Timing and Location of Emergency Department Revisits

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abstract

BACKGROUND: Emergency department (ED) revisits are used as a measure of care quality. Many EDs measure only revisits to the same facility, underestimating true rates. We sought to determine the frequency, location, and predictors of ED revisits to the same or a different ED.

METHODS: We studied ED discharges for children <18 years old in Maryland and New York in the statewide ED and inpatient databases. Revisits were defined as ED visits within 7 days of an index visit. Our primary outcome was the proportion of revisits that were different-hospital revisits (DHRs). We measured the underestimation of total revisits when only same-hospital revisits were measured. We determined the risk of DHR by quartile of annual ED pediatric volume, adjusting for case mix, insurance, state, and urban location.

RESULTS: Revisits across 261 EDs occurred after 5.9% of 4.3 million discharges. A per-ED median 21.9% of revisits were DHRs (interquartile range 14.2%–34.6%). Measuring only same-hospital revisits underestimated total revisits by 17.4%. The proportions of revisits that were DHRs by increasing volume quartile were 28.1%, 25.5%, 22.6%, and 14.5%. The adjusted risk of DHR was lower for increasing quartiles of pediatric volume (adjusted odds ratio for highest versus lowest quartile 0.27; 95% confidence interval, 0.19–0.36).

CONCLUSIONS: Measuring ED revisits only at the index ED significantly underestimates total revisits. Lower pediatric volume is associated with higher DHRs as a proportion of revisits. When using revisits as a measure of emergency care quality, effort should be made to assess revisits to different EDs.

WHAT'S KNOWN ON THIS SUBJECT: Emergency department (ED) revisits are a quality measure but hospitals do not commonly measure revisits to other EDs.

WHAT THIS STUDY ADDS: Nearly 1 in 5 pediatric ED revisits occur at a different ED than index visit. Revisits to a different ED were more common when initially presenting to low-pediatric volume EDs. Proper quality assurance requires identifying revisits across institutions.

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Unplanned return visits to an emergency department (ED) (revisits) are common and can represent delays in care.[1,2] In recent literature, authors demonstrate that many revisits are different-hospital revisits (DHRs), defined as revisits occurring at a different ED from the index visit.[3–5] Although DHRs are frequent, the factors that lead to DHRs in the ED remain unclear. For adults, DHRs are more common after initial visits in areas with a high density of EDs, among males, at academic hospitals, and among visits in which the patient lives in the same county as the ED.[6,7] For children, predictors of different-hospital pediatric inpatient readmissions include younger age, white race, private insurance, and index admission to a low-volume or urban hospital.[8] Definitive care for many conditions, particularly those requiring pediatric subspecialty expertise, is increasingly only available in higher-volume centers.[9]

Regardless of the cause for revisit, many EDs track revisits as a general measure of care quality. However, typically only same-hospital revisits (SHRs) are monitored.[10–12] This may result in underestimation of total revisits and could limit efforts to understand and optimize quality. Understanding the frequency and between-ED variability of DHRs is important to fairly and accurately evaluate ED revisits as a quality metric. Large numbers of DHRs specifically would highlight the importance of measuring all revisits in the routine quality assurance activities of EDs. Given the association of revisits with care quality, part of the between-ED variability in revisits and DHRs likely reflects a difference in the quality of care.

We sought to determine the timing and characteristics of all ED revisits for children and the influence of annual pediatric volume and urban location on the rate of revisits and on the proportion of revisits that are DHRs.

METHODS

Study Design

We conducted a retrospective, population-based cross-sectional study of children presenting to an ED in 2 states. We used the Healthcare Utilization Project State Emergency Department Databases and State Inpatient Databases (SDBs) of Maryland and New York, which together capture all statewide ED visits and are among the few states with few missing longitudinal identifiers.[13] The SDBs include patient-level identifiers that allow patients to be tracked between visits and hospitals.

We included visits with complete data for patients <18 years old presenting to an ED in Maryland in 2013 and in New York from 2011 to 2013. We also excluded those with a primary diagnosis of psychiatric illness (defined by using the Healthcare Utilization Project Clinical Classification Software), because they have different hospitalization and transfer patterns compared with patients with nonpsychiatric illnesses.[4,8]

An ED revisit was defined as a second visit within 7 days to any ED, after an index ED visit resulted in discharge. All included ED visits resulting in discharge were eligible to be index visits, including revisits. Although 48- and 72-hour windows are commonly used to define the revisit window, we chose a 7-day window to be more inclusive and because of its association with poor postvisit outcomes.[5,14–16] Inter-ED transfers were treated as a single visit, and visit characteristics were taken from the receiving ED that ultimately discharged the patient at the index visit. We excluded from analysis multiple ED visits on the same day because the data source lacked the time of day, so an index visit could not be identified. DHRs were defined as ED revisits in which the second ED differed from the first, and SHRs were defined as ED revisits in which the 2 EDs were the same.

For this analysis, the primary outcome was the DHR proportion, defined as the number of DHRs divided by total ED revisits (SHR plus DHR). The SHR proportion was calculated similarly. The secondary outcome was total ED revisits among all ED visits. The primary predictor of interest was pediatric ED volume of the index hospital, categorized by quartile of number of visits per year by patients less than age 18 years. Because quartiles were defined at the ED level, the number of visits in each quartile was unequal.

Other possible ED-level predictors included payer mix (quartile of proportion of Medicaid patients), Maryland or New York location, and urban location, defined as being in a county including a population center with 50 000 or more people. Visit-level predictors included patient age (<1, 1–4, 5–7, 8–11, and >11 years), sex, socioeconomic status, visit severity, and presence of a complex chronic condition (CCC). To assess socioeconomic status, we used the quartile of median income for the patient's zip code.[17] To determine the visit diagnosis, we used the first-listed diagnosis for each ED visit. Visit severity was the highest Severity Classification System score among all listed diagnoses (60% of visits had 1 diagnosis).[18] We assessed the presence of CCCs by determining whether any diagnosis of a CCC, as defined by Feudtner et al,[19] appeared in the SDBs at any visit for a given patient. We categorized number of CCCs by counting the number of body systems with a CCC (0–1, 2, 3, or ≥4).

Analysis

We first examined revisit timing by varying the revisit window to a horizon of 30 days, reporting the

TABLE 1 Characteristics of Children Who Visit EDs by Annual Pediatric Volume Quartile

	Annual Pediatric Volume, ED Quartile[a]			
	1, *N* (%)	2, *N* (%)	3, *N* (%)	4, *N* (%)
Pediatric visits per y	≤2703	2742–5877	6014–12 010	≥12 026
ED visits	198 411 (4.6)	578 001 (13.5)	903 246 (21.1)	2 594 829 (60.7)
State				
Maryland	6458 (3.3)	29 018 (5.0)	139 178 (15.4)	248 609 (9.6)
New York	191 953 (96.7)	548 983 (95.0)	764 068 (84.6)	2 346 220 (90.4)
Female sex	95 533 (48.1)	276 931 (47.9)	431 879 (47.8)	1 227 794 (47.3)
Age, y				
<1	11 167 (5.6)	42 907 (7.4)	86 225 (9.5)	331 719 (12.8)
1–4	49 173 (24.8)	157 472 (27.2)	275 251 (30.5)	915 369 (35.3)
5–7	27 144 (13.7)	79 549 (13.8)	128 666 (14.2)	401 481 (15.5)
8–11	34 725 (17.5)	95 539 (16.5)	139 442 (15.4)	373 905 (14.4)
≥12	76 202 (38.4)	202 534 (35.0)	273 662 (30.3)	572 355 (22.1)
ED Medicaid rate, quartile (% Medicaid visits)				
1 (≤35.6)	77 757 (39.2)	188 651 (32.6)	113 160 (12.5)	286 034 (11.0)
2 (35.7–46.6)	74 686 (37.6)	154 944 (26.8)	325 150 (36.0)	183 972 (7.1)
3 (46.7–61.9)	39 490 (19.9)	152 029 (26.3)	273 490 (30.3)	467 352 (18.0)
4 (≥62.0)	6478 (3.3)	82 377 (14.3)	191 446 (21.2)	1 657 471 (63.9)
ED location				
Urban	121 061 (63.6)	387 057 (67.3)	817 259 (92.2)	2 594 829 (100.0)
Nonurban	69 370 (36.4)	187 670 (32.7)	68 874 (7.8)	0
Weekend	64 206 (32.2)	187 186 (32.2)	277 705 (30.6)	741 410 (28.4)
Median income for zip code, quartile				
1, lowest income	43 694 (22.4)	112 757 (19.9)	202 877 (22.7)	1 042 931 (40.3)
2	83 698 (42.8)	220 777 (38.9)	194 879 (21.8)	472 893 (18.3)
3	39 602 (20.3)	110 495 (19.5)	205 001 (22.9)	510 796 (19.8)
4, highest income	28 430 (14.5)	123 576 (21.8)	292 188 (32.6)	558 530 (21.6)
No. CCCs[19]				
0–1	197 554 (99.6)	576 052 (99.7)	899 827 (99.6)	2 572 080 (99.1)
2	707 (0.4)	1518 (0.3)	2735 (0.3)	16 564 (0.6)
3	133 (0.1)	293 (0.1)	500 (0.1)	4285 (0.2)
≥4	17 (0.0)	138 (0.0)	184 (0.0)	1900 (0.1)
Visit severity[18]				
1, lowest severity	8911 (4.7)	22 253 (4.0)	34 544 (4.0)	102 850 (4.1)
2	103 997 (54.3)	287 283 (51.4)	433 352 (49.9)	1 262 110 (50.9)
3	72 476 (37.9)	228 795 (40.9)	369 653 (42.5)	1 029 867 (41.5)
4	5928 (3.1)	20 034 (3.6)	30 371 (3.5)	82 349 (3.3)
5, highest severity	166 (0.1)	496 (0.1)	892 (0.1)	3898 (0.2)

[a] ED-level pediatric volume. Lower-volume EDs have fewer visits per y, leading to smaller group sizes.

number of children with return visits to the ED each day after an index visit. Subsequent analyses used the preplanned outcome measure of revisit within 7 days.[14–16] We also explored revisit characteristics, admission rates, and the 3 most frequent index visit diagnoses.

To assess ED factors that may lead to revisits, we first compared ED-level unadjusted revisit rates and DHR proportions by annual pediatric ED volume, payer mix, state, and urban versus nonurban hospital location. Because severity of illness and comorbidities increase the risk of revisit, we further examined these associations using case-mix adjusted models by using random effects logistic regression with a random intercept for ED, to account for within-ED correlation of outcomes.[20,21] Because there is no widely accepted method of case-mix adjustment for pediatric ED patients, we used methods adapted from a study of hospital readmissions, accounting for age, patient CCCs, and visit severity.[8] We created case-mix adjusted models separately for each independent variable and a combined model including all visit-level variables. For each model, we calculated adjusted odds ratios (aORs) with 95% confidence intervals (CIs).

Visit-level individual variables may also influence the risk of revisit and DHR. We explored whether visit-level age, sex, median income for zip code, presence of a CCC, and visit severity were independently associated with revisit and DHR. For this analysis, we again used random effects logistic regression with a random intercept for ED.

To evaluate how well SHR serves as a measure of total revisits, SHR and total revisit rate (including SHRs and DHRs) were compared for each ED. We also determined the proportion of EDs that changed revisit rate quartile when SHRs alone were used to define revisits compared with total

TABLE 2 ED-Level Unadjusted and Adjusted Risk of Revisit Versus No Revisit and of DHR Versus SHR

	EDs	Revisit			DHR Versus SHR		
		Unadjusted Prevalence, %	Separate Models OR (95% CI)	Combined Model aOR (95% CI)	Unadjusted Prevalence, %	Separate Models OR (95% CI)	Combined Model aOR (95% CI)
All visits	261	5.9	N/A	N/A	17.4	N/A	N/A
Pediatric volume quartile, visits per y							
Quartile 1, ≤2703	63	4.6	Reference	Reference	27.9	Reference	Reference
Quartile 2, 2742–5877	66	4.5	0.96 (0.86–1.07)	0.92 (0.83–1.02)	24.1	0.69 (0.51–0.93)	0.67 (0.50–0.89)
Quartile 3, 6014–12 010	66	5.0	1.05 (0.94–1.18)	1.01 (0.90–1.12)	23.7	0.63 (0.47–0.85)	0.48 (0.35–0.65)
Quartile 4, ≥12 026	66	6.6	1.31 (1.17–1.46)	1.17 (1.04–1.31)	14.2	0.37 (0.27–0.49)	0.27 (0.19–0.36)
Payer mix quartile, % Medicaid							
Quartile 1, lowest	66	4.8	Reference	Reference	20.6	Reference	Reference
Quartile 2	65	4.7	1.02 (0.93–1.13)	1.03 (0.93–1.14)	23.3	1.12 (0.82–1.52)	1.13 (0.86–1.49)
Quartile 3	64	5.3	1.16 (1.05–1.28)	1.15 (1.04–1.28)	19.0	0.82 (0.60–1.12)	0.89 (0.67–1.18)
Quartile 4, highest	66	6.9	1.49 (1.35–1.65)	1.41 (1.27–1.57)	14.5	0.85 (0.62–1.15)	1.13 (0.84–1.52)
ED state							
Maryland	48	5.5	Reference	Reference	23.7	Reference	Reference
New York	213	4.8	0.91 (0.82–1.01)	1.00 (0.91–1.09)	16.7	0.90 (0.68–1.19)	0.81 (0.63–1.05)
ED location[a]							
Urban	211	6.0	Reference	Reference	17.4	Reference	Reference
Nonurban	44	4.9	0.96 (0.86–1.07)	1.11 (1.01–1.23)	16.8	0.71 (0.53–0.96)	0.47 (0.35–0.61)

Independent variables were ED pediatric volume quartile, payer mix (quartile of the proportion of patients with Medicaid as their primary payer), state, and urban versus nonurban location. Four separate models were constructed for each outcome, with each model including 1 independent variable and the case-mix variables (age, number of patient CCCs, and visit severity). One combined model for each outcome included all 4 independent variables and the case-mix adjustment variables.

N/A, not applicable

[a] Urban location status was missing for 6 EDs.

revisits. Among DHRs, we determined what proportion of patients selected institutions with higher pediatric volume.

Data were analyzed by using R version 3.4.0 (R Foundation, Vienna, Austria), multilevel analyses used the lme4 package, and figures were generated by using the ggplot2 package. The Institutional Review Board deemed this study exempt from review.

RESULTS

We included 4.5 million ED visits by children who were <18 years of age, excluding 127 532 visits (2.9%) for a psychiatric diagnosis, 29 723 visits (0.7%) for missing visit characteristics in transferred patients, and 21 989 visits (0.5%) for multiple same-day discharges. Transfers occurred in 36 172 (0.8%) of all ED discharges. We analyzed 4.3 million visits from 261 EDs. The annual pediatric ED volume quartiles were ≤2703, 2742–5877, 6014–12 010, and ≥12 026 visits per year. Patients visiting EDs that had a higher pediatric volume tended to be younger, live in urban locations, visit on weekdays, visit EDs with a larger Medicaid population, and have a slightly higher burden of CCCs (Table 1).

Children revisited within 7 days after 250 856 (5.9%) ED discharges. Revisits were categorized as a DHR in 43 630 (17.4%) cases and a SHR in 207 226 (82.6%) cases. The characteristics of the cohort by revisit and SHR versus DHR are shown in the Supplemental Table 5. Among revisits, 165 SHRs (0.1%) and 1293 DHRs (3.0%) arose from inter-ED transfers Among all revisits, 34 200 (13.6%) cases resulted in hospital admission. Patients with a DHR had a higher rate of admission than those with a SHR (28.8% vs 10.4%; odds ratio [OR] = 3.93; [95% CI, 3.83–4.04]).

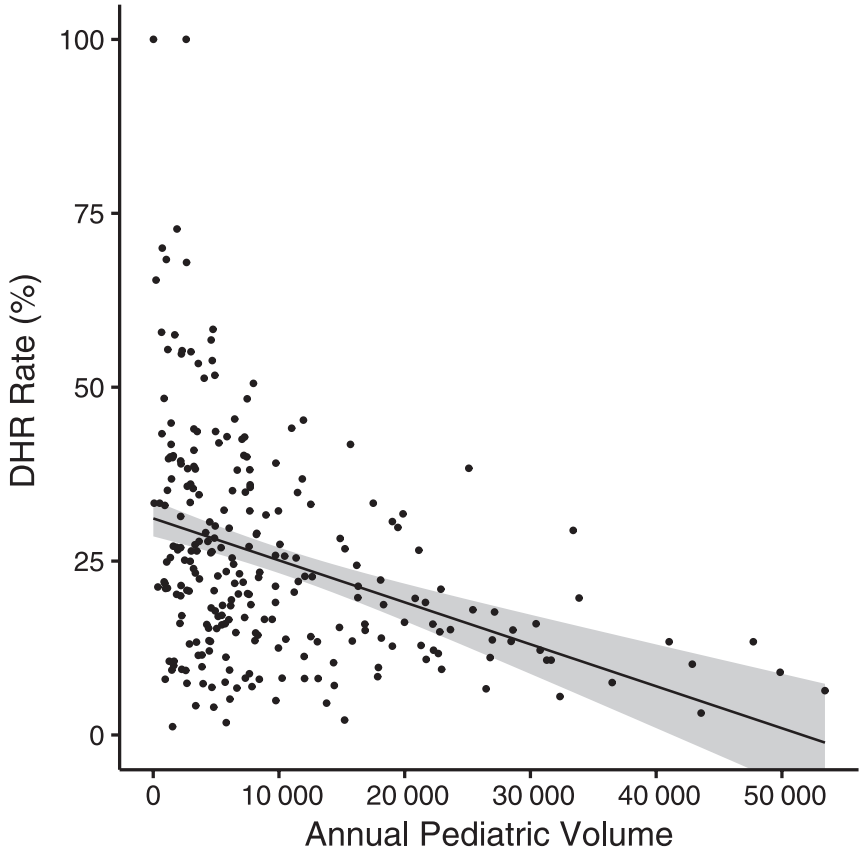

FIGURE 1
DHR rate for individual EDs by annual pediatric volume. Each point represents 1 ED. A linear regression line of best fit with 95% CIs is shown.

Among children with 2 ED visits in a 30-day period, the median time to the second ED visit was 8 days (interquartile range [IQR] 3–18, Supplemental Fig 2). The 3 most common primary index diagnoses leading to revisit were unspecified fever (6.6% of index visits leading to revisit), acute upper respiratory tract infection (6.2%), and unspecified viral infection (5.1%).

The highest ED-level pediatric volume quartile had a significantly different risk of revisits compared with the lowest (aOR = 1.17 compared with quartile 1, Table 2). In addition, proportionally larger Medicaid populations, and nonurban location were independently associated with risk of revisit. Increasing pediatric volume and urban location at the index encounter were each independently associated with DHR (Table 2, Fig 1). The risk of DHR in the highest volume centers was substantially lower compared with the risk in the lowest volume centers (aOR = 0.27; 95% CI, 0.19–0.36). Maryland and New York did not differ in DHR versus SHR or overall revisit rate. At the visit level, older age, female sex, CCCs, and increasing visit severity were each associated with a higher risk of revisit and with of DHR compared with SHR (Table 3). Higher median income for zip code was associated with a lower risk of revisit. However, the proportion with a DHR was higher among those with a revisit in these zip codes (Table 3).

Total revisit rate (DHR plus SHR) was a median 1.0% points greater than SHR rate alone (IQR 0.7–1.6). DHR proportions varied between hospitals, with a median 21.9% (IQR 13.5%–34.3%, Supplemental Fig 3) of revisits. EDs changed revisit rate quartile in 109 out of 261 (41.8%) cases when revisits were computed using only SHRs compared with all revisits.

When patients revisited to a different ED, they frequently visited an ED with higher pediatric volume (Table 4). In the bottom 3 quartiles of pediatric volume, at least 70% of DHRs were to EDs in a higher pediatric volume quartile. Those who had an index visit in an ED among the highest pediatric volume quartile went to a high pediatric volume ED in 82.4% of DHRs.

DISCUSSION

Data from 2 large and diverse states reveal that revisits occurred after 5.9% of pediatric ED discharges, and a substantial number (17.4%) of children with an ED revisit had a DHR. Thus, ascertaining only SHRs does not accurately reflect revisit performance, and total revisits are underestimated by at least 20% in most EDs if DHRs are not taken into account. EDs with lower pediatric volume have higher DHR proportions and are therefore more likely to underestimate revisits. The most common day to revisit was the day after the initial visit, with a steady decline thereafter, similar to previous literature.[5]

Revisits were more common in higher pediatric volume EDs. There are several possible reasons for this finding. Although we attempted to adjust for case mix, there may also be unmeasured confounders or residual confounding between patient population and acuity in higher volume EDs that might predispose patients to revisit.[20,22] Other possible reasons for increased revisits include greater reliance on EDs in primary care networks surrounding high-volume centers or discharging patients with higher risk of revisit.[23] In addition to pediatric volume, presence of a CCC, age <1 year, and higher visit severity were associated

TABLE 3 Visit-Level Unadjusted and Adjusted Risks of Revisit Versus No Revisit and of DHR Versus SHR

	Revisit		DHR Versus SHR	
	Prevalence, %	aOR (95% CI)	Prevalence, %	aOR (95% CI)
All visits	5.9	N/A	17.4	N/A
Age, y				
<1	8.6	Reference	19.2	Reference
1–4	6.3	0.73 (0.72–0.74)	16.7	0.83 (0.80–0.86)
5–7	5.1	0.58 (0.58–0.59)	15.2	0.70 (0.68–0.74)
8–11	4.6	0.53 (0.52–0.54)	17.1	0.76 (0.73–0.80)
≥12	5.3	0.61 (0.60–0.62)	18.5	0.72 (0.69–0.75)
Sex				
Female	5.9	Reference	17.7	Reference
Male	5.8	0.98 (0.97–0.99)	17.1	0.98 (0.95–1.00)
Median income for zip code				
Quartile 1, lowest	6.6	Reference	15.6	Reference
Quartile 2	6.1	0.96 (0.94–0.97)	15.4	0.99 (0.95–1.02)
Quartile 3	5.7	0.91 (0.90–0.93)	18.5	1.05 (1.01–1.09)
Quartile 4, highest	4.8	0.81 (0.80–0.83)	22.1	1.15 (1.10–1.20)
CCC				
No	5.6	Reference	16.6	Reference
Yes	12.6	2.26 (2.23–2.29)	24.9	1.73 (1.67–1.79)
Visit severity				
1, lowest	5.6	Reference	12.6	Reference
2	5.0	0.93 (0.91–0.95)	16.7	1.41 (1.32–1.50)
3	6.7	1.32 (1.29–1.35)	17.0	1.41 (1.32–1.51)
4	7.9	1.58 (1.53–1.62)	28.7	2.67 (2.47–2.89)
5, highest	7.6	1.28 (1.15–1.42)	55.1	6.79 (5.44–8.47)

Analyses were performed by age, sex, median income for zip code, CCC, and visit severity. To calculate aORs, we included all visit-level independent variables in a mixed-effects model with a random intercept for ED. N/A, not applicable.

TABLE 4 Flow of Patients Among Hospitals of Differing Pediatric Volume

Pediatric Volume of Index ED	Pediatric Volume of Revisit ED			
	Quartile 1, Lowest, %	Quartile 2, %	Quartile 3, %	Quartile 4, Highest, %
Quartile 1, lowest	5.7	28.5	17.8	47.9
Quartile 2	6.1	14.6	18.6	60.7
Quartile 3	2.7	7.2	16.7	73.5
Quartile 4, highest	1.5	4.0	12.1	82.4

Proportions of visits are given as the percentage of DHRs occurring in each of the index ED volume quartiles.

with revisit, findings that align with evidence from previous studies.[20,21]

Patients choose to revisit for multiple reasons, including worsening or lack of improving condition, fear, advice from family or friends, or physician referral.[2] Patients who revisit after initially visiting a lower pediatric volume ED go to a different, higher-volume ED more often than those who start at a higher-volume ED. It is possible that EDs with higher volumes of children are more familiar with specific pediatric conditions, may have pediatric-specific resources, or may be perceived as providing definitive care. Our data do not address these possibilities. Although readiness to provide basic care for children has improved nationally, in previous work by França and McManus[9], the authors suggest that the capability of community EDs to provide definitive pediatric care across many conditions has declined considerably, whereas academic facilities' capability has not.[24] DHRs led to a much higher admission rate than SHRs, suggesting a difference in the reasons families choose to return to the same or different ED. Children visiting urban EDs had a higher risk of revisiting to a different ED, perhaps reflecting more ED options in densely populated areas. Patients with CCCs and those with higher-severity initial visits had a much higher risk of revisiting to a different ED, but we could not assess the underlying reason for these associations.

ED revisits are not currently reported as a quality metric or incorporated into payment systems. Revisits may be a measure of ED care quality, are costly, and are analogous to hospital readmissions.[3] Since the passage of the Affordable Care Act and its Hospital Readmissions Reduction Program, hospitals have been incentivized to reduce inpatient readmissions.[25] ED revisits could become a metric to evaluate ED performance, and could potentially be tied to reimbursement. In this study, a failure to measure DHRs would result in a 17.4% underestimation of revisits and would disproportionately penalize EDs with higher pediatric volume. Individual EDs had wide-ranging DHR proportions, meaning one

could not simply add 17% to the an ED's SHR rate. Furthermore, ED administrators often learn from revisits, and not measuring DHRs leads to less opportunity to improve care and quality assurance activities.[10] Administrators may also better understand local ED use patterns through the analysis of DHRs.

With this study, we improve on previous work that assesses pediatric ED revisits by focusing specifically on the DHRs and their predictors. In a recent study of the 2011 statewide databases in New York and Florida, authors found that 21% of revisits were DHRs.[5] However, the authors of that study focused on the cost implications of revisit leading to hospitalization. In our study, we also extend work evaluating DHR predictors in adults in several Long Island, New York hospitals.[6] We expanded the geographic reach to 2 states, assessed the unique circumstances of children, and specifically looked at ED volume, which may be a surrogate for institutional experience.

Our study has several limitations. First, we could not ascertain revisits in the last 7 days of the data periods, and because visit dates are not recorded, we could not determine which patients were at risk for incomplete follow-up periods. This problem would not be expected to be related to any of our predictors of interest, or to the likelihood of DHR versus SHR. Second, our study could not discern the order of 2 or more discharges occurring on the same day. Therefore, we were unable to determine the visit characteristics of index visits in those cases; to the extent that some of those visits were revisits, it would lead to underestimation of the revisit rate. However, this occurred in only 0.5% of all cases and thus would be unlikely to change our revisit rate estimates in a clinically meaningful way. Third, some patients near state borders could have ED revisits across state lines, which would not have appeared in our data. Fourth, we relied on coding of CCCs only during ED and inpatient encounters. Therefore, we likely underestimated the burden of CCCs, on which our case-mix adjustment was based. We elected to look at any CCC regardless of whether it was listed before an ED visit, to maximize the sensitivity, but this could have led to assigning a CCC to a patient who did not yet have it. Fifth, we could not separately analyze transfers because more than half of transfers had incomplete data. We do not feel this biased the main results because transfers comprised <1% of visits. Finally, our study was subject to the inherent limitations of administrative data, in which we lacked a complete picture of institutional capabilities that could affect revisit location, and incomplete and erroneous coding could bias analyses.

CONCLUSIONS

Nearly 1 in 5 pediatric ED revisits occurred at a different ED from the index visit, suggesting that revisits are substantially undercounted when only SHRs are considered. Lower annual pediatric volume is associated with a higher proportion of DHRs. If revisits rates are to be used for quality assessment or payment, inclusion of revisits to different facilities must be included.

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ABBREVIATIONS

aOR: adjusted odds ratio
CCC: complex chronic condition
CI: confidence interval
DHR: different-hospital revisit
ED: emergency department
IQR: interquartile range
OR: odds ratio
SDB: State Emergency Department Databases and State Inpatient Databases
SHR: same-hospital revisit

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

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