Presumptive Anti-Helminthic Treatment and Prevalence of Parasitic Infections in Newly Arrived Refugees, Minnesota, 2010-2013

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Introduction

- Intestinal parasitic infections are among the most common conditions in refugees
- Refugees undergo mandated health screenings prior to U.S. arrival, defined by the Centers for Disease Control and Prevention (CDC)
- In 2008, CDC introduced guidelines for the overseas presumptive treatment of intestinal parasites in refugees
- The proportion of refugee arrivals to MN with documentation of overseas anti-helminthic treatment increased from 2% in 2010 to 50% in 2013

CDC's Presumptive Treatment Guidelines*

Refugee Population	Overseas Presumptive Treatment Recommendations
Adults	
Asia, Middle East, North Africa, Latin American, & Caribbean	Albendazole and Ivermectin
Sub-Saharan Africa, non-*Loa loa*-endemic area	Albendazole , Ivermectin, and Praziquantel
Sub-Saharan Africa, *Loa loa*- endemic area	Albendazole, Ivermectin (unless Loa loa cannot be excluded), and Praziquantel
Pregnant Women	
Asia, Middle East, North Africa, Latin America & Caribbean	Not recommended
Sub-Saharan Africa	Praziquantel
Children	
Asia, Middle East, North Africa, Latin America & Carribean	Albendazole and Ivermectin, based on weight and age
Sub-Saharan Africa	Albendazole , Ivermectin, and Praziqunatel, based on weight, age, and endemicity of Loa loa

*Adapted from CDC's "Guidelines for Overseas Presumptive Treatment of Strongyloidiasis, Schistosomiasis, and Soil-Transmitted Helminth Infections ," http://www.cdc.gov/immigrantrefugeehealth/guidelines/overseas/intestinal-parasites-overseas.html

Objective

- Compare the prevalence of parasitic infections among primary refugee arrivals to Minnesota with documentation of pre-departure anti-helminthic treatment to those without

Methods

- Included 8,306 primary refugee arrivals to MN from 2010-2013

- Refugee arrivals to MN are eligible for a post-arrival Refugee Health Assessment (RHA), which includes screening for intestinal parasites

- Refugees evaluated for parasitic infections via Ova and Parasite (O&P) stool exam and/or serology tests for Schistosomiasis and Strongylodiasis

Methods, cont.

- Overseas treatment documentation obtained from CDC's Electronic Disease Notification system (EDN)
- Domestic screening results obtained from the Minnesota Department of Health's refugee health database (eSHARE)
- Adjusted prevalence ratios calculated using log binomial regression model, adjusting for age and country of origin
- All analyses were conducted using SAS 9.4

Table 1. Characteristics of Primary Refugees Screened in Minnesota, by Overseas Treatment Status, Minnesota, 2010 – 2013.

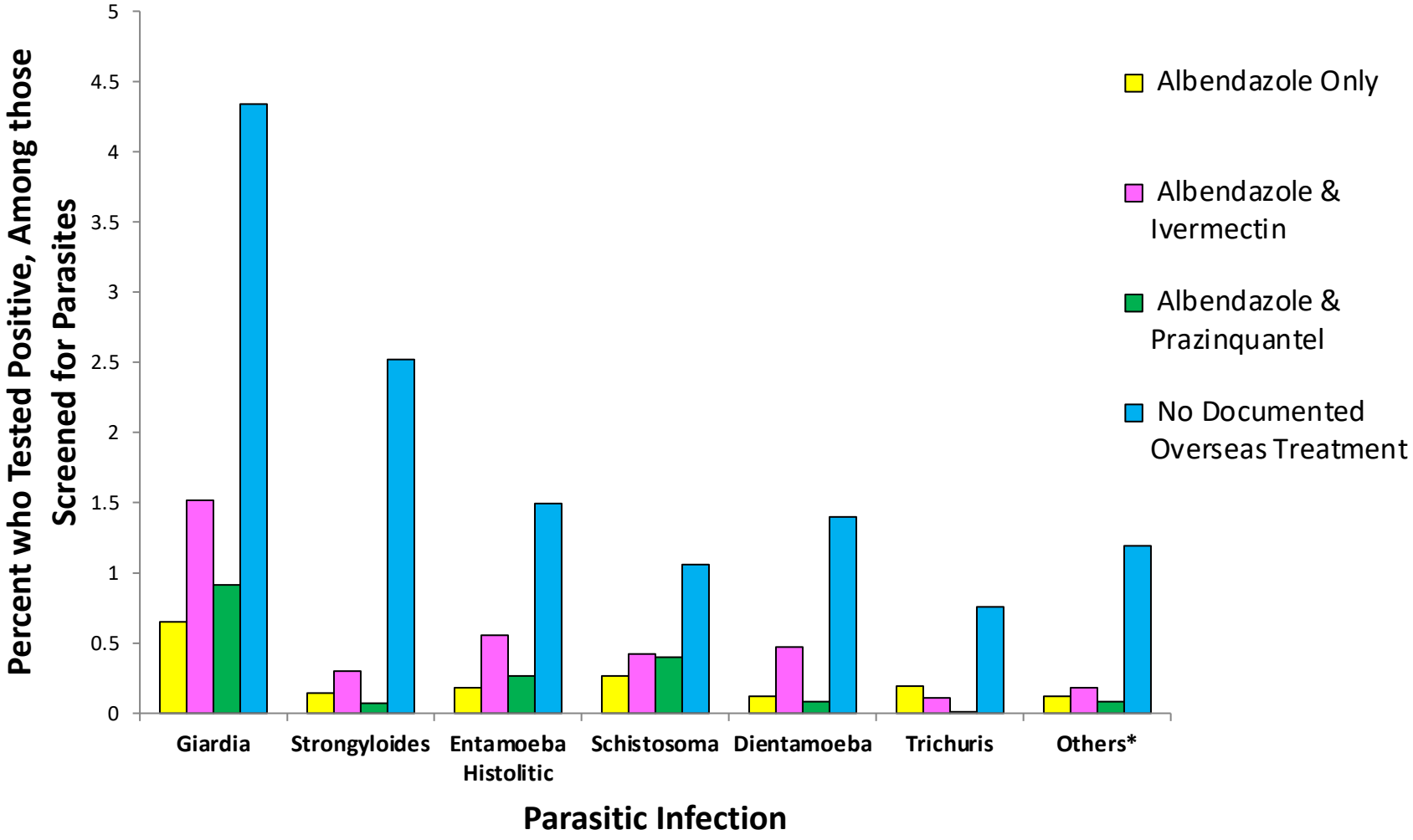
Characteristic		Total Arrivals to MN who received RHA*	Albendazole only (%)	Albendazole and Ivermectin (%)	Albendazole and Praziquantel (%)	No documented overseas treatment (%)
Region of Origin**	Asia	4,268	564 (13%)	1519 (36%)	0 (0%)	2185 (50%)
	Sub-Saharan Africa	3,241	132 (4%)	18 (<1%)	932 (29%)	2147 (66%)
	Other Regions	797	32 (4%)	0 (0%)	0 (0%)	765 (96%)
Sex	Female	4,071	363 (9%)	734 (18%)	428 (11%)	2546 (63%)
	Male	4,235	365 (9%)	803 (19%)	504 (12%)	2563 (60%)
Age	< 18 years old	3,619	390 (11%)	610 (17%)	361 (10%)	2258 (62%)
	≥ 18 years old	4,687	338 (7%)	927 (20%)	571 (12%)	2851 (61%)
Total		8,306	728 (9%)	1,537 (19%)	932 (11%)	5,109 (62%)

*RHA: Refugee Health Assessment, generally initiated within 90 days after U.S. arrival (>97% of eligible refugees received a refugee health assessment from 2010 to 2013
**Asia includes Bhutan, Burma (Myanmar), Cambodia, China, Laos, Nepal, Philippines, Tibet and Vietnam.
Sub-Saharan Africa includes Burundi, Cameroon, the Democratic Republic of Congo, Eritrea, Ethiopia, Gambia,
The Guinea, Ivory Coast, Kenya, Liberia, Mali, Sierra Leone, Somalia, Sudan, Tanzania, The United Republic of Togo, Rwanda, Uganda and Zimbabwe
Other Regions includes Cuba, Haiti, Mexico, Armenia, Belarus, Russia, Ukraine, Kyrgyzstan, Uzbekistan, Moldova, Afghanistan, Iran, Iraq, and the West Bank.

Results

- 3,197 (38%) received some pre-departure anti-helminthic
- 8,034 (97%) screened for intestinal parasites
- 520 (16%) with any documented pre-departure treatment tested positive for ≥1 pathogenic parasite, compared to 895 (18%) with no documented treatment (adjusted PR: 0.92; 95% CI, 0.87-0.97)

Figure 1. Prevalence of Intestinal Parasites by Overseas Treatment Status



* Other parasites include Hymenolepis, Paragonimus, Ascaris, Clonorchis, and hookworm

Table 3. Prevalence Ratios of Parasitic Infections by Overseas Treatment Status and Region of Origin, Minnesota, 2010-2013

Parasitic Infection	Region of Origin	Presumptive Treatment Received	Adjusted Prevalence Ratio***	95% CI	
Shistosoma spp.	Sub-Saharan Africa	Praziquantel	1.20	1.2	1.2
Strongyloides	Sub-Saharan Africa	Albendazole	0.56	0.45	0.7
	Asia	Albendazole and Ivermectin	0.48	0.48	0.48
	Asia	Albendazole only	0.26	0.14	0.47
Other Helminths*	Sub-Saharan Africa	Albendazole	0.62	0.29	1.31
	Asia	Albendazole and Ivermectin	0.30	0.19	0.48
	Asia	Albendazole only	0.74	0.47	1.17
Protozoans**	Sub-Saharan Africa	Any pre-departure anti-helminthic	1.20	0.96	1.48
	Asia	Any pre-departure anti-helminthic	0.90	0.76	1.06

*Other Helminths include Hymenolepis, hookworm, clonorchis, paragonimiasis, ascaris ,and trichuris
**Protozoans Include Giardia lamblia, Dientamoeba fragilis, and Entamoeba Histolitica
***Adjusted for age at U.S. arrival and country of origin; Treatment groups were compared to those who received no pre-departure treatment. However, for Schistosomiasis, sub-Saharan Africans who received Praziquantel (PZQ) were compared to those who did not receive PZQ

Conclusions

- Refugees who received any pre-departure treatment were significantly less likely to be infected with any pathogenic parasite upon arrival (adjusted PR: 0.92; 95% CI, 0.87-0.97)

- Refugees from Asia and Africa who received albendazole with or without ivermectin were significantly less likely to be infected with Strongyloides upon arrival

- Refugees from Asia who received albendazole and ivermectin were significantly less likely to be infected with helminths other than Strongyloides (adjusted PR: 0.30; 95% CI, 0.19-0.48)

- Refugees from Africa who received praziquantel were not less likely to be infected with Schistosoma, compared to those who did not receive praziquantel (adjusted PR: 1.20)

- Anti-helminthic pre-departure treatment had no significant affect on the prevalence of non-helminthic parasitic infections

*Resources for Health professionals on Schistosomiasis and Strongyloidiasis. Centers for Disease Control and Prevention. http://www.cdc.gov/parasites/strongyloides/health_professionals/index.html. (2013, Accessed 4/01/2015)

Limitations

- We relied upon documentation of treatment as recorded in EDN
  - Treatment documentation may not reflect actual treatment received
  - 54 (<1%) of refugees included in analysis did not have any records available in EDN
- Small numbers of refugees testing positive for some parasitic infections
- Majority of Strongyloidiasis and Schistosomiasis cases identified via serology, which could be detecting past, rather than current, infection

Thanks!

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Table 4. Number of Parasitic Infections by Overseas Treatment Status and Region of Origin, Minnesota, 2010-2013

Region of Origin	Parasitic Infection	Presumptive Treatment Received No. Screened for Intestinal Parasites			
		Albendazole and Praziquantel N= 930	Albendazole Only N= 132	Albendazole and Ivermectin N= 18	No Documented Treatment N= 2156
Sub-Saharan Africa	Shistosoma spp.	33 (3.55%)	0	0	58 (2.71%)
	Strongyloides	6 (<1%)	1 (<1%)	0	49 (2.29%)
	Other Helminths*	7 (<1%)	2 (1.52%)	0	29 (1.35%)
	Protozoans**	101 (10.86%)	14 (10.61%)	2 (11.11%)	200 (9.33%)
Region of Origin	**Parasitic Infection**	**Albendazole and Praziquantel N= 0**	**Albendazole Only N= 564**	**Albendazole and Ivermectin N= 1519**	**No Documented Treatment N=2183**
Asia	Shistosoma spp.	n/a	21 (3.72%)	35 (2.30%)	23 (1.07%)
	Strongyloides	n/a	11 (1.95%)	25 (1.65%)	141 (6.59%)
	Other Helminths*	n/a	23 (4.08%)	23 (1.51%)	104 (4.86%)
	Protozoans**	n/a	60 (10.64%)	187 (12.31%)	292 (13.64%)

*Other Helminths include Hymenolepis, hookworm, clonorchis, paragonimiasis, ascaris ,and trichuris
**Protozoans Include Giardia lamblia, Dientamoeba fragilis, and Entamoeba Histolitica