

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

Sarah D. Case, M.D., Brady G. Case, M.D., Mark Olfson, M.D., MPH,
James G. Linakis, M.D., Ph.D., Eugene M. Laska, Ph.D.

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 to 2008, for patients aged ≤ 18 years ($n = 73,015$). Visits with a principal diagnosis of a mental disorder ($n = 1,476$) were compared to 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% versus 6.3%, $p < .001$), to be triaged to rapid evaluation (27.9% versus 14.9%, $p < .001$), and to be admitted (16.4% versus 7.6%, $p < .001$) or transferred (15.7% versus 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 4 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. **Conclusions:** Compared with 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. *J. Am. Acad. Child Adolesc. Psychiatry*, 2011;50(11):1110–1119. **Key Words:** emergency services, psychiatric, length of stay, adolescent psychiatry, child psychiatry

Individual health professionals,¹ medical associations,² state health agencies,³ 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 to experience growing delays in treatment. Popular press accounts similarly describe prolonged waits for ED care of mentally ill youth.^{5–9} Although available data suggest that 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 primarily urban, tertiary pediatric EDs, mental health visits by youth 19 years 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 individuals making 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



This article is discussed in an editorial by Dr. Jennifer F. Havens on page 1093.

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. Furthermore, 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 18 years old or younger, resulting in a study sample of 73,015. 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 disorder (ADHD), substance use, adjustment, and

other psychiatric disorders. 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 noninstitutionalized residents younger than 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 $p < .05$. 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, if the treatment effect was significant, and

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