Trends in Pediatric Emergency Department Visits for Mental Health Conditions and Disposition by Presence of a Psychiatric Unit

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ABSTRACT

OBJECTIVE: To examine trends in mental health (MH) visits to pediatric emergency departments (EDs) and identify whether ED disposition varies by presence of a hospital inpatient psychiatric unit (IPU).

STUDY DESIGN: Cross-sectional study of 8,479,311 ED visits to 35 children's hospitals from 2012 to 2016 for patients aged 3 to 21 years with a primary MH or non-MH diagnosis. Multivariable generalized estimating equations and bivariate Rao-Scott chi-square tests were used to examine trends in ED visits and ED disposition by IPU status, adjusted for clustering by hospital.

RESULTS: From 2012 to 2016, hospitals experienced a greater increase in ED visits with a primary MH versus non-MH diagnosis (50.7% vs 12.7% cumulative increase, $P < .001$). MH visits were associated with patients who were older, female, white non-Hispanic, and privately insured compared with patients of non-MH visits (all $P < .001$). Forty-four percent of MH visits in 2016 had a primary diagnosis of depressive

disorders or suicide or self-injury, and the increase in visits was highest for these diagnosis groups (depression: 109.8%; suicide or self-injury: 110.2%). Among MH visits, presence of a hospital IPU was associated with increased hospitalizations (34.6% vs 22.5%, $P < .001$) and less transfers (9.2% vs 16.2%, $P < .001$).

CONCLUSION: The increase in ED MH visits from 2012 to 2016 was 4 times greater than non-MH visits at US children's hospitals and was primarily driven by patients diagnosed with depressive disorders and suicide or self-injury. Our findings have implications for strategic planning in tertiary children's hospitals dealing with a rising demand for acute MH care.

KEYWORDS: depression; discharge disposition; emergency department; pediatric mental health; suicide or self-injury

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WHAT'S NEW

The dramatic rise in pediatric mental health emergency department visits is being primarily driven by visits with a primary diagnosis of depression or suicide or self-injury, and there are significant differences in patient hospitalization and transfer rates depending on presence of an inpatient psychiatric unit.

NATIONAL RECOMMENDATIONS FOR pediatric emergency care include strengthening the capacity to address mental health (MH) emergencies as well as timely transfer to inpatient psychiatric care.[1] During the last decade, pediatric emergency department (ED) use for MH conditions has risen dramatically,[2−7] and EDs are increasingly serving as a "safety net" for youth in crisis.[8,9] ED visits with a primary or secondary diagnosis of suicidal ideation or suicide attempt are rising in children's hospitals across the United States,[10,11] but trends for other MH conditions have not been well described. The rise in pediatric ED use for MH conditions is straining the capacity of overcrowded EDs.[6] MH visits are longer, more likely to be triaged to urgent evaluation, and result in more admissions, transfers, and readmissions compared to non-MH visits.[3,12−14] Acute care of pediatric MH conditions in the ED often requires assessment of a broad spectrum of mental and substance use disorders, psychotropic medication treatment regimens, and underlying contextual factors, presenting a unique challenge for ED clinicians without psychiatric training.[15]

Pediatric ED clinicians face many barriers when connecting patients to specialized MH care.[16] Patients who need inpatient care often require a transfer to another facility, with many children enduring long ED wait times due to the national shortage of inpatient psychiatric beds.[17] Hospitals with inpatient psychiatric units (IPUs) may provide quicker access to acute MH care and improved coordination of care across the ED and MH clinical teams. Indeed, the one single-hospital study on this topic found that having an IPU was associated with shorter ED length of stay and higher rates of hospitalization.[16] To date, no national study has evaluated whether the presence of an IPU in a tertiary care children's hospital impacts rates of transfer or hospitalization for patients presenting to an ED with MH conditions.

To address this knowledge gap, using a large administrative database including 35 tertiary care children's hospitals we sought to: 1) describe 4-year trends in pediatric ED visits for primary MH versus non-MH conditions overall and by specific MH condition; 2) describe variation in sociodemographic characteristics, medical complexity, and ED disposition by MH diagnosis status; and 3) identify whether ED disposition for patients with a primary MH condition varies by presence of a hospital IPU. Together, these findings can inform strategic planning of pediatric ED resources in children's hospitals by identifying priority clinical populations and describing the impact of an IPU on ED disposition for patients with a primary MH condition.

METHODS

STUDY DESIGN AND DATA SOURCE

This study was a cross-sectional analysis of the Pediatric Health Information System (PHIS), an administrative database containing hospitalization data from 35 tertiary care US children's hospitals. All PHIS hospitals are members of the Children's Hospital Association (Lenexa, KS). Data quality and reliability are assured jointly by the Children's Hospital Association, participating hospitals, and Truven Health Analytics (New York, NY).[18] Each record in PHIS represents a single discharge and contains administrative data, including demographic characteristics, billing information, and procedures and diagnoses classified by the *International Classification of Disease, Ninth or Tenth Revision, Clinical Modification (ICD-9-CM/ICD-10-CM)*.

STUDY POPULATION

We examined all ED visits for patients aged 3 to 21 years from 2012 to 2016 from 35 hospitals with discharge and billing data for the entire study period. Similar to other studies, we restricted the study sample to visits for patients aged 3 to 21 years to focus on pediatric visits most likely to require acute MH care.[5,6,19]

CLASSIFICATION OF MH DIAGNOSES

The primary reason for ED visit was determined using ED discharge diagnosis codes. MH conditions were classified into diagnosis categories using ICD-9-CM or ICD-10-CM codes based on a scheme previously developed to identify pediatric MH conditions from hospital discharge data.[20] A visit was categorized as a primary MH visit if the primary discharge diagnosis was for a MH condition or met a validated definition for suicide attempt.[21] All other visits were categorized as a primary non-MH visit.

PATIENT AND HOSPITAL CHARACTERISTICS

Characteristics assessed for the primary MH and non-MH groups included age, sex, race/ethnicity, insurance type, medical complexity using the chronic condition indicator system, the complex chronic condition classification system,[22] and ED disposition. For ED MH visits, an ED disposition of admission included admission to a medical or psychiatric bed within the same hospital, and an ED disposition of transfer included both transfer to a psychiatric unit in another hospital and transfer to a free-standing psychiatric facility. A hospital was categorized as having an IPU if they submitted any records to PHIS with psychiatric unit bed charges. Billing codes were used to identify whether a hospital had an IPU available for the entire study period or a portion of the study period.

STATISTICAL ANALYSIS

We assessed associations of patient demographic and clinical characteristics by primary diagnosis group and age group using bivariate Rao-Scott chi-square tests, accounting for hospital clustering. We used traditional chi-square tests to assess associations by the presence of an IPU, since presence of an IPU is clustered at the hospital level. To assess aggregate trends in the growth of ED visits within subgroups, we used linear, multivariable regression. Multivariable models were derived using generalized estimating equations to account for clustering of data within hospitals. The linear generalized estimating equation models contained a random effect for hospital, fixed effects for population factors that may influence the growth trends (eg, total pediatric population, number of US pediatric ED visits, and total number of children living in poverty),[23] and interaction terms for primary diagnosis group and year. An interaction term between primary diagnosis group and year was used to compare the adjusted growth over time among patients visiting for primary MH or non-MH concerns. Cumulative growth was calculated as the percent change between 2012 and 2016. Subgroup analyses were performed on MH ED visits by specific MH condition, hospitals with IPUs for the full study period, and hospitals without IPUs for the full study period. Two hospitals added an IPU during the study period and were excluded from the trends analysis comparing IPU versus non-IPU hospitals. All hospitals were included in chi-square analyses. *P* values <.05 were considered statistically significant, and all analyses were performed with SAS, version 9.4 (SAS Institute, Inc, Cary, NC). This study of deidentified data was reviewed and deemed exempt by the Institutional Review Board at Children's Minnesota.

RESULTS

ED VISITS FOR MH VERSUS NON-MH CONDITIONS

We identified 8,479,311 ED visits that met inclusion criteria. Among these, 245,256 (2.9%) were primary MH visits, which represented 180,558 individual patients. Of patients with MH ED visits, 4.8% had 3 or more visits in a 1-year period. The rate of increase of ED visits for MH conditions from 2012 to 2016 was significantly greater than the increase in visits for non-MH conditions (50.7% vs 12.7%, $P < .001$). The rate of increase in ED visits for MH conditions differed by diagnosis (Figure). Three MH conditions increased by more than 100%, with an over 8 times greater cumulative rise than non-MH visits (Table 1). Visits with a diagnosis of depressive disorder rose 109.8% (6792 visits in 2012 to 14,253 in 2016); visits for suicide or self-injury rose 110.2% (5425 in 2012 to 11,406 in 2016); and visits with a diagnosis of trauma and stressor-related disorders rose 114.8% (1253 in 2012 to 2692 in 2016). Depressive disorders and suicide or self-injury represented almost a third of MH visits in 2012 (31.5%), and grew to 43.9% of visits by 2016.

Sociodemographic characteristics and ED disposition varied among ED patients depending on whether or not the primary diagnosis was a MH condition. Among pediatric ED visits for a primary MH condition, patients were more likely to be older, female, white non-Hispanic, and privately insured compared to youth seen in the ED for a non-MH visit (all $P < .001$; Table 2). Compared with non-MH ED visits, nearly 3 times as many patients visiting the ED with a primary MH condition were admitted (31.0% vs 11.4%, $P < .001$), and over 22 times as many were transferred (11.3% vs 0.5%, $P < .001$). There was no significant difference in medical complexity between MH and non-MH ED visits.

ED VISITS FOR MH CONDITIONS AT IPU VERSUS NON-IPU HOSPITALS

Of the 35 freestanding children's hospitals in our cohort, 14 (40%) had an IPU for the duration of the study period. Two hospitals added an IPU during the study period and were excluded from trend analysis. The majority of patients with a MH visit were treated at a hospital with an IPU (69.8%). Likelihood of having an IPU was significantly associated with hospital size; only 15.4% of hospitals with less than 15,000 admissions in 2016 had an IPU, whereas over half (63.6%) of hospitals with greater than 15,000 admissions had an IPU ($P = .006$). However, the cumulative percentage increase in MH visits at hospitals with an IPU was similar to the increase in MH visits in hospitals with no IPU (47.1% vs 40.5%, $P = .22$).

Patients visiting a hospital with an IPU for a MH condition were more likely to be older, male, white non-Hispanic, and privately insured compared to youth visiting a hospital without an IPU (all $P < .001$; Table 3). MH visits to a hospital with an IPU were more likely to result in admission compared to visits to non-IPU hospitals (34.6% vs 22.5%, $P < .001$), and we found a corresponding decrease in likelihood of transfer at IPU versus non-IPU hospitals (9.2% vs 16.2%, $P < .001$). Combined admission and transfer rates were higher at IPU versus non-IPU hospitals (43.8% vs 38.7%).

ED DISPOSITION BY SPECIFIC CONDITION AND PRESENCE OF AN IPU

The proportion of MH ED visits resulting in transfer compared to admission differed between hospitals with and without an IPU by specific MH condition. Patients visiting IPU hospitals who had a diagnosis of depressive disorders were almost 3 times as likely to be admitted
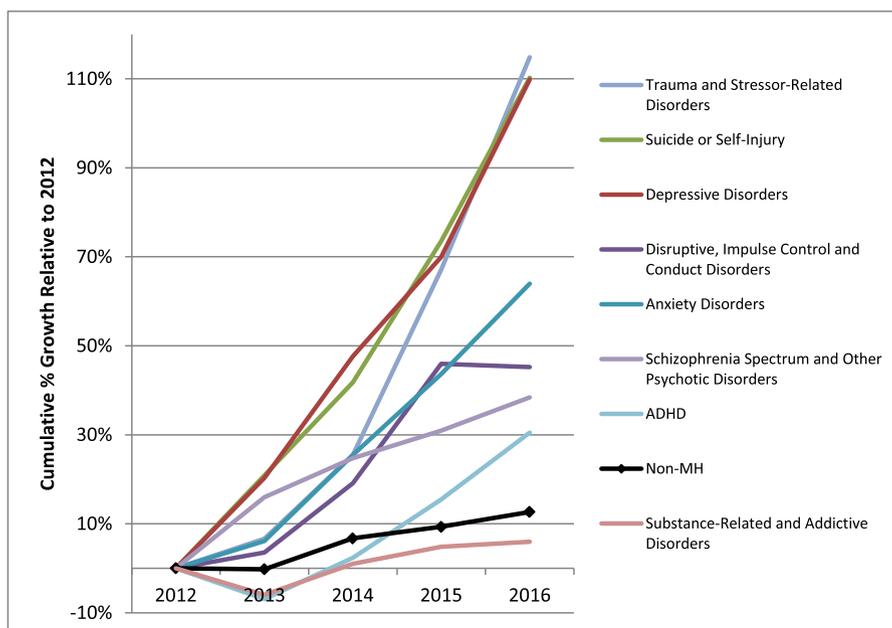

Figure. *Cumulative percentage growth from 2012 to 2016 for primary mental health (MH) versus primary non-MH ED visits.*

Table 1. Cumulative Percent Growth From 2012 to 2016 by Type of ED Visit and Specific MH Diagnosis Groups

	ED Visits in 2012 N	ED Visits in 2016 N	Cumulative % Growth 2012−2016	P Value
Non-MH ED visit	1,555,956	1,755,511	12.7%	-
MH ED visit	38,829	58,503	50.7%	<.001*
Top MH diagnosis groups				
Depressive disorders	6792	14,253	109.8%	<.001
Suicide or self-injury	5425	11,406	110.2%	<.001
Disruptive, impulse control and conduct disorders	5416	7864	45.2%	<.001
Anxiety disorders	3303	5415	63.9%	<.001
Trauma and stressor-related disorders	1253	2692	114.8%	.013
Substance-related and addictive disorders	1757	1862	6.0%	.038
Schizophrenia spectrum and other psychotic disorders	1177	1629	38.4%	<.001
ADHD	1053	1374	30.5%	.051

MH indicates mental health; ED, emergency department; ADHD, attention deficit hyperactivity disorder.
*P value for comparison between cumulative percent growth for MH versus non-MH ED visits.

Table 2. Characteristics of ED Visits for Pediatric Patients Overall and by Presence of a Primary MH Diagnosis From 2012 to 2016

Characteristic	All Patients (N = 8,479,311) n (%)	Primary MH Diagnosis* (N = 245,256) n (%)	Primary non-MH Diagnosis (N = 8,234,055) n (%)
Age, y			
3−7	3,835,865 (45.2)	20,980 (8.6)	3,814,885 (46.3)
8−12	2,363,983 (27.9)	65,802 (26.8)	2,298,181 (27.9)
13−17	1,997,177 (23.6)	151,038 (61.6)	1,846,139 (22.4)
18−21	282,286 (3.3)	7436 (3.0)	274,850 (3.3)
Sex			
Male	4,363,745 (51.5)	112,194 (45.8)	4,251,551 (51.6)
Female	4,114,475 (48.5)	132,942 (54.2)	3,981,533 (48.4)
Race/ethnicity			
White/NH	3,223,535 (38.0)	128,118 (52.2)	3,095,417 (37.6)
Black/NH	2,390,985 (28.2)	57,157 (23.3)	2,333,828 (28.3)
Hispanic	2,047,776 (24.2)	37,007 (15.1)	2,010,769 (24.4)
Other	817,015 (9.6)	22,974 (9.4)	794,041 (9.6)
Payer			
Government	5,263,303 (62.1)	133,764 (54.5)	5,129,539 (62.3)
Commercial	2,638,725 (31.1)	98,142 (40.0)	2,540,583 (30.9)
Self-pay	368,021 (4.3)	7626 (3.1)	360,395 (4.4)
Other	137,383 (1.6)	3105 (1.3)	134,278 (1.6)
Missing	71,879 (0.8)	2619 (1.1)	69,260 (0.8)
Chronic conditions			
CCC	471,809 (5.6)	10,515 (4.3)	461,294 (5.6)
Physical CCI	962,063 (11.3)	25,810 (10.5)	936,253 (11.4)
No CCC or Physical CCI	7,045,439 (83.1)	208,931 (85.2)	6,836,508 (83.0)
ED disposition			
Admitted	1,011,503 (11.9)	75,969 (31.0)	935,534 (11.4)
Discharged	7,221,525 (85.2)	133,964 (54.6)	7,087,561 (86.1)
Transfer	65,296 (0.8)	27,803 (11.3)	37,493 (0.5)
Left against medical advice	76,465 (0.9)	934 (0.4)	75,531 (0.9)
Died	857 (0.0)	20 (0.0)	837 (0.0)
Other	103,665 (1.2)	6566 (2.7)	97,099 (1.2)

MH indicates mental health; NH, non-Hispanic; CCC, complex chronic condition; CCI, chronic condition indicator.
*For primary MH diagnosis (Yes vs No) all differences significant at $P < .001$ with the exception of chronic conditions ($P = .10$).

compared to patients who visited non-IPU hospitals (47.5% vs 17.6%, $P < .001$; Table 4), while those visiting with disruptive, impulse control and conduct disorders were twice as likely to be admitted at IPU hospitals (27.7% vs 11.6%, $P < .001$). The likelihood of patient transfer was significantly lower at IPU versus non-IPU hospitals for the top MH conditions with the exclusion of anxiety disorders. Patients with a diagnosis of suicide or self-injury had the highest transfer rate at both types of hospitals, although the percentage of patients transferred was significantly lower at IPU versus non-IPU hospitals (36.9% vs 53.7%, $P < .001$). Patients with depressive disorders were the next most likely to be transferred, with transfers also less likely at IPU versus non-IPU hospitals (16.0% vs 30.9%, $P < .001$). Finally, we found that patients with depressive disorders had a higher overall combined admission/transfer rate at IPU versus non-IPU hospitals (63.5% vs 48.5%), resulting in lower rates of discharge at IPU hospitals (36.5% vs 51.5%, $P < .001$). In

Table 3. Characteristics of ED Visits With a Primary MH Diagnosis by Presence of a Hospital IPU From 2012 to 2016

Patient Characteristic	Inpatient Psychiatric Unit (N = 171,153) n (%)	No Inpatient Psychiatric Unit* (N = 74,103) n (%)
Age, y		
3–7	13,241 (7.7)	7739 (10.4)
8–12	46,392 (27.1)	19,410 (26.2)
13–17	106,661 (62.3)	44,377 (59.9)
18–21	4859 (2.8)	2577 (3.5)
Sex		
Male	79,047 (46.2)	33,147 (44.7)
Female	92,012 (53.8)	40,930 (55.3)
Race/ethnicity		
White/NH	91,795 (53.6)	36,323 (49.0)
Black/NH	38,519 (22.5)	18,638 (25.2)
Hispanic	24,732 (14.5)	12,275 (16.6)
Other	16,107 (9.4)	6867 (9.3)
Payer		
Government	91,373 (53.4)	42,391 (57.2)
Commercial	71,335 (41.7)	26,807 (36.2)
Self-pay	4616 (2.7)	3010 (4.1)
Other	1786 (1.0)	1319 (1.8)
Chronic conditions		
CCC	6968 (4.1)	3547 (4.8)
Physical CCI	18,980 (11.1)	6830 (9.2)
No CCC or physical CCI	145,205 (84.8)	63,726 (86.0)
ED disposition		
Admitted	59,264 (34.6)	16,705 (22.5)
Discharged	91,328 (53.4)	42,636 (57.5)
Transfer	15,801 (9.2)	12,002 (16.2)
Left against medical advice	654 (0.4)	280 (0.4)
Died	8 (0.0)	12 (0.0)
Other	4098 (2.4)	2468 (3.3)

NH indicates non-Hispanic; CCC, complex chronic condition; CCI, chronic condition indicator; MH, mental health; IPU, inpatient psychiatric unit.
*All differences significant at $P < .001$.

Table 4. Disposition for ED MH Visits Overall and by Presence of an IPU for the 5 Most Common Diagnosis Categories From 2012 to 2016

	Overall N (%)	Hospital IPU	
		Yes* N (%)	No N (%)
Depressive disorders			
N	50,788	43,230	7558
Hospitalization	21,863 (43.0)	20,534 (47.5)	1329 (17.6)
Transfer	9261 (18.2)	6923 (16.0)	2338 (30.9)
Discharged[†]	19,664 (38.7)	15,733 (36.5)	3891 (51.5)
Suicide or self-injury			
N	40,493	21,687	18,806
Hospitalization	13,587 (33.6)	7026 (32.4)	6561 (34.9)
Transfer	18,098 (44.7)	7997 (36.9)	10,101 (53.7)
Discharged	8808 (21.8)	6664 (30.7)	2144 (11.4)
Disruptive, impulse control, and conduct disorders			
N	33,244	24,728	8516
Hospitalization	7847 (23.6)	6859 (27.7)	988 (11.6)
Transfer	4743 (14.3)	2689 (10.9)	2054 (24.1)
Discharged	20,654 (62.1)	15,180 (61.4)	5474 (64.3)
Anxiety disorders			
N	21,113	12,622	8491
Hospitalization	1944 (9.2)	1557 (12.3)	387 (4.6)
Transfer	797 (3.8)	535 (4.2)	262 (3.1)
Discharged	18,374 (87.0)	10,530 (83.4)	7842 (92.4)
Trauma and stressor-related disorders			
N	8947	7851	1096
Hospitalization	3105 (34.7)	2868 (36.5)	237 (21.6)
Transfer	649 (7.3)	527 (6.7)	122 (11.1)
Discharged	5193 (58.0)	4456 (56.8)	737 (67.3)

ED indicates emergency department; MH, mental health; IPU, inpatient psychiatric unit.
*All differences significant at $P < .001$.
†Category includes patients who left against medical advice, died, or other, but vast majority of patients were discharged (95%).

contrast, patients visiting for suicide or self-injury had a lower combined admission/transfer rate at IPU versus non-IPU hospitals (69.5% vs 88.6%), resulting in higher rates of discharge at IPU hospitals (30.7% vs 11.4%, P < .001).

DISCUSSION

From 2012 to 2016, the increase in ED visits to US children's hospitals for MH conditions far outpaced the increase in visits for non-MH conditions. Depressive disorders and suicide or self-injury represented 44% of primary MH visits in 2016, and the increase in visits for these 2 MH conditions was almost 8 times that of non-MH visits. Patients visiting hospitals with an IPU for primary MH concerns were significantly more likely to be admitted, and thus significantly less likely to require transfer compared to patients visiting non-IPU hospitals. For the most common diagnosis group, depressive disorders, patients were nearly 3 times as likely to be admitted and half as likely to be transferred when visiting IPU hospitals. Combined admission/transfer rates also differed by IPU status. For all but 1 of the top 5 diagnosis groups, MH visits at IPU hospitals were more likely to result in either a hospital admission or a transfer to an inpatient unit. Our findings have several implications for strategic planning in tertiary children's hospitals.

Findings from this study confirm continued growth in MH-related ED visits using a large national dataset of tertiary care children's hospitals across the United States. While multiple studies have previously documented the dramatic rise in pediatric ED visits for MH conditions overall,[2−7] the only other study that stratified growth by individual MH condition was limited to data through 2012.[3] In addition, for this study time period, depressive disorders, suicide or self-injury, and trauma and stressor-related disorders were the primary drivers of the substantial cumulative rise in ED MH visits in children's hospitals. MH ED visits were also more likely among adolescents and females. Together, these findings are consistent with prior studies that found increases in ED visits specifically for suicide or self-injury in US youth,[3,10,11,24,25] and an increase in prevalence of major depression, particularly among female adolescents.[26,27] Priority populations for quality improvement interventions in the pediatric ED include youth with major depression or acute suicidal ideation or self-harm. Interventions to improve care may include development of standardized approaches to ED-based suicide and major depression screening, child psychiatric emergency care, and clinician decision support tools for ED disposition and child safety monitoring.

For hospitals considering opening an IPU, our results provide valuable information on the influence an inpatient unit has on patient disposition from the ED. We found that patients visiting IPU hospitals were more likely to be admitted and thus less likely to be transferred to another facility. A previous study by Sheridan et al found that in 2 tertiary pediatric EDs in close proximity, patients with ED visits for MH conditions in a hospital with an IPU were more likely to be hospitalized compared to patients visiting a hospital with no IPU.[16] Our study adds to these findings by including data from 35 tertiary children's hospitals across the United States, and by comparing transfer rates at IPU versus non-IPU hospitals. Our findings also highlight important differences in combined admission and transfer rates by specific diagnosis group. We found a higher combined admission/transfer rate for visits for depressive disorders at IPU versus non-IPU hospitals. In contrast, we found a lower combined admission/transfer rate for visits for suicide or self-injury at IPU versus non-IPU hospitals. A possible explanation for these results includes improved access to an on-site multidisciplinary MH team at IPU hospitals who can assist with ED disposition planning. For patients visiting for suicide or self-injury, the lower combined admission/transfer rate at IPU hospitals may indicate increased comfort with accurately assessing the risk for ongoing self-harm due to improved communication with on-site MH providers, allowing for more discharges.

Less than half of the hospitals in our cohort had an IPU during the study period indicating a national lack of access to inpatient psychiatric care within tertiary children's hospitals. In addition, at IPU hospitals, nearly 1 in 10 patients still required transfer for inpatient psychiatric care. While we do not know the exact numbers of inpatient beds available in IPU hospitals, these results suggest that even hospitals with an IPU cannot accommodate the full demand for admissions due to limited inpatient bed capacity.[28] These findings are consistent with a national shortage of inpatient psychiatric beds which is associated with prolonged ED stays and often results in discharge after long ED stays due to reduction in the MH crisis or frustration with waiting for an available bed.[29] There is limited research on the impact of discharge after long ED stays in pediatric patients, but ED revisit rates are higher for adult patients who had a psychiatric bed request in place prior to being discharged.[29] More than half of the children with a MH visit were discharged from the ED, but the proportion was lower in IPU hospitals. Future research should examine the clinical severity and complexity of youth discharged after a MH ED visit to estimate the extent of unmet need for inpatient psychiatric care.

Adequate access to timely inpatient psychiatric care is crucial for those experiencing a MH crisis, and our results show variation in access by presence of an IPU. While it may be expected that increased admission rates at IPU hospitals would correspond with lower transfer rates, these results have important implications for quality of care and overall healthcare costs. A transfer can result in discontinuity of care, while also resulting in the boarding of patients in the ED, keeping labor-intensive patients under the watch of providers while occupying beds that could be used by other patients. While adding an IPU is not a feasible option for all hospitals, those that have the capacity could justify the addition of inpatient beds to not only improve overall patient experience by providing more timely access to MH care, but also to potentially reduce costs due to a reduction in expensive transfers and avoidance of unnecessary hospitalizations. There are

multiple other ways to further integrate MH care into EDs and hospitals, including the use of training programs to help increase clinician skill and comfort level, strategic investment in MH and behavior specialists (eg, social workers, child life specialists, psychologists, psychiatrists, and behavior analysts) to increase the capacity for evaluation and treatment initiation, and low cost options including telemedicine-based approaches or innovative smartphone applications.[30]

This study has several limitations. We used an administrative dataset and were therefore limited to the information recorded by hospitals and submitted to PHIS. The diagnoses recorded may not have identified the correct MH condition, and there are likely differences in coding practices across sites that could have impacted the primary diagnosis given in the ED. While all ED MH visits were categorized into MH diagnosis groups, 28% of patients had a MH diagnosis code that was not categorized into 1 of our main 8 MH diagnosis groups. Our analysis was at the level of ED visits and not individual patients as our study objectives focused on hospital systems. We only focused on primary diagnosis, and did not take into account patients with secondary MH diagnoses or patients with undiagnosed MH conditions since comorbid MH diagnoses are rarely coded in the ED setting. Since we categorized MH condition using the primary diagnosis, we may have underestimated the rates of ED visits for depressive disorders and suicide or self-harm, such as for patients with a primary diagnosis of a trauma-related injury or overdose related to suicide or self-harm if the MH diagnosis was not coded by the clinical team. There were no standardized criteria to indicate the need for transfer or hospitalization, and we do not know the ultimate disposition of patients after they were transferred. Our rates of transfer may be underestimated as we only recorded transfers directly from the ED, while not accounting for transfers occurring after brief admissions to the hospital. A considerable proportion of patients were admitted at non-IPU hospitals (22.5%), likely due to an immediate need for stabilization; 21.5% of admitted patients were ultimately transferred, likely due to a lack of onsite specialized inpatient psychiatric treatment programs. When examining hospitalizations we could not differentiate between admissions to a medical or psychiatric bed. While billing data allowed us to determine the presence or absence of an IPU, we were not able to determine bed size or capacity of these units. Our study sample was limited to tertiary care children's hospitals, and thus, our findings may not be generalizable to non-children's hospitals. In addition, we only included hospitals that contributed billing data to PHIS continuously throughout the study period, and our study sample may not be generalizable to all tertiary care children's hospitals. There were some coding changes during the transition from ICD-9 to ICD-10 that could have impacted our results, but the consistency of trends over time in our analysis, along with a recent study concluding similar validity in recording clinical condition information,[31] argues for validity of the ICD coding classification scheme.

CONCLUSION

The rise in MH ED visits substantially exceeded non-MH visits in pediatric patients from 2012 to 2016. Our findings show that the dramatic increase is primarily driven by youth requiring acute care for depressive disorders and suicide or self-injury, underscoring the need for hospitals and EDs to identify strategies to address these priority populations. We found significant differences in hospitalization and transfer rates depending on presence of an IPU, which may indicate improved access to inpatient psychiatric care and greater opportunity to coordinate disposition planning with an on-site multidisciplinary MH team. More research will be needed to fully understand the benefits a hospital IPU provides for patients and health systems. Specifically, future studies should examine whether the presence of an IPU leads to more timely and effective care of acute MH conditions as well as reduced costs through reduction of repeat ED visits or psychiatric hospitalizations.

ACKNOWLEDGMENTS

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