Overview of Refugee Health Screening: Overseas

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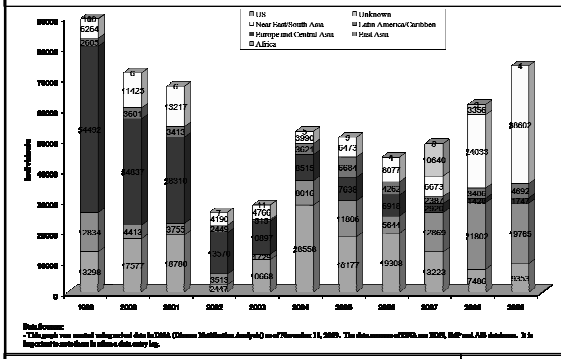
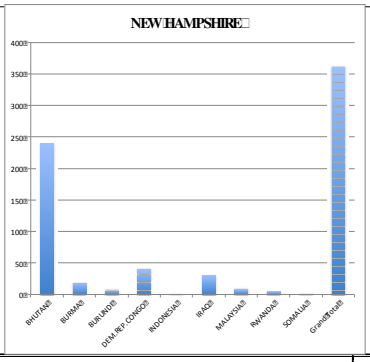
US Refugee Arrivals: FY 1999 - FY 2009

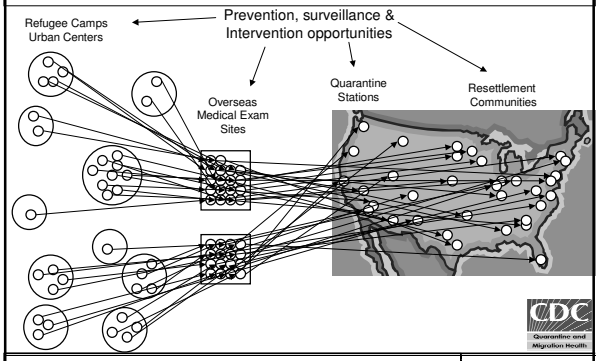


Refugee Arrivals in New Hampshire, 2012



Source:http://www.acf.hhs.gov/programs/orr/resource/fiscal-year-2012-refugee-arrivals

Mobility: time for health interventions?



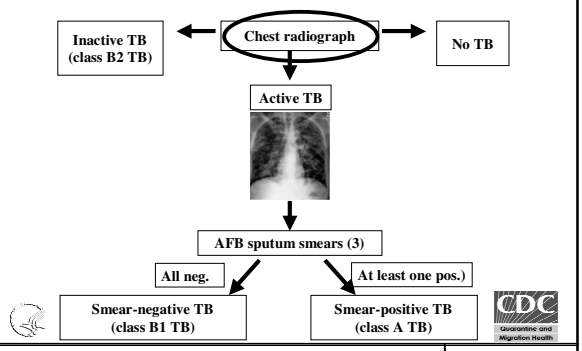
Refugee Health Screening

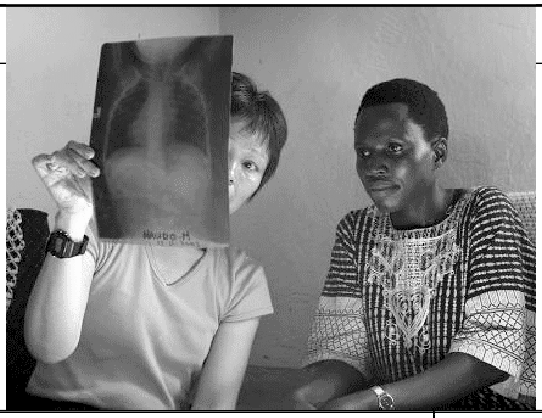
- Congress authorizes HHS Secretary to screen persons coming to US via Immigration Act
- HHS Secretary delegates CDC (DGMQ) to determine specific regulatory requirements and technical guidelines
- Medical exam is mandatory for all refugees
- Purpose: to identify applicants with inadmissible health-related conditions (all treatable)
  - Communicable disease of public health significance
  - Lack certain vaccinations
  - Physical/mental disorder with harmful behavior
  - Substance abuse
- Exams by ~6500 panel physicians selected by DOS & CDC
  - In US exams preformed by ~3,000 civil surgeons

Overseas Medical Exam

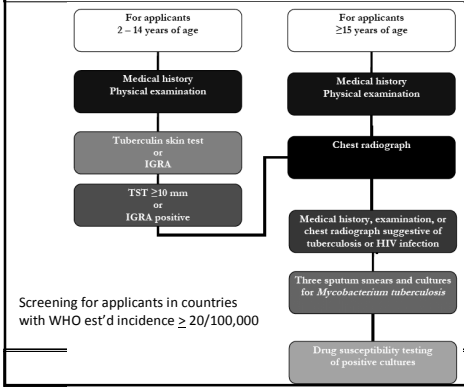
- Screening and/or Treatment for
  - –Tuberculosis
  - –Intestinal parasites
  - –Malaria
  - –Vaccine Preventable Diseases
  - –Not HIV

Overseas TB Screening: 1991 TB screening algorithm





2007 Revised TB Screening & Rx



Screening for applicants in countries with WHO est'd incidence ≥ 20/100,000

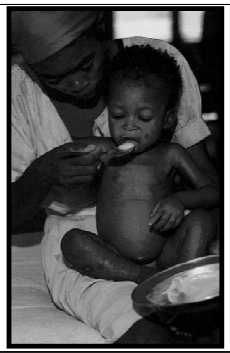
Tuberculosis Treatment

- Applicants with pulmonary or laryngeal TB must complete treatment under DOT prior to US immigration
- Applicants with possible TB who are sm and culture negative are not treated overseas unless their CXR and clinical findings are highly suggestive of TB
- Treatment is according to ATS/CDC/IDSA guidelines using only quality-assured drugs
- Contact investigations are performed, contacts evaluated and started on treatment as needed

Travel Clearance Validity: TB evaluation

- If no TB classification or only classified as LTBI (B2) or a contact (B3) and no HIV:
  - Travel clearance is valid for 6 months from the time the evaluation is complete
- Otherwise travel clearance valid for 3 months

Intestinal Parasites



Parasitic Helminths

- Trematodes (flukes)
  - Blood/various systems: *Schistosoma*
  - Biliary tract: *Clonorchis, Fasciola*
  - Lung: *Paragonimus*
- Cestodes (tapeworms)
  - *Taenia saginata, Taenia solium, Hymenolepis nana*
- Intestinal (nematodes/roundworms)
  - Intestinal
  - Blood, lymphatic, subcutaneous

Soil Transmitted Helminths = STH

- Ascariasis ("Roundworm")
- Trichuriasis ("Whipworm")
- Hookworm

Global Prevalence of Disease

Rank	Disease	# Infected
1.	Ascaris	807,000,000
2.	Trichuriasis	604,000,000
3.	Hookworm	580,000,000

de Silva, et al. Trends Parasitol 2003;19:547-51

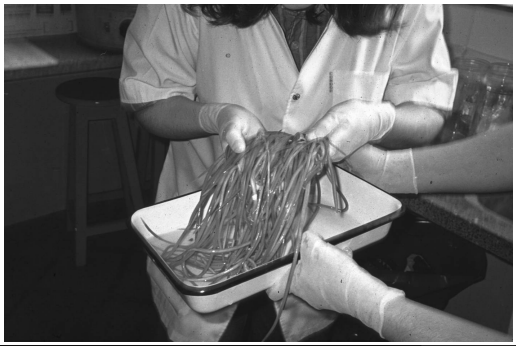
Soil Transmitted Helminths (STH)

- Intestinal Nematodes
- Part of development occurs in the soil
- Average 3-4 weeks in soil until infective
- Infection via eggs in contaminated soil (*Ascaris*, *Trichuris*) or skin penetration (Hookworm)

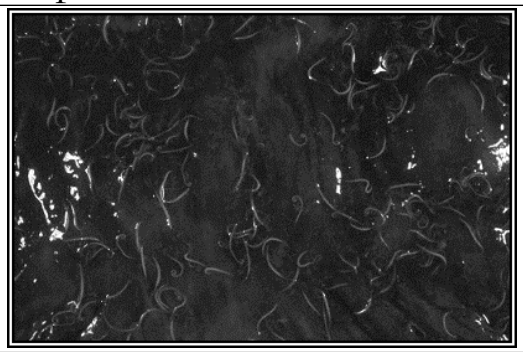
Intestinal Helminths

- *Ascaris lumbricoides*
  - May be asymptomatic,
  - Mild abdominal discomfort to (fatal) SBO
  - Malnutrition, impaired growth
- Trichuriasis
  - May be asymptomatic
  - Heavy infection – Frequent painful bloody stools with mucus, rectal prolapse
  - Children – anemia, growth-retardation
- Hookworm
  - Most asymptomatic, or mild GI symptoms
  - Blood loss leading to anemia and protein loss, growth retardation in children

Ascaris lumbricoides (roundworm)

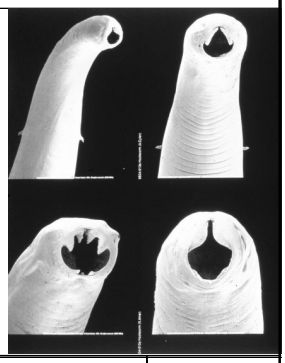


Whipworm: Trichuriasis Colitis

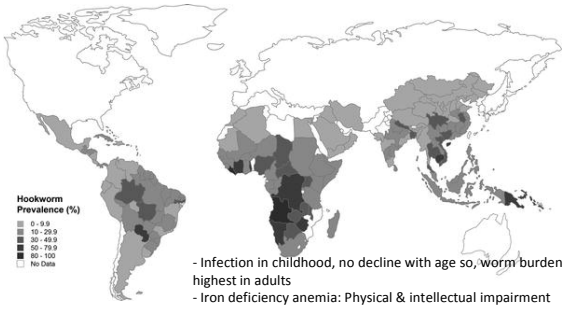


The Human Hookworms

Necator americanus
Ancylostoma duodenale



Human Hookworm



- Infection in childhood, no decline with age so, worm burden highest in adults
- Iron deficiency anemia: Physical & intellectual impairment
44 million pregnant women infected

How Prevalent are STSs in Refugee Populations?

- CDC and International Organization for Migration (IOM) screened Barawan Somali refugees awaiting resettlement
  - 38% had intestinal parasites
  - 25% had multiple infections

Source: Enhanced medical assessment strategy for Barawan Somali refugees–Kenya, 1997. MMWR, 1998. 46(52-53): p. 1250-4

What is the most effective approach?

- Muennig et al study of "watchful waiting" vs. universal screening vs. presumptive treatment with albendazole
- Compared with "watchful waiting"
  - Presumptive treatment: avert 870 disability life years (DALY's) and prevent 33 deaths and 374 hospitalizations, save $42 million/yr
  - Universal stool screening & treatment: cost $159,236 per DALY averted
- Presumptive Rx saves lives and money

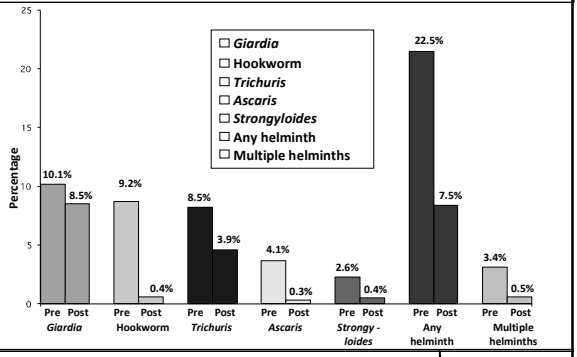
Muennig P, et al. NEJM, 1999;341(5):377-8

Implementation of Pre-DepartureTherapy for Intestinal Parasites

- Since May 1999: all sub-Saharan African refugees
  - Single dose of albendazole
  - Within 3 days of departure
  - Pregnant women and children < 2 yrs excluded
- Swanson et al:
  - Retrospective study of ~27,000 African and SE Asian refugees resettled in Minn between 1993 and 2007
  - Screened by stool examination for intestinal parasites on resettlement
  - Showed decrease in prevalence of intestinal nematodes among newly arrived refugees

Swanson et al. NEJM. 2012 Apr 19;366(16):1498-507.

Prevalence of Intestinal Parasites Among Refugees Arriving in Minnesota, pre/post-May 1999 (n = 26,928)



Benefits of Presumptive Treatment for STH

- Since overseas implementation of empiric albendazole therapy, there has been a significant decrease in intestinal parasites among newly-arriving refugees
  - 96% reduction in Hookworm prevalence
  - 93% reduction in *Ascaris* prevalence
  - 54% reduction in *Trichuris*
  - ~ 3-fold reduction in all stool helminths

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Pre-departure Presumptive Therapy

- Revised pre-departure recommendations now include presumptive treatment for Strongyloides and Schistosomiasis in selected populations
  - Ivermectin x 2 days for non-pregnant refugees from South/SE Asia and all non-loa loa endemic areas of Africa (being piloted)
  - Praziquantel for all sub-Saharan African refugees (January 2010)
  - Albendazole (single dose), all African and Asian refugees

See www.cdc.gov/ncidod/dq/refugee/index.htm

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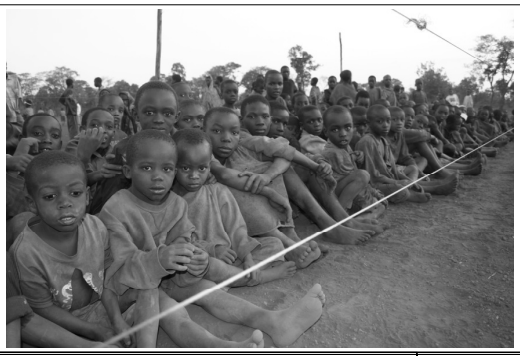
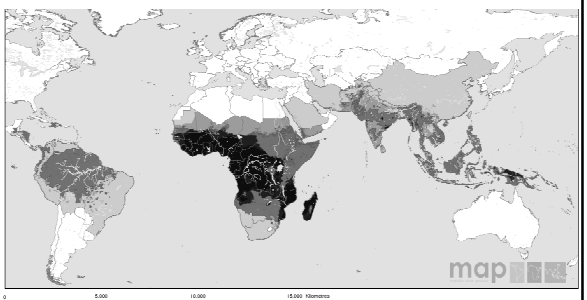
Pre-Departure Presumptive Therapy for Malaria



Malaria Morbidity & Mortality



- 104 endemic countries (~40% of population) at risk in 2011
- 216 million episodes in 2010
- 655,000 deaths in 2010 - mostly children <5

Preventing Malaria

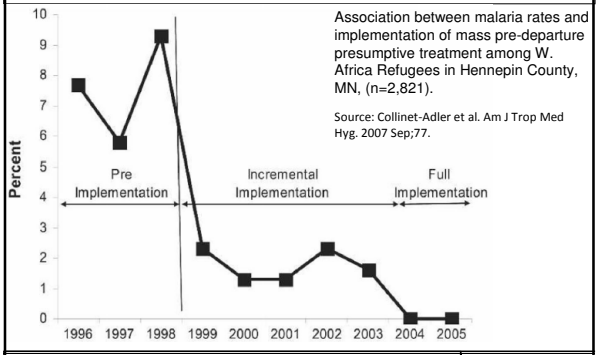
- Focus
  - *Plasmodium falciparum*
  - Sub-Saharan Africa (SSA)
- Before arrival
  - Prevalence of *P. falciparum* infection is >50% in much of sub-Saharan Africa
- After arrival
  - Many infected refugees are asymptomatic
  - Some refugees are parasitemic for months
  - A minority develop clinical malaria
- Malaria may be locally transmitted in the U.S.

Prevalence of Malaria Infection in US-Bound or Newly Arrived Refugees

Study Site, Year	Origin of Refugee	Timing	Prevalence of Infection		Percent *P. falcip.*
			All	Child	
Kenya, 1993 (n=279)	Somalia	Pre-departure	15%	30%	91%
Kenya, 1997 (n=385)	Somalia	Pre-departure	7%	10%	96%
US,1997-2000 (n=44 children)	W. Africa	~1 mo. post-arrival	--	64%	54%
Canada, 2000-2001 (n=521)	E. Africa	0-4 mo. post-arrival	19%	--	83%

Slutsker, JID 1995; Miller, AJTMH 2000; Maroushek, PIDJ 2005; Ndao JClinMicrobio 2004

P. falciparum Infection in Newly Arrived Refugees in Minnesota



More Data to support Malaria Pre-departure Presumptive Treatment

- Is this effective?
  - Stauffer et al: screened 103 Liberians 4 wks after arrival (2005)
  - 9% infected with *P. falciparum* by PCR vs. >60% prior to empiric treatment

Stauffer et al. Pediatric Infectious Disease Journal 2006, 25:948-950.

- Is it cost-effective?
  - Collinet-Adler et al: retrospective chart review of 58 symptomatic, confirmed cases of malaria seen in Hennepin County, MN, 1996 through 2005
  - Rx in US = $1700 vs presumptive pre-departure Rx = $150-$350 to prevent one case (NNTT=14)
  - Cost-effective if malaria prevalence >1%

Collinet-Adler et al. Am J Trop Med Hyg. 2007 Sep;77(3):458-63.

General Recommendations for Refugees from Sub-Saharan Africa

- Mass pre-departure treatment
  - **1999:** Sulfadoxine-pyrimethamine (SP, Fansidar™)
  - **2005:** Artemisinin-based combination therapy (ACT)
    - Artemether-lumefantrine (AL, Coartem™) preferred
    - Implementation delayed until July 2007 due to drug cost and availability

Outbreaks of Vaccine-Preventable Diseases affecting U.S.-Bound Refugees

Year	Disease	Refugee Population	Camp location
2004	Hepatitis A, varicella	Hmong	Thailand
	Measles, rubella, varicella	Liberian	Côte d'Ivoire
2005	Measles, rubella, varicella	Ethiopian, Somali	Kenya
2006	Varicella	Burmese	Thailand
	Polio	Somali	Kenya
2007	Measles, typhoid, varicella	Burmese	Thailand
	Meningitis	Somali, Sudanese	Kenya
	Measles	Somali	Kenya
	Meningitis, mumps	Burundian	Tanzania
	Mumps	Eritrean	Ethiopia
2008	Pertussis	Somali	Kenya

Summary and Future Directions in Refugee Screening

- Shift from domestic to more pre-departure screening, treatment, prevention
  - TB screening
  - Presumptive Rx for STHs and malaria
- The pre-departure interventions are evidence-based, cost-effective
- Future plans to increase post-arrival surveillance and follow-up
- Increased communication across systems (e.g. from overseas to post-arrival clinicians)
- Adapting to population-specific guidelines

CDC Quarantine and Migration Health

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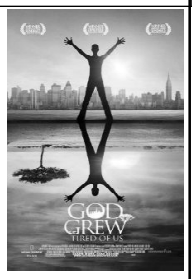

God Grew Tired of Us (full length film):
http://www.imdb.com/video/hulu/vi2933562905?ref_=tt_pv_vi_1

CDC MDH

All applicants with pulmonary or laryngeal tuberculosis disease who need treatment overseas will need to complete directly observed therapy (DOT) prior to U.S. immigration.

Applicants diagnosed with possible tuberculosis disease who are smear and culture negative should not have treatment begun overseas unless the CXR and clinical findings are highly suggestive of tuberculosis disease.

Follow current ATS/CDC/IDSA guidelines (http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm).

Use only quality-assured drugs. Consult the World Health Organization (WHO) Global Drug Facility (GDF) for first-line drugs and the International Dispensary Association (IDA, Amsterdam) or WHO Green Light Committee for second-line drugs.

Contacts of Tuberculosis Cases

Contacts of persons with pulmonary tuberculosis disease should be removed from exposure to the person with tuberculosis.

All contacts should receive a TST or IGRA.

Contacts who have clinical findings or CXR findings suggestive of tuberculosis should provide at least three sputum specimens for AFB microscopy and mycobacteria culture.

TB Classifications

No TB Classification

Applicants with normal tuberculosis screening examinations.

Class A TB with waiver

All applicants who have tuberculosis disease and have been granted a waiver.

Class B1 TB, Pulmonary

No treatment

- Applicants who have medical history, physical exam, or CXR findings suggestive of pulmonary tuberculosis but have negative AFB sputum smears and cultures and are not diagnosed with tuberculosis or can wait to have tuberculosis treatment started after immigration.

Completed treatment

- Applicants who were diagnosed with pulmonary tuberculosis and successfully completed directly observed therapy prior to immigration. The cover sheet should indicate if the initial sputum smears and cultures were positive and if drug susceptibility testing results are available.

Class B1 TB, Extrapulmonary

Applicants with evidence of extrapulmonary tuberculosis. The anatomic site of infection should be documented.

Class B2 TB, LTBI Evaluation

Applicants who have a tuberculin skin test ≥10 mm or positive IGRA but otherwise have a negative evaluation for tuberculosis. The size of the TST reaction or IGRA result, the applicant's status with respect to LTBI treatment, and the medication(s) used should be documented. For applicants who had more than one TST or IGRA, all dates and results and whether the applicant's TST or IGRA converted should be documented. Contacts with TST ≥5 mm or positive IGRA should receive this classification (if they are not already Class B1 TB, Pulmonary).