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High Turnover Stays for Pediatric Asthma in the United States: Analysis of the 2006 Kids' Inpatient Database

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Abstract

Background—Pediatric observation units provide an alternative to traditional hospitalization.

The extent to which observation units could replace inpatient care for asthmatic children is unknown.

Objective—To describe brief inpatient (“high-turnover,” HTO) stays for US children hospitalized with a principal discharge diagnosis of asthma, to characterize cases that may be appropriate for observation.

Design—We analyzed the 2006 Kids' Inpatient Database, a nationally representative sample of hospital discharges. HTO stays were defined as hospitalizations of 0 or 1 night in duration. We conducted descriptive statistics and case-mix adjusted, sample-weighted regression analysis of HTO stays, and associated hospital charges.

Subjects—Discharges among children aged 2 to 20 years with a principal discharge diagnosis of asthma.

Measures—HTO stays and total charges.

Results—Overall, 34,592 (34%) pediatric asthma hospitalizations were HTO, accounting for 66,278 hospital days in 2006. HTO stays were associated with younger age, uncomplicated asthma, and private insurance. Freestanding children's hospitals had the highest proportion of HTO stays, 38% (95% CI: 34%–42%) compared with 32% (95% CI: 28%–36%) for children's units and 33% (95% CI: 31%–34%) for general hospitals. In multivariate regression analyses,

charges were significantly higher across hospital types when HTO stays begin in the emergency department.

Conclusions—The presence of a large number of HTO stays for children hospitalized for asthma suggests the need to explore opportunities to restructure care for this condition, perhaps through the development of physically or operationally distinct observation units.

Keywords

pediatric; asthma; acute care; health care delivery; hospitalization; observation

Pediatric observation units (OUs)-an alternative to traditional inpatient care, in which children are treated and discharged in less than 24 hours-have been used by a small group of pediatric institutions for more than 30 years but have not been widely adopted.¹⁻⁴ As the costs of health care in the United States continue to rise, OUs are rapidly gaining attention as a way that institutions may reduce the costs of care for high volume conditions such as asthma. Asthma is already among the top conditions treated within existing pediatric OUs^{1,5-8} and more than 70% of OU admissions for asthma are successfully discharged home without requiring an inpatient stay.⁹⁻¹² However asthma still ranks third nationally among conditions for which children are hospitalized and is the single most common reason for pediatric admissions through the emergency department (ED).¹³

What is not yet clear is whether there are sufficient numbers of asthma discharges that may be appropriate for observation care to justify hospitals' efforts to establish OU programs. In an analysis of the nationally representative Nationwide Inpatient Sample, we identified a recent pronounced increase in the proportion of children hospitalized in the United States who experience high-turnover (HTO) inpatient stays-where discharge occurred on the day of or the day after admission.¹⁴ Over the 11-year study period, HTO stays for children discharged under the diagnosis-related group (DRG) for asthma increased significantly from 19% in 1993 to 33% in 2003. This growth in HTO stays suggests that the acute inpatient level of care designation¹⁵ is being applied to children who, by the duration of their stay, may be responsive to treatment within an OU. Understanding patient and hospital characteristics associated with HTO stays for high prevalence conditions such as asthma may guide the expansion of models of pediatric OU care.

Using the most recent year of the nationally representative Kids' Inpatient Database (KID), we examine HTO stays for US children who were hospitalized in 2006 with a principal discharge diagnosis of asthma. Our objectives are to (1) provide estimates of health care utilization for pediatric asthma in terms of HTO stays and (2) identify patient and hospital characteristics associated with cases that may be appropriate for observation as an alternative to hospitalization.

METHODS

Sample

The KID is a component of the Healthcare Cost and Utilization Project (HCUP), sponsored by the Agency for Healthcare Research and Quality.¹⁶ HCUP contains a set of health care

databases, developed through partnership among federal and state governments and health care institutions. The KID is the only all payer hospital administrative dataset designed specifically to assess use of hospital services by children.

We analyzed the KID from the most recent year available, 2006. These data reflect a sample of pediatric discharges from 3739 community, nonrehabilitation hospitals. The KID includes a systematic random sample of pediatric discharges (patient age <21 years) from all hospitals in the 38 State Inpatient Databases that participate in the KID. It contains de-identified, patient-level clinical, and resource use data included in a typical discharge abstract. Observation status and OU cases that are not billed as inpatient admissions do not enter the dataset. The study was approved by the University of Michigan Institutional Review Board.

Case Selection

We analyzed hospital discharges among children 2 to 20 years of age with a principal discharge diagnosis of asthma (ICD-9 codes 493.0–493.92). Children aged <2 were excluded because of the potential for overlap between bronchiolitis and a true diagnosis of asthma in this age group (n = 18,819). Transfers as the admission source (n = 3981) or discharge disposition (n = 775) were excluded due to the inability to determine the original admission source and total duration of hospital-based care. Discharges with fatalities were also excluded (n = 21). Of the 67,701 hospital stays in the KID with a principal diagnosis of asthma, 62,022 cases (92%) were included in our analysis.

Measures

Patient Characteristics—Age categories (2–4 years, 5–11 years, and 12 years and older) were based on the National Heart, Lung, and Blood Institute’s asthma guidelines.¹⁷ Race was collapsed into the following categories: white, black, Hispanic and other, including Asian/Pacific Islander and Native American because of small cell size (<30) for certain racial groups. Race was missing for 23% of the dataset; therefore, cases where race was missing were categorized as “missing” and included in analyses to avoid systematic exclusion of hospitals that do not report this variable.¹⁴ Expected payer is categorized within the KID as Medicaid, private, uninsured (self-pay or no charge), and other (Tricare/CHAMPUS, Title V, and other government programs). The Medicaid and other payer were collapsed into a public payer category.

To evaluate condition-specific comorbid conditions, individual ICD-9 codes in diagnosis fields 2 to 15 were tallied and placed in rank order. Two of the top 5 unique secondary diagnoses represented conditions with only 1 or 2 ICD-9 codes (hypoxia and eczema/dermatitis). Other top 5 secondary diagnoses (486-pneumonia organism unspecified, 465.9-acute upper respiratory infection, and 276.5-volume depletion) have clinical overlap with several additional ICD-9 codes. To account for related conditions, we expanded these groups to include all ICD-9 codes used by the HCUP Clinical Classification Software (CCS) groupings.¹⁸ The CCS, developed by Agency for Healthcare Research and Quality, allows for categorization of diagnoses into a manageable number of clinically related groups. The

pneumonia, upper respiratory infection, or fluid and electrolyte disorders' secondary diagnoses were assigned to cases with one of the ICD-9 codes from the CCS groupings.

Hospital Characteristics—Hospital type was classified as (1) freestanding children's hospital, (2) children's unit, or (3) general hospital, according to a variable provided in the KID based on information from the National Association of Children's Hospitals and Related Institutions. Hospital teaching status, admission source, and weekend versus weekday admissions were also analyzed as factors potentially associated with HTO stays. The KID provides the source of admission for each hospital stay categorized as (1) "ER," (2) another hospital, (3) another facility, or (4) routine/birth/other. For this study, ED-based hospitalizations were compared with those designated routine. The routine designation excludes stays that were transferred from another hospital and reflect direct or scheduled admissions.¹⁹

Dependent Variables

Length of Stay—In the KID, length of stay (LOS) is calculated by subtracting the admission date from the discharge date. Each time a patient stays through midnight, LOS increases by 1. With this measure, all same-day stays are coded as LOS = 0. We primarily evaluated LOS in terms of HTO stays, previously defined as hospitalizations of 0 or 1 night in duration.¹⁴ LOS was also analyzed categorically as HTO stays, stays 2 to 4 nights, and stays 5 nights or longer for comparison of patient and hospital characteristics.

Charges—Hospital charges reported to HCUP represent the total amount charged by the hospital for the entire hospital stay including procedures. According to HCUP, ED charges before a hospitalization may be bundled with total hospital charges depending on requirements of individual payers. Total charges do not include professional fees.

Case-Mix Adjustment

Case-mix adjustment was performed using the all patient refined (APR)-DRG severity of illness classification categories.²⁰ The 4 APR-DRG severity categories provided in the dataset indicate minor, moderate, major, and extreme illness and were included in the multivariate model as controlling variables.

Season was included in the multivariate model to control for the expected variation in the triggers for asthma exacerbations and the volume of hospital admissions for pediatric respiratory conditions throughout the year.

Data Analysis

The authors conducted all analyses using Stata 10.0 (Stata Corp, College Station, TX) statistical software. We applied sampling weights provided by the KID¹⁶ and used the svy commands in Stata to generate nationally representative estimates. For the weights, hospitals are stratified using the following 6 hospital characteristics: ownership/control, bedsize, teaching status, rural/urban location, region, and freestanding children's hospital. The complex survey design accounts for clustering of data at the hospital level by using hospital

identification number as the primary sampling unit. The results represent weighted analyses unless otherwise indicated.

The distribution of HTO stays across hospitals was evaluated by determining the proportion of HTO stays from each hospital, calculated as the number of HTO stays from the hospital divided by the total number of discharges from that hospital. All freestanding children's hospitals and children's units with asthma discharges in the data set reported both HTO and longer stays. Within the general hospitals ($n = 2607$), there were 289 hospitals in which all sampled discharges were HTO (proportion of HTO equal to 1) and 539 hospitals in which all sampled discharges contained no HTO stays (proportion of HTO equal to 0).

These 828 general hospitals contributed 6587 (11%) discharges to the analytic sample. A sensitivity analysis excluding these cases was consistent with our primary results; therefore, we present the primary data only. Bivariate associations between categorical patient and hospital characteristics and LOS categories were analyzed using $[\chi^2]$ tests. Survey weighted logistic regression was performed to evaluate the independent association of patient and hospital characteristics with HTO stays. Records with missing data were excluded from multivariate analyses, with the exception of race where missing values were included as a separate category. Independent variables that were significantly associated with HTO stays in bivariate analysis ($P < 0.10$) were included in the final model. Stratified analysis was used to compare the influence of hospital type on HTO stays across secondary diagnosis groups. For ease of interpretation, these results are presented as posterior predictions of the proportion of HTO stays within hospital type.

As expected, the histogram of total charge data was heavily skewed. To eliminate extreme outliers, charges were truncated at the first and 99th percentile (\$1397 and \$47,076, respectively).

Analyses of charges were performed on log-transformed truncated total charges, which were more symmetric. We performed linear regression using the log-transformed truncated total charges as the dependent variable. Again, variables that were significantly associated with charges in the bivariate analysis ($P < 0.10$) were included in the final multivariate linear regression model. Results were back-transformed into original units for presentation. Inflation of standard errors for the final point estimates was adjusted using the smearing estimator described by Duan.²¹

RESULTS

Sample Characteristics

Analyses included 62,022 unweighted cases of children aged 2 to 20 years hospitalized with a principal discharge diagnosis of asthma in 2006, representing an estimated 102,533 pediatric asthma hospitalizations nationally. Of the unweighted cases, 9003 were from 36 freestanding children's hospitals, 12,200 were from 109 children's units in general hospitals, and 40,918 were from 2607 general hospitals.

Most asthma discharges in the KID were in children younger than 12 years (Table 1). More than one-third of the sample had no reported secondary diagnoses. Severe and extreme severity of illness were rare (<3%). A minority of discharges were from freestanding children's hospitals. Significant variation in teaching hospital status and admission through the ED were noted by hospital type. Teaching hospital status was assigned to 88% (95% CI: 71%–96%) of discharges within freestanding children's hospitals, 92% (95% CI: 85%–96%) of discharges within children's units, and 43% (95% CI: 39%–46%) of discharges within general hospitals. The ED was the admission source for 83% (95% CI: 74%–91%) of discharges within freestanding children's hospitals, 78% (95% CI: 73%–83%) within a children's unit, and 66% (95% CI: 64%–68%) within general hospitals

HTO Stays

Overall, an estimated 34,592 (34%) pediatric asthma hospitalizations in 2006 were HTO stays. HTO stays accounted for 66,278 (95% CI: 61,590–70,965) days of inpatient care, significantly more than the 44,642 (95% CI: 39,450–49,834) days of inpatient care for stays 5 nights in duration or longer. Patient and hospital characteristics for HTO stays compared with longer stays are presented in Table 2. All bivariate associations are significant ($P < 0.001$). The median proportion of HTO stays was 38.1% (IQR: 30.7%–45.6%) within freestanding children's hospitals, 33.7% (IQR: 24.3%–44.3%) within children's units, and 31.3% (IQR: 20.0%–43.7%) within general hospitals. The median LOS was 2 (IQR: 1–3) nights for all hospital types.

Younger age was the greatest predictor of experiencing a HTO stay after adjusting for other patient and hospital variables (Table 3). Although no significant difference was identified between HTO discharges within children's units in general hospitals and general hospitals, the adjusted odds of experiencing a HTO stay in a freestanding children's hospital was 1.26 times greater than in a general hospital. Discharges from a teaching hospital and discharges following admission through the ED were also significantly associated with associated with HTO stays ($P = 0.01$).

The variation noted in the adjusted proportion of HTO stays by secondary diagnoses fits clinical expectations (Table 4). Discharges with comorbid pneumonia or hypoxia had the lowest adjusted proportions of HTO stays whereas discharges with no secondary diagnoses or eczema/dermatitis had the highest. These patterns were consistent across hospital type.

Total Hospital Charges

In 2006, weighted aggregate hospital charges for asthma HTO stays reached \$162 million (95% CI: \$146–\$177 million). In multivariate linear regression models, LOS, age, APR-DRG severity of illness, hospital type, and admission source were significantly associated with total hospital charges. Mean adjusted total hospital charges were significantly higher when the admission began in the ED compared with routine admissions (Fig. 1). Total charges in general hospitals were significantly lower than charges in freestanding children's hospitals and children's units.

DISCUSSION

In 2006, HTO stays accounted for more than one-third of pediatric asthma hospitalizations within the KID. These stays represent substantial aggregate hospital resource utilization in terms of inpatient days and hospital charges. Our findings suggest a large number of children who are hospitalized for asthma may be eligible for observation as an alternative to traditional inpatient care, as indicated by the duration of their hospital stay. Younger age, uncomplicated asthma, private insurance coverage, and freestanding children's hospitals are most strongly associated with greater proportions of HTO stays.

Young children experience high rates of hospitalization for asthma.^{22–26} We found that children less than 5 years of age were also most likely to experience HTO stays. Adolescents and young adults experience the lowest rates of HTO stays, which may be related to a tendency to hospitalize this age group for more severe asthma exacerbations.^{24,27} Although these findings may reflect higher readmission rates for younger asthmatics,^{26,28,29} it is also possible that there are fewer outpatient alternatives to hospitalization available to young children. General hospitals, where the majority of children are cared for nationally, may be comfortable treating older children in OUs established to care for adults, thus avoiding the need to hospitalize milder exacerbations in adolescents and young adults.

Patterns of HTO stays by secondary diagnoses are not surprising. However, it was unexpected to find that more than 20% of cases with an associated diagnosis of pneumonia and nearly 30% of cases with hypoxia experienced HTO stays. Consistent with our findings, children with pneumonia and hypoxia have been previously identified as less likely to experience short hospital stays.^{10,30} In fact, in some institutions, these children are excluded from the OU setting.^{7,10,31} Although they represent small groups of patients, more than 1 in 5 children with these more complicated asthma exacerbations were discharged after a HTO stay. To optimize utilization of OUs and avoid unnecessary hospitalization in patients with complicated asthma who could respond to OU care, the creation of or modification to treatment algorithms and observation protocols may be needed.

Interpreting results related to payer status is comparatively more complex. We find proportions of HTO stays to be similar for uninsured and privately insured patients. The reason for both groups having significantly higher proportions of HTO stays than the public payer group is not immediately apparent. We expect HTO stays to be influenced by factors that may be associated with payer status, including severity of illness, access to a primary care medical home, home asthma management, parental preferences, and outpatient and inpatient provider practices. Exploring these issues requires patient-level clinical data throughout the acute care encounter and data from the perspective of the patient, parent, and health care providers at the time of admission and discharge.

Another hypothesis for our findings on payer status relates to the potential for differences in reimbursement practices. Private insurers may provide incentives to hospitals that realize shorter inpatient stays, and patients without coverage may be more likely to try to leave the hospital more quickly. In contrast, if payers offer lower reimbursement or deny

reimbursement for HTO stays, patients may remain hospitalized for an extra day to justify the admission. The existence and nature of such policies were not available for these data.

Although HTO stays for asthma occur within all hospital types, we found a statistically significant association between freestanding children's hospitals and HTO stays. Freestanding children's hospitals may have systems in place that promote HTO stays, such as condition-specific treatment protocols, the use of pediatric hospitalist services, ready access to home care services that allow for earlier discharges, or perhaps the presence of OUs. The latter possibility is supported by the fact that the majority of pediatric OUs in the published literature are within large children's hospitals or their EDs.¹

If some HTO stays measured in this study were actually treated in an OU, then our findings characterize the brief nature of hospital care for asthma but may somewhat overestimate the proportion of hospital discharges that could be shifted to OU settings. Conversely, "observation status," a billing designation applied to cases that do not meet inpatient criteria, is typically considered outpatient treatment. As such, stays under observation status would not be included in the KID-a sample of inpatient discharges.³² Future studies are needed to characterize the settings in which children receive observation care in the United States and to clarify the degree to which billing "misclassification" of OU care effects on our results. Evaluating systems of care in hospitals with high proportions of HTO stays may reveal opportunities to restructure inpatient wards for greater efficiency or may reveal the need to develop alternatives to traditional inpatient care.

Counter to previous research that has found non-birth-related admissions originating in the ED to be shorter and less expensive than non-ED admissions,¹⁹ charges for ED-based asthma admissions were significantly higher than routine admissions across LOS categories and hospital type in 2006. Our findings may indicate high intensity of services and resource utilization associated with ED care for asthmatic children. As the additional charges associated with ED care do not appear to have benefit in terms of inpatient LOS, they may contribute to quality outcomes not measured in this dataset, including patient safety and timeliness of care. Higher charges associated with freestanding children's hospitals and children's units within general hospitals are consistent with previous research and may be related to unique services or clinical or staffing approaches required to care for children.^{33,34}

Limitations

Data reported to HCUP are collected from discharge abstracts and do not contain admitting diagnosis. Final billing diagnoses may not accurately capture the reason for admission or comorbid conditions. In addition, the APR-DRG severity of illness categories are based on analysis of associated ICD-9 codes, which may not adequately control for case-mix differences among hospitals. The routine admission designation includes nontransfer and non-ED-based stays, therefore, some of these hospitalizations may be for scheduled care (eg, testing) whereas others may be direct admissions for acute treatment from an outpatient clinic setting. The dataset does not distinguish between these different reasons for hospitalization.

The LOS counts provided by the KID, expressed in incremental calendar days, do not offer the detail needed to determine if a 1-night stay lasted 20 versus 40 hours. In addition, treatment time in the ED may or may not be included in these LOS counts (and may differ depending on individual hospital policies), which could contribute to underestimation of the true duration of hospital-based care.

The duration of care within the ED may be in part influenced by inpatient hospital factors. For example, when the inpatient ward is at capacity, an admitted patient may be “boarded” in the ED prolonging the ED treatment time.

There are additional limitations to administrative data when ED care precedes hospitalization, including not knowing the treatment delivered in the ED or the costs attributable to this care. Higher charges associated with ED-based admissions may reflect the addition of ED charges to the total charges for a given hospitalization.

CONCLUSION

With crowded EDs, limited inpatient hospital capacity, and rising health care costs, it becomes increasingly important to match the intensity of services and location of acute care with the clinical needs of pediatric patients. The large proportion of HTO stays for children with a primary diagnosis of asthma suggests the need to explore opportunities for improvement in terms of resource utilization, health care delivery, and ultimately patient outcomes. Efforts to provide alternatives to traditional inpatient care will require attention to differences by patient age and comorbid conditions. Further evaluation of reimbursement practices and hospital services is needed to understand the influence of these factors on HTO stays.

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FIGURE 1.

Mean adjusted total charges for HTO stays by admission source within hospital type. The bars display mean adjusted total charges for HTO stays by admission source in the overall sample and by hospital type. The vertical lines represent the 95% confidence interval for the adjusted mean value. Charges are adjusted for patient age, APR-DRG illness severity, admission source, hospital type, hospital teaching status, and LOS.

TABLE 1

Overall Sample Characteristics—Hospitalizations With a Principal Discharge Diagnosis of Asthma in the 2006 Kids' Inpatient Database

Characteristics	
Overall	
Sample, n	62,022
Weighted, N	102,532*
Weighted N (%)*	
Patient characteristics	
Age category	
2–4 yr	39,761 (39)
5–11 yr	41,575 (40)
12–20 yr	21,197 (21)
Male gender	60,693 (60)
Race	
White	28,533 (28)
Black	26,960 (26)
Hispanic	17,785 (17)
Other	5778 (6)
Missing	23,476 (23)
Payer	
Public	52,653 (51)
Private	43,137 (42)
Uninsured	6477 (6)
Secondary diagnoses	
Asthma alone	35,038 (34)
Hypoxia	13,111 (13)
Upper respiratory infection	12,281 (12)
Pneumonia	10,695 (10)
Fluid and electrolyte disorders	3860 (4)
Eczema/dermatitis	3289 (3)
Other	24,258 (24)
APR-DRG severity of illness	
Minor	73,826 (72)
Moderate	26,094 (25)
Severe	2361 (2)
Extreme	251 (<1)
Season	
Winter	23,388 (25)
Spring	23,606 (25)
Summer	11,841 (13)

Characteristics	
Fall	34,946 (37)
Hospital characteristics	
Hospital type [†]	
Freestanding children's hospital	16,704 (16)
Children's unit in general hospital	19,703 (19)
General hospital	66,124 (64)
Teaching hospital	60,429 (60)
Admission through the ED	72,815 (71)
Weekend admission	26,233 (26)

Difference in sample size within cells is due to missing values.

* Percentages may not add to 100 due to rounding.

[†] As designated by HCUP, using information from the National Association of Children's Hospitals and Related Institutions (NACHRI).

ED indicates emergency department; APR-DRG, all patient refined diagnosis-related group.

TABLE 2

Patient and Hospital Characteristics for Pediatric Asthma Hospitalizations by Length of Stay Category

	% (95% CI)		
	HTO* Stays (Sample n = 20,970; Weighted N = 34,592)	2–4 Nights (Sample n = 37,321; Weighted N = 61,727)	5+ Nights (Sample n = 3732; Weighted N = 6213)
Age category			
2–4 yr	44.8 (43.8–45.8)	36.6 (35.8–37.4)	26.7 (25.2–28.2)
5–11 yr	37.6 (35.8–37.4)	42.1 (41.4–42.7)	41.8 (40.1–43.6)
12–20 yr	17.6 (25.2–28.2)	21.3 (20.7–21.9)	31.5 (29.8–33.3)
Male	63.0 (62.3–63.7)	59.1 (58.6–59.7)	53.7 (51.9–55.5)
Payer			
Public	48.3 (46.3–50.4)	52.9 (51.2–54.6)	55.0 (52.4–57.6)
Private	44.6 (42.4–46.7)	41.1 (39.4–42.9)	39.1 (36.5–41.6)
Uninsured	7.1 (6.1–8.1)	6.0 (5.0–6.9)	5.9 (4.5–7.3)
Secondary diagnosis			
Asthma alone	39.9 (37.8–42.0)	32.8(31.2–34.4)	15.8(14.0–17.6)
Hypoxia	10.4 (8.8–12.0)	13.4(11.9–14.9)	19.6(16.3–23.0)
Upper respiratory infection	13.1 (12.0–12.4)	11.6(10.8–12.4)	9.5(8.3–10.7)
Pneumonia	6.7 (6.2–7.3)	11.3(10.5–12.1)	22.3(20.5–24.1)
Fluid and electrolyte disorders	3.4 (2.9–3.9)	3.9 (3.5–4.4)	4.1 (3.4–4.8)
Eczema and dermatitis	3.7 (3.1–4.2)	3.1 (2.7–3.5)	2.2(1.6–2.7)
Other	22.8 (21.8–23.8)	23.8(23.1–24.6)	26.4 (24.4–28.5)
Hospital type [†]			
Freestanding children's hospital	18.5 (14.4–22.7)	14.7(11.1–18.4)	19.2(13.7–24.7)
Children's unit in general hospital	18.4 (14.7–22.1)	18.8(14.6–23.0)	27.8(21.0–34.7)
General hospital	63.1 (58.3–67.8)	66.4(61.7–71.2)	52.9 (46.3–59.6)
Teaching hospital	37.3 (33.9–40.6)	42.2 (38.6–45.8)	32.7 (27.2–38.2)
Emergency department admission	72.6 (70.0–75.1)	69.9 (67.5–72.3)	73.3 (69.6–77.0)

* HTO indicates high-turnover (0 or 1 night of inpatient care).

[†] As designated by HCUP using information from the National Association of Children's Hospitals and Related Institutions (NACHRI).

TABLE 3

Adjusted* Odds of Experiencing a High-Turnover Stay by Patient and Hospital Characteristics

	Adjusted OR	95% CI	<i>P</i>
Age category			
2–4 yr	1.54	1.45–1.63	<0.01
5–11 yr	1.10	1.04–1.16	<0.01
12–20 yr (referent)	1		
Male	1.16	1.12–1.21	<0.01
Payer			
Public (referent)	1		
Private	1.18	1.11–1.25	<0.01
Uninsured	1.34	1.20–1.50	<0.01
Hospital type [†]			
General hospital (referent)	1		
Children's unit in a general hospital	0.93	0.76–1.14	0.48
Free standing children's hospital	1.26	1.04–1.52	0.02
Teaching hospital	1.19	1.06–1.34	<0.01
Emergency department admission	1.12	1.03–1.22	0.01

* Adjusting for race, gender, season, and APR-DRG severity of illness category.

[†] As designated by HCUP using information from the National Association of Children's Hospitals and Related Institutions (NACHRI).

OR indicates odds ratio; CI, confidence interval.

TABLE 4

Adjusted* Proportion of High-Turnover Stays for Discharges Coded With Asthma Alone or a Top Ranking Secondary Diagnosis by Hospital Type

	% HTO (95% CI)		
	General Hospital [†]	Children's Unit in a General Hospital [†]	Freestanding Children's Hospital [†]
Asthma alone	35.6 (34.3–36.9)	35.6(31.6–39.9)	42.7 (38.6–46.9)
Secondary diagnosis			
Hypoxia	31.3(30.2–32.4)	29.9 (26.3–33.8)	36.8 (33.0–40.8)
Upper respiratory infection	33.4 (32.2–34.6)	33.0(29.1–37.2)	40.0 (36.0–44.2)
Pneumonia	24.2 (22.8–25.7)	22.7(19.5–26.1)	27.8(24.4–31.6)
Fluid and electrolyte disorders	28.2(27.1–29.3)	27.0 (23.6–30.7)	34.1 (30.4–38.1)
Eczema and dermatitis	35.7 (34.3–37.2)	33.3(29.5–37.5)	39.9(35.9–44.1)
Other	31.3(30.2–32.4)	29.5 (25.9–33.4)	36.2 (32.3–40.2)

* Adjusting for age, race, gender, payer, season, APR-DRG severity of illness category, hospital type, teaching status, and admission source.

[†] As designated by HCUP using information from the National Association of Children's Hospitals and Related Institutions (NACHRI).