non-endemic countries. This review was attempted to connect refugees' and migrant' travel and communicable diseases.

**Key words:** Communicable diseases, Refugees, Migrants, Travels.

## Introduction

Components of the health assessment for immigrants and refugees include addressing patient health concerns, screening for diseases associated with the country of origin and migration history, initiating age-appropriate immunizations, and routine healthcare maintenance. Guidance on a broad range of topics related to immigrant and refugee health in the United States is available from the United States (CDC, 2014a).

Definitions: Migrants refer to individuals who come to resettle in a new country. Migrants types include: 1- 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 nationality and unable to or, due to such fear, is unwilling to avail himself of the protection of that country (UN High Commissioner for Refugees, 2014). Refugees seek to establish their status as a refugee having fled their country of origin and while residing in a country of first asylum. 2- Asylum seeker: An individual who has submitted a claim to a government for refugee status and is waiting for the claim to be accepted or rejected. Asylum seekers seek to establish their refugee status after fleeing to a country where they hope to be granted asylum. 3- Asylee is an individual whose claim for refugee status has been granted, & 4- Parolee is an individual allowed into a country for urgent humanitarian reasons. Parole confers temporary status only; parolees must depart when the conditions supporting their parole cease to exist.

Preliminary screening: Refugees must undergo screening before arrival via an organized system that includes the Department of State, the International Organization for Migration, the CDC, state health departments, and United States resettlement agencies. Often these individuals have health insurance or entitlement to healthcare on arrival for a designated period of time. Many clinical practices for other migrant groups are extrapolated from the best practices developed for refugee settlement.

Legal migrants to the United States must undergo screening before arrival for specific infectious diseases of public health significance (such as tuberculosis & sexually transmitted diseases), illicit drug use, and psychiatric issues that may pose a threat to themselves or others. Some groups are excluded from specific requirements (for example, refugees and international adoptees are exempt from vaccine requirements), and many undocumented migrants, visitors, and students arrive with no health or immunization records. Most migrants warrant additional screening tests (e.g., hepatitis B serology, hemoglobin) and may need treatment for parasites or malaria (CDC, 2014b). It should not be assumed that a screening test has been done, a vaccine has been administered, or

presumptive therapy is administered in the absence of written documentation (including month and year or antibody testing).

Clinical health assessment: The CDC published guidelines for medical examination of newly arrived refugees, and a checklist that includes screening recommended for refugees arriving in the United States (CDC, 2014c) In addition, the Canadian Collaboration for Immigrant and Refugee Health has published guidelines for care of immigrants and refugee populations (Pottie *et al,* 2011). Clinicians must tailor guidelines for screening, diagnosis, and management to personal circumstances, exposure history, symptoms and signs, and risk factors.

Establishment of rapport is critical for productive clinical encounters with recent immigrants. Stressful factors for immigrant patients include lack of familiarity with the healthcare system, language and cultural barriers, and the possibility of prior emotional or physical trauma. In addition, limited health literacy is often a significant issue of which to be aware. Patients may be reluctant to discuss concerns due to fear that revealing health problems may affect their immigration status.

Stressful factors for healthcare providers include lack of familiarity with health assessment done abroad and recommendations for screening in the United States, unfamiliarity with illnesses seen more commonly in migrants, language and cultural barriers, and pressure to perform a significant workload of testing, immunization, and health maintenance activities in a limited amount of time, often through an interpreter.

All screening tests and immunizations need not be completed in the first visit; establishing a trusting relationship will facilitate completion of all the required elements over time. Explaining what to expect and inquiring about immediate medical or social concerns will facilitate establishment of the rapport. Addressing immediate concerns at the first visit and repeating inquiries about general and family well-being at each subsequent visit reinforces empathy and compassion and can build trust between the patient and provder. Effective listening may elicit additional concerns not revealed initially (Tennant *et al,* 2023). Health history must include standard elements as present and past medical problems, surgeries, pregnancies, outcomes, medications (as complementary and alternative), allergies, immunizations, and family history must be elicited. Mental health issues deserve special attention as many migrants have lost not only their homeland, but also family members to disease, war, or unwanted separation. Many have experienced rape or torture; this information may not be offered in early interviews. Mental health testing must be in the 1st or 2nd visit includes suicide risk and other issues (Anderson *et al,* 2017). Social history should include inquiry regarding current living conditions as well as migration history, including regions of residence and travel. Migrants may spend many years en route, which may include time in remote, rural settings, urban areas, or in refugee camps. Other important components of social history include education, languages (preferred spoken and written language for interacting with health system), occupational history, and current support or early appointments must also be used to address issues; as explaining local medical care delivery system, the a primary care provider concept, access to after-hours care, and emergency services (O'Malley and Rich, 2015)

Physical examination: Vital signs and growth parameters (height, weight, & head circumference in young children) should be measured and compared with age- and sex-based norms. Migrants may be under or overweight; nutritional deficiencies are more prevalent; and chronic conditions such as hypertension and diabetes may be undiagnosed. Assessment of vision and hearing is important that can affect school performance, job, and general quality of life. Dental caries are a common problem among new immigrants; oral hygiene and dental care must be detected and addressed early. A complete phys-

ical examination must be done, although, if there are no acute issues, genital exams are deferred to a follow-up appointment. Special attention is paid to reflect formerly undiagnosed medical case, cultural practices, or prior torture (Williams and Baird, 2016). Skin lesions may reflect parasitosis, traditional healing methods (scarification), or retained shrapnel related to trauma. Hepatosplenomegaly may indicate patients with hyperreactive malaria syndrome or schistosomiasis or leishmaniasis or even fascioliasis (Abou-Bakr *et al,* 2019). Heart murmurs may be present in patients with conditions ranged from anemia to tetralogy of Fallot, or signs of heart failure may be appreciated in patients with rheumatic heart disease or Chagas disease. Genital examination may reveal more common in refugees such as female genital cutting or filariasis hydrocele (Saleh *et al,* 2023).

Immunizations: Assessment for completion of primary immunizations and immunity to vaccine-preventable diseases must be undertaken. Immunizations may be considered valid if they include the vaccine' name and the month and year of administration and if the schedule reflects the recommended timing as outlined in CDC published schedules. Measles-containing vaccine as measles-mumps-rubella (MMR) was not valid if given before one year of age (Van Doorslaer *et al,* 1994). Optimal approach to serologic tests for immunity to vaccine-preventable diseases is uncertain but varies with likelihood of previous vaccination or infection. Serologic testing is usually appropriate for varicella and hepatitis A because of high population prevalence. Immunity testing for HBV is done often in conjunction with hepatitis B infection testing (Figueira *et al,* 2003), and for measles, mumps, and rubella may be done at the discretion of provider; alternatively, MMR vaccine may be administered. Most favor administration of other routine vaccines without preliminary was serologic testing (Cohen and Veenstra, 2006).

Infectious diseases as tuberculosis: Immigrants from endemic tuberculosis (TB) regions must be examined for active or latent tuberculosis (LTBI) as (table 1). CDC (2014) published guidelines for tuberculosis screening in newly arrived refugees; Testing for LTBI must be performed regardless of time since immigration, since TB may present years after exposure (Walter *et al,* 2014). Of 59% of foreign-born persons diagnosed active TB had resided in the States for <five years, 15% for < one year, and 18% between 1 and four years (CDC, 2012). Two accepted tests identified latent tuberculosis infection (LTBI), tuberculin skin test (TST) and interferon gamma release assay (IGRA). TST involves an intradermal injection of a purified protein derivative into arm lower part to see whether the patient reacted to the injection, but IGRA is a blood test measuring the person's immune response to TB proteins (Pai *et al*, 2021). There are differences as to costs, simple use, skill, and laboratory equipment required for these 2 tests, with differences in accuracy of the tests in specific populations, such as those with past the BCG vaccination (Menzies, 2020). A TST of ≥5 mm is considered positive for individuals with HIV infection, other immunocompromising conditions, history of TB exposure, and with signs of tuberculosis on chest radiograph; a TST of ≥10 mm is positive in all other categories of migrants. Patients with a positive TST or IGRA must undergo chest radiography and assessment for signs of active tuberculosis and the LTBI treatment for should be administered (WHO, 2021).

Human immunodeficiency virus: Immigrants must undergo routine screening for HIV with a combination assay to detect HIV antigen and antibodies (Tangredi *et al,* 2008).

Hepatitis: CDC published guidelines for hepatitis screening among newly arrived refugees (Weinbaum *et al,* 2008).

Hepatitis B: Immigrants from hepatitis B countries infection ≥2% must undergo routine screening, regardless of vaccination status in their country (Eckman *et al,* 2011). Their children should also undergo testing.

Individuals living in the household of those with hepatitis B infection should also be offered screening and immunization (Hurie *et al,* 1992). Horizontal transmission of hepatitis B is documented in family units. Hepatitis B-infected individuals should be evaluated for treatment, given vaccination against hepatitis A if neither immune, nor eligible or have failed treatment, must have routine early screening to detect HCH for hepatitis B surface antigen (HBSAg), surface antibody; HBSAb or anti-HBS, and core antibody; HBcAB or anti-HBc (Terrault *et al,* 2016)

Hepatitis A & C: Some migrants, particularly those who are older and coming from resource-limited settings, have had infection with hepatitis A as children, and routine screening may not be warranted. Younger migrants may not have had hepatitis A as children due to improvements in sanitation in many countries (Fishbain *et al,* 2002). Screening may be cost effective for certain groups, such as older children and adults who have a history of hepatitis, or those who are candidates for routine immunization or who would otherwise require immunization such as in travel setting or infection due to hepatitis B or C (Plans-Rubió, 2004). Young children must receive immunization against hepatitis A according to current recommendations (Schwartz and Raveh, 1998).

Routine screening for hepatitis C among immigrants is controversial due to lack of data but is likely not warranted in all populations (Eckman *et al,* 2013). It is most appropriate for groups with identified risk factors or those coming from areas of increased prevalence for hepatitis C (such as Pakistan, and the Republic of Georgia). Migrants should be asked about history of blood transfusions or needle-sharing practices such as tattooing or acupuncture. The screening rates range from 0.8 to 3% (Chen *et al,* 2014).

Sexually transmitted diseases: The CDC (2014b) published guidelines for sexually transmitted disease (STD) screening among newly arrived refugees. Screening for STDs includes a thorough medical history, physical examination, and laboratory testing. The history must include inquiry regarding sexual partner(s) with known or suspected STDs, active symptoms of current infection (genital discharge, dysuria, genital lesion, or rash), and prior history of STD or sexual trauma, as well as lymph node palpation and genital examination (Workowski *et al,* 2021).

Laboratory tests should include: 1- HIV testing in all persons >12 years and including those ≤12 years if risk factors or maternal history is unknown. Routine screening of migrants for HIV in the United States was discontinued in 2010. 2- Screening for syphilis (rapid plasma reagin [RPR] or Venereal Disease Research Laboratory (VDRL or equivalent test) in patients ≥15 years old and at younger ages based on risk factors, signs, or symptoms. Confirmatory testing; fluorescent treponemal antibody (FTA), *Treponema pallidum* particle agglutination assay (TPPA), or ELISA must be done for all positive RPR or VDRL patients. 3- Tesing for *Chlamydia* (nucleic acid amplification test) in women ≤ 25 years old, with new sexual partner or multiple partners, or symptomatic patients or leukocyte esterase on urine dipstick. 4- Testing for gonorrhea in patients with symptoms or leukocyte esterase on urine dipstick (Yu *et al,* 2022). Screening is a must for individuals with a history of rape or sexual assault. STD persons with signs or symptom must receive comprehensivetesting. Others as chancroid, granuloma inguinale/donovanosis, lymphogranuloma venereum, herpes or warts or trichomoniasis (Carosi *et al,* 2000)

Parasitic infections: CDC published guidelines for management of intestinal parasites among refugees overseas and /or after arrival (CDC, 2014d). The guidelines are based on prevalence data in refugee populations and should only be extrapolated to populations with similar risk factors. At-risk asymptomatic immigrants who didn't receive antiparasitic treatment (or incomplete treatment) before departure must either undergo screening or receive presumptive treatment on arrival as predeparture antiparasitic treatment

(reference). Others may not receive any testing or treatment for intestinal parasites.

Helminths: Screening or giving albendazole for empiric treatment of soil-transmitted helminths may be appropriate for asymptomatic at-risk individuals following arrival from the following regions, if treatment was not administered before migration: Asia, the Middle East, Africa, Latin America, and the Caribbean. Stool screening is preferred over presumptive treatment for infants <12 months of age and may be deferred until after delivery for pregnant women (CDC, 2014e). Presumptive treatment for soil-transmitted helminths before migration has been shown to reduce the prevalence of parasitic infection in refugees resettled from selected countries (Geltman *et al,* 2003).

Strongyloidiasis: Screening or administration of ivermectin to treat strongyloidiasis is appropriate for asymptomatic individuals following arrival from the following regions if treatment was not administered before migration: Asia, the Middle East, North Africa, sub-Saharan Africa (non-Loiasis-endemic areas), Latin America, and the Caribbean (Swanson *et al,* 2012). Screening for strongyloidiasis consists of serology tests; stool larva and parasite examination may be used, but its sensitivity is limited (CDC, 2024a). Patients from loiasis-endemic areas, ivermectin must be given only if *L. loa* microfilaria was ruled out. Screening for its microfilaria consists of a thick blood smear done between10am & 2pm. (CDC, 2024b). It is especially important that patients from endemic areas undergo *Strongyloides* treatment before anticipated immunosuppression (corticosteroids or other immune modulators) to minimize disease dissemination or hyperinfection. Ivermectin unless patients are from loisis endemic area; albendazole is used (Zaky *et al,* 2019). In pregnant women, ivermectin is one dose for uncomplicated chronic strongyloidiasis (Wikman-Jorgensen *et al*, 2021).

Schistosomiasis: Screening or administration of praziquantel for empiric treatment of schistosomiasis is appropriate for asymptomatic patients following arrival from highly endemic areas of sub-Saharan Africa, including pregnant women and children >4 years of age, if treatment was not administered before migration (Aula *et al,* 2021). Screening for schistosomiasis consists of serology. Also, stool and urine examination are used (Abo-Madyan *et al,* 2004).

Malaria: CDC published guidelines for malaria management among refugees (CDC, 2014e). Presumptive treatment or laboratory testing for *P. falciparum* malaria is appropriate if fever or history of recent fever is present or if there is unexplained anemia, thrombocytopenia, or splenomegaly; it can be among asymptomatic individuals following arrival from highly endemic areas of the sub-Saharan Africa (El-Tawdy *et al,* 2018).

For high-risk individuals from areas that are highly endemic for malaria (where persons may be infected but asymptomatic), presumptive treatment is preferred given the cumbersome process for screening that consists of three blood films at 12- to 24-hrs intervals. Sensitivity of rapid diagnostic testing for diagnosis of asymptomatic malaria in newly arrived refugees is limited (CDC, 2006). Pregnant women and children <5 kg should undergo laboratory testing and receive directed treatment if infection is detected; presumptive treatment must not be used (Fried and Duffy, 2017). Asymptomatic or subclinical *P. falciparum* was rare among immigrants from Southeast Asia, South Asia, Central Asia, parts of East Africa (e.g., Nairobi), and all areas in the Western Hemisphere; neither presumptive treatment nor laboratory screening is warranted for them (Huang *et al*, 2017). Neither presumptive treatment nor laboratory screening is warranted routinely for non-malignant malaria in asymptomatic ones from any region.

General blood count: A complete CBC for anemia, macrocytosis, microcytosis, and/or eosinophilia; these results may indicate malnutrition, hemoglobinopathy, or parasitosis (Válka and Čermák, 2018). CBC results may be used in conjunction with other findings to

help identify other health problems (such as lymphopenia in a patient with risk for HIV infection, anemia, and microcytosis in a patient with extremity pain suggestive of sickle cell disease, or thrombocytopenia and anemia together with fever suggestive of malaria). Eosinophilia can be a marker for parasites (Seybolt *et al,* 2006). Screening for CBC is warranted following Srrival and can be repeated three to six months later; this is particularly important for children between 6 months &16 years of age (CDC, 2014f).

Micronutrient screening: Defect in vitamin B12 and vitamin D were reported with high prevalence among some immigrant groups (Aucoin *et al,* 2013). As an example, vitamin B12 deficiency was in high rate among Bhutanese Nepali and Iraqi refugees (CDC, 2011). There is no consensus on universal screening for vitamin B12 deficiency; given the potential for long-term neurologic squeals, some favor providing multivitamins with B12 to newly arriving migrants (Benson *et al,* 2013). Vitamin D deficiency was seen with high prevalence among African immigrants, including Somali and Ethiopian women (Campagna *et al,* 2013). Vitamin D screening is appropriate for refugees; testing or empiric supplementation is warranted for those with compatible signs or symptoms of deficiency, including rickets, osteopenia, poor growth, or motor delay. Some favor screening or vitamin D supplementation for the majority of migrants (El-Tawdy *et al,* 2017).

Mental health screening: There is a high prevalence of mental health issues among refugees, particularly those arriving from areas of civil unrest; these include major depression, anxiety, and posttraumatic stress disorder (Jaranson *et al,* 2007). The process of migration is stressful and may predispose most migrant groups to mental health conditions. Mental health assessment includes a detailed social and psychiatric history; this may be difficult to achieve in the initial visit but is important to pursue (Jimenez et al, 2022). Assessing mental health is challenging and made even more difficult by language barriers, perceptions of mental illness in other cultures, and lack of standardized screening instruments for different populations. Refugees may have experienced loss of family members, personal health, and security. Many are victims of rape, torture, famine, or nutritional deprivation (Breilh, 2021). Initial screening can be limited to questions to identify those with serious mental illness and risk for suicide. Subsequently, as rapport is established, a formal mental health assessment can be performed using a screening tool (Hollifield *et al,* 2013). Screening for sexual trauma in women may be helpful (Ekblad *et al,* 2007).

Cancer screening: Cancer types vary geographically and other exposures. In many resource-limited countries, cervical and lung cancer are leading deaths cause among women and men, respectively (American Cancer Society, 2016). Cancers related to infectious diseases occur especially in migrant populations including cervical as human papillomavirus infection, gastric as *Helicobacter pylori*, & hepatocellular cancer as hepatitis B (Baj *et al*, 2022).

Migrants should be asked their real age, as their stated age is often incorrect by years that affect screening recommendations. Women beyond the usual screening age for pap smears need normal results, with co-testing for HPV, before ending screening. Many migrants have never had routine health testing and concept may be foreign; additional effort to explain rationale for such screening may be required. Bilingual educational tools and use of bilingual/bicultural health educators may be helpful. Refugees must be tested for predisposing factors to cause hypertension, obesity, diabetes, and tobacco. Susceptibility to metabolic syndrome is predominantly due to environmental factors and psychological stress (Rosenthal *et al,* 2022). One must consider global health issues that can cause chronic infection among migrants (Baum *et al,* 2014): 1-Eosinophilia may reflect parasites such as strongyloidiasis, filariasis, or schistosomiasis. 2- Hematuria, fem

ale infertility, or chronic pelvic pain may reflect schistosomiasis. 3- Splenomegaly may reflect hyperactive malaria syndrome or schistosomiasis or leishmaniasis. 4- Chronic rash or itching may reflect mycetoma, onchocercciasis, or other filariae (Morsy *et al,* 2022). 5- Heart failure or esophageal motility disorders may reflect Chagas, & 5- Seizures or other CNS symptoms may reflect neurocysticercosis (Garcia *et al,* 2020).

## Conclusion

CDC published guidelines for medical examination of new refugees and a checklist included screening recommended for those arriving in the United States. Recommendations for immigrant groups other than refugees were derived from these guidelines.

Primary immunizations and immunity to vaccine-preventable diseases is a must.

Immigrants from higher TB prevalence of areas must undergo screening for active and latent TB infection. Testing for LTBI consists of tuberculin skin test (TST) or IGRA. Receipt of BCG vaccination is not a contraindication to TST and must not be considered in result interpretation. IGRAs are not affected by BCG vaccination so are a useful alternative to TST for evaluation of LTBI in BCG-vaccinated persons. Immigrants from HB countries with prevalence of ≥2% and their children (irrespective of birth country) should undergo routine screening, regardless of vaccination status in country of origin.

STD assessment includes a good medical history, physical examination, and laboratory tests. STDs include syphilis, chlamydia, gonorrhea, chancroid, granuloma inguinal/ donovanosis, lymphogranuloma venereum, genital herpes, warts, and/or trichomoniasis.

Guidelines for intestinal parasites among refugees overseas and/or on arrival, are important mainly helminthic infections. Also, for malaria among refugees include presumptive treatment or laboratory for *P. falciparum* among asymptomatic ones on arrival from endemic sub-Saharan African regions, if treatment was not given before migration.

General screening must be for CBC, lead exposure, anemia, mental health, and chronic diseases as malignancy, hypertension, and hypercholesterolemia

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Table 1: Estimated epidemiological burden of tuberculosis cases, 2013

| Country | Population (1000s) | Mortality* | | HIV+ve TB mortality | | Prevalence | | Incidence | | HIV TB cases (%) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Afghanistan | 30,552 | 42 | 27-53 | 0.3 | 0.2-0.3 | 340 | 178-554 | 189 | 167-212 | 0.34 | 0.29-0.40 |
| Bangladesh¶ | 156,595 | 51 | 33-69 | 0.1 | <0.1-0.2 | 402 | 210-656 | 224 | 199-253 | 0.12 | <0.1-0.16 |
| Brazil | 200,362 | 2.2 | 1.3-3.4 | 1.0 | 0.8-1.4 | 57 | 27-99 | 46 | 41-52 | 14 | 13-16 |
| Cambodia | 15,135 | 66 | 42-92 | 3.9 | 3.0-5.0 | 715 | 604-834 | 400 | 366-444 | 3.9 | 3.4-4.4 |
| China | 1,385,567 | 3.0 | 2.9-3.1 | <0.1 | <0.1-0.1 | 94 | 82-107 | 70 | 66-77 | 0.46 | 0.22-0.79 |
| DR Congo | 67,514 | 68 | 33-78 | 9.5 | 0.3-35 | 549 | 285-898 | 326 | 297-356 | 7.5 | 0.13-27 |
| Ethiopia | 94,101 | 32 | 17-50 | 5.9 | 3.8-8.5 | 211 | 170-257 | 224 | 188-276 | 11 | 7.4-14 |
| India[Δ] | 1,252,140 | 19 | 12-28 | 3.0 | 2.5-3.5 | 211 | 143-294 | 171 | 162-184 | 5.7 | 4.8-6.6 |
| Indonesia[◊] | 249,866 | 25 | 14-37 | 1.6 | 0.9-2.5 | 272 | 138-450 | 183 | 164-207 | 3.2 | 2.1-4.5 |
| Ethiopia | 94,101 | 32 | 17-50 | 5.9 | 3.8-8.5 | 211 | 170-257 | 224 | 188-276 | 11 | 7.4-14 |
| India[Δ] | 1,252,140 | 19 | 12-28 | 3.0 | 2.5-3.5 | 211 | 143-294 | 171 | 162-184 | 5.7 | 4.8-6.6 |
| Indonesia[◊] | 249,866 | 25 | 14-37 | 1.6 | 0.9-2.5 | 272 | 138-450 | 183 | 164-207 | 3.2 | 2.1-4.5 |
| Kenya | 44,354 | 20 | 12-27 | 21 | 17-27 | 283 | 156-447 | 268 | 261-275 | 41 | 39-42 |
| Mozambique | 25,834 | 69 | 36-101 | 148 | 105-198 | 559 | 303-893 | 552 | 442-680 | 57 | 39-74 |
| Myanmar | 53,259 | 49 | 29-71 | 8.0 | 6.3-9.9 | 473 | 364-595 | 373 | 340-413 | 8.8 | 7.8-9.8 |
| Nigeria | 173,615 | 94 | 39-156 | 49 | 27-78 | 326 | 246-418 | 338 | 194-506 | 25 | 10-44 |
| Pakistan | 182,143 | 56 | 25-92 | 0.5 | 0.3-0.9 | 342 | 284-406 | 275 | 205-357 | 0.53 | 0.3-0.83 |
| Philippines | 98,394 | 27 | 25-29 | <0.1 | <0.1-<0.1 | 438 | 385-495 | 292 | 261-331 | 0.11 | <0.1-0.14 |
| Russia | 142,834 | 12 | 12-13 | 1.0 | 0.7-1.3 | 114 | 51-201 | 89 | 82-100 | 6.2 | 5.2-7.3 |
| South Africa | 52,776 | 48 | 28-73 | 121 | 90-158 | 715 | 396-1130 | 860 | 776-980 | 61 | 50-71 |
| Thailand | 67,011 | 12 | 7.3-18 | 2.8 | 2.0-3.6 | 149 | 72-252 | 119 | 106-134 | 15 | 12-17 |
| Uganda | 37,579 | 11 | 5.8-18 | 19 | 13-26 | 154 | 85-243 | 166 | 149-193 | 52 | 42-62 |
| UR Tanzania | 49,253 | 12 | 7.0-17 | 12 | 9.8-15 | 172 | 92-277 | 164 | 157-170 | 37 | 35-39 |
| Viet Nam | 91,680 | 19 | 13-26 | 2.1 | 1.3-3.2 | 209 | 86-384 | 144 | 121-174 | 7.2 | 5.4-9.1 |
| Zimbabwe | 14,150 | 40 | 25-52 | 153 | 121-189 | 409 | 235-630 | 552 | 474-643 | 72 | 55-86 |
| High-burden countries | 4,484,710 | 21 | 18-25 | 6.7 | 5.6-7.9 | 208 | 183-235 | 165 | 158-173 | 12 | 11-14 |
| AFR | 927,371 | 42 | 32-54 | 32 | 27-38 | 300 | 263-341 | 280 | 251-311 | 34 | 29-39 |
| AMR | 970,821 | 1.5 | 1.2-1.7 | 0.6 | 0.6-0.7 | 38 | 30-48 | 29 | 28-31 | 11 | 11-12 |
| EMR | 616,906 | 23 | 15-34 | 0.3 | 0.2-0.4 | 165 | 143-189 | 121 | 100-144 | 0.94 | 0.67-1.2 |
| EUR | 927,371 | 42 | 32-54 | 32 | 27-38 | 300 | 263-341 | 280 | 251-311 | 34 | 29-39 |
| SEAR | 1,855,068 | 23 | 18-30 | 2.6 | 2.2-3.0 | 244 | 188-307 | 183 | 175-192 | 4.9 | 4.4-5.5 |
| WPR | 1,858,410 | 5.8 | 5.4-6.3 | 0.3 | 0.2-0.3 | 121 | 109-134 | 87 | 82-92 | 1.4 | 1.2-1.6 |
| Global | 7,135,628 | 16 | 14-18 | 5.0 | 4.3-5.8 | 159 | 143-176 | 126 | 121-131 | 13 | 12-14 |

Rates per 100,000 population unless indicated=[§] * Mortality excluded among HIV-positive TB cases, classified as HIV deaths according to ICD-10. ¶ TB disease burden not approved in Bangladesh and Δ Estimates for India not approved.

Table 2: Interpretation of hepatitis B serologic panel

| Tests | Results | Interpretation |
|---|---|---|
| HBsAg, Anti-HBc & Anti-HBs | Negative | Susceptible |
| HBsAg | Negative | Immune due to natural infection |
| Anti-HBc & Anti-HBs | Positive | |
| HBsAg & Anti-HBc | Negative | Immune due to hepatitis B vaccination* |
| Anti-HBs, | Positive | |
| HBsAg Anti-HBc & IgM anti-HBc | Positive | Acutely infected |
| anti-HBs | Negative | |
| HBsAg & Anti-HBc | Positive | Chronically infected |
| IgM anti-HBc & Anti-HBs | Negative | |
| HBsAg | Negative | Four interpretations possible |
| Anti-HBc | Positive | |

Table 3: Medication regimen and dosing for presumptive parasites treatment

| Refugee population | helminths: Albendazole | Strongyloidiasis: Ivermectin | Schistosomiasis: Praziquantel |
|---|---|---|---|
| Adults: Asia, Middle East, North Africa, Latin American & Caribbean | 400mg orally (single dose) | 200mcg/kg/day orally once a day for 2days | Not recommended |
| Sub-Saharan Africa, non-*Loa loa*-endemic area | 400mg orally (single dose) | 200 mcg/kg/day orally once a day for2 days | 40mg/kg orally (single or divided & given in two doses) |
| Pregnant: Asia, Middle East, North Africa, Latin America, & Caribbean | Not recommended | Not recommended | Not applicable |
| Sub-Saharan Africa | Not recommended | Not recommended | As adults |
| Children: Asia, Middle East, North Africa, Latin America,& Caribbean | 12 to 23 months old: 200mg orally, not for ≤12 months | 200 mcg/kg/day orally a day for 2 days, not be used < or equal to 15 kg | Not applicable |
| Sub-Saharan Africa | ages 12 to 23 months: 200 mg orally for a day, but not for infant < 12 months old | 200mcg/kg/day orally once a day for two days must not use if <or equal to 15 kg or from loisis-endemic area | Children from sub-Saharan Africa, ≤4 years old must not receive presumptive praziquantel. |

Table 4: Endemicity of *Loa loa* in African countries

| African countries not *Loa loa* endemic I ivermectin for *Strongyloides*) | | | | *Loa loa* endemic ( ivermectin *not* for *Strongyloides*) |
|---|---|---|---|---|
| Algeria | Libya | Ghana | Somalia | Angola |
| Botswana | Madagascar | Guinea-Bissau | South Africa | Cameroon |
| Burkina Faso | Malawi | Kenya | Sudan | Central Africa Republic |
| Burundi | Mali | Liberia | Swaziland | Chad |
| Côte d'Ivoire | Liberia | Namibia | Tanzania | Republic of Congo |
| Egypt | Liberia | Niger | Togo | Democratic Republic of the Congo |
| Ethiopia | Mauritius | Rwanda | Uganda | Equatorial Guinea |
| Eritrea | Morocco | Senegal | Zambia | Gabon |
| Gambia | Mozambique | Sierra Leone | Zimbabwe | Nigeria, and South Sudan |