

# Eosinophilia in Rhode Island Refugees, 2015-2020

Maranatha Teferi AB<sup>1</sup>, Marcela Osorio BA<sup>1</sup>, Benjamin Gallo Marin AB<sup>1</sup>, Ann Ding MD<sup>1,2</sup>, Ian Michelow MD<sup>1,2</sup>

<sup>1</sup> Warren Alpert Medical School of Brown University, Providence, RI, USA

<sup>2</sup> Department of Pediatrics, Rhode Island Hospital, Providence, RI, USA

## BACKGROUND

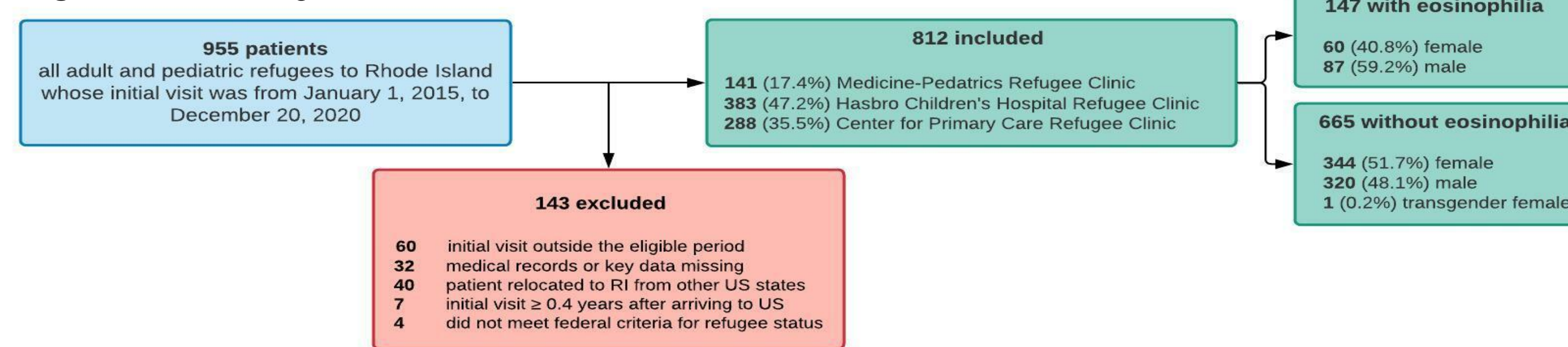
- Previous studies identified high rates of parasitic pathogens in asymptomatic, newly arrived refugees.<sup>1</sup> Left untreated, parasitic infections can have significant health consequences including infertility, urinary tract malignancy, and death.<sup>1</sup>
- Eosinophilia, or the presence of elevated eosinophils in blood, has been identified as a marker for a variety of health conditions including parasitic infections, although its reliability is still debated.<sup>2</sup>
- **Objective:** Investigate (1) the incidence of eosinophilia in adult and pediatric patients at our refugee clinics and (2) differences in demographics between patients with and without eosinophilia, and determine the rates of symptoms and positive parasitic testing in patients with eosinophilia

## METHODS

- A retrospective chart review was performed on all adult and pediatric refugee patients in Rhode Island, all of whom had their initial refugee intake clinic visit at Lifespan's Center for Primary Care Refugee Clinic, Hasbro Children's Refugee Clinic, or Medicine-Pediatrics Refugee Clinic from January 1, 2015, to December 20, 2020.
- Patients were excluded if:
  - a. their initial visit was outside the eligible period
  - b. medical records were missing, or key clinical or laboratory data were not available
  - c. they relocated to RI from other US states where they already had an initial visit
  - d. the initial visit was  $\geq 0.4$  years after arriving in the US
  - e. they did not meet the federal criteria for refugee status
- This study was approved by the Lifespan IRB.

## RESULTS

**Figure 1. Flow Diagram of Patient Enrollment**



**Table 1. Demographics (All Subjects)**

Characteristic	All patients	Eosinophilia	No Eosinophilia
Total, n (%)	812 (100%)	147 (18.1%)	665 (81.9%)
Sex			
Female	404 (49.8%)	60 (40.8%)	344 (51.7%)
Male	407 (50.1%)	87 (59.2%)	320 (48.1%)
Other	1 (0.15%)	0 (0.0%)	1 (0.15%)
Age (yrs; median, 25%-75%)*			
Entire cohort	18.65, 8.43 - 31.13	19.5, 10.5 - 30	18.3, 8.2 - 31.4
Children ( $\leq 18$ years)	393 (48.4%)	68 (46.3%)	325 (48.9%)
Adult ( $>18$ years)	419 (51.6%)	79 (53.7%)	340 (51.1%)
Region of origin (ie exit) (%)			
Africa	505 (62.2%)	121 (82.3%)	384 (57.7%)
Americas	32 (3.9%)	1 (0.7%)	31 (4.7%)
Europe	32 (3.9%)	5 (3.4%)	27 (4.1%)
Asia	242 (29.8%)	20 (13.6%)	222 (33.4%)
Australia	1 (0.1%)	0 (0%)	1 (0.2%)

**Table 2. Clinical Information in Patients with Eosinophilia (n=147)**

Characteristic	Mild 450-1,499/ $\mu\text{L}$	Moderate 1,500-4,999/ $\mu\text{L}$	Severe $\geq 5,000/\mu\text{L}$	Total
<b>Demographics, n (%)</b>	113 (76.9%)	30 (20.4%)	4 (2.7%)	147
Sex				
Female (n, %)	52 (46.0%)	6 (20%)	2 (50%)	60 (40.8%)
Male (n, %)	61 (54%)	24 (80%)	2 (50%)	87 (59.2%)
Other	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Age (years)				
Entire cohort (median, IQR)	19.5 (25.5)	19.75 (12.6)	17.45 (18.2)	19.5
Children ( $\leq 18$ years)	56 (49.6%)	11 (36.7%)	2 (50%)	68
Adult ( $\geq 19$ years)	57 (50.4%)	19 (63.3%)	2 (50%)	79

**Table 3. Symptoms at Initial Encounter among Patients with Eosinophilia who had Symptoms (n=67)**

Symptom	Present
Nausea	3 (4.4%)
Vomiting	5 (7.4%)
Abdominal Pain	12 (17.6%)
Diarrhea	4 (5.9%)
Bloody Stool	0 (0%)
Fatigue	1 (1.5%)
Fever/Chills	3 (4.4%)
Weight loss	2 (2.9%)
Cough	9 (13.2%)
SOB	0 (0%)
Rash	7 (10.3%)
Pruritus	8 (11.8%)

**Table 4. Parasites detected among patients with eosinophilia (n=147)**

Parasite detected	Value
Parasite detected by Stool OP or PCR (n, % of instances detected)	
Giardia	25 (40)
Entamoeba	3 (4)
Cryptosporidium	0
Other	34 (55)
1 parasite (n, % of patients w/ eosinophilia)	54 (37)
2 or more parasites (n, % of patients w/ eosinophilia)	5 (3)

## CONCLUSIONS

- Eosinophilia is a common finding in both adult and pediatric refugee patients (18.1%)
- Parasites that were identified include giardia, entamoeba histolytica, schistosoma, and strongyloides, by stool testing (PCR and O&P), blood smear and serology
- Most patients' region of origin/exit was Africa (62%); this was true among patients with (82%) and without (57.7%) eosinophilia
- Symptoms present at initial encounters typically were unrelated to parasitic infections
- Limitation: serology did not distinguish between current and past infection

## FUTURE DIRECTIONS

More sophisticated analyses to:

- **Determine** the temporal association of eosinophilia with symptoms and clinical outcomes
- **Describe** eosinophilia management in this population to inform clinical decision making
- **Predict** outcomes by using clinical and laboratory characteristics

## REFERENCES

1. Seybolt LM, Christiansen D, Barnett ED. Diagnostic evaluation of newly arrived asymptomatic refugees with eosinophilia. *Clinical Infectious Diseases*. 2006 Feb 1;42(3):363-7.
2. Dawson-Hahn EE, Greenberg SL, Domachowske JB, Olson BG. Eosinophilia and the seroprevalence of schistosomiasis and strongyloidiasis in newly arrived pediatric refugees: an examination of Centers for Disease Control and Prevention screening guidelines. *The Journal of pediatrics*. 2010 Jun 1;156(6):1016-8.

## ACKNOWLEDGMENTS

We would like to thank the Emerging Infectious Disease Scholars Program, funded through the National Institutes of Health: National Institute of Allergy and Infectious Disease (R25AI140490).