

Figure 2. Spearman's rank correlation coefficients between each *O. tsutsugamushi* serotype

Orientia tsutsugamushi IgM						
Serotype	Karp	Hirano	Kato	Shimokoshi	Gilliam	Irie
Karp		0.8234	0.8178	0.2425	-0.1741	-0.294
Hirano	0.8234		0.7221	0.2542	-0.1163	-0.3113
Kato	0.8178	0.7221		0.3781	0.0595	-0.1341
Shimokoshi	0.2425	0.2542	0.3781		0.0805	-0.0265
Gilliam	-0.1741	-0.1163	0.0595	0.0805		0.6363
Irie	-0.294	-0.3113	-0.1341	-0.0265	0.6363	

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#### 436. A survey of Schistosomiasis and Strongyloidiasis Among Eritrean Immigrants to Israel

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**Background.** Immigration from east Africa (mainly Eritrea) to Israel peaked during 2011–2013. Little is known about the prevalence of chronic parasitic diseases in this population. We performed a survey of Schistosomiasis and Strongyloidiasis among immigrants, both are parasites that can cause chronic infections, and can lead to significant morbidity and complications.

**Methods.** A prospective survey of adults (>18 years) from Eritrea was performed at a primary care clinic for immigrants in Tel Aviv, Israel. Participants provided written informed consent. Stool and blood samples were collected, and participants filled epidemiological and clinical questionnaires. Stool was tested by real time PCR for *Strongyloides stercoralis* and *Schistosoma* species, serum was tested for IgG antibodies against these pathogens using commercial kits (WB, LDBio Diagnostic for schistosoma, ELISA, SciMedx for Strongyloides).

**Results.** A total of 106 patients were included in the survey; 85% were males and 15% females, median age was 34 (IQR30–39) years, and median duration living in Israel was 7 years (IQR 6–9). Serology was positive in 55/106 (52%) for *Schistosoma* spp. and in 1/106 (1%) for *Strongyloides*. Stool PCR for *Schistosoma* was positive in 34 of 106 (32%), and uniformly negative for *Strongyloides*. Risk factors for positive schistosoma serology and PCR were male gender and younger age. Other factors such as duration of residence in Israel, staying in other countries along the way to Israel, self-reported swimming in fresh water reservoirs and symptoms such as diarrhea, abdominal pain, and blood in stool were not significantly associated with *Schistosoma* infection.

**Conclusion.** We found high rate of *Schistosomiasis* (both by serology and PCR in stool) among Eritrean immigrants in Israel. While serology can remain positive for many years after there are no longer living parasites, high rates of positive stool PCR suggest current active infection. In contrary, chronic *Strongyloidiasis* was rarely detected. Empirical treatment of schistosomiasis with praziquantel should be considered for immigrants from Eritrea.

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#### 437. Spatial Distribution of Schistosomiasis After Repeated Praziquantel Treatments in a Rural Community in Brazil

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**Background.** Schistosomiasis is to a degree a disease of contact with fecally contaminated surface waters, rather than ingestion. Repeated treatments with praziquantel reduce schistosomiasis prevalence and morbidity; however, transmission persists and prevalence of infection often recover within a few years.

**Methods.** In a community in rural Bahia, Brazil that straddles a shallow river, we surveyed and treated all individuals that tested positive for schistosomiasis by Kato Katz in stools in 2009, 2012, 2013, 2015, and 2017. Upstream and downstream, as well as common water contact sites along the river were sampled and analyzed by microbial source tracking for human fecal indicator markers. The location of each home and water contact site was registered with a handheld GPS unit. Spatial analyses were performed by using QGIS software, version 2.14.

**Results.** The population in the village was 460 in 2009, with minimal fluctuation over the study period. In 2009, schistosomiasis prevalence was 45%. After successive rounds of community-wide treatment with praziquantel, in the years 2012, 2013, 2015, and 2017, prevalence decreased to 24%, 16%, 13%, and 1.6%, respectively. Among the river water samples, human fecal indicator markers were detectable in minimal quantities upstream of the village. The highest concentrations were found in the downstream sections of the village. Hotspot analysis, raster calculator, and nearest neighbor analysis were used to display and analyze the prevalence of schistosomiasis. Distribution of infection was widespread initially and clustered in the downstream sections of the village after successive treatments.

**Conclusion.** In this rural community in Brazil, sustained decrease in schistosomiasis prevalence was seen after multiple community-wide treatments over 5 years. Reinfection was not distributed randomly but concentrated in the downstream portion of the village, where human fecal water contamination is increased. Targeting sanitation in key areas may decrease sources of transmission persistence after cessation of community-wide treatment efforts.

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#### 438. Finding Toxocara Eggs in Park Soil From Montgomery County, Pennsylvania

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**Background.** *Toxocara canis* (dogs) and *Toxocara cati* (cats) is a parasitic worm commonly called roundworm. *Toxocara* eggs are spherical to oblong in shape, have a rough/pitted edge, appear brownish in color, and measures 75–90 µm (*T. canis*) and 65–70 µm (*T. cati*). This environmental surveillance study was designed to examine *Toxocara* contamination levels of selected parks in Montgomery County, Pennsylvania for the first time.

**Methods.** Six soil samples (2 cups each) were obtained from six different parks, for a total of 36 samples. Two table spoons of dried/sifted soil were added to a glass, covered with 1/4 cup of a sugar floatation solution, stirred for 30 seconds, and let sit for 1 hour. The supernatant was transferred to a 20 mL plastic tube, capped, and let sit overnight. Three drops of surface fluid were placed on a glass slide and examined at ×400 total magnification. The number of *Toxocara* eggs from a full grid search of the cover slip area was recorded.

**Results.** Overall, 35 of 36 samples tested positive for *Toxocara* eggs. The parks and samples varied in their levels of contamination of *Toxocara* eggs; smallest samples (0 and 2 eggs) from Sanatoga Park and largest samples from Pottstown Memorial Park [52 eggs – picnic pavilion] and Heather Place Park [56 eggs – tree grove]. The average number of eggs from Sanatoga Park (2.5 eggs [95% CI: 1.0, 4.0]), Gerald Richards Park (4.0 eggs [95% CI: 3.8, 6.2]), and Althouse Arboretum (4.7 eggs [95% CI: 3.3, 6.1]) were significantly lower than Manderach Park (11.7 eggs [95% CI: 9.6, 13.8]). Sanatoga, Gerald Richards, and Heather Place had similar average number of eggs ( $\chi^2 = 3.97 < 5.99$ ). Pottstown Memorial Park (18.2 eggs [95% CI: 4.1, 32.1]) and Heather Place Park (18.5 eggs [95% CI: 3.5, 23.5]) had the highest averages; both parks had very similar average number of eggs ( $\chi^2 = 0.02 < 3.84$ ).

**Conclusion.** This study demonstrated that *Toxocara* eggs could be found in every park that was tested. The number of eggs per sampled varied greatly; highest amounts in areas that could contain food droppings (e.g., picnic area) or potential bathrooms for dogs (e.g., tree grove). Some parks were significantly less infected with an average number of *Toxocara* eggs than other parks.

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#### 439. Impact of Pre-Travel Consultation on Clinical Management and Outcomes of Traveler's Diarrhea

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**Background.** International travelers are at high risk of acquiring traveler's diarrhea. Pre-travel consultation has been associated with lower rates of infections. The objective was to study the impact of pre-travel consultation on clinical management and outcomes of traveler's diarrhea.

**Methods.** This retrospective cohort study analyzed 1,160 patients diagnosed with traveler's diarrhea at Mayo Clinic Rochester, Minnesota from 1994 to 2017. Variables included high-risk activities, post-travel care utilization, antimicrobial prescriptions, hospitalizations, and complications. Travelers were divided into those who sought ( $n = 256$ ) and did not seek ( $n = 904$ ) pre-travel consultation.

**Results.** Pre-travel consultation was associated with more post-travel infectious disease (ID) consultation [OR 3.2 (95% CI 1.9–5.4)], more stool sampling [OR 1.6 (95% CI 1.1–2.4)], and more antimicrobial prescriptions [OR 1.6 (95% CI 1.04–2.4)] compared with the non-pre-travel consultation group. The pre-travel consultation group had shorter hospital stays (adjusted mean 1.8 days for pre-travel vs. 3.3 days for non-pre-travel consultation group,  $P = 0.01$ ) and reduced gastroenterology consultation rates [OR 0.2 (95% CI 0.06–0.97)].

**Conclusion.** Pre-travel and ID consultation may have facilitated appropriate management of traveler's diarrhea, which reduced duration of hospitalization and gastroenterology consultation for prolonged or severe symptoms. These results support the important role of the ID physician in managing traveler's diarrhea.

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#### 440. The Masqueraders Presenting a Multisystem Disease: Unusual and Atypical Clinical Features of Scrub Typhus in Fukushima, Japan

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**Background.** Scrub typhus (ST) is endemic in Fukushima, where the highest number has been reported from 2006 to 2011 in Japan. Atypical clinical presentation of ST makes the diagnosis difficult followed by treatment delay. Despite fatal but treatable disease with early recognition, the myriad clinical features of ST have been underreported.

**Methods.** We reviewed the clinical features of adult patients diagnosed as ST from 2008 to 2017 at Ohta Nishinouchi General Hospital, a major teaching hospital in Fukushima, Japan.

**Results.** Total 55 cases (serotype Karp 24, Irie/Kawasaki 21, Hirano/Kuroki 10) of ST were confirmed by elevated specific IgM and IgG in the paired sera and real-time PCR analysis of eschars. Unusual presentations as the main clinical features of ST are found in 7/55 (13%; Karp 4 and Irie/Kawasaki 3), including cardiovascular (3 cases of paroxysmal atrial fibrillation), neurological (2 cases of syncope and one case of encephalitis) and metabolic/electrolyte disorder (one case of hyponatremia). In terms of atypical clinical features, the cases without triad (fever  $\geq 38.0^{\circ}\text{C}$ , rash and eschar) were found in 14/55 (25%). The cases of "eschar negative scrub typhus" were found in 6/55 (11%; Karp 1, Irie/Kawasaki 2, Hirano/Kuroki 3). The cases without fever and rash were also found in 6/55 (11%; Karp 2, Irie/Kawasaki 3, Hirano/Kuroki 1) and 4/55 (7%; Karp 2, Irie/Kawasaki 1, Hirano/Kuroki 1), respectively. Severe cases (4/55, 7%) were found with shock and disseminated intravascular coagulation including one fatal case (1/55, 1.8%; Hirano/Kuroki). Besides more than the half of ST cases with triad (30/55; 55%), unusual and atypical presentations were found in 38% (21/55) of the total number of cases.

**Conclusion.** The diagnosis of ST is a clinical challenge without typical features. In endemic area, unusual and atypical presentation of ST involving multi-system should be noted as the odds-on favorite differential diagnosis.

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#### 442. The Results of a Primary Care-based Screening Program for *Trypanosoma cruzi* in East Boston, Massachusetts

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**Background.** This study reports the outcomes of the Strong Hearts pilot project to integrate screening for *Trypanosoma cruzi* into a primary care setting and facilitate referral for treatment at East Boston Neighborhood Health Center.

**Methods.** Continuing education about Chagas disease was offered to healthcare providers, and community-based outreach was provided. One-time screening for all patients  $\leq 50$  years old who lived in Mexico, South or Central America for  $\geq 6$  months was recommended. The initial screening test was an ELISA performed by a commercial laboratory and confirmatory testing was performed at the US CDC. Confirmed positives were defined as positive on both the screening and confirmatory tests. Confirmed positive patients were referred to the Pediatric and Adult Infectious Disease clinics at Boston Medical Center for further evaluation and treatment. We compared the proportion of confirmed positives by sex, age, and self-reported national origin using chi-squared tests. We then used multivariable logistic regression to examine predictors of (1) confirmed positive or (2) discordant screening and confirmatory testing.

**Results.** A total of 2,183 screening tests were sent; 84 (3.8%) were positive, 2,082 (95.4%) negative, and 17 (0.8%) indeterminate. Among 73 tests with confirmatory results available, 19 (26%) were positive and 54 (74%) negative. All indeterminate tests were confirmed negative. The proportion of confirmed positives increased with increasing age ( $P = 0.014$ ) (Table 1), but there were no significant differences by sex (M: 8/757, F: 11/1,413,  $P = 0.51$ ) or national origin ( $P = 0.79$ ). Nineteen confirmed positives have been evaluated and six initiated benznidazole to date. Three confirmed positives were pregnant. In multivariable models, there were no significant predictors of confirmed positive or discordant testing.

**Conclusion.** This pilot shows that integration of screening for Chagas disease is feasible in primary care. Although the prevalence of *T. cruzi* infection was higher in older age groups, there were no clear demographic predictors of a confirmed positive or discordant test. We also found a high false-positive rate of the screening test, highlighting the need for improved serologic testing options.

**Table 1.**

Age Group (Years)	Positive Cases (#)*	Total Screened (#)	Prevalence (%)
$\leq 19$	0	101	0.0
20–29	3	742	0.4
30–39	7	820	0.9
40–49	5	392	1.3
$\geq 50$	4	115	3.5

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#### 443. West Nile Virus in Humans in Greece, 2010–2017

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**Background.** In 2010, the first West Nile (WN) virus outbreak was recorded in Central Macedonia, northern Greece, with 197 WN neuroinvasive disease (WNNND) cases; the largest reported in Europe since 1996. In the consecutive years, seasonal outbreaks continued to occur. We investigated the 2010–2017 outbreaks to determine their extent, describe the geographical and temporal distribution of human cases and implement appropriate control measures.

**Methods.** We supported the investigation of suspected human cases and strengthened the laboratory surveillance. We interviewed cases and treating physicians and recorded suspected place of exposure, type of disease (WNNND or non-WNNND) and disease outcome. We estimated case fatality (CF) of neuro-invasive disease (WNNND). PCR-positive samples were sequenced.

**Results.** Since 2010, a total of 672 human cases were recorded, from June to October, including 474 (71%) WNNND cases. Cases were recorded for five consecutive

This abstract has been withdrawn at the author's request.