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Urgent Care and Emergency Department Visits in the Pediatric Medicaid Population

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abstract

BACKGROUND: Urgent care (UC) is one of the fastest growing venues of health care delivery. We compared clinical and cost attributes of pediatric UC and emergency department (ED) visits that did not result in admission.

METHODS: Our study examined 5 925 568 ED and UC visits of children under 19 years old in the 2010 through 2012 Marketscan Medicaid Multi-State Database. Basic demographics, diagnoses, severity, and payments were compared. Between ED and UC visits, χ^2 tests were used for proportions and Wilcoxon rank-sum tests were used for continuous variables.

RESULTS: The UC and ED had the same most common diagnoses. Over half the UC visits were low severity. The ED had a higher rate of return within 7 days (8.4% vs 6.9%, $P < .001$) and follow-up with their primary care physician (22% vs 17.2%, $P < .001$). Few (<1%) were admitted on return visits from the ED or UC. Payments for UC were significantly less (median $76.90 vs $186.20, $P < .001$). This continued to hold true when comparing payments for selected diagnoses and each severity level. By extrapolating the cost savings, a national Medicaid per-year savings, if all lowest severity level visits were seen in UC, was more than $50 million.

CONCLUSIONS: UC and ED Medicaid visits have similar most common diagnoses, rate of return, and admission. Severity level and payments were lower in UC. There is potential significant cost savings if lower acuity cases can be transitioned from the ED to UC.

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Dr Montalbano conceptualized and designed the study, drafted the initial manuscript, and revised the manuscript; Mr Rodean acquired the data, carried out the initial analyses, drafted the initial manuscript, and reviewed and revised the manuscript; Dr Kangas contributed to the study conception, drafted the initial manuscript, and reviewed and revised the manuscript; Dr Lee contributed to the study design and analysis of the data and critically reviewed the manuscript; Dr Hall conceptualized and designed the study, supervised analyses and interpretation of data, and reviewed and revised the manuscript; and all authors approved the final manuscript as submitted.

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WHAT'S KNOWN ON THIS SUBJECT: Urgent care (UC) is a growing venue of health care delivery treating nonemergent conditions. Although the majority of patients seen in the UC setting are children, no studies have focused solely on the pediatric population.

WHAT THIS STUDY ADDS: The UC and emergency department (ED) had the same most common diagnoses. Almost half the ED visits were low severity. We found potential significant cost savings if lower acuity cases could be transitioned from the ED to UC.

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Urgent care (UC) is one of the fastest growing venues of health care delivery used to treat many nonemergent conditions.[1] Urgent care, as defined by Centers for Medicare and Medicaid Services, includes facilities that see patients within 12 hours without an appointment to avoid the likely onset of an emergency medical condition.[2] These centers are distinct from a hospital emergency department, office, or clinic.[3] Previous studies have cited the accessibility, ease of use, timeliness of visits, and decreased cost as reasons patients are increasingly visiting these sites.[4] The AAP endorses UC as a "safe, effective adjunct to, but not a replacement for, the medical home or emergency department."[5] These lower acuity sites have been shown to provide care of comparable quality to care delivered in the emergency department (ED) setting for appropriate cases.[6]

Compared with the cost of care in the ED, many nonemergent conditions that could be treated in these lower acuity settings instead of the ED could lead to substantial savings.[6–8] More than 20 years ago, Warren and Isikoff compared diagnosis-specific charges for Medicaid patient visits at a university medical center and found significantly higher charges for all diagnoses treated in the ED compared with UC.[8] With the exponential growth of health care costs, this gap has potentially grown.

Although a significant proportion of patients seen in the UC setting are children, no studies have focused solely on the pediatric population.[8–10] Thus, we sought to compare clinical attributes and payments for pediatric UC and ED visits that did not result in admission using the Medicaid Marketscan database. This information could help shape policy that reduces health care costs for Medicaid payments.

METHODS

Our study examined ED and UC visits that did not result in admission for children under the age of 19 in the 2010, 2011, and 2012 Marketscan Medicaid multistate claims database (Truven Health Analytics). Marketscan contains the inpatient, outpatient, long-term care, and retail prescription claims data for 10 or 12 unidentified states (dependent on the year), as well as basic enrollment information such as year of birth, gender, race, and the months of enrollment. The outpatient ED and UC visits were included contingent on the patient's continued enrollment through the month after the visit (which would most likely exclude deaths resulting from those visits), to assess utilization after the encounter.

The database contains comprehensive claims for both capitated managed care (77.5% of visits in the cohort) and fee-for-service (22.5%), although the payment information is only available from fee-for-service claims that cover facility and professional fees, services, radiology, laboratory, and pharmacy. Because geographic, policy, and facility differences can bias payment comparisons, both managed care and fee-for-service claims were standardized.[11] Following the work of Kuo et al, a standard payment per unit of service was generated from the fee-for-service payments, and then multiplied by the number of units on a claim to compute a claim total.[12] This was applied to both managed care and fee-for-service claims.

In accordance with the policies of the Children's Mercy Hospitals and Clinics' Institutional Review Board, this research using a deidentified data set, was not considered human subjects research.

Clinical Grouping

Children with complex chronic conditions were identified by using Feudtner et al's version 2, with diagnoses taken from all Medicaid claims from the year before and including the visit.[13]

Each visit was assigned a severity score (1–5, with 5 being the most severe) based on the Severity Classification System (SCS) established by Alessandrini et al. SCS is a risk adjustment tool based on intensity of resources needed to diagnose and treat pediatric emergency diagnoses based on the *International Classification of Diseases, Ninth Revision* (*ICD-9*).[14] Because the SCS was developed by using ICD-9 codes of visits in 2002, some ICD-9 codes have since changed to capture additional levels of detail with additional characteristics designated in *ICD-9, Clinical Modification* (*ICD-9-CM*). For example, in 2002, 780.6 was classified as "Fever," with no subdiagnoses. However, in 2012, 780.6 is a root for "Fever and other physiologic disturbances of temperature regulation" including "Fever, unspecified" (780.60), "Fever presenting with conditions classified elsewhere" (780.61), "Postprocedural fever" (780.62), "Postvaccination fever" (760.63), and others. Modifications were made to the SCS to apply the severity of root diagnoses in the *ICD-9* to the more detailed subdiagnoses of the updated *ICD-9-CM*. In the previous example, the severity score originally assigned to "Fever" (level 3), would be applied to "Postprocedural fever, " "Postvaccination fever," and all other subdiagnoses. Members of the original design team of the SCS reviewed the most prevalent codes accounting for 91.5% of the cases that used the modification and checked for validity. Only 1 reviewed code was assigned an increased severity level after the modification was applied. The diagnosis with the highest severity was used as the diagnosis for analysis and assigned the severity of the visit. In the case

of multiple diagnoses with a same severity listed during a visit, the diagnosis appearing earliest in the list of diagnoses was used.

The most severe diagnosis chosen from each visit was then grouped on the basis of the single-level Clinical Classification Software (CCS) developed by the Healthcare Cost and Utilization Project.[15] The CCS allowed similar ICD-9 codes from different patients to be grouped into an overarching diagnosis category for analysis. For example, the CCS category for Asthma contains extrinsic, intrinsic, chronic obstructive, other forms of asthma, and unspecified asthma (493.0×, 493.1×, 493.2×, 493.8×, and 493.9×, respectively). Therefore, a CCS category may contain ICD-9-CM codes with different severity levels. In the previous example of asthma, extrinsic asthma with status asthmaticus (493.01) has a severity score of 4, whereas extrinsic asthma with (acute) exacerbation (493.02) has a severity score of 3.

Return visits to the ED and UC within 7 days were analyzed using the CCS and SCS to check for related complaints to the original diagnosis as well as return severity. Return to office within 7 days included visits to locations outside of hospitals, public clinics, and military treatment facilities, where health professionals provide health examinations, diagnosis, and treatment of illness or injury on an ambulatory basis.

Statistical Analyses

The sample of ED and UC encounters were drawn from a total of 12 794 875 enrollment years. According to Centers for Medicare and Medicaid analyses from the Statistical Enrollment Data System, there were 130 168 785 CHIP and Medicaid enrollment years over the time period from 2010 until 2012, so the database accounts for ~9.8% of those member-years.[16–18] Savings (mean ED payments minus mean UC payments) were therefore multiplied by a factor of 10.17 to attain national estimates and divided by 3 to obtain per-year savings. To determine differences between ED and UC visits, χ^2 tests were used for proportions and Wilcoxon rank-sum tests were used for continuous variables. All analyses were performed with SAS 9.3 (SAS Institute Inc., Cary, NC).

TABLE 1 UC and ED Visits in Medicaid Population

	UC Visits, n = 869 817 (%)	ED Visits, n = 5 055 751 (%)	P
Median age (Q1, Q3)	6 (2, 11)	5 (2, 12)	<.001
Age group			<.001
0–2	223 878 (25.7)	1 543 857 (30.5)	
3–5	193 709 (22.3)	1 022 113 (20.2)	
6–12	283 532 (32.6)	1 330 737 (26.3)	
13–18	168 698 (19.4)	1 159 044 (22.9)	
Gender			<.001
Male	430 914 (49.5)	2 587 791 (51.2)	
Female	438 903 (50.5)	2 467 960 (48.8)	
Race/Ethnicity			<.001
White	452 365 (52.0)	2 464 730 (48.8)	
Black	190 203 (21.9)	1 721 558 (34.1)	
Hispanic	120 746 (13.9)	342 348 (6.8)	
Other	106 503 (12.2)	527 115 (10.4)	
No. of CCCs (all encounters)			<.001
0	805 832 (92.6)	4 535 606 (89.7)	
1	53 621 (6.2)	398 067 (7.9)	
2	7205 (0.8)	68 406 (1.4)	
3+	3159 (0.4)	53 672 (1.1)	
Severity level			<.001
1	44 163 (5.1)	174 940 (3.5)	
2	492 113 (56.6)	2 037 315 (40.3)	
3	314 416 (36.1)	2 516 731 (49.9)	
4	10 820 (1.2)	265 256 (5.1)	
5	918 (0.1)	11c171 (0.2)	
Unknown	7387 (0.8)	50 338 (1.0)	

CCCs, complex chronic conditions.

RESULTS

Patient Characteristics

There were 869 817 urgent care visits and 5 055 751 emergency department visits that met the inclusion criteria. Patients using the ED (85.3% of the study encounters) were more likely to be at the age extremes (0–2 and 13–18) and were more than twice as likely to have ≥3 complex chronic conditions versus the UC (Table 1). UC patients were twice as likely to be Hispanic compared with the ED (13.9% vs 6.8%, $P < .001$). The UC was also noted to have more female patients (50.5%), whereas the ED had a majority of male patients (51.2%). However, the 2 sites of care showed similar seasonal patterns, with the busiest month being December and the slowest month being July (Supplemental Table 4).

Diagnoses

The 3 most common diagnostic categories were the same for the UC and ED, "upper respiratory infection," "fever," and "otitis media" (Table 2). Almost a quarter of UC visits and 10% of ED visits were for upper respiratory infections. More than half the UC visits were lower severity (level 1 or 2), 61.7% vs 43.8% in the ED ($P < .001$). The ED visits, comparatively, were 4 times more likely to have a level 4 or level 5 diagnoses. In both the ED and UC the most common level 5 diagnostic category was "other injury" (Supplemental Table 5).

TABLE 2 Most Common Diagnoses

UC Visits, *n* = 869 817		ED Visits *n* = 5 055 751	
Diagnosis (CCS)	Number (%)	Diagnosis (CCS)	*n* (%)
Upper respiratory infection	207 335 (23.8)	Upper respiratory infection	499 347 (9.9)
Otitis media	81 695 (9.4)	Fever	464 975 (9.2)
Fever	61 962 (7.1)	Otitis media	258 168 (5.1)
Other respiratory infection	27 540 (3.2)	Superficial injury	204 960 (4.1)
Asthma	25 575 (2.9)	Asthma	184 867 (3.7)
Superficial injury	24 268 (2.8)	Nausea/vomiting	176 461 (3.5)
Eye infection	23 747 (2.7)	Other injury	175 003 (3.5)
Other injury	23 168 (2.7)	Open head wound	157 120 (3.1)
Allergy	22 836 (2.6)	Abdominal pain	151 236 (3.0)
Viral infection	22 789 (2.6)	Other respiratory infection	134 722 (2.7)

TABLE 3 Visits Within 7 DAYS

	UC Visits *n* = 869 817 (%)	ED Visits *n* = 5 055 751 (%)	*P*
Return to UC or ED	60 095 (6.9)	422 744 (8.4)	<.001
Return to ED (% of returns)	25 627 (42.6)	408 337 (96.6)	
Return to UC (% of returns)	37 052 (61.7)	17 452 (4.1)	
Return to office	149 325 (17.2)	114 315 (22.0)	<.001
Admit to hospital	3704 (0.4)	36 564 (0.7)	<.001
Median LOS (Q1, Q3)	2 (1, 4)	3 (2, 4)	
Return percentage by severity			<.001
Level 1	2387 (5.4)	9578 (5.5)	
Level 2	30 505 (6.2)	136 889 (6.7)	
Level 3	25 493 (8.1)	239 819 (9.5)	
Level 4	1074 (10.1)	31 366 (11.8)	
Level 5	74 (8.0)	1469 (13.2)	

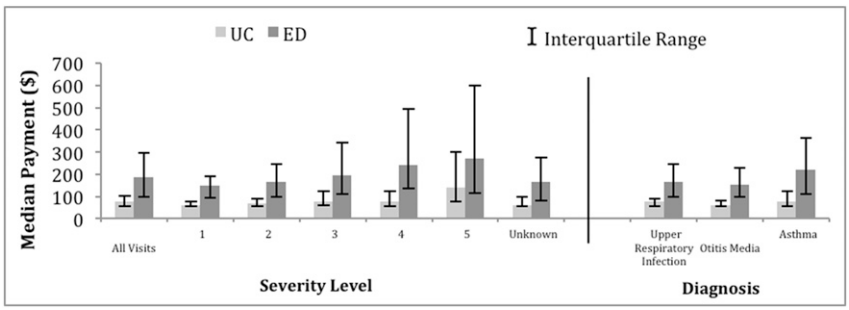

FIGURE 1
Payments.

Returns and Return With Admission

The ED visits had a higher rate of return to ED or UC within 7 days (8.4% vs 6.9%, $P < .001$) and a higher rate of follow-up at an office visit (22% vs 17.2%, $P < .001$). The return rate was statistically higher for ED visits for each level of severity (Table 3). The 2 most common diagnostic categories that lead to a return visit were the same for the ED and UC, "upper respiratory infection" and "fever." It was more likely for patients to return to the ED after a UC visit than back to the UC (61.7% vs 42.6%, $P < .001$). We can speculate that patients either self-triaged to the ED or were instructed to return to the ED to seek a higher level of care if getting worse. Few patients were admitted within 7 days of being discharged from their initial visit, <1% in both populations.

Payments

Payments for UC visits were significantly less than ED visits (median $77 [interquartile range $54–100] vs $186 [interquartile range $96–$296], $P < .001$), and this continued to hold true when comparing payments for selected diagnoses and at each severity level (Fig 1). By extrapolating the mean savings for severity level 1 visits, a national per-year savings if all visits of this type were seen in UC was more than $50 million. If all level 2 severity encounters were seen in UC as well, the savings would be ~$875 million.

DISCUSSION

Although UC is a growing segment of health care delivery, it is largely underrepresented and understudied in the literature. The few studies of health care delivery and quality in UC have not specifically focused on pediatric utilization.[4,8] This retrospective review of pediatric Medicaid patients delineates the epidemiology of UC use compared with the ED. In a systematic review of literature looking at factors associated with nonurgent ED use (not specific to pediatric EDs), it was found that an average of 37% of all ED visits in the United States were nonurgent.[9] This is similar to our finding that almost half of the ED visits were the lowest severity categories, either level 1 or 2 severity. If the lowest acuity patients could be seen in a lower acuity setting, such as the UC, this shift could decrease the overutilization of the ED. Previous studies have shown that care for low-acuity diagnoses in nonhospital-based ambulatory settings is comparable in quality to that in EDs and can be provided at a lower cost.[6] Ideally patients would seek care initially from their medical home and only seek care at higher levels of acuity if directed by their

primary care provider or if that care provider was unable to evaluate them at that time.

Our findings show that the most common diagnoses seen in both the ED and UC are lower severity diagnoses: upper respiratory infections, acute otitis media, and fever. These can be treated at a lower cost in the UC setting compared with the ED. We found the same diagnosis, with the same level of severity, had payments 2 to 5 times as much in the ED versus the UC. Treating lower acuity visits in the UC, centered around rapid service and low cost, may in turn decrease the financial burden on the national health care system.[19] The difference in return rates was not attributable to severity, as the return rate was higher for ED visits for each known level of severity. Primary care physician follow-up after an ED visit may be a practice engrained in the local systems that the UC disrupter has not yet fully established. We can also speculate that patients either self-triaged to the ED or were instructed to return to the ED to seek a higher level of care if getting worse.

The demographic comparisons offered a few interesting results. Of note, the Hispanic population use of the UC was almost twice that of those seeking care in the ED. This could be due to the sample of the states in the database, geographic availability of UC sites in Hispanic-dominant communities, or familiarity of the Hispanic community with *clinicas sin cita* (clinics without an appointment). Another interesting difference noted was the fact that there were more female patients seen in the UC setting compared with the ED. In national surveys of acute care settings, male patients dominate the pediatric population, as documented in the National Hospital Ambulatory Medical Care Survey by the Centers for Disease Control and Prevention.[20] Perhaps this is because there are more medically driven complaints seen in UC settings versus more injury-driven complaints seen in the ED.

This study has some inherent limitations similar to other administrative database studies. First, the study was limited to visits from the Marketscan Medicaid database. However, children make up the largest percentage of Medicaid usage, and with 10 to 12 states included in the analysis, this provided a very large sample size. Even so, these states may have different prevalence of UC compared with those not included in the database. The population of those states may also have differed, such as the percentage of Hispanic population. Although the database allowed for analysis of continuity of care and diagnoses, the results may not be generalizable to those with private insurance or self-pay. The administrative data could also suffer from general quality concerns such as misclassification of *ICD-9* or place of service codes. Visits that resulted in death or admissions were also not included, which decreases the number of higher severity levels. This is a retrospective, observational study, limited to reporting the epidemiology and comparisons between 2 sites. Also, because of scant research in the area of pediatric urgent care, comparisons with previous research were limited. Future comparative effectiveness studies of the pediatric population use of ED and UC should explore other payer systems to see whether the population and clinical attributes remain comparable to what we found in the Medicaid population.

This retrospective review of pediatric Medicaid visits to the UC and ED validated our hypotheses that the UC and ED have similar top diagnoses, severity level is lower in the UC, there is a similar rate of return and return with admission between the 2 locations, and the UC does have lower payments versus the ED. There is significant potential monetary savings if lower acuity cases can be transitioned from the ED to UC.

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ABBREVIATIONS

CCS: Clinical Classification Software, ED, emergency department
ICD-9: International Classification of Diseases, Ninth Revision
ICD-9-CM: International Classification of Diseases, Ninth Revision, Clinical Modification
IQR: interquartile range
SCS: Severity Classification System
UC: urgent care

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