Analysis of Enteric Parasites Found in Refugees in Texas, 2000-2005

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Introduction

Estimated Worldwide Prevalence of Parasitic Infections

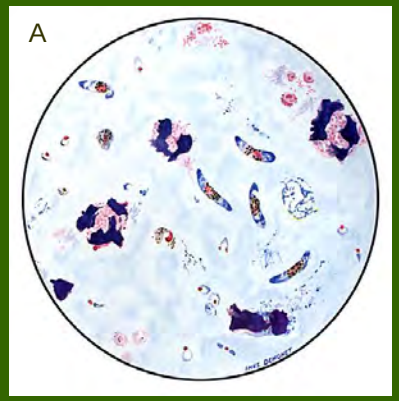
Infection	Prevalence
Toxoplasmosis	1-2 billion
Ascaris	1 billion
Hookworm disease	800-900 million
Amebiasis	200-400 million
Schistosomiasis	200-300 million
Malaria	200-300 million
Filariasis	250 million
Giardiasis	200 million
Pinworm infection	60-100 million
Strongyloidiasis	50-80 million
Guinea worm infection	20-40 million
Trypanosomiasis	15-20 million
Leishmaniasis	1-2 million

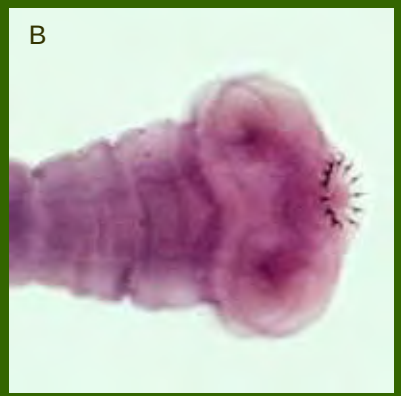
taken from Table 51-1, Schaechter's Mechanisms of Microbial Disease, fourth edition

Overview of Parasitology

Parasites: helminths and protozoa

- Blood and tissue parasites
  - malaria
- Enteric parasites
  - tapeworm
- Arthropods





A: thick blood smear of malaria; B: *T. solium*; images from CDC's DPDx

A Risk for Populations

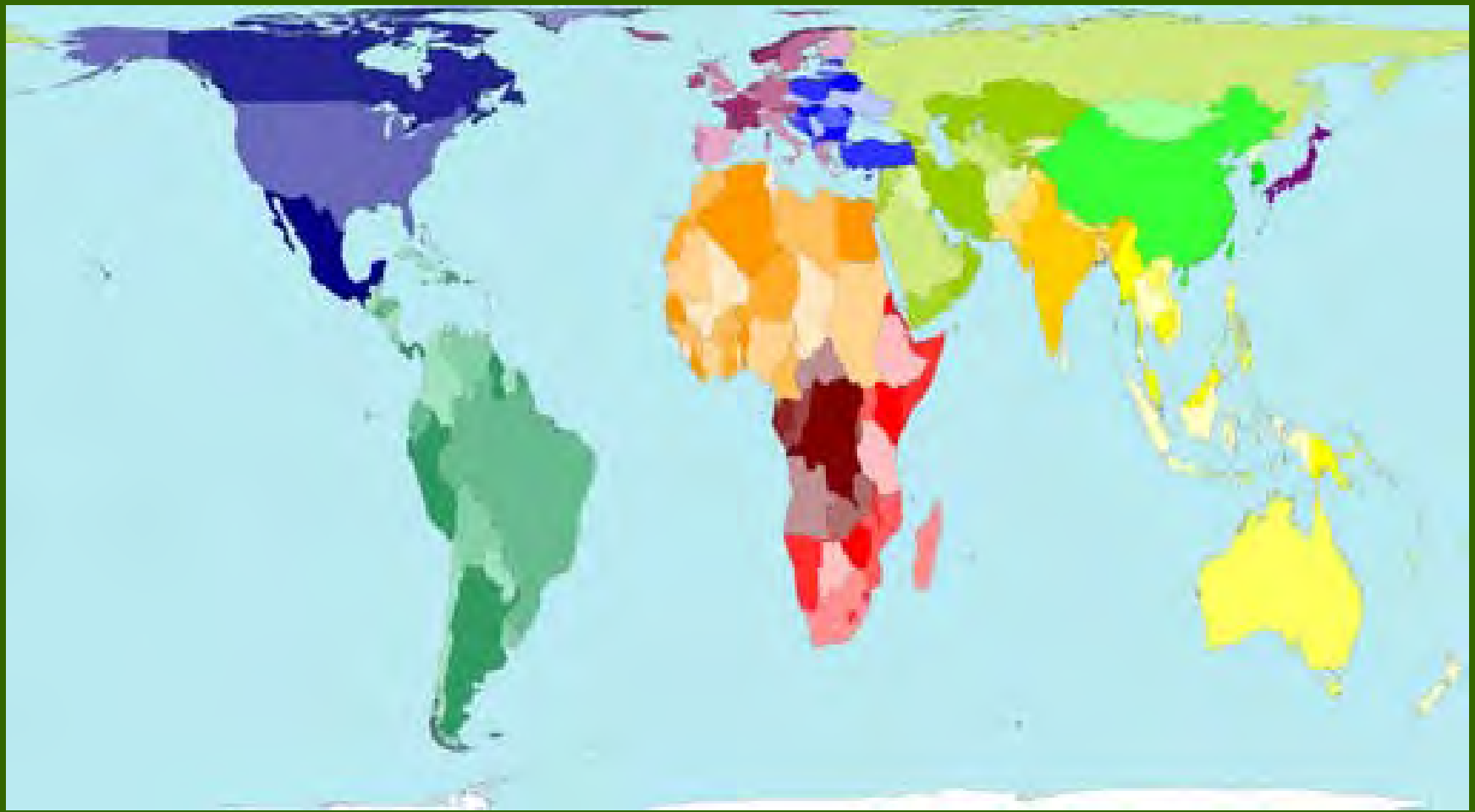
- Developing countries
- Tropics
- Southern United States
- Institutional settings (e.g. daycares)
- Newly arrived persons
  - Travelers
  - Immigrants
  - Refugees

http://www.internationalstudies.villanova.edu/students/photocontest/photos/SP04%20photo%20contest/Newly%20Arrived%20Refugees%20Peter%20Dweyer,%20Tibet.jpg

Refugees

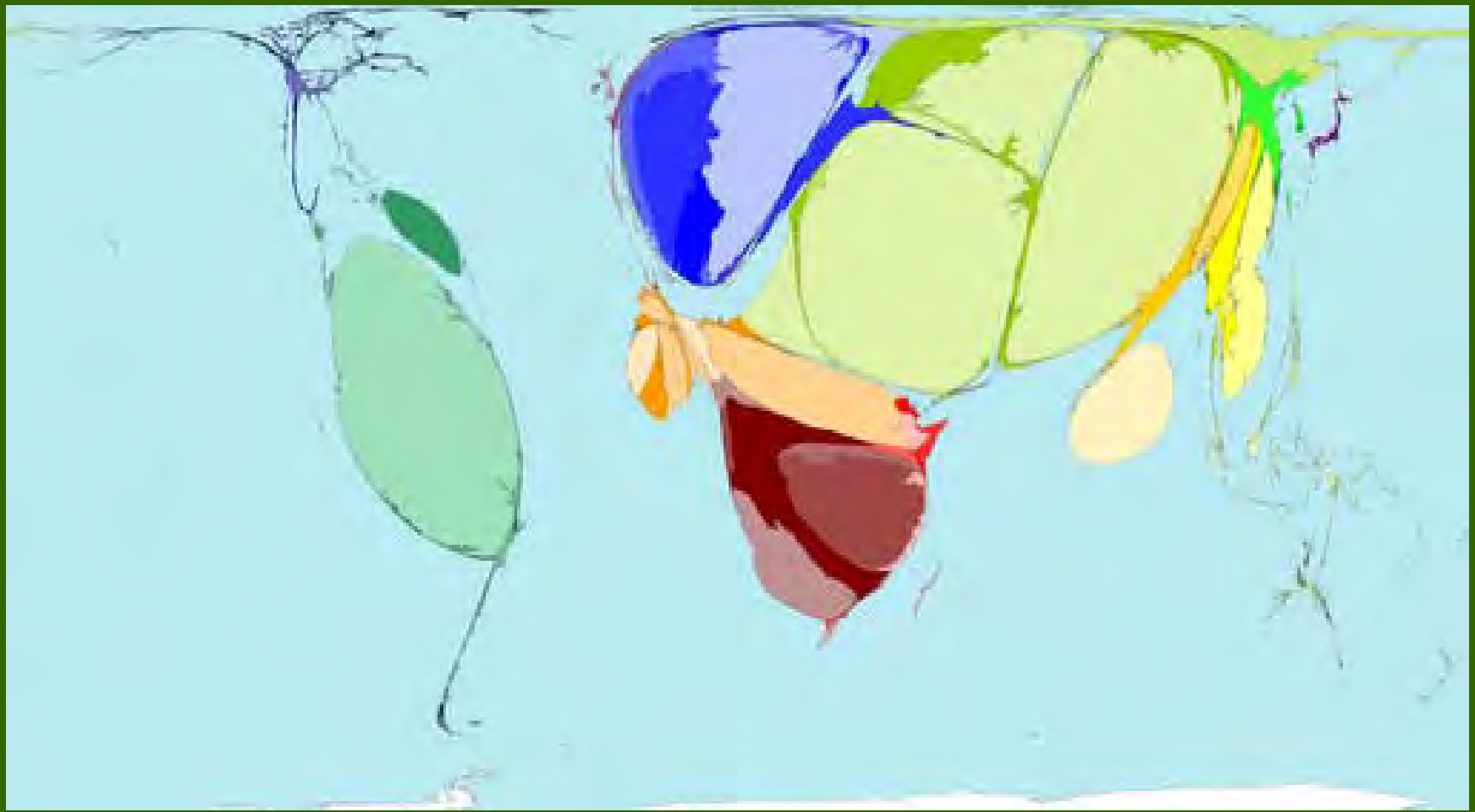
- Immigration and Nationality Act: person forced to leave home country and unable to return because of persecution
- Refugees are not
  - Immigrants
  - Internally displaced persons

The world as you are used to seeing it



http://www.sasi.group.shef.ac.uk/worldmapper/display.php?selected=1

Where are refugees commonly from?



http://www.sasi.group.shef.ac.uk/worldmapper/display.php?selected=14

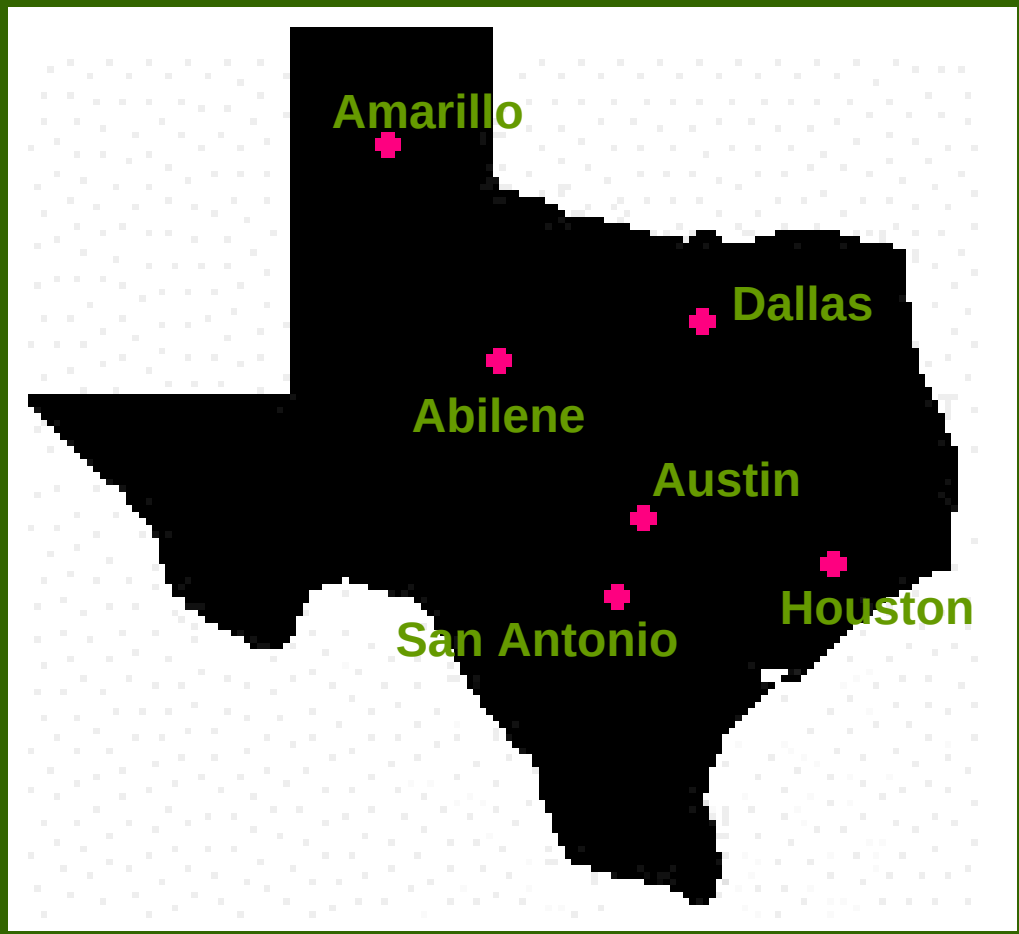
And where are they going?

http://www.sasi.group.shef.ac.uk/worldmapper/display.php?selected=13

Resettlement to the United States

- Pre-departure→health screening
- Arrival in US→results of screening sent to state health departments
- Arrival in Texas→screening at refugee clinics

Refugees entering Texas



Purpose

- To analyze the enteric parasites found in refugees entering the state of Texas between 2000 and 2005
- Determine prevalence, demographic characteristics

Materials and Methods

http://www.respecteurope.org/Refugees/tabid/58/Default.aspx

Study Population

- Official refugees entering Texas between January 1, 2000 and December 31, 2005
- Database of 14,540 specimen entries
- Analysis carried out using Access, Excel

Specimen submission and screening procedure

- Clinics collect stool samples
  - Formalin vial
  - PVA vial
- Samples sent to Medical Parasitology Section at TDSHS
- Process, ID, and enter in database

Texas Department of State Health Services: Medical Parasitology Section

Refugee Databases

Lab ID
(Access)

Refugee Demographics
(EpiInfo)

Master Database
(Access)

Cleaned Database

Demographic Variables

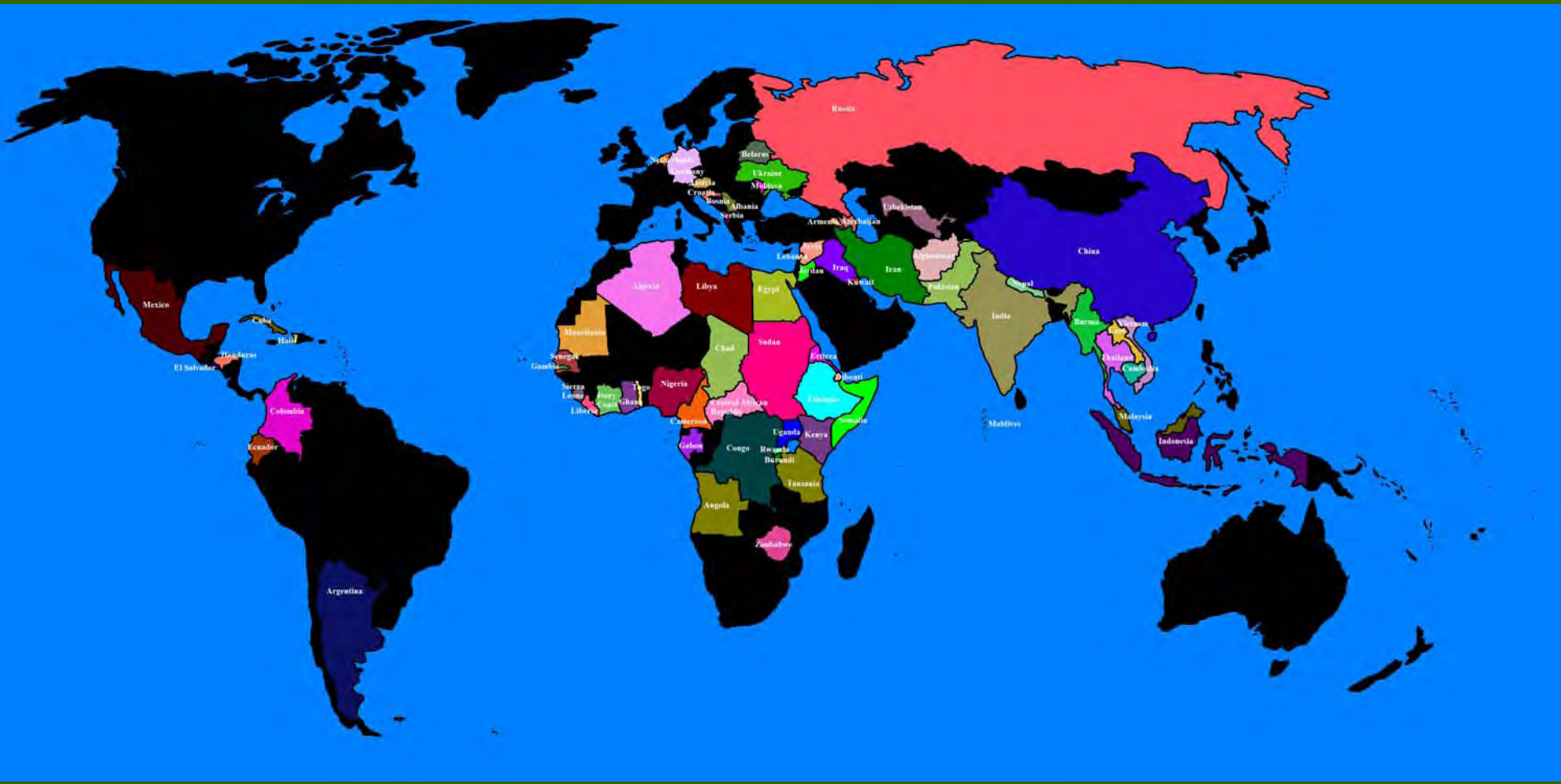
- Overall prevalence
- Country of origin
- Area of origin
- Gender
- Age
- Multiple infections
- City of arrival

http://www.cbc.ca/world/story/2004/12/13/darfur041213.html

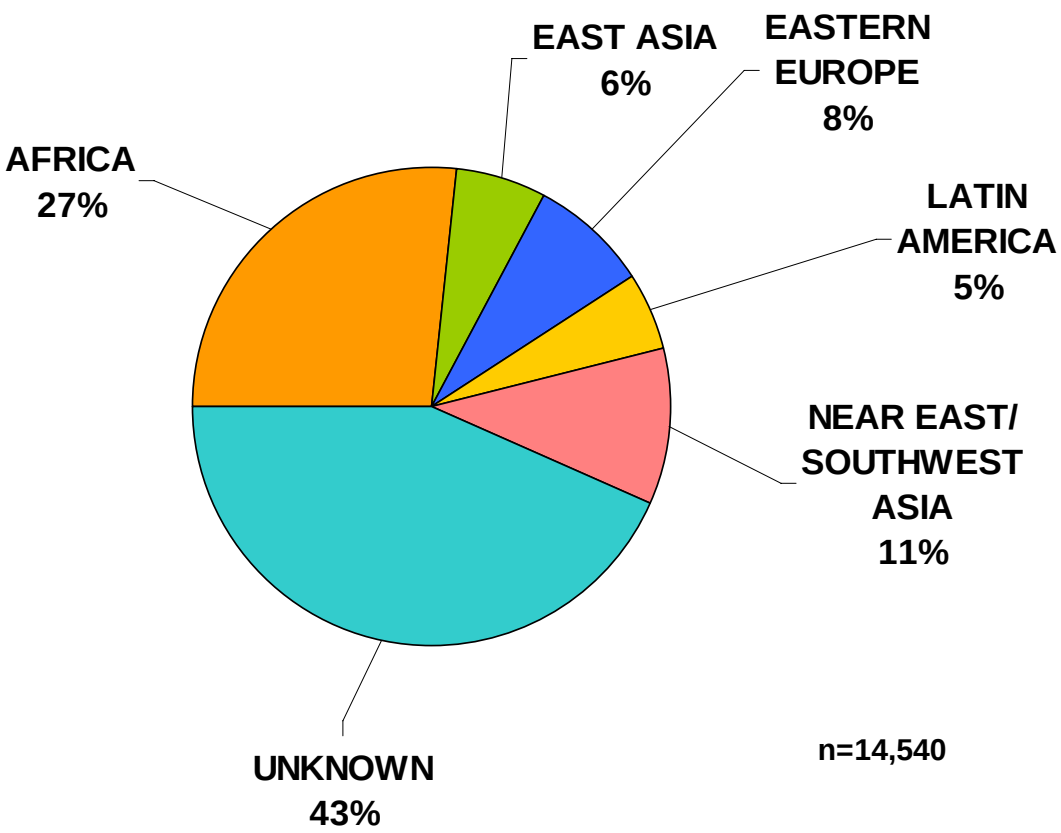
Results

http://ec.europa.eu/echo/information/library/refugees/03.htm

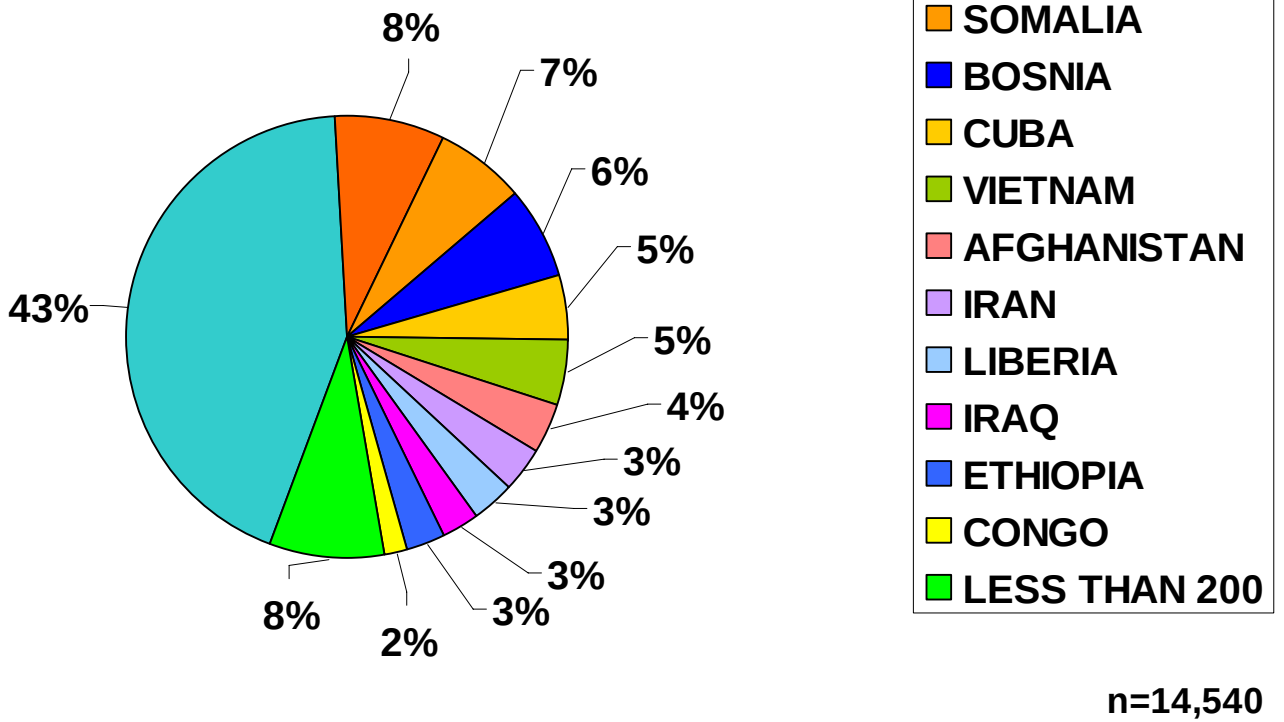
Countries of Origin for Refugees in Texas



Percent of Refugees by Area of Origin



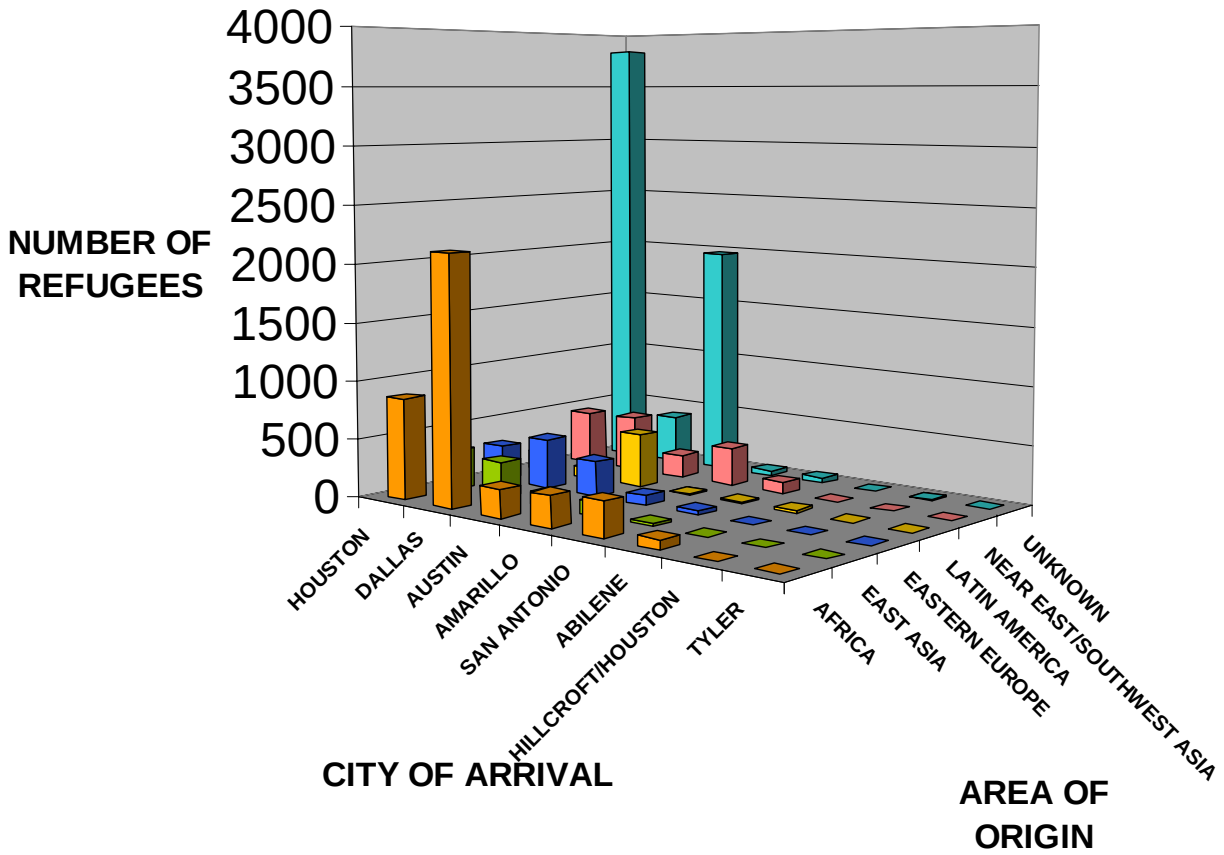
Percent of Refugees by Country of Origin



n=14,540

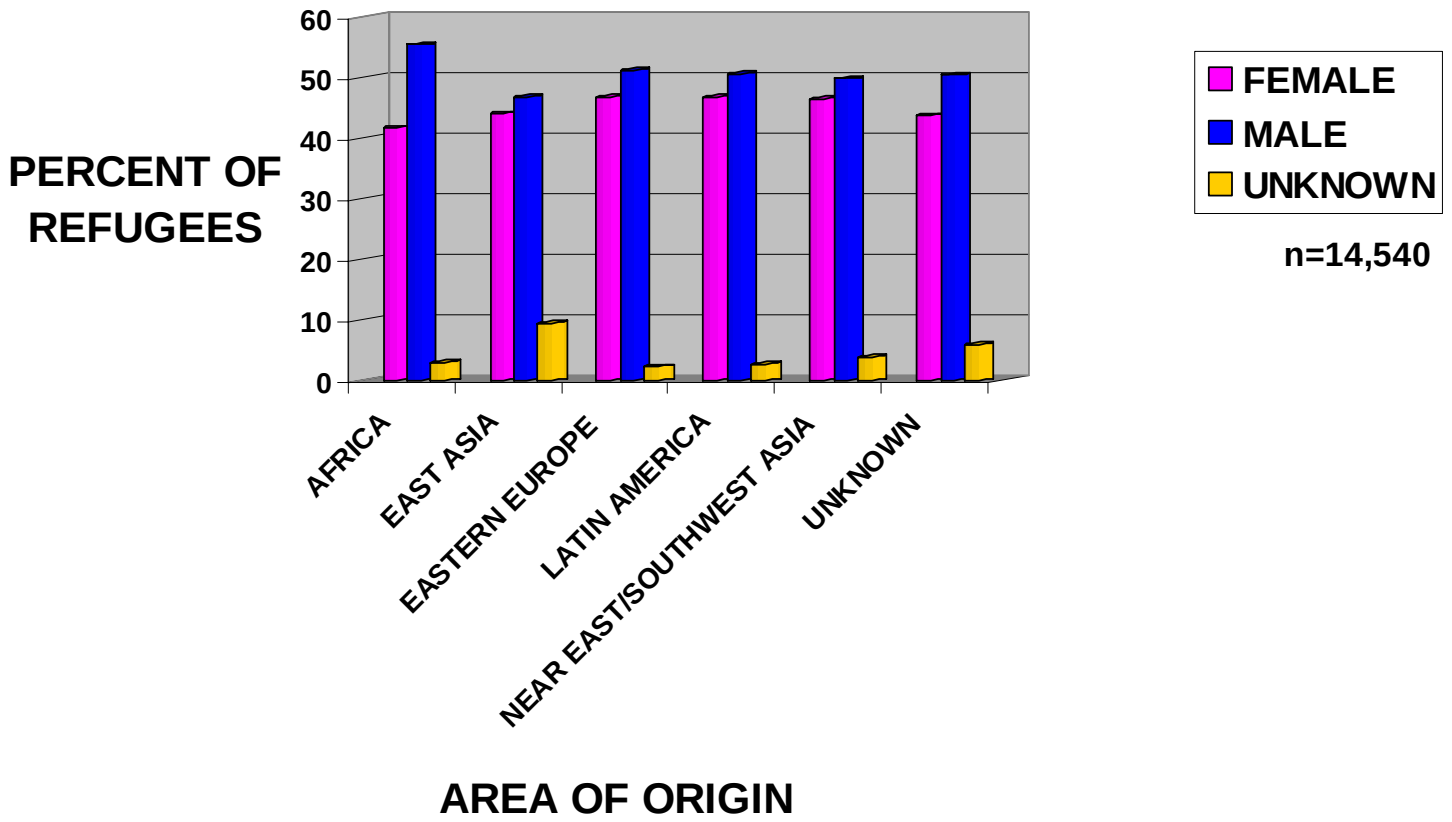
Which refugees are going where?

Breakdown by Area of Origin for Refugees Who Entered Texas by City of Arrival, 2000-2005

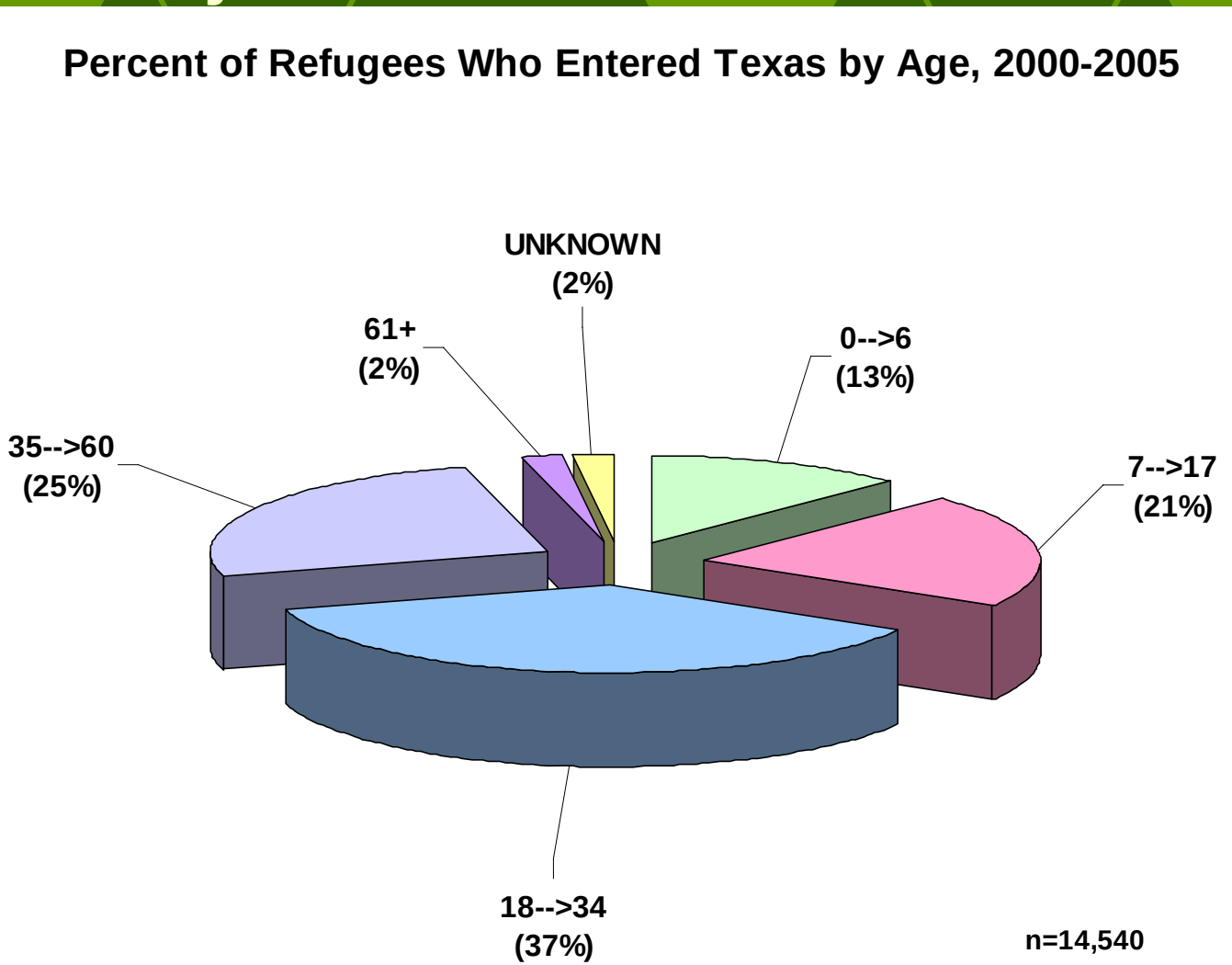


Refugees entering Texas…

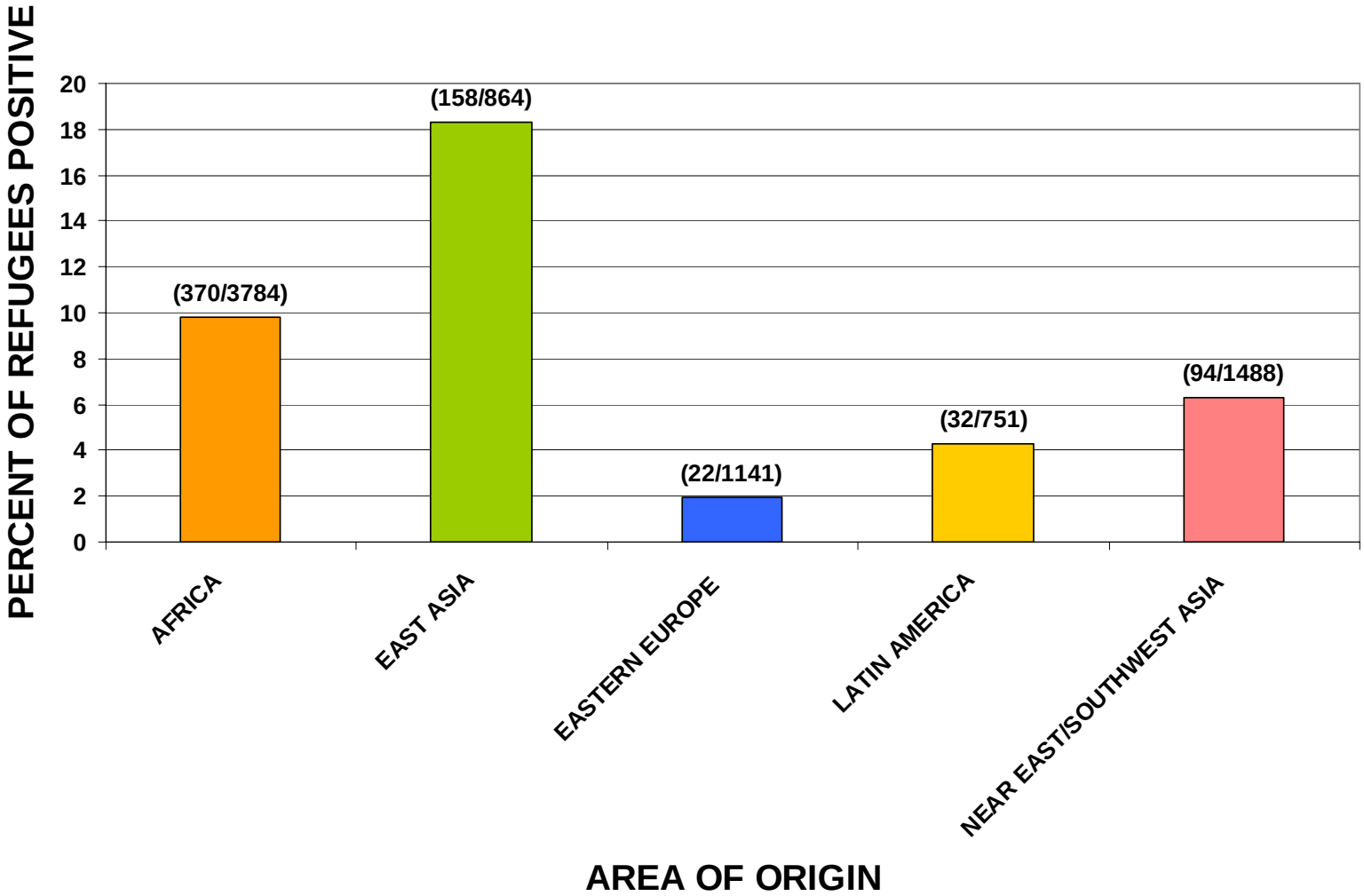
Percent by Gender of Refugees Who Entered Texas by Area of Origin, 2000-2005



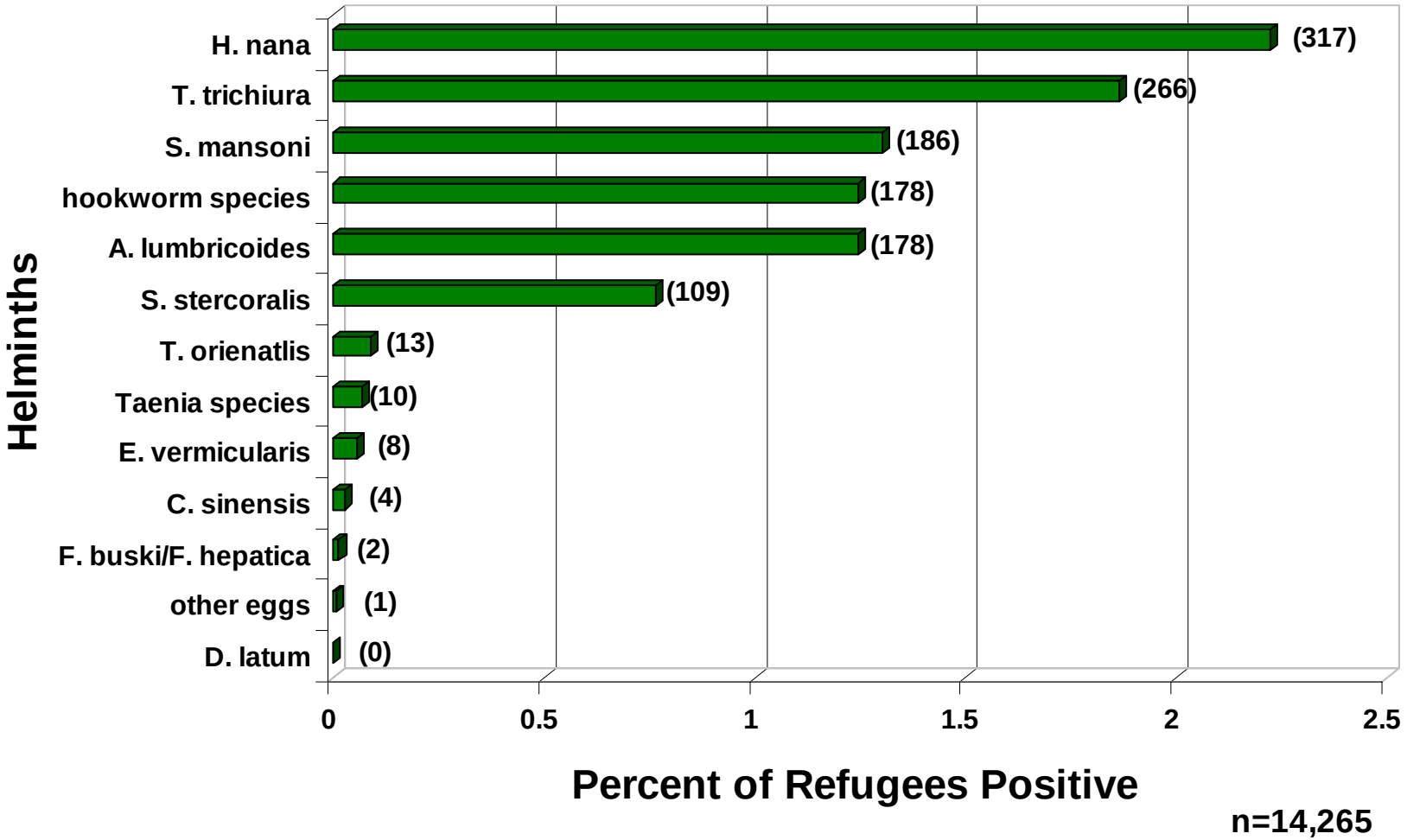
…are not just adults.



Percent of Refugees Positive for Helminths by Area of Origin

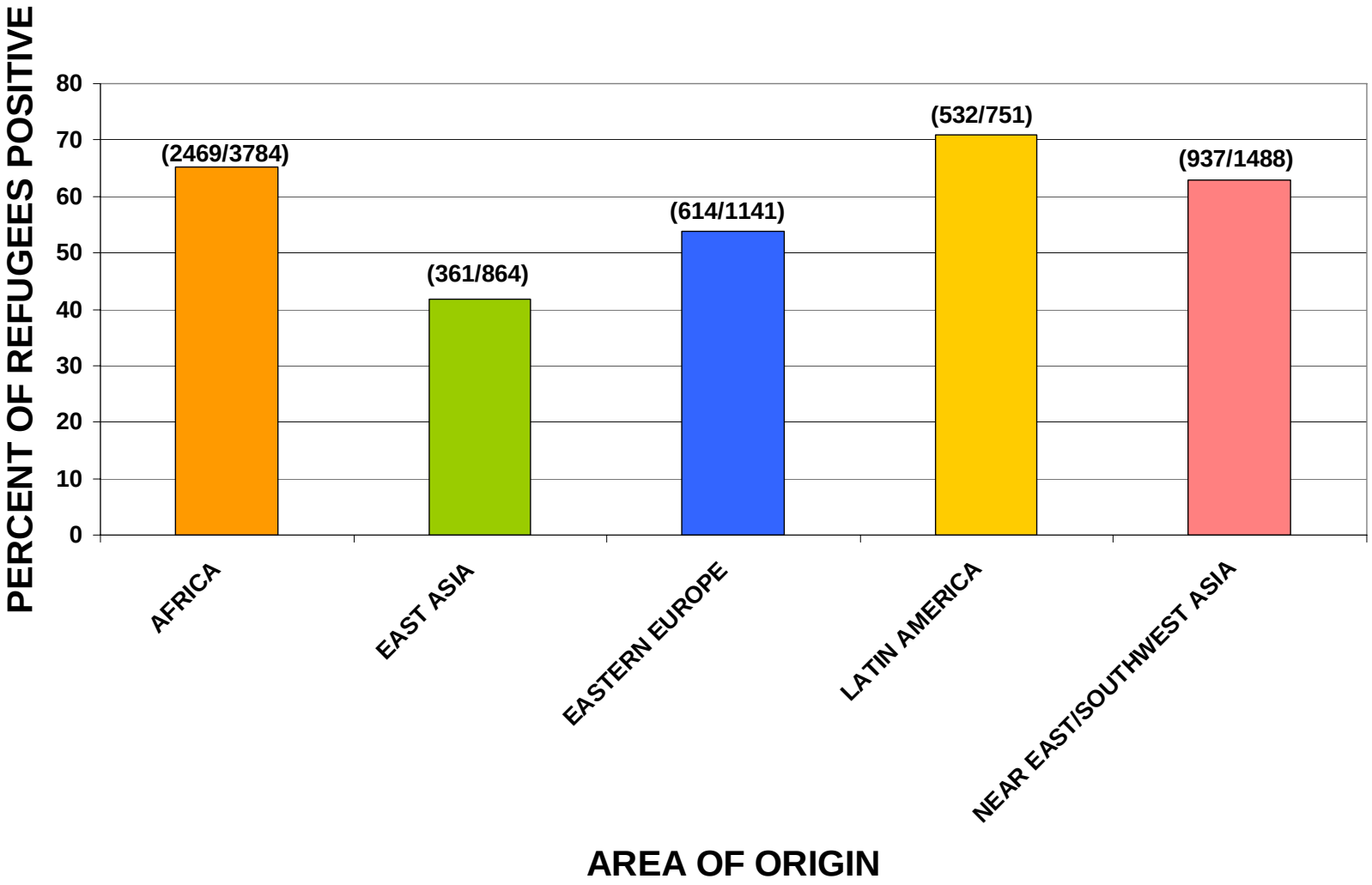


Percent of Refugees Positive for Individual Helminth Parasites

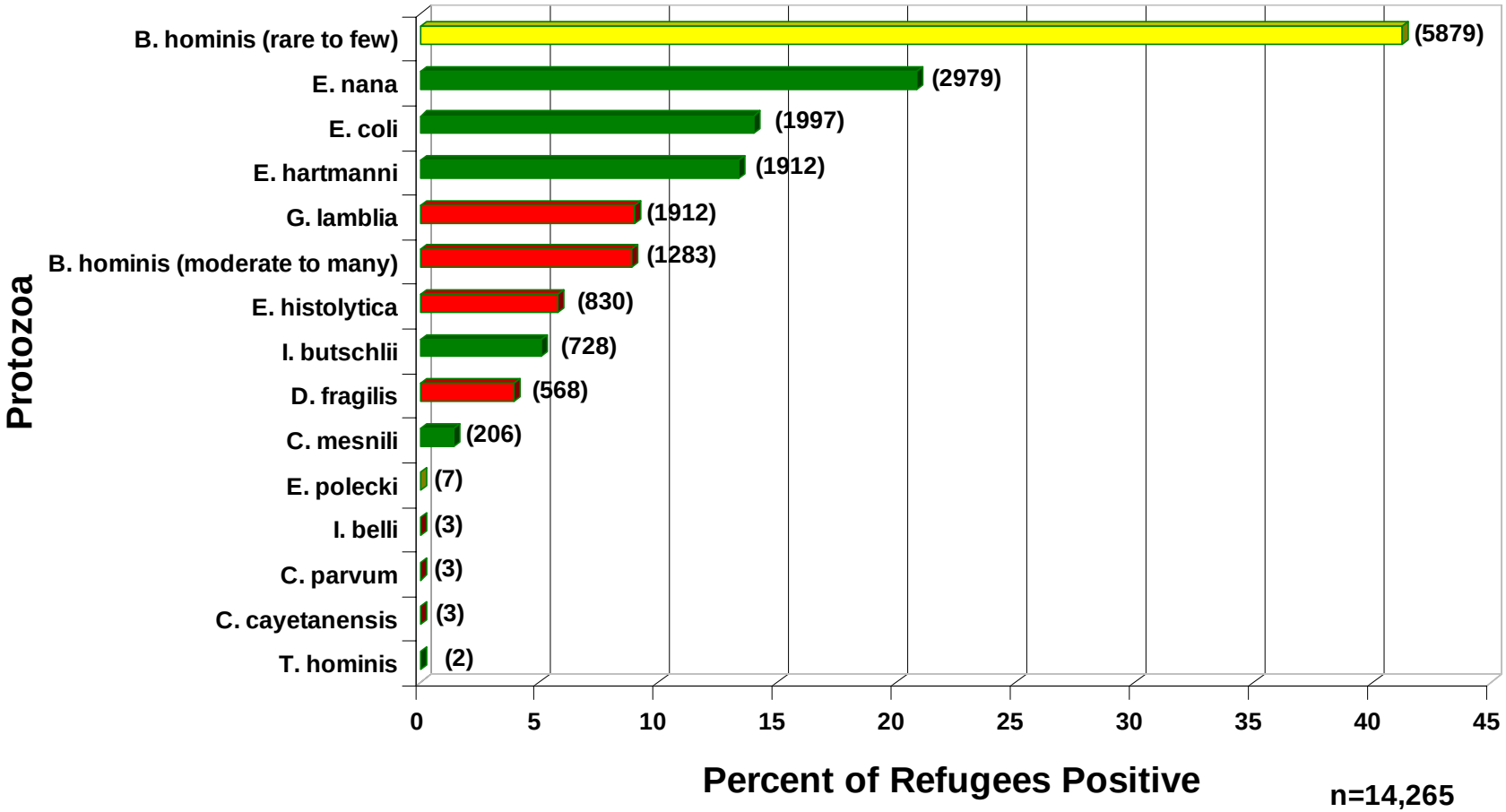


n=14,265

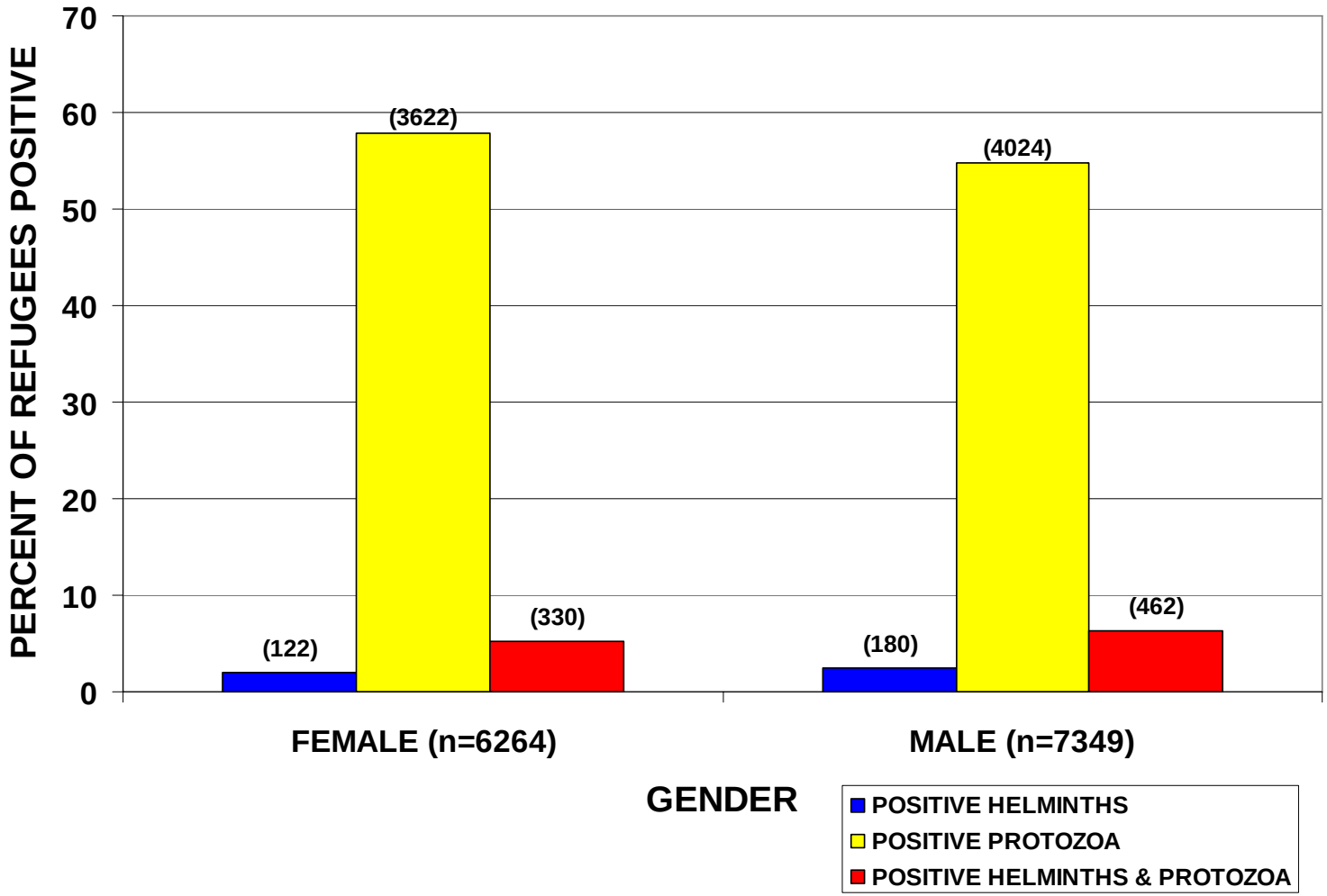
Percent of Refugees Positive for Protozoa by Area of Origin



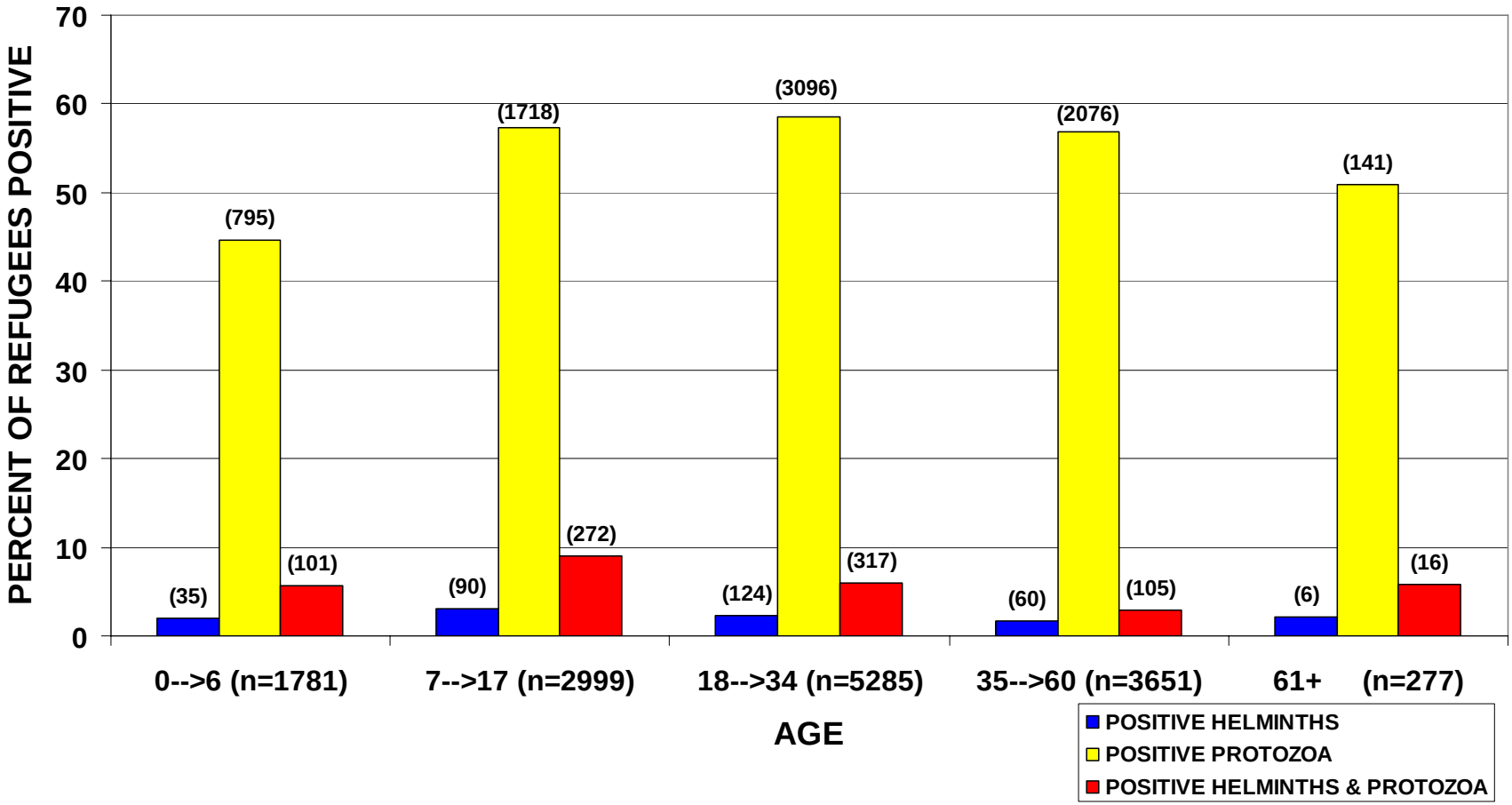
Percent of Refugees Positive for Individual Protozoan Parasites



Gender of Refugees Positive for Helminths and Protozoa Individually, and for Both Helminths and Protozoa



Age of Refugees Positive for Helminths and Protozoa Individually, and for Both Helminths and Protozoa




http://saindarfur.org/darfur_photos/albums/uploads/May/2/refugees_food_line_AFP_5_12_05.jpg

Conclusions

Conclusions

- Refugees who entered Texas came from all areas of the world
  - Africa
  - Gender
  - Age

Statistically Significant Differences

- Gender
  - Males:
    - Helminths ($p \leq 0.01$)
    - Both helminths and protozoa ($p \leq 0.01$)
  - Females:
    - Protozoa ($p \leq 0.025$)
- Age
  - 7 to 17 years:
    - Helminths ($p \leq 0.001$)
    - Both helminths and protozoa ($p \leq 0.001$)
  - 18 to 34 years:
    - Protozoa ($p \leq 0.001$)

Limitations

- Significant portion of refugee database missing information (e.g. country of origin)
- Number of specimens not equal to total number of refugees who entered Texas during study period
- Country of origin may not be country where infection acquired
- Only reflects data from refugees tested

Study Impact

- Medical clinics across Texas
  - Refugees
  - General population

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Questions?