

# Health Care Utilization of Refugee Children After Resettlement

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**Abstract** Refugee children can have significant health problems. Our objective was to describe health status and health care utilization of refugee children after resettlement. A retrospective chart review of refugee children was performed. Initial laboratory data was extracted. Primary care visits, emergency room visits, and subspecialty referrals in the first 15 months from arrival were recorded. The sample included 198 refugees, many with positive initial screening tests. After arrival, 21% had an emergency department visit, 40% had a primary care sick visit, and 71% had a primary care follow-up. Mean number of visits ranged from 0.3 for emergency department to 1.9 for follow-up. Fifty-seven percent were referred to at least one subspecialist. Refugee children had substantial disease burden at arrival. Most had primary care follow-up visits

and subspecialty referral after resettlement. These visits were largely for problems identified on initial screening and for general pediatric illnesses.

**Keywords** Refugee · Emergency department · Primary care · Health care utilization

## Introduction

Many refugees experience war, hunger, and poor sanitation prior to resettlement to a third country. Given this, refugee children are often not surprisingly found to have substantial disease burden at initial medical screening appointments upon arrival to the United States. For example, rates of positive purified protein derivative (PPD) tests have ranged from 20% in Buffalo, NY to 35% in Portland, Maine [1–3]. Eleven percent of newly arrived refugee children in Massachusetts were found to have elevated lead levels [4]. When the authors looked specifically at African children, 27% had elevated lead levels. Of children returning stool samples, studies have shown rates of pathogenic parasites from 21 to 46% [2, 3, 5]. Significant rates of anemia, malnutrition, positive hepatitis B surface antigen, and dental caries have also been found [1–3, 5, 6].

Although many studies have characterized the health status of newly arrived refugees, less is known about how their health care needs are addressed and their utilization of health care services after resettlement. Previous research addressing health care utilization in this population has focused on adult usage of primary care and emergency care services [7–9]. The frequency of, and indications for, health care utilization by refugees, particularly children, is still unclear. The few studies that have been done have had mixed findings. For example, Weinstein et al. found that adult

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refugees within a county health care system used emergency and subspecialty services infrequently [7]. In addition, a small descriptive study of 15 adult and pediatric Sudanese refugees in a family practice setting found few subspecialty referrals [10]. However, a study of adult and pediatric asylum seekers in Ireland found higher rates of health care visits and referrals as compared to the general population [8]. Similarly, a study of Yugoslavian refugees children and adults in Texas showed high emergency room usage with 51% of the refugee families surveyed reporting their children had a hospital emergency room visit in the past year [11].

The primary objectives for this study are to describe the health status of a pediatric refugee population at arrival and to identify the frequency of, and indications for, visits to their primary care provider, the emergency department, and subspecialty clinics after resettlement.

## Methods

### Setting/Participants

A retrospective chart review of refugee children was performed at Rhode Island Hospital/Hasbro Children's Hospital. Hasbro Children's Hospital is the only children's hospital in the state. Refugee children were identified by obtaining a list from the International Institute of Rhode Island of all refugees who arrived in Providence, RI through their organization between November 2003 and November 2006. The International Institute is one of two volunteer organizations in Rhode Island that helps with the resettlement of refugees. The majority of refugees arriving in Providence are resettled through this organization.

### Data Collection

The data received from the International Institute included names of refugees with their date of birth, date of arrival, and country of origin. Data on refugees ages 0–18 years of age were extracted from this list and hospital electronic records were accessed to determine which children were seen at the Rhode Island Hospital/Hasbro Children's Hospital clinics. Inclusion criteria were: Age 0–18 years, at least one pediatric primary care appointment at one of the Rhode Island Hospital/Hasbro Children's Hospital primary care clinics (Adolescent Medicine, Hasbro Primary Care, or Medicine/Pediatrics), and arrival in Providence between November 2003 and November 2006. This time frame was chosen to ensure that all children had been in the United States for at least 15 months at the time of chart review. This study was reviewed and approved by the Rhode Island Hospital and Rhode Island Department of Health Institutional Review Boards.

Age, sex, date of arrival in the United States, country of origin and refuge were recorded from the initial clinic visit. In addition, results of initial tuberculosis, hepatitis, stool ova and parasite, hemoglobin, human immunodeficiency virus (HIV), rapid plasma regain (RPR) and lead testing were extracted. The presence of anemia was determined using age and gender defined hemoglobin cutoffs from the third National Health and Nutrition Examination Survey (NHANES III) [12]. The following data were extracted from paper and electronic sources for the first 15 months after arrival to the United States: Immunizations, number of primary care and emergency room visits, diagnoses at these visits, subspecialty referrals, including why and where referred, and whether or not the patient attended a subspecialty visit.

Primary care information was derived from the paper medical chart. Laboratory data was located in the paper medical chart and the hospital's electronic database. Type of primary care visit was recorded. Types included well child, follow-up, sick, and nurse visits. Diagnoses from primary care visits were derived from the assessment and plan in the paper chart. Missed primary care appointments also were recorded.

Subspecialty referral information was first derived from assessment and plans from the paper chart. Attendance at a subspecialty appointment was determined by three methods. First, in our institution some subspecialty clinics use the same primary care paper medical chart and a note from the subspecialist could be found. Second, the correspondence section of the paper chart was reviewed to look for letters from any subspecialist. Finally, the hospital's electronic system was reviewed for any dictated notes from subspecialists.

Emergency department charts are kept as separate paper charts from the primary care chart and were not directly reviewed. Instead, emergency department data was derived from a computer-generated list of visit dates and corresponding ICD-9 codes for each patient in our database, which was provided by the emergency department.

### Analysis

Data was entered using Microsoft EXCEL 2003 software program and descriptive statistics were generated using SPSS 10.0 for Windows software. Children were divided into three age groups: Infant and toddler (0–2 years), pre-school and school-age (3–10 years) and adolescent (11 years and older).

Diagnoses at visits were reviewed qualitatively by the principal investigator. Most individual diagnoses were divided into categories in general by organ system, however latent tuberculosis, lead poisoning, and failure to thrive/malnutrition were left as individual diagnoses due to their increased frequency and importance in refugee populations. Although many diagnoses could fit into multiple categories, they were only placed into one.

## Results

### Sample Characteristics

Between November 2003 and November 2006, 254 refugee children aged 0–18 years arrived through the International Institute of Rhode Island and 218 (86%) were seen at the clinics at Hasbro Children’s Hospital. Of these, 204 charts were available for review. Five of the 204 patients were excluded because they only received one-time immunizations through the free immunization program at the Hasbro Primary Care clinics, without a physician visit. Another patient was excluded because she had originally resettled in another state prior to arriving in Rhode Island, leaving an effective sample size of 198 refugee children. All patients had been in the United States for at least 15 months at time of chart review.

The majority of refugees (71%) were from Liberia. Other frequently represented countries of origin were Somalia (14%), Burundi (8%) and Ethiopia (2%). Forty-nine percent were male and 51% were female. The mean age at arrival was 8.8 years with a range of 4 months to 18.7 years. The mean time from arrival to the first primary care appointment was 27 days (SD = 20). Fifty-one percent of patients continued primary care in these clinics for at least 1 year after initial clinic visit. These patients had primary care visits recorded between 12 and 15 months after their initial clinic visit. Nine percent of patients never returned to the primary care clinics after the initial physician visit. Tests ordered at arrival varied with lead being the least common test ordered (41%) and complete blood count the most common (94%), as shown in Table 1. Table 1 also shows rates of positive initial screening test results. The lowest rate of positive testing was for human immunodeficiency virus (2%) and the highest rate was for anemia (43%). Lead levels ranged from 0 to 22 mcg/dL with a mean of 7.8 mcg/dL. Hemoglobin levels ranged from 5.1 to 16 g/dL with a mean of 11.7 g/dL.

### Primary Care and Emergency Department Utilization

The mean number of each visit type and number of patients with at least one of each type of visit in a 15 month period are

**Table 1** Frequency of initial tests ordered and positive at arrival

	Tested (% of total sample)	Positive (% of those tested)
Human immunodeficiency virus	119 (60)	2 (2)
Malaria	82 (42)	4 (5)
Rapid plasma reagin	100 (50)	3 (3)
Hepatitis B surface antigen	176 (89)	18 (10)
Stool ova and parasites (positive if pathogenic)	95 (48)	20 (21)
Lead $\geq$ 10 mcg/dL	84 (41)	21 (25)
Tuberculin skin test $\geq$ 10 mm	171 (86)	48 (28)
Complete blood count (positive if anemic)	186 (94)	80 (43)

shown in Table 2. The most common diagnoses or diagnostic categories for each visit type are shown in Table 3.

Diagnostic categories were defined specifically as follows. Gastrointestinal diagnoses included abdominal pain, hepatitis A, chronic or carrier state hepatitis B, hepatitis C, parasites, gastroenteritis, *Helicobacter pylori*, gastrointestinal bleeding, gastroesophageal reflux disease, jaundice, constipation, vomiting, diarrhea, and hepatomegaly. Dermatologic diagnoses included rash, burn scars, warts, keloid, tinea, eczema, alopecia, acne, molluscum, and contact dermatitis. Genitourinary diagnoses included contraception, pregnancy, rape, dysuria, enuresis, gonorrhea, scrotal pain, proteinuria, hematuria, and dysmenorrhea. Neurodevelopmental diagnoses included seizure, developmental delay, headache, behavior problems, and paresthesias. Hematologic/oncologic diagnoses included anemia, thalassemia, lymphadenopathy, and hemoglobin C trait. Cardiac diagnoses included murmur, chest pain, syncope, palpitations, irregular heartbeat, and hypertension. Psychosocial diagnoses included social stressors, sleep disturbance, suicide attempt, school problems, depression, and post traumatic stress disorder. Surgical diagnoses included hernias. Other infectious disease diagnoses included viral syndrome, abscess, hand/foot/mouth, HIV or HIV exposed, candidiasis, malaria, eosinophilia, meningitis, fever, lice, RPR positive, folliculitis, adenitis, herpes stomatitis, and hand infection.

### Subspecialty Utilization

Fifty-seven percent of patients were referred to at least one subspecialist. There were 153 referrals for 113 patients. Twenty-eight percent of those referred (32/113) were referred to more than one subspecialist. Subspecialists most commonly referred to and reasons referred are shown in Table 4. Seventy-eight percent of those patients referred to a subspecialist attended at least one subspecialty appointment.

## Discussion

To our knowledge, this is one of few studies to not only characterize initial disease burden, but also describe

**Table 2** Primary care (nurse, well child, follow-up, sick, and missed appointments) and emergency department utilization for 198 subjects

Type of visit	Total	# of patients with at least one visit in first 15 months (%)	Mean # per patient in first 15 months (range)
Nurse	223	130 (66)	1.1 (0–9)
Well child	302	198 (100)	1.5 (1–5)
0–2 years old			2.5 (1–5)
3–10 years old			1.4 (1–2)
11+ years old			1.3 (1–2)
Follow-up	384	141 (71)	1.9 (0–14)
0–2 years old			2.2 (0–9)
3–10 years old			1.7 (0–14)
11+ years old			2.2 (0–11)
Sick	141	79 (40)	0.7 (0–4)
0–2 years old			1.3 (0–4)
3–10 years old			0.8 (0–4)
11+ years old			0.4 (0–4)
Missed appointment	235	124 (63)	1.1 (0–10)
Emergency	55	41 (21)	0.3 (0–3)
0–2 years old			0.6 (0–3)
3–10 years old			0.3 (0–3)
11+ years old			0.2 (0–3)

**Table 3** Most common diagnoses or diagnostic categories for primary care and emergency department visits

Sick (174 diagnoses for 79 patients)	Follow-up (539 diagnoses for 141 patients)	Emergency (57 diagnoses for 41 patients)
Upper respiratory tract (30)	Hematologic/oncologic (69)	Trauma/injury (21)
Gastrointestinal (26)	Gastrointestinal (62)	Upper respiratory tract (8)
Other infectious (26)	Latent tuberculosis (61)	Lower respiratory tract (6)
Dermatologic (18)	Dermatologic (57)	Gastrointestinal (4)
Lower respiratory tract (13)	FTT/malnutrition (54)	Ear (4)
Trauma/injury (12)	Other infectious (34)	Other infectious (3)
Genitourinary (11)	Neurodevelopmental (30)	Dental (2)
Ear (10)	Genitourinary (23)	Dermatologic (2)
FTT/malnutrition (6)	Cardiac (23)	Neurodevelopmental (2)
Neurodevelopmental [5]	Lead poisoning (22)	Eye (2)

subsequent health care utilization of a sample of pediatric refugees in the first 15 months after arrival to the United States. In addition, an unanticipated finding in this study was that specific laboratory testing ordered at arrival was variable. For example, most patients had an initial complete blood count (94%), tuberculin test (86%), and hepatitis B surface antigen (89%) ordered. However, fewer than half had an initial lead (41%), stool ova and parasite (48%), or malaria (42%) completed. These differences are likely due to practice variation between providers prior to the institution of a more uniform refugee clinic intake process. It is also important to note that numbers for stool ova and parasite testing only reflect those patients who returned stool samples. It is expected that more than 48% of patients actually had the test ordered at their initial visit, but some did not return a sample.

A substantial burden of disease was identified with initial testing and of those tested, the prevalence of positive results was consistent with other studies. For example, elevated lead levels were found in 25% of our predominantly Liberian sample and 27% of African refugee children in a Massachusetts sample [4]. Although this is comparable to other studies of pediatric refugees, it is substantially higher than the general prevalence of elevated lead in children in Rhode Island from 2003 to 2006, which was 2.4–5.3% [13].

Other diseases noted on initial testing included 21% of refugees with pathogenic parasites in stools, which was the same as in the study of refugee children in Massachusetts [4]. A positive tuberculin skin test was found in 28% of our population, which is within the range found in previous studies including 20% in a study of pediatric refugees in

**Table 4** Most common referrals and reasons referred for 198 subjects

Clinic	Patients referred (%)	Indications for referral
TB clinic	32 (16.2)	Latent TB
Ophthalmology	18 (9.1)	Failed vision screen, eye pain, chalazion, photophobia, conjunctivitis
Lead clinic	15 (7.6)	Elevated lead
Gastroenterology	10 (5.1)	Hepatitis B carrier, chronic hepatitis B, hepatitis C, rectal bleeding
Cardiology	10 (5.1)	Murmur, chest pain, palpitations, syncope
Dermatology	9 (4.5)	Rash, warts, keloid, alopecia
Hearing/speech	8 (4.0)	Speech delay, hearing loss
Surgery	7 (3.5)	Hernia, abscess, nevi
Nutrition	7 (3.5)	FTT, malnutrition
Child safe	6 (3.0)	Sexual abuse, physical abuse, gonorrhea
Otolaryngology	5 (2.5)	Cholesteatoma, chronic tympanic membrane perforation, facial swelling, obstructive sleep apnea
Infectious disease	4 (2.0)	HIV, RPR+
Dental	4 (2.0)	Toothache

Buffalo, NY and 35.2% in Portland, Me [1, 3]. However, we found a higher number of children with anemia than previous pediatric refugee studies. Forty-three percent of children in our study had anemia at arrival as compared to 31% of the African refugees in the study by Geltman et al. in Massachusetts and 19.7% of refugees and immigrants in a study of new arrivals to Portland, Me [3, 5].

With respect to health care utilization, most patients had a scheduled follow-up (71%) or nurse visit (66%). Fewer patients, although still a substantial number, had primary care sick (40%) or emergency room visits (21%). The visit type with the highest mean number of visits over the 15 months was scheduled follow-up visits, with a mean of almost two and a large range up to 14 visits for a single patient. Although emergency room visits were attended by the least number of patients (21%) in the 15 month period, this number is still higher than that found in a study of emergency department utilization in over 10,000 children younger than 18 years [14]. The authors found that the percent of children with any visits to the emergency department in one calendar year (1997) to range from 9.7% in children uninsured all year to 14.1% in children publicly insured all year.

Some qualitative differences in diagnoses or diagnostic categories were noted between visit types. For example, the top three diagnostic categories for follow-up visits were hematologic (mostly anemia), gastrointestinal, and latent tuberculosis, which largely reflects problems identified on initial screening. Subspecialty referrals also reflected problems identified during the initial screening process. These included tuberculosis clinic for latent tuberculosis, ophthalmology for poor visual acuity, lead clinic for elevated lead, and gastroenterology for hepatitis carrier status or disease.

In contrast, the top categories for primary care sick and emergency room visits were largely acute pediatric illnesses. Upper respiratory tract, gastrointestinal, and other infectious problems were most represented for sick visits. These were similar to the common categories for emergency room visits except for trauma or other injury diagnoses, which were not surprisingly more common in the emergency setting.

There are very few studies of health care utilization in pediatric refugees to which we can compare our data. Although not directly comparable, two studies warrant further discussion. First, a 1-year retrospective study of general practice utilization for 171 adult and pediatric asylum seekers was performed in Ireland [8]. This study showed increased usage of services for asylum seekers as compared to the general population. The most represented country of origin for the asylum seekers was Nigeria (43%). The authors found that male and female children up to the age of four had 5.32 and 5.67 visits to the general practitioner over 12 months, respectively. School-age children (5–12 years) had slightly lower means with 3.1 for females and 4.67 for males. This is similar to our data when looking at the total number of visits to the primary care physician (combining sick, follow-up, and well child visits). In our study, children ages 0–2 years had an average of six visits to the primary care physician over 15 months and preschool and school-age children (3–10 years) had an average of 3.9 visits.

Twenty-one percent of children had at least one emergency room visit in the first 15 months after arrival. This is much lower than the 51% of families who reported at least one emergency room visit for their children in the past year in a survey of 152 households in Texas with refugee children from former Yugoslavia [11]. Sixty-two percent of



these families also reported no medical home for their children. This difference could be attributed to methodologic differences between the two studies, parental report versus chart review. In addition, the current study only evaluated health care utilization in refugees who had at least one well child visit in a specific practice. Children who never had a well visit may be more likely to seek emergency care, such that our study may underestimate emergency room usage in a broader refugee population.

A limitation to this study is that all visits may not be captured if patients sought care outside of our institution. Refugee children who never established a medical home are also not well captured in this study. They may have increased emergency room usage but less primary care and subspecialty usage. We are also unable to comment on the appropriateness of emergency department utilization because only diagnostic codes were accessed, as opposed to charts. In addition, due to the lack of mental health services in the clinic setting, mental health service utilization is only reflected in related diagnoses at primary care and emergency visits. Finally, a relatively homogenous population of mostly Liberian refugees in one institution limits the generalizability to other refugee populations.

The main strength of the study is the concentration of pediatric services in one academic medical center. Most refugees who arrive in Rhode Island are resettled in the city of Providence and the children are largely referred to Hasbro Children's Hospital for initial primary care. In addition, many of the pediatric subspecialists who are referred to by clinic providers are affiliated with the hospital. All of these factors improve the quality of the data and make it less likely that a large number of visits outside the institution were missed.

In conclusion, most pediatric refugees had primary care follow-up visits and required subspecialty consultations, which were largely for health problems identified on initial screening. They also sought care for general pediatric problems in both the primary care and emergency room settings. These results highlight the importance of thorough screening of refugee children on arrival as well as the need for ongoing follow-up. Providers in primary care, subspecialty, and emergency settings should be aware of the types of health problems faced by refugee children in order to better serve their needs.

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