

ORIGINAL RESEARCH

Pediatrics

Pediatric emergency department use by Afghan refugees at a temporary housing facility

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Funding and support: By JACEP Open policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article as per ICMJE conflict of interest guidelines (see www.icmje.org). The authors have stated that no such relationships exist.

Abstract

Objectives: In August 2021, “Operation Allies Welcome” evacuated 76,000 Afghan refugees to 8 US temporary housing facilities. The impact of refugee influx on local emergency department (ED) use and the resources needed during resettlement are poorly described. We report the frequency of pediatric ED visits and characterize the ED resources needed by pediatric Afghan refugees from 1 temporary housing facility.

Methods: This single-center, retrospective cohort study identified participants via a refugee identifier in the medical record. The primary outcome was the frequency and timing of pediatric ED visits; secondary outcomes included resources used during ED evaluation and management. Trained reviewers collected data using a predefined instrument and descriptive statistics are reported.

Results: This study included 175 pediatric ED visits by Afghan refugees. The highest volumes ($n = 73$, 42%) occurred 3–5 weeks after evacuation. Common presenting complaints included fever (36%), gastrointestinal (15%), and respiratory (13%). Resources used included radiography (64%), lab testing (63%), and medication (78%). Specialist consultation occurred in 43% of visits; infectious diseases (17%) and neurology (15%) were the most common. Discharge (61%) was more common than admission (39%), though 31% of discharged patients had a repeat ED visit. Only 51% attended a recommended follow-up appointment.

Conclusion: In this study, most pediatric ED visits by refugees occurred within 5 weeks of arrival. Most patients were discharged after diagnostic testing, medication, and specialist consultation, but repeat ED visits were common. These patterns have important implications in preparing for future mass displacement events.

KEYWORDS

pediatric emergency medicine, pediatric refugee, refugee, use of health care

Supervising Editor: Lauren Black, MD, MPH.

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1 | INTRODUCTION

1.1 | Background

Humanitarian crises and mass displacement events disrupt access to health care and result in acute medical needs upon refugee arrival in receiving countries; emergency resources are often used to fill this gap.¹ From 2018 through 2020, the United States (US) received 64,000 refugees, approximately 40% of whom were less than 18 years old.² On August 29, 2021 the US Department of Homeland Security launched "Operation Allies Welcome," a coordinated federal effort to evacuate and resettle over 76,000 Afghan refugees in the United States.³ In less than one month, more refugees arrived in the United States than over the previous three years, as Afghan refugees were transported to one of eight US "safe haven" temporary housing facilities (Marine Corps Base Quantico, Virginia; Fort Pickett, Virginia; Fort Lee, Virginia; Holloman Air Force Base, New Mexico; Fort McCoy, Wisconsin; Fort Bliss, Texas; Joint Base McGuire-Dix-Lakehurst, New Jersey; Camp Atterbury, Indiana).³

1.2 | Importance

The medical needs of resettling refugees are significant and often require emergency resources for stabilization of acute illness/injury or decompensation of chronic illness during evacuation.⁴⁻⁷ Children have unique health needs in displacement events, including traumatic injuries, susceptibility to communicable diseases, sensitivity to malnutrition and dehydration, and mental health needs, which are not necessarily addressed by adult refugee health care services.^{1,8-12} Few studies in the US describe emergency department (ED) use and the emergency medicine resources used by pediatric refugees during resettlement.

1.3 | Goals of this investigation

We sought to characterize the frequency, timing, and resources used during pediatric ED visits by refugee children from a temporary housing facility during a mass resettlement event in the US.

2 | METHODS

2.1 | Study design

This was a single-center, retrospective cohort study of pediatric ED visits by children from the Operation Allies Welcome temporary housing facility at Camp Atterbury from September 1, 2021 until January 24, 2022. This study was approved by the Indiana University Institutional Review Board (IRB #14031).

2.2 | Setting

Camp Atterbury (Edinburgh, Indiana) is a US National Guard training base located 36 miles south of Indianapolis, Indiana. From September

The Bottom Line

In this study of pediatric emergency department visits by Afghan refugees, 51% of visits occurred within the first 5 weeks. Overall, the most common presenting complaint was fever, and 39% of patients required admission. These patterns can help prepare for future displacement events.

1, 2021 until January 24, 2022 Camp Atterbury provided temporary housing to Afghan refugees during the Operation Allies Welcome resettlement process. Under standard resettlement circumstances, refugees undergo medical screening exams before arriving in the United States; however, due to the urgency of evacuation, standard prearrival screening was not routinely performed.¹³ Thus, upon arrival to temporary housing facilities, refugees received a full medical screening exam and age-appropriate vaccines as recommended by the Centers for Disease Control and Prevention.¹³ Due to the unprecedented urgency of evacuation, if an individual's vaccine records were not readily available, they received all recommended vaccines based on age. Refugees had access to additional medical care and mental health services on an as-needed basis in the temporary housing facility. If on-site health care personnel (either during an initial medical screening exam or subsequent medical visit) determined that the diagnostic or treatment needs exceeded the in-camp resources and capabilities, refugees were then transported to an ED.¹⁴ Our study site, a 30-bed quaternary care center ED with approximately 50,000 annual visits, was the nearest pediatric ED. This retrospective study was conducted in April and May of 2022.

All data were obtained directly from the hospital's electronic medical record data warehouse (Cerner; Oracle Corporation) by one of four trained chart reviewers using a predefined data collection instrument. Study data were collected and managed using REDCap electronic data capture tools hosted at Indiana University.

2.3 | Selection of subjects

Eligible ED encounters were for (1) refugees temporarily housed at Camp Atterbury, (2) aged 0-21 years, (3) transported from Camp Atterbury to the study site for ED evaluation, and (4) evaluated between the dates of the temporary housing operation (September 1, 2021-January 24, 2022). Encounters were excluded if they were not refugees temporarily housed at Camp Atterbury or were refugees who permanently resettled at a different local address, older than 21 years of age, arrived for a health care encounter other than ED evaluation, or arrived outside the temporary housing facility operation dates.

We identified encounters retrospectively in the electronic medical record using a unique address that was given to all Afghan refugees from the temporary housing facility at Camp Atterbury during the standardized ED registration process. These encounters were then cross-referenced with prospectively recorded hospital operations logs

of all transports from Camp Atterbury to the study site to increase internal validity. The study design did not allow for a priori sample size calculation and a convenience sample was used.

2.4 | Measures/outcomes

We measured the number of ED visits using counts of visits in the electronic medical record. The age, sex, chief complaint, emergency severity index (ESI), past medical history, past surgical history, home medication list, and final disposition were directly transcribed from the ED encounter for each visit by a trained chart reviewer. Chart reviewers examined the ED orders to report any blood, urine, stool or viral testing; radiology study; or medication orders, which were all treated as dichotomous variables. Chart reviewers then read the triage note, ED note, any consultant notes, and discharge instructions for documented interpreter use, specialist consultation, and if outpatient follow-up was recommended. Finally, the chart reviewer examined the medical record for repeat ED visits and follow-up visits (measured by the presence of a primary care or specialist note). The study design included a minimum of 67 days between the closing of the temporary housing facility and the measurement of follow-up visit attendance.

The primary outcome was the frequency and timing of ED visits by pediatric refugees from the temporary housing facility at Camp Atterbury. Secondary outcomes included characterization of patient demographics, ED triage, ED evaluation and management, final disposition, and follow-up attendance.

2.5 | Data analysis

We analyzed the data using descriptive techniques. We determined the incidence of ED visits and described patient and ED characteristics using counts and proportions. We provided monthly counts and proportions of ED visits, triage acuity, chief complaint, and final disposition of all ED visits to contextualize the primary and secondary outcomes. We performed all descriptive analyses in STATA 17 (StataCorp; College Station, TX).

3 | RESULTS

3.1 | Participants

Of 178 pediatric ED visits by Afghan refugees, we excluded 2 patients greater than 21 years old and 1 patient transported for a non-emergent surgical admission, leaving 175 in the analysis.

3.2 | Descriptive data

The 175 ED visits represented 110 individuals, with 41 patients presenting more than once during the study period (Table 1). Patients aged 0–17 years presented to the ED and the median age was 3 years (interquartile range 1–8 years); no patients aged 18–21 years pre-

TABLE 1 Description of age, sex, past medical/surgical history, medication use, chief complaint, and emergency severity index among refugees presenting for emergency department evaluation.

Characteristic	Descriptive statistic
Age	
Age (years), range	0–17 years
Age (years), median (interquartile range)	3 years (1–8 years)
Sex	
Male, n (%)	94 (54%)
Female, n (%)	81 (46%)
Past medical and surgical history	
No past medical or surgical problems, n (%)	125 (71%)
Chronic/ongoing condition, n (%)	36 (20%)
Acute/resolved condition, n (%)	9 (5%)
Unknown, n (%)	5 (3%)
Medication history	
Daily medication prescribed, n (%)	17 (10%)
No daily medication prescribed, n (%)	150 (86%)
Unknown, n (%)	8 (5%)
Chief complaint	
Fever, n (%)	63 (36%)
Gastrointestinal, n (%)	27 (15%)
Respiratory, n (%)	23 (13%)
Musculoskeletal, n (%)	22 (13%)
Skin/soft tissue, n (%)	18 (10%)
Seizure, n (%)	14 (8%)
Fall/closed head injury, n (%)	12 (7%)
Ear, nose, or throat, n (%)	12 (7%)
Other, n (%)	22 (13%)
Unknown/not listed, n (%)	2 (1%)
Multiple chief complaints, n (%)	40 (23%)
Fever and respiratory, n (% subtotal)	24 (60%)
Fever and gastrointestinal, n (% subtotal)	5 (13%)
Gastrointestinal and other, n (% subtotal)	4 (10%)
Fever and respiratory and gastrointestinal, n (% subtotal)	2 (5%)
Respiratory and other, n (% subtotal)	2 (5%)
Fever and rash, n (% subtotal)	2 (5%)
Fever and seizure, n (% subtotal)	1 (2%)
Emergency Severity Index (ESI)	
ESI–1, n (%)	0 (0%)
ESI–2, n (%)	16 (9%)
ESI–3, n (%)	143 (82%)
ESI–4, n (%)	11 (6%)
ESI–5, n (%)	2 (1%)
Unknown/not listed, n (%)	3 (2%)

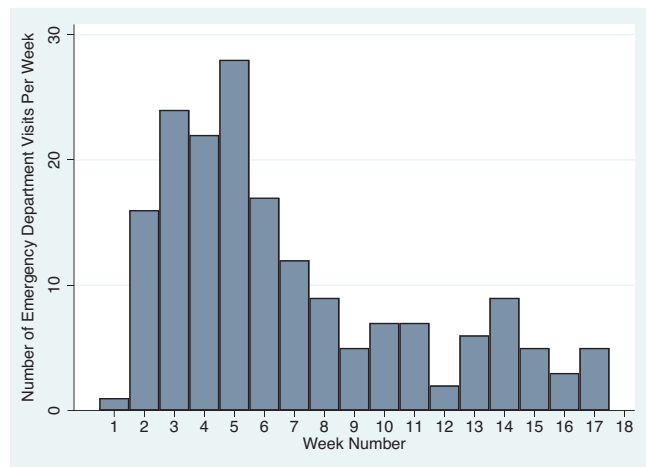


FIGURE 1 Number of emergency department visits per week of temporary housing facility operation, August 29, 2021 (week 1) through December 26, 2021 (week 17). There were no emergency department visits after December 26.

sented during the study period. We observed similar proportions of male (53%) and female (47%) patients. Of the 170 (97%) visits with a documented past medical and surgical history, 125 (71%) had no past medical or surgical problems documented, 36 (21%) had a chronic condition, and 9 (5%) had a prior acute condition that had resolved (e.g a fracture that had healed). Of the 167 visits (95%) with a documented medication history, 17 (10%) patients were prescribed daily medication.

3.3 | Frequency and timing of ED visits

The 175 ED visits accounted for less than 1% of the historical annual emergency department volume (50,000 visits per year). All ED visits occurred in the 17 weeks after the opening of the temporary housing facility; there were no visits in the final 5 weeks of housing facility operation. Over half ($n = 91$, 51%) of visits occurred during the first 5 weeks of temporary housing facility operation, and the highest volumes were seen during weeks 3–5 ($n = 74$, 42%) (Figure 1). The majority ($n = 91$, 52%) of ED visits occurred between 3 pm and 11 pm with the lowest number of visits ($n = 12$, 7%) between 3 am and 10 am.

3.4 | ED triage

Primary triage chief complaints included: fever ($n = 63$, 36%), gastrointestinal (nausea/vomiting, constipation/diarrhea, jaundice, abdominal pain; $n = 27$, 15%), respiratory (cough, shortness of breath; $n = 23$, 13%), musculoskeletal (bone/joint pain, cast reevaluation; $n = 22$, 13%), skin/soft tissue (cellulitis, abscess, burn, laceration, rash, insect bite/sting; $n = 18$, 10%), seizure ($n = 14$, 8%), fall/closed head injury ($n = 12$, 7%), ear/nose/throat (ear pain, congestion, nasal foreign body, nosebleed, dental pain, sore throat; $n = 12$, 7%), and other ($n = 22$,

13%). Forty (23%) visits had triage chief complaints involving 2 organ systems, which commonly included fever and either a respiratory and/or gastrointestinal complaint ($n = 31$, 78%). No patients received ESI-1 triage, 16 (9%) ESI-2, 143 (82%) ESI-3, 11 (6%) ESI-4, and 2 (1%) ESI-5 (Table 1). Monthly summary statistics for the entire ED population are presented, for reference, in Appendix 1 and we observed similar chief complaints among refugees and the entire ED population, though a higher proportion of refugees received ESI-3 triage.

3.5 | ED evaluation and management

The ED evaluation most often involved a radiology study ($n = 112$, 64%) and blood or urine testing ($n = 110$, 63%). Of visits with blood testing, 24 (22%) were for communicable infectious diseases such as tuberculosis, human immunodeficiency virus, malaria, mumps, herpes simplex virus, and measles. Less common studies were viral testing ($n = 45$, 26%) and stool testing ($n = 15$, 9%). Management included medication administration ($n = 136$, 78%) and specialist consultation ($n = 75$, 43%). There were 14 visits (8%) that consulted multiple specialties; in total, 92 ED consults were completed. The most often consulted specialties were pediatric infectious diseases ($n = 16$, 17% of consults), neurology ($n = 14$, 15% of consults), orthopedics ($n = 13$, 14% of consults), neurosurgery ($n = 11$, 12% of consults), and general/trauma surgery ($n = 10$, 11% of consults). Less common consults included burn ($n = 5$, 7% of consults), dentistry ($n = 4$, 4% of consults), urology ($n = 4$, 4% of consults), ophthalmology ($n = 3$, 3% of consults), and child protection team ($n = 3$, 4% of consults). Less than 2% of all consults were for cardiology, ear/nose/throat, gastroenterology, behavioral health, dermatology, endocrinology, rheumatology, or toxicology. Interpreter use was documented in 61% of encounters (Table 2).

3.6 | ED disposition

One-hundred and six visits (61%) resulted in discharge and 69 (39%) resulted in admission. The median ED length of stay for discharged patients was 4.8 hours (interquartile range 3.3–8.3 hours), though the length of stay varied by week (Figure 2). Visits resulting in admission were most often to a ward bed ($n = 39$, 63% full admission; $n = 23$, 37% observation). Only 7 visits (10% of all admissions) were placed in the intensive care unit. The highest admission rates were seen in weeks 1 ($n = 1$, 100%) and 2 ($n = 11$, 69%), with variable rates of admission during weeks 3–17 (Figure 3). The general population admission rates from the ED are presented, for reference, in Appendix 1 and ranged from 15% to 17%. There were no ED deaths reported during the study period.

3.7 | ED repeat use and follow-up

Of ED discharges, 32 visits (30% of discharges) were associated with a repeat ED visit during the study period. Of ED discharges, 39 (37%

TABLE 2 Description of emergency department orders placed during evaluation, including laboratory testing, radiology studies, medication administration, and consultation.

Emergency department orders	n (%)
Blood or urine test ordered	110 (63%)
Any infectious disease blood test ordered	24 (14%)
Tuberculosis (T-SPOT®)	6 (3%)
Human immunodeficiency virus	5 (3%)
Malaria	5 (3%)
Mumps	5 (3%)
Herpes simplex virus	4 (2%)
Measles	4 (2%)
Other ^a	15 (9%)
Viral test ordered	45 (26%)
Stool test ordered	15 (9%)
Radiology study ordered	112 (64%)
Medication administered	136 (78%)
None of the above	10 (6%)
Consultation	n (%)
Interpreter	107 (61%)
Encounters with specialist consultation	75 (43%)
Encounters with multiple consultations	14 (8%)
Total emergency department consultations	92
Pediatric infectious diseases	16 (17%)
Pediatric neurology	14 (15%)
Pediatric orthopedics	13 (14%)
Pediatric neurosurgery	11 (12%)
Pediatric surgery (including trauma)	10 (11%)
Pediatric plastic surgery (including burn)	5 (5%)
Pediatric dentistry	4 (4%)
Pediatric urology	4 (4%)
Pediatric ophthalmology	3 (3%)
Child protection team	3 (3%)
Pediatric cardiology	2 (2%)
Pediatric ear, nose, and throat	2 (2%)
Pediatric gastroenterology	2 (2%)
Behavioral health	1 (1%)
Pediatric dermatology	1 (1%)
Pediatric endocrinology	1 (1%)
Pediatric rheumatology	1 (1%)
Toxicology	1 (1%)

^aBartonella, cytomegalovirus, diphtheria, Epstein-Barr virus, Leptospirosis, parvovirus, hepatitis, Toxoplasma.

of discharges) were referred for outpatient follow-up at the study site; however, only 20 (51% of those referred) attended a follow-up appointment within 2 months of discharge.

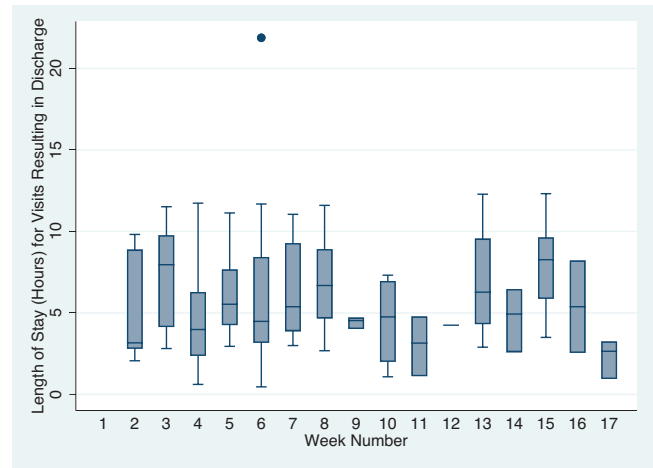


FIGURE 2 Box-and-Whisker plot of the emergency department length of stay among emergency department encounters resulting in discharge.

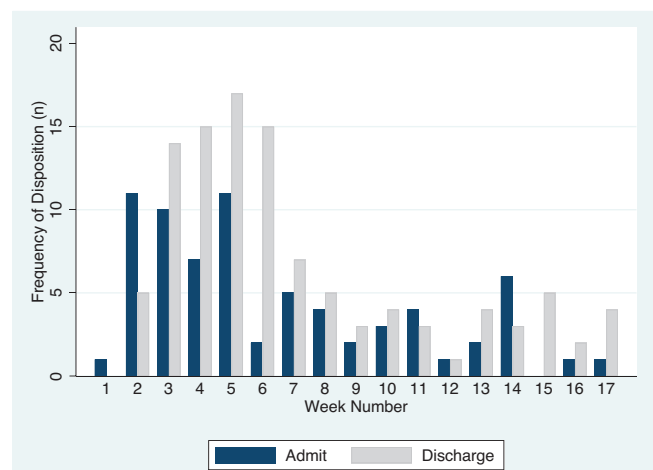


FIGURE 3 Frequency of emergency department disposition between August 29, 2021 (week 1) and December 26, 2021 (week 17).

3.8 | Limitations

In our description of health care use, there was no publicly available data set of all refugees sent from the temporary housing facility to an ED, which may have resulted in under-reporting the frequency of ED use. Similarly, because there are no publicly available records documenting how pediatric refugees were distributed among the eight US temporary housing facilities, this single-center data set is of limited external validity both in the US and internationally. Additionally, our study was not designed to control for dynamic operational changes that occurred throughout the resettlements process; the development of increased pediatric patient care capacity at Camp Atterbury during later months affects our ability to draw conclusions about the decrease in ED visits after week 5 as well as increased capacity for on-site follow-up at the temporary housing facility.

In our description of ED evaluation and management, final disposition, and follow-up attendance, our study had 2 notable limitations.

First, our study population was affected by selection bias because all refugees were first evaluated at the temporary housing facility by on-site health care personnel, who determined there was a need for ED evaluation. Given the unique factors associated with living in the temporary housing facility and ED use only after being evaluated and referred by on-site health care personnel, there was not an appropriate control group for comparison. We, therefore, summarized monthly trends for the entire ED in the Appendix to provide some context for our results but cannot conclude if refugee status alone was associated with changes to evaluation (such as overtesting), treatment, or disposition. Second, there may have been a loss to follow-up, as we do not know when and where refugees were resettled; our low follow-up rate may be secondary to resettlement in another state.

4 | DISCUSSION

In this study, the majority of pediatric ED visits by refugees occurred within 5 weeks of the temporary housing facility opening. ED evaluation was most often needed for children less than 8 years of age presenting with a fever or respiratory or gastrointestinal symptoms who needed lab and/or imaging studies. Almost half required specialist consultation. One third of visits resulted in admission (10% to intensive care) and admission rates were highest during the first 2 weeks of temporary housing facility operation. Discharges were common after long ED lengths of stay, but one third of discharged patients returned to the ED; only half attended a recommended follow-up appointment.

The frequency and timing of pediatric ED visits by refugees was similar to prior resettlement events. In 2 longitudinal studies of pediatric refugees resettling in Rhode Island (Watt et al, 2012) and France (Zunino et al, 2021), highest rates of pediatric ED use occurred between 1 and 15 months after resettlement.^{15,16} A distinction of our study is that most pediatric ED visits occurred within the first 35 days of resettlement. Interestingly, this timing replicates descriptions by Wetzke et al (2018) and Happel et al (2019) of the acute care needs to be observed in a refugee camp located in Germany, though it is unclear how many required ED evaluations in these studies.^{17,18} Our observed decrease in visits after week 5 coincided with the development of greater pediatric health care capacity at Camp Atterbury, as was the case in a similar temporary housing facility in Quantico, VA described by Goetzman et al (2022).¹³

We observed a specialist consultation rate of 44% with a frequent need for infectious diseases and neurology consultation. This outcome is uncommon in the pediatric refugee literature, though Zhang et al (2018) report a consultation rate ranging from 27% to 69% for pediatric refugees with traumatic injuries in a Canadian tertiary care ED.¹⁹ We suspect that the infectious disease consultations in our study were related to the complex interplay between patient-specific situations (eg, no available vaccine records) and environmental risk factors (eg, potential exposure to individuals with the communicable disease during air evacuation, as well as congregate housing at the temporary housing facility) that required specialist input for appropriate evalua-

tion, treatment, and isolation.¹³ The frequent consultation of pediatric neurology was both unexpected and not replicated elsewhere; however, the number of seizure presentations equaled the number of neurology consultations and may be explained by this alone, as neurology is normally consulted by the study site ED for first-time, non-febrile seizure or breakthrough seizure without an outpatient neurologist. Future resettlement efforts may consider the logistics of accessing specialist consultation for complex pediatric presentations.

The admission rate of 39% was over 2-times higher than similar studies reporting pediatric refugee admission rates ranging from 7.9% to 16.7%.¹⁹⁻²² This admission rate is also greater than the study site's general population admission rate of 15%–17%. Our observed high admission rate may be explained by the transfer process, which required health care personnel at the temporary housing facility to first evaluate the patient and then determine need for ED transfer, resulting in higher acuity and/or more complex patients to be referred to the ED. Additionally, the studies cited here were based in Turkey, France, Germany, and Canada; our admission rate may simply reflect US health care practices. Future planning efforts should consider the possibility of high admission rates, especially during the first weeks of refugee resettlement.

A key observation was the frequency of reevaluation in the ED. Carrico et al (2017) observed health care use among refugees resettling in Kentucky and noted that 22% of those visiting an ED had a repeat visit, most of which occurred before an initial domestic health screening.²³ Guess et al's 2019 case-control study of pediatric refugees enrolled in a family medicine clinic demonstrated lower rates of ED use among refugees, suggesting that access to primary care may reduce frequent emergency department use.²⁴ Our study suggested that refugees had difficulty attending outpatient appointments, though the study design did not allow us to speculate why. Zeidan et al (2019) and Alwan et al (2020) previously surveyed refugees resettling in the US and demonstrated that missed outpatient appointments were frequently attributed to language barriers, lack of transportation, US health insurance, and challenges navigating medical facilities.^{25,26} Future planning efforts may consider pathways to reduce common barriers refugees encounter when arranging outpatient follow-up.

In this case series, most pediatric ED visits by refugees were children younger than 8 years presenting with fever or respiratory or gastrointestinal symptoms during the first 5 weeks of resettlement, often requiring diagnostic testing, medication administration, and specialist consultation. Most patients were discharged after long lengths of stay, but many did not attend recommended follow-up appointments and one third returned to the ED. These distinct patterns of ED use have important implications for preparation for future mass displacement events.

ACKNOWLEDGMENTS

The research team would like to acknowledge the military and civilian personnel at Camp Atterbury who provided excellent clinical care under difficult circumstances. We would also like to thank the multidisciplinary team that assembled at Riley Hospital for Children at Indiana University Health to provide the best possible care for these children

and their families. No funding or financial support was used for this study.

CONFLICTS OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Ulintz A, Anderson K, Shah I, Khan M, Weinstein E, Peterson R. Pediatric emergency department use by Afghan refugees at a temporary housing facility. *JACEP Open*. 2023;4:e12947. <https://doi.org/10.1002/emp2.12947>

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