Trends in Visits and Costs for Mental Health Emergencies in a Pediatric Emergency Department, 2010–2016

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Abstract

Objective: Analyze trends in visit numbers, length of stay (LOS), and costs of pediatric mental health emergency department (ED) visits over time.

Methods: We conducted a cross-sectional, time-series analysis from 2010 to 2016 of mental health visits, identified by billing diagnosis codes, among children 5 to 18 years old in a tertiary pediatric ED. We used Poisson regression to analyze trends in rates of mental health visits, patient-hours, and visits with LOS ≥ 24 hours. We used time-series analysis to trend median costs per visit.

Results: From 2010 to 2016, there were 197,982 ED visits and 13,367 (6.7%) mental health visits. Mental health visits increased by 45% (from 1462 to 2119), compared to a 13% increase in non−mental health visits. The rate of mental health visits increased from 5.6 to 7.1 per 100 ED visits and increased 5.5% annually, compared to −0.4% annually for non−mental health visits (incidence rate ratio [IRR], 1.06; 95% confidence interval [CI], 1.05−1.07). Mental health patient-hours increased 186%, compared to an 18% increase in non−mental health patient-hours. The rate of mental health visits with LOS ≥ 24 hours increased from 4.3 to 18.8 per 100 mental health visits and increased 22% annually (IRR, 1.22; 95% CI, 1.19−1.26). Median costs per visit increased by $38 per quarter (95% CI, $28−$48).

Conclusions: Rates of mental health visits, patient-hours, visits with LOS ≥ 24 hours, and visit costs are increasing over time. Additional hospital and community resources are needed to address rising ED utilization for mental illness in children.

Keywords: emergency care; mental health; pediatrics; resource utilization

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What's New

We document large increases in pediatric mental health emergency department visits from 2010 to 2016, with rises in total patient-hours and length of stay, particularly for visits ≥ 24 hours and ≥ 48 hours.

Approximately 1 in 5 children in the United States experiences a mental health disorder in a given year.[1] Pediatric emergency department (ED) visits for mental health conditions have been increasing over time, with a 40% increase in a national sample from 2009 to 2013 (from 9.3 to 13.7 visits per 1000).[2] Pediatric mental health visits have a longer median length of stay (LOS) than non−mental health visits.[3,4] As the number of inpatient psychiatric beds has decreased in the United States over time, some children experience a prolonged stay in the ED while awaiting placement for a higher level of psychiatric care.[5,6] Prior single-center studies have reported rising median ED LOS, as well as rising median charges, for pediatric mental health ED visits over time.[7–9]

Recent trends in ED resource utilization are important to describe as they can guide appropriate levels of investments in provider education, mental health staffing, and infrastructure dedicated to mental health patients. ED utilization can also highlight the need for increased attention to mental health services in the greater health system. In particular, information about the prevalence of prolonged LOS over 24 hours (commonly referred to as boarding), total patient-hours of care, and visit costs is necessary to achieve a comprehensive understanding of ED mental health resource utilization, and these data are not all available from national datasets.[10] Resource use is not commonly reported in terms of total patient-hours of care, but this measurement serves as an important marker for the time spent caring for mental health patients relative to other patient populations.

The objectives of our study were to analyze recent trends in pediatric mental health ED utilization at our

institution, as measured by ED visits, patient-hours, LOS, and hospital costs for treatment. We hypothesized that ED mental health visits and patient-hours are increasing at a faster rate than non−mental health ED visits and advancing faster than previously described in the literature. We also hypothesized that mental health visits with LOS ≥ 24 hours and median costs per visit are rising over time.

METHODS

STUDY DESIGN AND SETTING

We conducted a retrospective, cross-sectional, time-series analysis of pediatric mental health ED visits at an urban tertiary care children's hospital from January 1, 2010, to December 31, 2016. The hospital has approximately 400 inpatient medical beds, a 16-bed inpatient pediatric psychiatric unit, and a 12-bed affiliated Community-Based Acute Treatment psychiatric unit on a different campus. There are 3 other academic pediatric EDs in the metropolitan area. At our hospital, a standard medical clearance evaluation for a mental health visit includes an examination by a physician, urine toxicology testing, urine human chorionic gonadotropin (for females), and an electrocardiogram. A psychiatric social work team is available 24 h/d and provides recommendations regarding psychiatric level of care. Mental health patients awaiting a higher level of psychiatric care may be hospitalized on the inpatient medical unit if no appropriate placement is found after 2 searches, which generally occurs after the patient has been in the ED for 24 hours or more. This study was approved by our hospital's institutional review board.

STUDY POPULATION

We identified mental health ED visits from an administrative electronic medical record by the presence of any International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) mental health discharge code from January 1, 2010, to September 30, 2015, and by any International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) mental health discharge code from October 1, 2015, to December 31, 2016 (Table 1). The ICD codes were adapted from prior work on pediatric mental health ED visits.[3,11−13] Cost data were obtained from our hospital's Department of Finance, which relies on activity-based costing to generate costs for each billable unit. These are multiplied by the respective quantities and summed to estimate costs for each ED encounter. Cost data were only available for the years 2011 to 2016. Cost data were available for 71% to 85% of visits from 2011 to 2013 and for >99% of visits from 2014 to 2016. Cost data were examined by quarters to allow for a more granular analysis of trends.

MEASUREMENTS

Patients were included for analysis if they were 5 to 18 years old, as mental health diagnoses are rare in infants and toddlers, and based on prior pediatric mental health literature.[3,14,15] We collected the following variables: age, sex, race/ethnicity, primary language, insurance, timing of ED presentation, and ED disposition. Insurance status was classified as public, private, or both public and private plans. The timing of ED presentation was categorized by ED check-in time as follows: daytime, 7:00 AM to 2:59 PM; evening, 3:00 PM to 10:59 PM; and overnight, 11:00 PM to 6:59 AM. Presentation during the weekend was defined as a check-in time from Saturday at 12:00 AM to Sunday at 11:59 PM. Presentation during a school month was defined as visits occurring in September through June, based on local school calendars.[16] We defined a mental health visit as a repeat visit if the patient had been seen in

Table 1. Mental Health ICD-9 and ICD-10 Diagnosis Codes

Code Numbers	Description
ICD-9	
290.0−314.90, except 307.6, 307.7, 310.2	Mental health disorders except enuresis, encopresis, and post-concussion syndrome
780.1	Hallucinations
780.5	Sleep disturbance
799.21−799.25, 799.29	Emotional states
V62.84, E950−E959	Suicide and self injury
V62.85	Homicidal ideation
V40.31	Wandering
V40.39	Other behavior problem
ICD-10	
F20−F69, F90−F99	Mental health disorders, except disorders due to physiological conditions, substance use, intellectual disabilities, and developmental disorders
R45 except R45.83	Emotional states except excessive crying
R46.81	Obsessive-compulsive behavior
R46.89	Other symptoms involving appearance and behavior
Z91.83	Wandering

ICD-9 indicates International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10, International Classification of Diseases, Tenth Revision, Clinical Modification.

our ED within 1 year with a mental health ICD discharge diagnosis code. Disposition from the ED was classified as an admission (to the psychiatric or medical unit) or discharge (which included discharge to home with outpatient care, partial hospital programs, or psychiatric hospitalization at a different institution). Admission to the medical inpatient unit included those admitted for medical reasons (eg, acute ingestion) as well as patients boarding while awaiting placement for a higher level of psychiatric care.

Outcome Measures

Outcome measures included number of ED visits, total patient-hours, LOS, return mental health visits, and hospital costs for treatment.

Data Analysis

Descriptive statistics were calculated for frequencies of patient demographic characteristics, LOS, and admission rates for mental health and non−mental health ED visits. Rate differences with 95% confidence intervals (CIs) were calculated to compare differences between the mental health and non−mental health visits. Differences in median LOS secondary to visit type (mental health vs non−mental health) and visit timing were compared by median difference with 95% CI. Total patient-hours for each year were calculated by summing the LOS for mental health visits in a given year.

To analyze changes over time in mental health visits, we estimated a Poisson regression model with the visit count as the dependent variable. The independent variables included calendar year, a binary visit-type indicator variable (ie, denoting mental health and non−mental health visits), a year-by-visit-type interaction term, and the log of the annual number of visit-type-specific ED visits as the offset (coefficient constrained to 1). The interaction term tested whether the annual trend in ED visit rates differed for mental health versus non−mental health visits. The incidence rate ratio (IRR) represents the annual rate of change during the study period of mental health visits over the annual rate of change during the study period of non−mental health visits. An incidence rate ratio greater than 1 indicates a greater increase in mental health than non−mental health visits over time. To analyze changes in patient-hours over time, we constructed a similar Poisson regression model except that we counted patient-hours instead of visits. To analyze changes in visits with LOS ≥ 24 hours, LOS ≥ 48 hours, and return visits, we constructed similar Poisson regression models except that we defined the visit type by LOS or return visit status.

We used a time-series analysis for median costs of ED visits, using quarters as the unit of analysis and time as the independent variable to analyze trends (change in costs per quarter). All costs were inflation-adjusted to 2016 dollars using the inpatient hospital services component of the Consumer Price Index published by the Bureau of Labor Statistics.[17] We used an autoregressive model and performed the Durbin-Watson test for autocorrelation in the residuals for orders 1 through 4 (past 1 year). Because there was a no evidence of autocorrelation, we did not correct for it in the final model. We used the nonparametric Wilcoxon rank-sum test to compare costs for visits with LOS < 24 hours to those ≥ 24 hours. Analyses were conducted in Stata 13.0 (StataCorp; College Station, Tex) and SAS 9.4 (SAS Institute; Cary, NC).

Results

Between 2010 and 2016, there were 197,982 total ED visits among patients 5 to 18 years old, including 13,367 (6.7%) mental health ED visits. Relative to non−mental health visits, mental health visits had higher proportions that were female, teenagers (13 to 18 years old), white non-Hispanic, English-speaking, and carriers of both public and private insurance (Table 2). Mental health visits were more likely than non−mental health visits to have a length of stay between 24 and 47 hours (11.1% vs 0.2%) and a length of stay ≥ 48 hours (2.6% vs 0.1%). Among mental health visits, 5.1% resulted in admission to our hospital's inpatient psychiatric unit, and 17.5% resulted in hospitalization on the medical unit.

During the study period, mental health ED visits increased by 45%, from 1462 visits in 2010 to 2119 visits in 2016, compared to a 13% increase in non−mental health visits, from 24,715 visits to 27,922 visits. The rate of mental health visits increased from 5.6 to 7.1 per 100 ED visits over the study period and increased an average of 5.5% annually, compared to −0.4% annually for non−mental health visits (IRR, 1.06; 95% CI, 1.05−1.07) (Fig. 1A). Mental health total patient-hours increased 186%, from 10,595 patient-hours in 2010 to 30,301 patient-hours in 2016; non−mental health patient-hours increased 18%, from 100,297 to 118,130. The rate of mental health patient-hours increased from 9.6 to 20.4 per 100 ED patient-hours and increased an average of 13.5% annually, compared to −2.5% annually for non−mental health patient-hours (IRR, 1.16; 95% CI, 1.16−1.17) (Fig. 1B). In 2016, mental health patient-hours accounted for 20.4% of all ED patient-hours and 7.1% of ED visits.

Mental health visits had a significantly higher overall median ED length of stay (5.9 hours; interquartile range [IQR], 4.0−13.0) compared to non−mental health visits (3.4 hours; IQR, 2.1−5.1), with a median difference of 2.6 hours (95% CI, 2.5−2.6). The median LOS for mental health visits increased from 5.3 hours (IQR, 3.8−7.7; range, 0.5−49.2) in 2010 to 6.3 hours (IQR, 4.1−19.5; range, 0.5−185) in 2016. The median LOS for mental health visits increased by 0.16 h/yr, compared to −0.02 h/yr for non−mental health visits (median difference, 0.19 h/yr; 95% CI, 0.16−0.21). The median ED LOS for mental health visits varied by visit timing and was longer for visits during school months (6.0 hours; IQR, 4.0−14.2) compared to non−school months (5.2 hours; IQR, 3.5−9.4; median difference, 0.9; 95% CI, 0.6−1.1) (Table 3).

Mental health visits with LOS ≥ 24 hours increased from 4.3 to 18.8 per 100 mental health visits and

Table 2. Demographic and Clinical Characteristics of Mental Health and Non–Mental Health Emergency Department Visits from 2010 to 2016

	Mental Health Emergency Department Visits (n = 13,367)	Non–Mental Health Emergency Department Visits (n = 184,615)	Rate Difference (95% Confidence Interval)
Sex, n (%)			
Male	6327 (47.3%)	94,560 (51.2%)	−3.9% (−4.8 to −3.0)*
Female	7040 (52.7%)	90,055 (48.8%)	3.9% (3.0–4.8)*
Age group			
5–8 yr	1590 (11.9%)	64,672 (35.0%)	−23.1% (−23.7 to −22.5)*
9–12 yr	3169 (23.7%)	49,240 (26.7%)	−3.0% (−3.7 to −2.2)*
13–15 yr	4697 (35.1%)	37,197 (20.2%)	15.0% (14.2–15.8)*
16–18 yr	3911 (29.3%)	33,506 (18.1%)	11.1% (10.3–11.9)*
Race/ethnicity			
White/non-Hispanic	6909 (51.7%)	78,555 (42.6%)	9.1% (8.3–10.0)*
Black/non-Hispanic	2477 (18.5%)	35,286 (19.1%)	−0.6% (−1.3 to 0.1)
Hispanic	1903 (14.2%)	40,775 (22.1%)	−7.8% (−8.5 to −7.2)*
Other/unavailable	2078 (15.5%)	29,999 (16.2%)	−0.7% (−1.3 to −0.1)*
Primary language English	11484 (85.9%)	149,801 (81.1%)	4.8% (4.2–5.4)*
Insurance type			
Private	5928 (44.4%)	83,339 (45.1%)	−0.8% (−1.7 to 0.1)
Public	5547 (41.5%)	81,172 (44.0%)	−2.5% (−3.3 to −1.6)*
Both	1682 (12.6%)	16,386 (8.9%)	3.7% (3.1–4.3)*
Unavailable	210 (1.6%)	3718 (2.0%)	−0.4% (−0.7 to −0.2)*
Length of stay			
<12 h	9896 (74.0%)	181,568 (98.4%)	−24.3% (−25.1 to −23.6)*
12–23 h	1622 (12.1%)	2352 (1.3%)	10.9% (10.3–11.4)*
24–47 h	1490 (11.2%)	401 (0.2%)	10.9% (10.4–11.5)*
≥48 h	344 (2.6%)	98 (0.1%)	2.5% (2.3–2.8)*
Unavailable	15 (0.1%)	196 (0.1%)	0.0% (−0.1 to 0.1)
Admitted (within facility)	3021 (22.6%)	34,882 (18.9%)	3.7% (3.0–4.4)*
Psychiatric unit	685 (5.1%)	307 (0.2%)	5.0% (4.6–5.3)*
Medical unit	2336 (17.5%)	34,575 (18.7%)	−1.3% (−1.9 to −0.6)*

*Denotes statistical significance ($P < .05$).

increased 22% annually (IRR, 1.22; 95% CI, 1.19–1.26). In other words, mental health visits with LOS ≥ 24 hours accounted for 4.3% of mental health visits in 2010 and increased to 18.8% in 2016 (Fig. 2). Mental health visits with LOS ≥ 48 hours increased from 0.1 to 6.4 per 100 mental health visits and increased 82% annually (IRR, 1.82; 95% CI, 1.68–1.98). The rate of repeat mental health visits with a prior mental health ED visit within

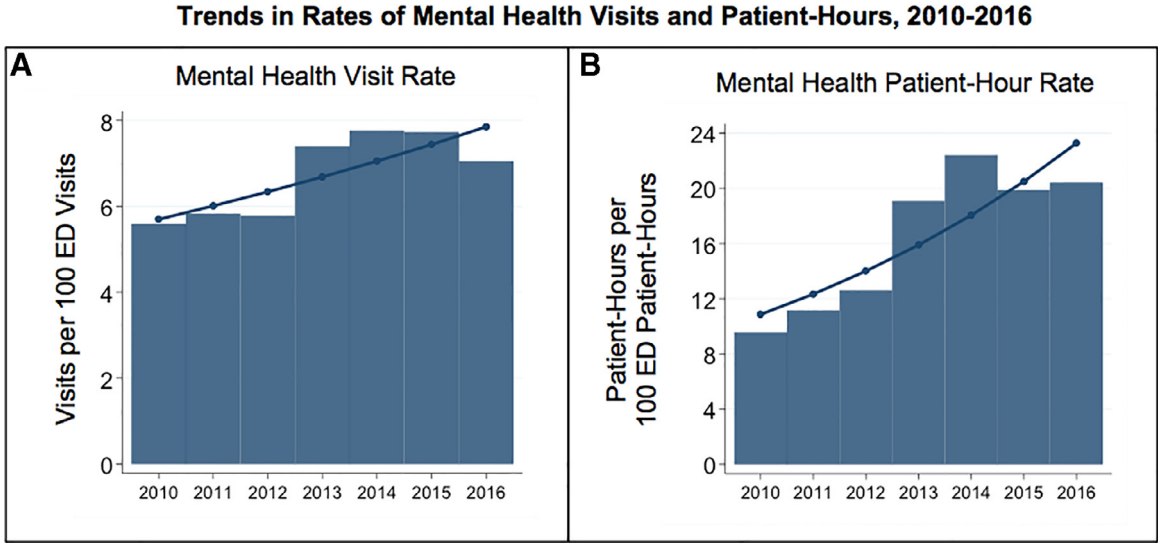

Figure 1. *(A) The rate of mental health visits increased from 5.6 to 7.1 per 100 emergency department visits (5.5% annual increase). (B) The rate of mental health patient-hours increased from 9.6 to 20.4 per 100 emergency department patient-hours (13.5% annual increase). ED indicates emergency department.*

Table 3. Median Emergency Department Length of Stay by Visit Characteristic for Mental Health Visits

Visit Characteristic	Median Emergency Department Length of Stay, Hours (Interquartile Range) (N = 13,367)	Median Difference (95% Confidence Interval)
Time of day		
Day (7:00 AM–2:59 PM)	6.2 (4.3–10.2)	Reference
Evening (3:00 PM–10:59 PM)	5.7 (3.8–17.5)	−0.4 (−0.6 to −0.2)*
Night (11:00 PM–6:59 AM)	5.6 (3.4–12.7)	−0.6 (−0.9 to −0.2)*
Day of week		
Weekend	5.2 (3.5–9.8)	Reference
Weekday	6.1 (4.1–14.1)	0.9 (0.7–1.1)*
Month of year		
Non-school (July–August)	5.2 (3.5–9.4)	Reference
School (September–June)	6.0 (4.0–14.2)	0.9 (0.6–1.1)*

*Denotes statistical significance ($P < .05$).

1 year increased from 22.6 to 26.4 per 100 mental health visits and increased 4.0% annually (IRR, 1.04; 95% CI, 1.02−1.06).

From 2011 to 2016, median costs per ED visit increased by $38 per quarter (95% CI, $28−$48), from a median cost per visit of $642 in 2011 to $1317 per visit in 2016 (Table 4 and Fig. 3). The median cost for visits with LOS < 24 hours was $821 per visit, compared to a median cost for visits with LOS ≥ 24 hours of $4050 per visit ($P < .001$). The total cost for all ED mental health visits was $10,744,493 in 2014 and $10,177,038 in 2016, with $4,308,758 of costs in 2016 being incurred by patients with public insurance.

DISCUSSION

Our study demonstrates that pediatric ED resource utilization has increased significantly from 2010 to 2016 for pediatric mental health patients. We analyzed visits with prolonged LOS and ED patient-hours as measures of ED resource utilization that are not available in national datasets. ED visits by mental health patients increased 45% and patient-hours increased threefold, with mental health patient-hours in 2016 accounting for over a fifth of all patient-hours in our ED. These increases were greater among mental health visits compared to non−mental health visits. We report rising numbers of mental health visits with LOS ≥ 24 hours and ≥ 48 hours, rising numbers of repeat mental health visits, and increasing median costs per visit over time.

The trends in pediatric mental health visits at our institution build on previously described national trends in the growth of pediatric mental health ED visits while adding new information on patient-hours, visits with extremely long LOS, and costs. Data from the National Hospital Ambulatory Medical Care Survey demonstrated a 26%

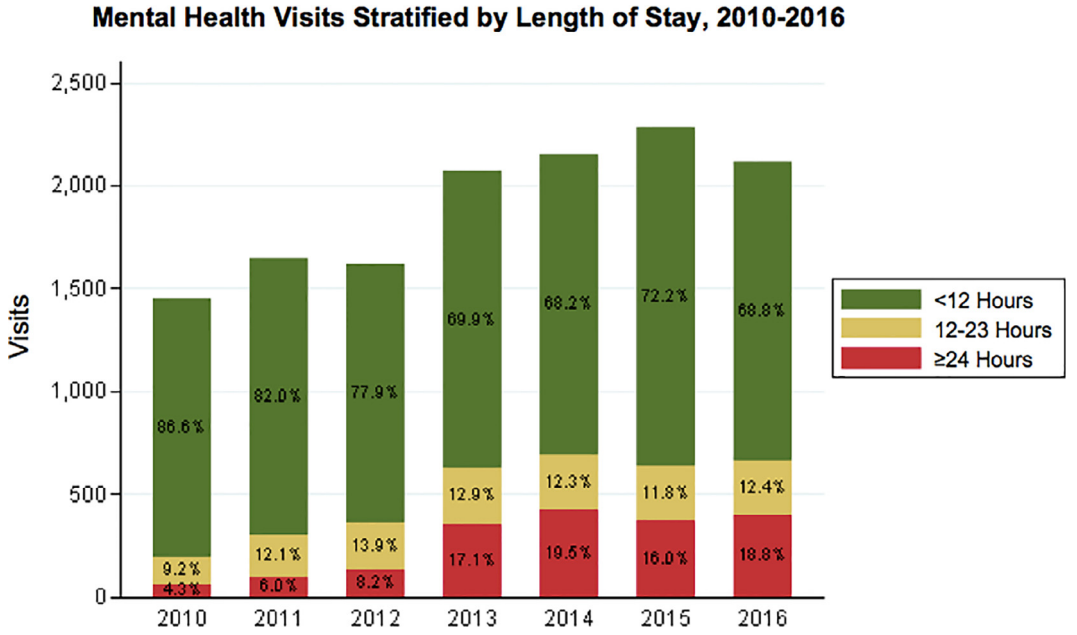

Figure 2. *Proportion of emergency department mental health visits, stratified by length of stay in hours.*

Table 4. Quarterly Trends in Median Costs for Mental Health Emergency Department Visits (in 2016 Dollars)

Variable	Estimate	Standard Error	*t* Value	*Pr* > |*t*|
Intercept*	$480	73.2	6.55	<.0001
Time†	$38	5.1	7.43	<.0001

*Represents the baseline median visit cost in Quarter 1 of 2011.
†Represents the increase in the median visit cost per quarter.

increase in pediatric mental health ED visits from 2001 to 2010, from approximately 491,000 visits to 619,000 visits.[11] Among children's hospitals participating in the Pediatric Health Information System, pediatric mental health ED visits rose by 40% from 2009 to 2013, from 9.3 visits to 13.7 visits per 1000.[2]

Drivers for rising ED mental health visits may include the increasing prevalence and complexity of psychiatric disorders in children, as well as limited access to mental health resources, prompting more ED referrals. A higher proportion of children are presenting to the ED over time with more than 1 prior psychiatric diagnosis, prior psychiatric admissions, and home medications prescribed.[7] Nationally, the 12-month prevalence of major depressive episodes diagnosed in adolescents increased from 8.7% in 2005 to 11.3% in 2014, and the age-adjusted suicide rate increased by 24% from 1999 to 2014.[18,19] In parallel to the rising prevalence of illness, pediatric ED visits have increased for suicidal ideation, suicide attempts, and self injury.[20,21] Inadequate availability of outpatient mental health care may be contributing, with an estimated average wait time to a first appointment with a child psychiatrist in 5 US cities of 42.9 days.[22] A critical workforce shortage of child psychiatrists exists, with only 8300 practicing child psychiatrists in 2012 compared to a projected need of 30,000, further compounding access issues.[23]

The increasing length of stay for pediatric mental health patients at our institution is consistent with prior studies, and we additionally highlight visits with extremely long LOS ≥ 24 hours and ≥ 48 hours. A single-center study in Oregon demonstrated a rise in mean ED LOS for pediatric mental health visits from 6.7 hours to 20.8 hours between 2009 and 2013, and a single pediatric ED in New York reported a rise in median LOS from 5.3 hours (IQR, 3.2−15.4) to 17.0 hours (IQR, 6.0−26.0) from 2004 to 2014.[8,7] In Massachusetts, behavioral health ED visits with LOS > 12 hours among children and adults increased from 17% in 2011 to 23% in 2015, and teens (age 12 to 17 years) were more likely to have LOS > 12 hours than adults.[24] Medical clearance time has been shown to account for only a small proportion of LOS for mental health ED visits.[10] When the quantity of psychiatric placements for a higher level of care is insufficient to meet the needs, this results in longer ED LOS for mental health patients.[10,25,26] Potentially detrimental effects of ED boarding include a delay in definitive mental health care, exposure to a high-stimulation environment, and a reduced ED capacity to care for medical patients.[4,27,28]

We found that the timing of ED visits was associated with LOS for pediatric mental health visits. The greater LOS during school months is consistent with prior literature correlating mental health visits with times of school attendance and may be due to increased stressors imposed by school.[29−31] In addition, mental health patients seen overnight and on weekends had a shorter median ED LOS, which may be due to decreased referrals when school and outpatient psychiatry clinics are closed. Knowledge of the relationship between visit timing and LOS may help guide decisions for ED behavioral health staffing.

Median cost per pediatric mental health visit also increased over time. One prior single-center study also found rising median charges over time for pediatric mental health ED visits from 2009 to 2013, with higher charges for each hour increase in LOS.[8] Another recent study of pediatric mental health ED costs demonstrated that the addition of board-certified psychiatrists and trained social workers to a pediatric ED did not

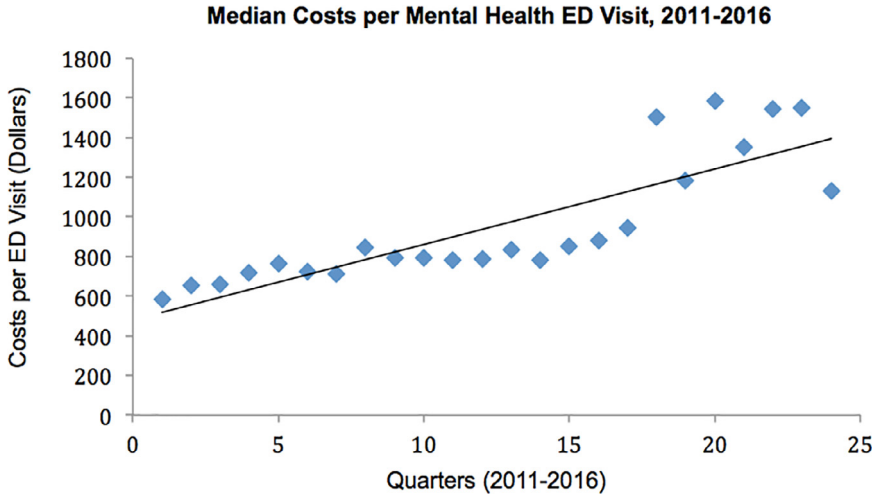

Figure 3. *The median costs (expressed in 2016 dollars) per emergency department visit increased by $38 per quarter (95% confidence interval, $28−$48). ED indicates emergency department.*

significantly change mean ED costs, but did reduce ED LOS.[15] Further study is warranted to test interventions that have the potential to reduce ED costs.

The rise in pediatric mental health conditions over time is a national crisis that will require systemwide reforms, including a heightened focus on prevention and increased integration of mental health care into routine outpatient and hospital care for children.[32] As a more comprehensive solution is pursued, rising use of the pediatric ED as a safety net for crisis stabilization should prompt focused investments in ED mental health infrastructure. Multifaceted interventions that include staff education, increased availability of mental health social workers and attending psychiatrists, specialized room design, and streamlined patient assessment have successfully decreased LOS for mental health visits.[15,33–35] Hospitals that have invested in an onsite inpatient pediatric psychiatric unit have a reduced ED LOS compared to those without one.[36] Intervention-based trials are needed to determine which strategies will most effectively reduce ED utilization, such as programs that enable same-day urgent psychiatric appointments, mobile crisis outreach teams, and regional emergency telepsychiatry consultations.[23,37,38] Future research should include correlation of ED visits and LOS with local availability of outpatient and inpatient mental health services. Accountable care organizations and population health models may provide increased financial incentives for coordination of mental illness to prevent ED visits.[39]

Limitations

Our study has several limitations. Because it was performed at a single center, ED use patterns may be affected by local factors such as inpatient bed numbers, availability of outpatient mental health services, local and state laws, and reimbursement structures, which may limit generalizability. As Massachusetts provides fairly comprehensive public mental health benefits such as mobile crisis intervention, in-home therapy, and intensive care coordination, we might expect even greater ED resource utilization in other states without such services available.[40]

Using ICD diagnosis codes to identify mental health visits may result in some misclassification. Mental health visit numbers may be overestimated for visits that occurred for a primary medical reason that had a co-occurring mental health diagnosis coded. The prevalence of mental health conditions among hospitalized children may be as high as 1 in 4;[41] however, in our ED, the rate of dual coding of mental and non−mental health diagnoses appears to be low, as the percent of visits with >1 ICD diagnosis coded was 2.6% in 2010 and 4.9% in 2016. This proportion is small, so it is not likely to significantly impact trend analyses. Conversely, some mental health visits were likely not captured by our ICD scheme, as indicated by the 0.2% admission rate to the psychiatric unit from ED visits classified as non−mental health. Visit classification may also have been impacted by the change from ICD-9 to ICD-10 coding, but the consistency of trends over time argues for validity of the classification scheme.

We excluded children younger than age 5, in order to focus on the group of children most likely to present to the ED with psychiatric illness, but it is possible we missed some mental health visits for very young children. The administrative database had limited information available on discharges, as it did not distinguish between discharges to home and transfers to other psychiatric facilities, limiting our analysis of these subgroups. The time of medical clearance was not available in the database; therefore, we were unable to determine its relative contribution to the total ED LOS.

The cost analysis was limited by some visits that did not have cost information available in the financial database, as there were no cost data from 2010 and only partial cost data through 2013. Trends in cost of care were based only on hospital care and did not include physician fees. Finally, estimated trends in costs rely on the assumption of accurate inflation adjustment; the consumer price indices for inpatient hospital care may not accurately reflect inflation in our geographic region and do not account for any differences in the inflation rate by specific types of services.

Conclusions

In summary, in our pediatric ED, resource utilization for pediatric mental health visits increased substantially from 2010 to 2016. We found rising numbers of mental health visits, patient-hours, prolonged ED LOS ≥ 24 hours, repeat visits over time, and costs. Additional hospital and community resources are needed to address the rising demand for emergency mental health care for children and teenagers. Investments in provider education, ED staffing, and systems changes will be necessary to adequately care for this growing patient population seeking emergency care.

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