

Research Article

Urgent Care to the Pediatric Emergency Department: Characteristics of Referred Patients

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Abstract

This study aims to describe characteristics, resource utilization, and diagnoses in children referred from UCs to the PED, compared to traditional referring sites. This retrospective cohort includes children referred from UCs, Primary Care Providers (PCPs) or community Emergency Departments (EDs) to an urban, tertiary-care PED in RI, 2007-2012. Descriptive statistics, ANOVA, Kruskal-Wallis, and chi-square tests were applied. Of 1,933 patients, 764 (39.5%) were referred from UCs, 709 (36.7%) from PCPs, and 460 (23.8%) from EDs. UC referrals had lower acuity, shorter LOS, and less admissions, IVs, laboratory tests, or antibiotics compared to PCPs and EDs ($p < 0.001$). Concussion or head injury were more common diagnoses in UC referrals; fractures and abdominal pain were common from all sites. UCs should target preparedness for common pediatric diagnoses, emphasizing those that can be treated without PED resources. This data can be used to develop standards for pediatric care in UCs and thereby decrease unnecessary PED referrals.

Keywords: Ambulatory Care; Emergency Services; Health Resources; Pediatrics; Standard of Care

Introduction

Proportionally few patients (adults and children) are referred from UCs to emergency departments (EDs) (less than 3-4% of UC visits), though at 160 million total annual UC visits the absolute number of ED referrals is significant [1,2]. Despite a low ED referral rate, 71% of surveyed UCs have contacted emergency medical services to refer a child to a local ED in the last year [3]. When UCs refer children to the ED, their preparedness for pediatric emergencies is variable. A survey on UCs' pediatric readiness found that 62% of UCs had written transfer protocols with community EMS and 54% had written transfer protocols with local hospitals [3]. This suggests that procedures for pediatric referrals to the ED are not consistently defined in the UC setting. While the

AAP provides guidelines on pediatric urgent care emergency preparedness [4], standardization regarding treatments available has not been established for UCs that treat children. This leads to wide variability and no standardized expectation of which types of acute pediatric complaints UCs should be prepared to treat.

There are few descriptions about the pediatric population who utilizes UCs in the community, and limited data on the necessity of UC to ED referrals [5,6]. A single study reviewing pediatric referrals from UCs to the PED found that most were considered "Essential Referrals" (i.e. requiring ED tests or interventions), though few are considered "Serious Referrals" (i.e. requiring advanced life support or with life-threatening presentations) [7]. With such limited data on this topic, it's unclear whether these trends in pediatric UC referrals are generalizable to other geographic regions. Overall, little is known about the portion of essential versus unnecessary referrals pediatric population referred from UCs to EDs.

The primary aim of this study is to describe characteristics and ED resource utilization by children referred from UCs to a PED in Rhode Island. These patients were compared to traditional referral sites including primary care provider settings (PCPs) or community EDs as a frame of reference. We hypothesize that pediatric UC referrals utilize ED resources similarly to those referred from the PCP, and less frequently than referrals from community EDs. The secondary aim is to identify the 10 most common diagnoses amongst patients referred from UCs to the PED. A firm understanding of pediatric UC referrals to the PED is needed to guide standardization of pediatric care provided in the urgent care setting, and limit unnecessary referrals that do not utilize PED resources.

Materials and Methods

This is a retrospective cohort study, reviewing children (ages 0-18 years) referred from UCs, PCP or community EDs to an urban, tertiary care children's hospital PED in Providence, RI, from 2007-2012. Data was collected retrospectively using the institution's data collection program, Data Warehouse.

The PED provider (Physician or Nurse Practitioner) documented patient and referring provider's information into the electronic medical record (Medhost, Inc.) in real-time when a referring provider called to notify the PED of an in-bound patient. Since the electronic record has free-text entry fields, varying levels of detail and completion were entered on each patient, including provider name, phone number, organization name, a description of the reason for referral by the referring provider, or demographic information. The Rhode Island Hospital Institutional Review Board (IRB) approved this study.

Inclusion criteria were patients referred to the PED by an outside provider as identified in the EMR by an inbound entry and were referred from UC, PCP, or ED settings. Patients were excluded if the referring provider or location was not identified in the EMR inbound entry, or if age was 19 years and above. Patients referred from non-primary care sites, such as subspecialty clinics or from psychiatric offices, were excluded because these patients are unlikely to present to UCs. Patients with incomplete data points (e.g. missing information on referring provider, age, gender, lab tests) were excluded from analysis.

Patients were categorized into 3 cohorts based on the referring sites: UCs, primary care settings, or community EDs. The definition of UC for this study, based on that of the Urgent Care Association of America, included free-standing urgent care centers and walk-in, acute-care centers, that do not see children for well child visits or do not make scheduled appointments for acute visits [8]. All UCs during the timeline of data collection for this study were privately owned or community-based sites, none were academically affiliated, and none of the UC sites in this region exclusively treated children. Primary care provider settings included

pediatric or family medicine providers who work at private practices, academic primary care clinics, or community health clinics. Community emergency departments were defined as surrounding community or academic hospitals that treat both adults and children, and are not affiliated with a children's hospital.

ANOVA or Kruskal-Wallis were used to compare continuous variables and chi-square was used for comparison of categorical variables. Analyses were performed using Stata v.14 (StataCorp, LP). Characteristics that were analyzed included age, gender, ESI triage level, disposition, length of stay, ED resources utilized (specifically, intravenous (IV) catheters, oral, nebulized, IV or intranasal (IN) medications, laboratory tests, radiology tests, electrocardiograms (EKGs), moderate sedation, or inpatient admission) and the 10 most common discharge diagnoses. Emergency severity index scale (ESI) for triage was applied to patients, where level 1 signifies highest acuity. Length of stay is defined as time of arrival in the PED to time of discharge from the PED. Sedations were identified from the data based on which patients received ketamine, which was the sole medication used for induction in a moderate sedation at this institution.

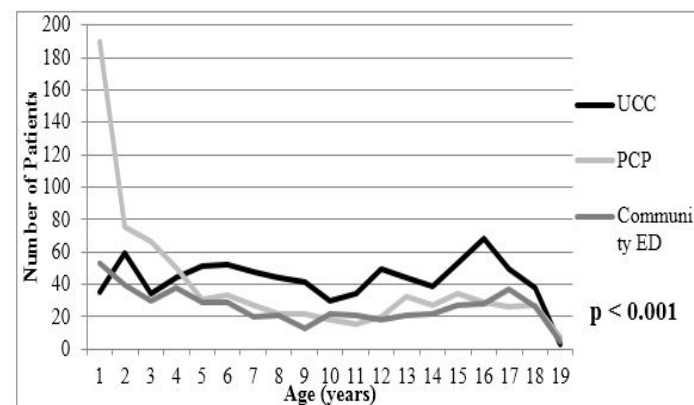
Results

There were 6,708 referrals from outside locations to the PED during the study period. There were 3,242 charts with incomplete or missing chart data (missing demographic, visit date and time, diagnoses, or medication or treatment usage) that were excluded. Of the remaining patients, 741 were referrals from facilities listed in exclusion criteria (e.g. specialty offices, mental health facilities, the Department of Health), and 792 were excluded for lack of referral provider information. A total of 1,933 patients were included in this study: 764 (39.5%) were referred from UCs, 709 (36.7%) were referred from the primary care setting, and 460 (23.8%) were referred from community EDs.

Table 1 depicts the demographics, ESI triage level, PED disposition and median LOS, from each referral site. UCs referred all ages to the PED with the largest numbers of patients in adolescence. PCPs and community EDs referred a predominance of infants compared to other ages (Appendix 1). The youngest patients (median age) were transferred from PCPs, while oldest patients were transferred from UCs ($p < 0.001$). There was no significant difference in gender of patients from all referring sites. Patients coming from UCs had lower ESI triage levels than PCP or ED referrals indicating lower triage acuity ($p < 0.001$). Patients referred from UCs were most commonly discharged from the PED, whereas patients referred from community EDs were most commonly admitted ($p < 0.001$). Less than 8% of ED and 1% of PCP referrals were transferred to other institutions (i.e. other children's hospitals or pediatric mental health in-patient facilities). Median length of stay was shortest for children referred from UCs ($p < 0.001$).

	UCC	PCP	Communi- ty ED	p-value
	N = 764	N = 709	N = 460	
Median age in years (IQR)	9.3 (4.8-14.3)	4.1 (1.0-12.0)	7.9 (3.3-14.1)	< 0.001
Gender N (%)				0.245
Male	452 (59.1%)	376 (53.0%)	254 (55.2%)	
Female	312 (40.8%)	333 (46.9%)	206 (44.8%)	
ESI Triage Level N (%)				< 0.001
1	2 (0.3%)	3 (0.4%)	10 (2.2%)	
2	359 (47%)	348 (49.1%)	279 (60.7%)	
3	370 (48.4%)	325 (45.8%)	151 (32.8%)	
4	33 (4.3%)	33 (4.7%)	20 (4.3%)	
5	0 (0%)	0 (0%)	0 (0%)	
Disposition from PED N (%)				< 0.001
Admit	168 (22%)	246 (34.7%)	182 (39.6%)	
Discharge	594 (77.7%)	457 (64.5%)	243 (52.8%)	
Eloped	2 (0.3%)	1 (0.1%)	0 (0%)	
Transfer	0 (0%)	5 (0.7%)	35 (7.6%)	
Median LOS in minutes (IQR)	248 (181-326)	274 (199-357)	273 (199-364)	

Table 1: Characteristics of children referred from outside locations to the PED, including median age, gender, ESI triage level, disposition, and median Length of Stay (LOS).



Appendix 1: Distribution of patient ages by referral site.

Analysis of PED resource utilization was performed. (Table 2) Patients referred from UCs were most likely to receive oral medications ($p < 0.001$), and were least likely to have IV medications, laboratory tests, or antibiotics administered ($p < 0.001$). Usage of intranasal medications, radiologic studies, and EKGs were similar in the three comparison groups. Laboratory tests were performed on approximately one-third of UC referrals, and radiology studies were performed on half of UC referrals. Moderate sedation was most commonly administered in patients from community EDs and UCs (9% and 7%, respectively) over patients from PCPs (0.9%), ($p < 0.001$).

	UCC	PCP	Communi- ty ED	p-value
	N = 764	N = 709	N = 406	
Any Medication	625 (82%)	556 (78%)	330 (72%)	0.001
Med Route				
IV	287 (38%)	279 (39%)	222 (48%)	< 0.001
PO	449 (59%)	385 (54%)	174 (38%)	< 0.001
IN	14 (1.8%)	7 (0.9%)	6 (1.3%)	0.38
Neb	72 (9%)	117 (17%)	15 (3%)	0.001
Labs	289 (38%)	415 (59%)	205 (45%)	< 0.001
Radiology	409 (54%)	346 (49%)	218 (48%)	0.07
EKG	35 (5%)	37 (5%)	23 (5%)	0.87
Sedation	55 (7%)	7 (0.9%)	43 (9%)	< 0.001
Antibiotics	63 (8%)	111 (16%)	48 (10%)	<0.001

Table 2: Resources utilized on patients referred to the PED. Medication Routes included IV (Intravenous), PO (Oral), IN (Intranasal), or Neb (Nebulized). Results listed as number of patients (% of total).

The 10 most common diagnoses of each referral site are listed in Table 3. Each of the referral sites had abdominal pain or fracture amongst the top three most common diagnoses. Diagnoses of concussion and head injury were more common in UC referrals than PCP or community ED referrals.

UCC	PCP	Community ED
N = 764	N = 709	N = 406
Fracture 121 (15.9%)	Bronchiolitis 43 (6.1%)	Fracture 56 (12.2%)
Abdominal Pain 82 (10.8%)	Fracture 39 (5.5%)	Mental Health 44 (9.6%)
Laceration 43 (5.7%)	Abdominal Pain 39 (5.5%)	Abdominal Pain 33 (7.2%)
Pneumonia 34 (4.5%)	Fever 38 (5.4%)	Seizure 19 (4.1%)
Concussion 29 (3.8%)	Pneumonia 29 (4.1%)	Laceration 18 (3.9%)

Asthma 27 (3.5%)	Vomiting 28 (4.0%)	MVC 17 (3.7%)
Gastroenteritis 24 (3.2%)	Asthma 28 (4.0%)	Foreign Body 13 (2.8%)
Fever 23 (3.0%)	Abscess 23 (3.2%)	Appendicitis 12 (2.6%)
Head Injury 21 (2.8%)	URI 19 (2.7%)	Burn 9 (2.0%)
Vomiting 15 (2.0%)	Gastroenteritis 18 (2.5%)	Abscess 8 (1.7%)

Table 3: Five most common diagnoses, listed as number of patients (% of patients from that referral site) of patients referred to the PED.

Discussion

This study described and compared the patient characteristics, ED resource utilization, and diagnoses of children referred to a PED from UCs, primary care settings and community emergency departments. UC referrals were lower in acuity, had shorter LOS, required less IVs and laboratory tests, and were least frequently admitted, compared to referrals from PCP and community EDs. This suggests that children with overall lower severity of illness are referred from UCs.

The results of this study are comparable to resource utilization rates reported previously. One study that described children referred from UCs to a PED found that in the PED, 33% received laboratory tests, 52% had radiologic imaging, 44% received a procedure (Including Intravenous (IV) Placement), and 83% were discharged home [7]. These data suggest that some portion of children referred to the PED do not utilize ED resources and are not hospitalized. UCs that lack medication, equipment, emergency transfer protocols, or provider expertise for pediatric complaints may refer patients to the PED who do not require ED resources [3,6]. Improved anticipation of pediatric complaints and adherence to AAP guidelines for pediatric emergency preparedness may limit non-essential referrals from UCs to the PED [4,7].

Currently, there are no standards or benchmarks for what medical care an urgent care that treats children should or should not provide. As pediatric urgent care standardization is developed, UCs in the community should strategically target preparedness for common pediatric diagnoses, with an emphasis on diagnoses that can be treated in the UC setting. Based on the common diagnoses identified in this study amongst UC to PED referrals, we suggest that UCs incorporate adjunctive, evidence-based, outpatient measures to support common pediatric complaints, and thereby minimize unnecessary referrals to the PED, when ED resources are not needed. These suggested adjuncts are summarized in Table 4.

Condition	Adjunct
Fracture	Supplies and knowledge for splinting minor pediatric fractures
	Identify pediatric orthopedist who can see patients on a next-day basis
	X-ray services
Laceration	Immobilization training with sheet wraps or papoose boards
	Distraction techniques (e.g. singing, toys, bubbles, screen-based videos or games)
	Medications for anxiolysis (intranasal midazolam) ⁹
Fever	Increase availability of oral medications (e.g. antipyretics, antibiotics)
	Use of a triage tool using age-based vital signs to detect early sepsis ¹⁰
Concussion	Use of the PECARN head injury algorithm to identify low risk for traumatic brain injury ¹¹

Table 4: Suggested adjuncts for Pediatric Urgent Care Centers for Common Conditions that lead to PED Referrals.

A limitation of this study was that the EMR had more limited documentation capabilities in early years of data collection. There were increasing numbers of patients that met inclusion criteria for this study with each successive year during the study period. We speculate that increasing referred patients corresponded to improved user ability to electronically document referral calls or increased utilization of the physician referral line by outside institutions. We were unable to identify patients who were directed via phone consultation to the PED, or those seen at outside facilities but the referring provider did not call the PED to provide a hand-off of patient information. There is a possibility that patients who were less urgent were instructed to go to the PED but not called in by the provider, which may bias patient inclusion for this study to patients who are more ill or require more resources. We met a challenge in analyzing the diagnosis data via relying on the diagnostic code entered in the medical record, as these can vary based on what a provider reports. There was a limitation in identifying both resources needed and resources already utilized at the referring facilities, as this was not available in our database. Some resources needed at referring sites may include hours of operation (e.g. patients seen at UC at the time of closing), pediatric medications, or pediatric expertise in practitioners. Resources utilized prior to PED arrival might include diagnostic imaging (e.g. Head CT performed at the community ED), lab tests, or IVs, as this would skew what PED resources were utilized on those patients. Finally,

this region's UC mixture (i.e. lacking academic center- affiliated UCs or Pediatric UCs) may not be generalizable to all geographic areas.

In summary, UC referrals to the PED were lower in acuity, shorter LOS, and utilized ED resources (specifically IVs, laboratory tests, antibiotics, and hospital admission) less than referrals from PCP and community EDs. Concussion or head injury were more common diagnoses in UC referrals; fractures and abdominal pain were common from all sites. UCs should target preparedness for common pediatric diagnoses, emphasizing those that can be treated without PED resources. This data can be used to develop standards for pediatric care in UCs and thereby decrease unnecessary PED referrals.

Previous Presentations:

Abstract: Society for Pediatric Urgent Care, 2015, Cincinnati, OH

Abstract: Pediatric Academic Societies Meeting, 2016, Baltimore, MD

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