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Length of Stay of Pediatric Mental Health Emergency Department Visits in the United States

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Abstract

OBJECTIVE—To compare pediatric mental health emergency department visits to other pediatric emergency department visits, focusing on length of stay.

METHOD—We analyzed data from the National Hospital Ambulatory Medical Care Survey, a nationally representative sample of US emergency department visits from 2001–2008, for patients aged ≤ 18 years ($n=73,015$). Visits with a principal diagnosis of a mental disorder ($n=1,476$) were compared to other visits ($n=71,539$) with regard to patient and hospital characteristics, treatment and length of stay. Predictors of prolonged mental health visits were identified.

RESULTS—Mental health visits were more likely than other visits to arrive by ambulance (21.8% vs. 6.3%, $p<.001$), be triaged to rapid evaluation (27.9% vs. 14.9%, $p<.001$), and be admitted (16.4% vs. 7.6%, $p<.001$) or transferred (15.7% vs. 1.5%, $p<.001$). The median length of stay for mental health visits (169 minutes) significantly exceeded that of other visits (108 minutes). The odds of extended stay beyond four hours for mental health visits was almost twice that for other visits (adjusted odds ratio 1.9, 95% CI 1.5–2.4) and was not explained by observed differences in evaluation, treatment or disposition. Among mental health visits, advancing calendar year of study, intentional self-injury, age 6–13 years, Northeastern, Southern, and metropolitan hospital location, use of laboratory studies, and patient transfer all predicted extended stays.

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Dr. Laska served as the study statistical expert.

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CONCLUSIONS—Compared to other pediatric emergency visits, mental health visits are longer, are more frequently triaged to urgent evaluation, and more likely to result in patient admission or transfer, thereby placing distinctive burdens on US emergency departments.

Keywords

emergency services; psychiatric; length of stay; adolescent psychiatry; child psychiatry

INTRODUCTION

Individual health professionals¹, medical associations², state health agencies³, and the United States (US) Surgeon General⁴ have expressed concern that critical shortages of inpatient and outpatient mental health services increasingly force US children and adolescents to seek care in emergency departments (EDs) and suffer prolonged and growing delays in treatment. Popular press accounts similarly describe extensive delays in ED care of mentally ill youth.^{5–9} While available data suggest mental health problems do account for a rising number and proportion of pediatric ED visits in the US^{3,10,11}, information on the duration of ED pediatric mental health visits has been limited largely to reports from a small number of specialized facilities. In a research network of 24 largely urban, tertiary pediatric EDs, mental health visits by youth aged 19 and younger not resulting in admission or transfer experienced a median length of stay (LOS) of 3.2 hours, exceeding other visits by 1.1 hours.¹² Seven percent of mental health visits in the sample were longer than 24 hours, and mental health visits were more likely to be admitted or transferred than other visits. In another report from one urban pediatric ED, youth receiving psychiatric care had a median 4.8 hours LOS.¹³ A third small study from a single ED described a trend between 1999 and 2002 toward extended stays for pediatric mental health visits.¹⁴ These studies did not include visits to general EDs, where most youth visits occur and which differ from pediatric EDs in youth case mix, treatment patterns, and wait until physician assessment.¹⁵

We analyzed data from a nationally representative sample of ED visits in US hospitals during the years 2001 to 2008 to test the hypothesis that the LOS of pediatric mental health visits exceeds that of non-mental health visits. Further, we compared patient, hospital, and treatment characteristics of pediatric mental health and non-mental health ED visits and assessed factors associated with extended LOS of mental health visits.

METHOD

Study Design

We compared the LOS of pediatric mental health ED visits to non-mental health visits and identified predictors of extended stays for mental health visits. Because no patients were directly contacted, no confidential identifying information was collected, and all data were publicly available, this study was exempted from institutional review board approval.

Setting, Selection of Participants, and Methods of Measurement

Data were drawn from the National Hospital Ambulatory Medical Care Survey (NHAMCS) 2001–2008.¹⁶ NHAMCS is a nationally representative sample of visits to hospital emergency and outpatient departments conducted annually by the National Center for Health Statistics (NCHS). NHAMCS uses probability samples of primary sampling units, approximately 500 short-stay or general hospitals within these units, emergency service areas within hospital EDs, and patient visits within these areas. Data are collected by hospital staff instructed by the Census Bureau. Annual response rates varied from 89.4% to 94.2% and provide data on approximately 40,000 annual visits.¹⁷ Because visits, and not

persons, are sampled, multiple visits by the same patient may be included. Following NCHS recommendations,¹⁸ data from contiguous survey years were combined to derive more stable estimates.

Analyses were limited to visits of patients aged 18 years or younger, resulting in a study sample of 83,015. The selected age range reflects eligibility for most child and adolescent inpatient and community mental health services. Visits were classified as mental health visits based on the presence of a principal diagnosis of a mental disorder, International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 290–316. Principal mental disorder diagnoses were grouped into eight categories based on a modification of a classification presented elsewhere¹⁹: psychotic, bipolar, depressive, anxiety, disruptive behavior or attention-deficit/hyperactivity (ADHD), substance use, adjustment, and other psychiatric. Patient and hospital characteristics included in study analyses are presented below in Table 1, and treatment characteristics and presented in Table 2. Selected variable definitions are provided in table footnotes.

Primary Data Analysis

To obtain national estimates, sample visits were weighted by a factor derived from the sampling procedure. Annual population-adjusted rates of ED visits were calculated using Census Bureau estimates for civilian non-institutionalized residents ≤ 18 years.²⁰ A χ^2 statistic was used to test for differences between mental health and other visits in the distribution of patient, hospital, and treatment characteristics at the 5% level. If the overall distribution for a characteristic differed at $p < .05$, differences for each level of the characteristic were tested using a Bonferroni-adjusted χ^2 statistic (based on the number of categories) to maintain a familywise error rate of 5%.

Kaplan-Meier estimates of distributions of LOS for mental health visits and non-mental health visits were calculated (Figure 1). The pronounced rightward skewness of the distributions prompted us to select logistic regression to model LOS as a dichotomous outcome. A cut-point of 4 hours was chosen based on both review of the existing literature and the LOS distribution observed in the current sample (representing approximately the 85th percentile for all pediatric ED visits). Sensitivity analyses using alternate cut-points at 3 and 5 hours did not alter primary study findings.

Two sets of logistic regression analyses were used to identify significant predictors of extended LOS. The first set used all pediatric ED visits to assess whether principal mental disorder diagnosis predicts extended LOS (> 4 hours), controlling for significant patient and hospital characteristics and, if significant, year of visit. All potential predictors were modeled as categorical covariates with the exception of calendar year of visit, which was modeled as a continuous variable. Potential predictors were eligible for inclusion if they predicted extended LOS at $P < .25$ in a univariate regression. The multivariate model was refit in a backwards stepwise fashion retaining all covariates that significantly predicted extended LOS at $P < .05$. In order to identify whether the effect of a principal mental disorder was moderated by other predictors, we added interaction terms between predictors and the variable encoding the presence of a principal mental disorder in a similar backwards stepwise fashion and retained all interaction terms which significantly predicted extended LOS at $P < .10$. To assess whether treatment differences may have mediated the observed effect of principal mental health diagnosis, we subsequently added treatment characteristics as main effects in the model, retaining those significant at $P < .05$. Treatment effects were considered mediators if distributions of the treatment differed between mental health versus other visits and inclusion of the treatment in modeling attenuated the effect of principal mental health diagnosis.

The remaining set of analyses was conducted using only pediatric mental health visits to identify predictors of extended LOS in this group. The first analysis calculated odds ratios for patient and hospital characteristics from a model including significant patient and hospital characteristics and, if significant, year of visit, selected in the backwards fashion described above. In order to examine potential treatment mediators of the observed patient and hospital effects, the second analysis added treatment variables to the model and examined changes in the effects of patient and hospital predictors. A treatment was considered a mediator of a specific patient or hospital effect if distribution of the treatment differed significantly across the patient or hospital characteristic and if inclusion of the treatment in modeling attenuated the patient or hospital effect.

Calculations were conducted with SUDAAN 10 statistical software (RTI International, Research Triangle Park, NC) using sample weights and strata provided by NHAMCS. Estimates based on fewer than 30 visits are considered unreliable and are labeled in the tables.

RESULTS

Visit Numbers and Population Rates

There was a weighted mean estimate of 480,700 (95% CI 431,400–530,000) ED visits per year for the treatment of mental disorders in US youth. The annual population rate was 6.2 visits per 1,000 US youth (95% CI 5.6–6.8), with a higher rate of ED use by adolescents aged 14–18 years (16.6, 95% CI 14.8–18.4) than by children aged 6–13 years (3.6, 95% CI 2.9–4.3). Population rates of mental health ED visits did not differ between males (6.1, 95% CI 5.3–6.9) and females (6.3, 95% CI 5.6–7.1) or between white (6.2, 95% CI 5.5–6.9) and black Americans (7.1, 95% CI 5.8–8.5), though rates for Hispanics (3.0, 95% CI 2.3–3.7) were significantly lower than for non-Hispanics (6.7, 95% CI 6.0–7.4). The population rate in the Northeast (8.5, 95% CI 7.1–9.8) was higher than in the West (4.6, 95% CI 3.6–5.6) or South (5.3, 95% CI 4.5–6.2), but not the Midwest (7.6, 95% CI 5.6–9.5).

Mental health visits accounted for 1.6% (95% CI 1.5–1.9) of all pediatric ED visits in the US, 4.7% (95% CI 4.2–5.3) of visits for adolescents aged 14–18 years, and 1.4% (95% CI 1.2–1.8) of visits by children aged 6–13 years. The proportion of mental health ED visits ranged regionally from 1.2% (95% CI 1.0–1.4) in the South to 2.2% in the Northeast (95% CI 1.9–2.6).

Patient, Hospital, and Treatment Characteristics

Patient and hospital characteristics for pediatric mental health and non-mental health ED visits are shown in Table 1. Mental health visits were more likely to arrive via ambulance or other public service (police, social service, or other public official escort), between the hours of midnight and 8am, and on weekdays, and were less frequently made by younger, black, Hispanic, and publicly-insured youth. Mental health visits were more likely to be triaged to urgent evaluation and to present with intentional self-injuries or injuries of unknown intent. Almost one-fifth of mental health visits were diagnosed with a co-morbid general medical condition. Mental health visits were more likely than other visits to occur in a metropolitan area and in the Northeast.

Treatment characteristics for pediatric mental health and non-mental health ED visits are shown in Table 2. Mental health visits were less likely to be seen by a physician within the time recommended at triage. A larger proportion of mental health than non-mental health visits received laboratory studies but fewer received imaging studies, therapeutic medical procedures, or medications. Mental health visits resulted in admission or transfer far more frequently than other visits and were less likely to be discharged without a referral.

Table 3 presents the distribution of psychiatric diagnostic groupings in the sample of visits with a principal mental health diagnosis. Depressive disorders were the most common principal diagnoses, followed by anxiety and disruptive behavioral disorders or ADHD.

Length of Stay

Figure 1 presents the distribution functions of LOS for pediatric mental health and non-mental health ED visits. Distributions for both groups demonstrated marked rightward skew, and differences between the distributions rose as percentile increased. The median LOS for mental health visits (169 minutes, 95% CI 156–182) exceeded that for non-mental health visits (108 minutes, 95% CI 105–113) by 61 minutes (56.2%). The proportion of mental health visits longer than 4 hours was 2.4 times the proportion for other visits (28.9% v. 12.2%, $p < .001$). Mean LOS, presented to facilitate comparison with other studies, was 249 minutes for mental health visits and 148 minutes for other visits.

Principal mental health diagnosis was associated with an odds of extended LOS 1.9 (95% CI 1.5–2.4) times that of other diagnosis after adjusting for the effects of significant patient and hospital predictors, which included age, ethnicity, method of arrival, presence and intent of injury, co-morbid mental health and medical diagnoses, and urban hospital setting. In moderator analyses with patient and hospital characteristics, the effect of principal mental health diagnosis varied significantly by patient age and ethnicity. Principal mental health diagnosis predicted extended stays in non-Hispanic youth aged 6–13 years (adjusted odds ratio (AOR) 2.9, 95% CI 1.8–4.6) and 14–18 years (AOR 1.8, 95% CI 1.3–2.5) but not in children aged 5 or younger or in Hispanic youth of any age, for whom non-mental health stays were significantly more likely to be extended than for white youth (16.3% vs. 11.5%, $p < .001$). Among treatment characteristics, wait until initial physician examination, conduct of laboratory studies, imaging, and therapeutic procedures, as well as disposition all significantly predicted odds of extended LOS. However, only increased use of laboratory studies and patient admission explained (mediated) the effect of principal mental health diagnosis. Further, these treatment differences explained only a small proportion of mental health diagnosis effect and did so for non-Hispanic adolescents (AOR 1.8 before vs. 1.5 after addition of treatment effects) but not children.

Predictors of Extended Length of Stay for Mental Health Visits

Predictors of extended LOS (>4 hours) for pediatric mental health ED visits which were significant in multivariate modeling are presented in Table 4. Intentional self-injury, ages 6–13 years and 14–18 years, and treatment in Northeastern, Southern, and metropolitan hospitals all predicted extended LOS. A significant time trend of increased odds of extended stay was also observed (AOR 1.1 for each advancing calendar year, or a cumulative AOR of 1.9, 95% CI 1.3–2.6 for 2008 vs. 2001). Psychiatric diagnosis grouping did not predict extended LOS. Laboratory studies and hospital transfer predicted extended stay, and variation in these treatment characteristics fully explained (mediated) hospital and injury effects, partially explained age effects, and did not explain the year effect.

DISCUSSION

In the present study we describe the LOS for pediatric mental health visits in US hospitals. The population rate of these visits and the proportion of all pediatric visits they represent for 2001–2008 are consistent with the rate of 5.9 per 1,000 youth and proportion of 1.6%, respectively, that were previously reported for 1993–1999.¹¹ Similar to mental health visits in specialized pediatric EDs^{12,13}, pediatric mental health ED visits in the representative sample of general hospitals we studied are longer, triaged to more urgent assessment, and more likely to result in patient transfer or inpatient admission. After a decade of marked

constriction in use of pediatric inpatient mental health care²¹ and persisting concerns over access to outpatient mental health treatment²², ED providers face the challenging task of finding inpatient beds for one third of youth who present with mental disorders.

Mental health visits were over 60 minutes longer than non-mental health visits, a difference which may impart meaningful clinical risks and administrative costs. Extended ED LOS has been implicated in departure of high acuity patients prior to receipt of care, increased ambulance diversion,²³ and patient dissatisfaction. Following a 39 minute reduction in mean LOS, one study reported a decrease of greater than 50% in patients who left without being seen.²⁴ In addition, aggressive, suicidal, and homicidal youth often require monitoring by security personnel. The cost of such monitoring²⁵ increases with visit duration.

Differences in risk of extended stays between mental health and non-mental health visits were not explained by observed evaluation, treatment, or disposition characteristics and were greatest for school age children. Processes specific to evaluation and treatment of mental disorders in youth, including the mental status exam, elicitation of multiple collateral reports in risk assessment, and psychoeducation, are intrinsically time consuming. Alternately, delays may reflect waits for specialist evaluation which were not captured in our data.

Mental health visits were markedly more likely than other visits to arrive with a police or social service escort in our sample, suggesting a distinctive clinical, family, and social context for much emergency pediatric mental health care. Research on two psychiatric emergency services in New York City found that youth brought in by police suffered from greater symptomatic severity, were more violent and self-injurious, more likely to use drugs, from families with greater risk of domestic violence and lesser parental competence, and more likely to be referred to intensive treatment than a propensity-matched sample of walk-ins.²⁶ Police referred youth were not, however, more likely to have experienced court or child protection involvement. Involuntary assessment and social service involvement predicted clinical urgency among youth seen in another urban psychiatry emergency service.²⁷ In our data, differences in referral patterns between mental health and non-mental health visits did not explain the observed difference in LOS, and referral source did not predict extended length of stay among mental health visits, but we lacked important information on child custody, court involvement, and family characteristics.

Our national estimate of length of stay for pediatric mental health visits is considerably shorter than averages reported from urban EDs^{13,25,28} in geographic regions associated with especially long LOS. Laboratory studies and patient transfers appeared to explain the marked regional variation in LOS for emergency mental health visits, but reasons for these different treatment patterns are unclear. Inability to move admitted patients from the ED to an inpatient bed is the most frequently cited reason for ED crowding²⁹⁻³¹, and regional variation in the proportion of EDs able to directly admit mentally ill youth may contribute to the regional variation in ED LOS. One nationally representative survey conducted from 2002 to 2003 found regional variations in pediatric inpatient services accessible from EDs that mirror our ED LOS findings.³² The proportion of EDs in hospitals that did not admit children was highest in the Northeast (16.8%) and South (12.0%), where we found ED LOS to be the longest.³² In some settings, youth are admitted to non-psychiatric units prior to transfer to psychiatric units³³, while in others pediatric mental health admissions are almost exclusively to specialty units³⁴, but this distinction was not made in the above survey.

Probability of extended stays for mental health visits rose over the period we studied. By 2008, the odds of an extended stay (>4 hours) was almost twice that in 2001, and we did not observe comparable growth in the duration of non-mental health visits. Our findings in

youth contrast with a recent comparison including adults which demonstrated no difference between mental health and other visits in the growth of stay durations from 2001 to 2006.³⁵ Together, these data support popular and professional impression of a distinct pattern of growth in the duration of mental health emergency visits for young people, but the causes of this pattern are unclear. Delays in the disposition of severely ill youth might have arisen from rapid constriction in the use of inpatient pediatric mental health services²¹ and in the number of US inpatient psychiatric beds.³⁶ Declining pediatric mental health provider participation in private insurance panels, suggested by anecdotal reports, may also have complicated ED disposition to outpatient care. Finally, growing clinical complexity of pediatric mental health visits, driven by rising use of psychotropic medication monotherapies³⁷ and combination treatments³⁸ in young people, may have prompted more intensive reliance on specialist assessment in the ED and prolong stays.

Interpretation of study findings must consider a number of important limitations. First, we chose to use principal ICD-9 mental health codes to narrowly define mental health visits, and we may therefore underestimate their prevalence. Some other studies have utilized much broader mental health visit definitions, such as any visit in which a principal or secondary mental health diagnosis was given, a mental health reason for the visit was reported by the patient, or a psychotropic medication was prescribed, refilled, continued, or ordered.¹⁰ Second, without expert validation, it is not possible to assess the role of criteria-based mental disorders on ED LOS. Psychiatric diagnosis remains a particular challenge in young people,³⁹ with data supporting both the over- and under-diagnosis of youth mental disorders in routine clinical settings^{40–42} and indicating poor diagnostic agreement between ED and specialty mental health assessments.⁴³ Third, no information was available concerning prior or subsequent treatment patterns for ED visits. 2.1% of mental health and 2.7% of other pediatric visits followed a visit in the previous 72 hours, and because the NHAMCS surveys visits and not persons, the population adjusted rates we report are of visits, not unique persons. Fourth, possible effects of LOS on subsequent treatment and outcome could not be identified. Fifth, treatment charges and costs were unavailable. Sixth, we restricted analyses to youth and did not directly examine whether the trends and associations we found were similar to those in adult ED visits. Finally, because ED-level data were not available, we could not examine how characteristics such as the availability of specialized child and adolescent mental health services, ED volume, or hospital occupancy affect LOS.

Our findings suggest areas for administrative and clinical reform. Specialized emergency mental health teams may substantially shorten LOS for pediatric mental health visits.²⁸ Because ED visit reimbursement does not rise with LOS, such efforts to reduce ED LOS may prove cost-effective²⁸, especially where pediatric mental health volume is substantial. In most community hospital EDs, where pediatric mental health volume is small, assessment of youth with psychiatric symptoms is conducted by ED clinicians with little or no training in pediatric emergency mental health assessment or must await specialist consultation.⁴⁴ Innovations such as regional emergency telepsychiatry consultations may reduce LOS in the ED⁴⁵ and triage with rapid referral may avert ED use. Short-term admission to non-psychiatric beds with psychiatric consultation may also reduce ED overcrowding when specialty beds are unavailable.

The present findings raise questions for future research. Most fundamentally, the relative contributions of clinical and administrative factors to mental health ED LOS require further clarification. Data on the structure and time allocations of pediatric emergency mental health assessments are limited. It is not known to what extent time is devoted to clinical processes such as building an alliance with fearful or defiant youths, gathering important historical information from families and schools, providing psychoeducation, and brief supportive treatment. It is also not known how much time is allocated to administrative challenges,

such as waiting for specialist evaluations, callbacks from mental health benefit managers, and bed openings in distant inpatient units. Additional work is also needed to determine the role of local inpatient and outpatient mental health service availability on ED LOS. Finally, the effect of extended ED LOS on health outcomes for mentally ill youth has not been examined. Information on the qualitative or subjective experiences of youth and families during ED visits, as well their subsequent treatment course and service use, would enhance understanding of whether hastening ED visits might yield substantial improvements in pediatric mental health.

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Figure 1. Distribution of Length of Stay for Mental Health versus Non-Mental Health Pediatric Emergency Department Visits in US Hospitals, 2001–2008. Note: Datapoints labeled with length of stay for each decile and 5th and 95% percentiles. The 50th percentile length of stay duration is the median value.

Table 1

Patient and Hospital Characteristics of Pediatric Mental Health (MH) and Non-Mental Health (NMH) Emergency Department (ED) Visits in US Hospitals, 2001–2008

Characteristic	MH Visits (n=1,476) ^b		NMH Visits (n=71,539) ^b		Comparison Statistics		
	Percent		Percent		χ^2	df	p
Patient Characteristics							
Age, in years							
0–1	1.1 ^c		23.9		57.2	3	≤.001
2–5	2.6		23.7		167.5	1	≤.001
6–13	23.8		28.3		147.6	1	≤.001
14–18	72.6		24.1		4.5	1	≤.05
Female Gender	48.9		48.0		141.2	1	≤.001
Race					0.2	1	0.661
White	77.6		71.2		6.0	2	≤.01
Black	19.8		25.0		9.6	1	≤.01
Other ^d	2.6		3.8		6.6	1	≤.05
Hispanic Ethnicity	11.2		18.6		4.8	1	≤.05
Primary Payer					37.0	1	≤.001
Public Insurer	36.7		43.4		3.3	3	≤.05
Private Insurer	48.1		42.7		7.9	1	<.01
Self Pay	12.4		10.5		5.0	1	≤.05
Free Care & Other ^e	2.8		3.4		2.1	1	0.151
Mode of Arrival					0.5	1	0.465
Ambulance	21.8		6.3		48.4	2	≤.001
Public Service ^f	13.1		1.0		27.7	1	.001
Walk In	65.1		92.7		40.6	1	≤.001
Time of Arrival					48.6	1	≤.001
8:00am – 3:59pm	32.2		35.8		4.2	2	≤.05
4:00pm – 11:59pm	48.5		50.9		2.7	1	0.103
12:00am – 7:59am	19.3		13.2		1.2	1	0.281
					8.3	1	<.01

Characteristic	MH Visits (n=1,476) ^b		NMH Visits (n=71,539) ^b		Comparison Statistics		
	Percent		Percent		χ^2	df	p
Weekend Arrival (Saturday – Sunday)	24.2		31.9		22.8	1	≤.001
Summer Arrival (June – August)	20.0		22.9		1.6	1	0.208
Immediacy with Which Should be Seen (Triage) ^g					19.3	3	≤.001
< 15 Minutes	27.9		14.9		12.5	1	≤.001
15–60 Minutes	46.1		40.9		3.9	1	≤.05
> 1 Hour to 2 Hours	18.4		27.7		19.4	1	≤.001
> 2 Hours	7.6		16.5		30.4	1	≤.001
Injury, Poisoning, or Adverse Effect					22.8	4	≤.001
Not Injured	59.3		62.1		1.1	1	0.295
Intentionally Self Injured	14.4		0.5		52.0	1	≤.001
Assaulted by Others	1.2 ^c		1.4		0.1	1	0.785
Unintentionally Injured	15.7		31.0		59.0	1	≤.001
Injured, Unknown Intent	9.4		5.0		17.7	1	≤.001
Co-morbid Mental Disorder	21.1		0.6		79.7	1	≤.001
Co-morbid General Medical Condition	17.8		31.5		53.5	1	≤.001
Seen in Same ED in Prior 72 Hours	2.1		2.7		1.0	1	0.322
<i>Hospital Characteristics</i>							
Hospital in Metropolitan Area ^h	85.6		83.5		1.5	1	0.228
Hospital Region ^h					5.9	3	<.01
Northeast	23.3		17.1		8.1	1	<.01
Midwest	28.3		23.4		2.4	1	0.130
South	30.8		42.4		13.9	1	≤.001
West	17.7		17.2		0.1	1	0.786
Hospital Ownership ⁱ					2.5	2	0.090
Private Non-Profit	75.5		72.4				
Public Non-Federal	16.3		16.1				
Private For-Profit	8.2		11.5				

Note: df = degrees of freedom

^a MH visits defined as those with principal ICD-9-CM diagnoses 290-316 in youth aged 18 and younger.

^b N represents unweighted sample visits.

^c Unreliable estimate based on n<30 sample subjects.

^d Includes Asian, native Hawaiian/other Pacific Islander, American Indian/Alaska native, or more than one race reported.

^e Includes worker's compensation and unknown sources of payment.

^f Includes non-ambulance police, social service, or other public official.

^g Defined by triage nurse recommendation.

^h Based on US Census conventions.

ⁱ χ^2 calculated for differences in individual variable levels only where the χ^2 for change of the overall distribution function of the variable is significant at $p<0.05$.

Table 2

Treatment Characteristics of Pediatric Mental Health (MH) and Non-Mental Health (NMH) Emergency Department (ED) Visits in US Hospitals, 2001–2008

Treatment Characteristic	MH Visits ^a (n=1,476) ^b		MH Visits ^d (n=1,476) ^b		Comparison Statistics	
	Percent	Percent	χ^2	df	p	
Seen by MD within Time Recommended at						
Triage	73.0	81.0	7.7	1	≤.01	
Laboratory Study Done	67.0	49.2	17.5	1	≤.001	
Imaging Done	30.1	47.5	18.9	1	≤.001	
Therapeutic Medical Procedure Done ^c	23.6	38.8	44.8	1	≤.001	
Medication Given	35.6	73.4	86.4	1	≤.001	
Disposition			22.1	4	≤.001	
Discharge without Referral	32.2	50.8	39.0	1	≤.001	
Discharge with Referral	33.1	39.3	6.0	1	≤.05	
Admit	16.4	7.6	23.4	1	≤.001	
Transfer	15.7	1.5	53.0	1	≤.001	
Other ^d	2.7	0.8	6.2	1	≤.01	

Note: df = degrees of freedom; MD = medical doctor

^a MH visits defined as those with principal ICD-9-CM diagnoses 290–316 in youth aged 18 and younger.^bN represents unweighted sample visits.

^c Does not include psychosocial interventions.

^dIncludes dead on arrival, died in the ED, left without being seen, or left against medical advice.

Table 3

Principal Diagnosis of Pediatric Mental Health (MH) Emergency Department Visits in US Hospitals, 2001–2008

Diagnostic Group (n=1,476) ^b	% of MH Visits ^a (95% CI)
Depressive (381)	23.9 (20.3–27.9)
Anxiety (274)	21.6 (18.1–25.7)
Disruptive Behavior and ADHD (263)	19.8 (16.7–23.3)
Substance Use (226)	14.4 (11.3–18.2)
Psychotic (113)	7.2 (5.6–9.3)
Bipolar (76)	4.4 (3.1–6.4)
Adjustment (75)	3.5 (2.4–5.3)
Other Psychiatric (68)	5.0 (3.6–7.0)

Note: ADHD = attention-deficit/hyperactivity disorder. CI = confidence interval.

^a MH visits defined as those with principal ICD-9-CM diagnoses 290–316 in youth aged 18 and younger.

^b N represents unweighted sample visits.

Significant Predictors of Extended Length of Stay (> 4 Hours) of Pediatric Mental Health (MH) Emergency Department Visits in US Hospitals, 2001–2008

Table 4

Predictor	% of MH Visits (n=1,476) ^a	Median LOS, in min	% of Stays > 4 hr	AOR of LOS > 4 h (95% CI)	Statistics
					F df p
<i>Advancing Calendar Year of Visit</i>	-	-	-	1.1 (1.1–1.2) ^b	10.2 1 ≤.01
<i>Patient Characteristics</i>					
Injury, Poisoning, or Adverse Effect					7.7 4 ≤.001
Intentionally Self Injured	14.4	210	42.0	2.3 (1.5–3.6) ^b	
Injured, Unknown Intent	9.4	168	32.2	1.7 (1.0–2.8)	
Unintentionally Injured	15.7	148	22.9	0.9 (0.5–1.6)	
Not Injured	59.3	168	26.2	Reference	
Age, in Years					6.0 2 ≤.01
6–13	23.8	170	33.8	4.5 (1.8–11) ^b	
14–18	72.6	171	28.1	3.2 (1.3–7.8) ^b	
<5	3.6	112	8.7	Reference	
<i>Hospital Characteristics</i>					7.7 3 ≤.001
Hospital Region					
Northeast	23.3	203	37.4	2.9 (1.8–4.6) ^b	
South	30.8	172	33.3	2.3 (1.4–3.6) ^b	
West	17.7	151	27.4	1.6 (0.9–2.9)	
Midwest	28.3	144	17.3	Reference	
Hospital Urbanicity					9.4 1 ≤.01
Metropolitan Area	85.6	178	31.1	2.3 (1.3–4.0) ^b	
Non-Metropolitan Area	14.5	127	16.4	Reference	
<i>Treatment Characteristics (Mediators)</i>					13.3 1 ≤.001
Laboratory Study					
Done	67.0	177	39.8	3.8 (1.8–8.1) ^b	
Not Done	33.1	134	16.2	Reference	

Predictor	% of MH Visits (n=1,476) ^a	Median LOS, in min	% of Stays > 4 hr	AOR of LOS > 4 h (95% CI)	Statistics		
					F	df	p
Disposition						7.0	4
Transfer	15.7	292	52.5	3.4 (1.6–7.1) ^b			≤.001
Discharge with Referral	40.8	154	22.3	1.7 (0.8–3.6)			
Admit	16.4	180	32.2	1.7 (0.8–3.4)			
Discharge without Referral	27.6	142	22.7	Reference			

Note: CI = confidence interval; df = degrees of freedom; F = Wald F test; LOS = length of stay.

^a N represents unweighted sample visits. Mental health visits defined as those with principal ICD-9-CM diagnoses 290–316 in youth aged 18 and younger.

^b Adjusted odds ratio (AOR) significantly different from 1 at p<.05.