Published in final edited form as:

Pediatr Emerg Care. 2019 October ; 35(10): 716–721. doi:10.1097/PEC.0000000000001651.

Factors Associated with Length of Stay in Emergency Departments for Pediatric Patients with Psychiatric Problems

Joseph L. Smith, M.P.H[1], **Alessandro S. De Nadai, M.A.**[2], **John Petrila**[1], **Eric A. Storch, Ph.D.**[1,2,3,4,5]

[1]Department of Health Policy & Management, College of Public Health, University of South Florida

[2]Department of Psychology, University of South Florida

[3]Department of Pediatrics, University of South Florida

[4]Rogers Behavioral Health - Tampa Bay

[5]All Children's Hospital - Johns Hopkins Medicine

Abstract

Objectives.—Length of stay (LOS) and boarding for pediatric psychiatric patients presenting in the emergency department (ED) have been understudied, despite evidence that children with psychiatric disorders experience longer LOS relative to those without. This investigation examined correlates of LOS and boarding among youth with psychiatric disorders presenting to the ED in a large, statewide database.

Methods.—Using the 2010-2013 Florida ED discharge database, generalized linear mixed models were used to examine for associations between LOS and patient and hospital characteristics among pediatric patients (<18 years) who presented with a primary psychiatric diagnosis (n=44,328).

Results.—Patients had an overall mean ED LOS of 5.96±8.64 hours. Depending on the definition used (i.e., 12- or 6-hours), between 23% and 58% of transferred patients were boarded. Patient characteristics associated with a longer LOS included female gender, being 15-17 years old, Hispanic ethnicity, having Medicaid or VA/TriCare insurance, having impulse control problems, having mood or psychotic disorders, and exhibiting self-harm behaviors. Patient transfer, large hospital size, and rural designation were associated with longer LOS. Teaching hospital status and profit status were not significantly associated with LOS.

Conclusion.—These data suggest that LOS for pediatric psychiatry patients in the ED varies significantly by psychiatric presentation, patient disposition and hospital factors. Such findings have implications for quality of care, patient safety, and health outcomes.

Keywords

Length of Stay; Boarding; Pediatric Psychiatry; Emergency Department; Suicide

Correspondence to Joseph L. Smith, M.P.H., University of South Florida, Department of Health Policy & Management, 12901 Bruce B Downs Blvd., Tampa, FL 33612. jsmith42@health.usf.edu.

Introduction

Extended length of stay (LOS) and boarding (i.e., waiting for inpatient admission or transfer) in the emergency department (ED) are harmful and costly to both patients and hospitals.[1-4] Long LOS and boarding are endemic for patients presenting with psychiatric problems,[1,5,6] especially children.[7-9] Pediatric patients with psychiatric problems are twice as likely to have ED stays lasting more than 4 hours, when compared to pediatric patients with only medical disorders.[7] Furthermore, over a third of pediatric patients requiring psychiatric care are boarded in EDs.[8] Unfortunately, pediatric patients with psychiatric problems may be vulnerable to negative consequences resulting from long LOS and boarding due to the delay in specialized care. In general, consequences of long ED LOS and boarding include longer inpatient LOS,[2] greater frequency of admissions[2] and disruptive behavior requiring intervention by clinical or security staff.[10] Therefore, it is necessary to empirically identify factors related to ED LOS to mitigate such consequences.

Prior studies examining LOS and boarding in pediatric patients with psychiatric disorders are generally limited to relatively small samples, in a single setting[8,11,12] (for an exception see Case et al.[7]). Within the literature, ED LOS has been associated with self-harm including suicidality,[7,8,11] severity of homicidal ideation,[11] being 6-13 years,[7] being 10-13 years old,[11] being African American,[11] and being seen in a metropolitan hospital.[7] We used these factors, to the extent possible, to examine the contribution of each to LOS.

In this study, we extended these findings by examining the relationship between LOS and patient and hospital characteristics, using a large, statewide ED database. We reviewed the literature for factors affecting ED LOS in pediatric and adult populations. Based on those findings, we hypothesized that longer LOS will be associated with self-harm (including suicidality),[7,8,13] psychotic symptoms,[13] substance use disorders,[14] being under 13 years old,[6,7] large hospital size,[15] nonprofit hospital ownership (versus for-profit ownership),[15] teaching (versus non-teaching hospitals),[15] metropolitan (versus rural hospitals),[7] and transfer disposition (versus discharged home).[7,14] In addition, we hypothesized that uninsured patients would have the longest LOS relative to commercially insured patients.

Methods

This study was a retrospective analysis of the 2010 to 2013 Florida Agency for Health Care Administration ED discharge datasets. These datasets are versions of the State Emergency Department Databases (SEDD) warehoused by the Healthcare Cost and Utilization Project (HCUP) under the U.S. Agency for Healthcare Quality and Research.[16] The dataset contained 28,749,452 patient encounters. Of these 7,391,915 were <18 years, and 44,830 encounters were associated with a well-defined primary psychiatric diagnosis that was not due to physical or birth abnormalities. In addition, records with missing data in any of the hospital characteristics fields were listwise deleted (n=501), as was one patient that died. Therefore, the final sample size was 44,328. The dataset was limited to visits where the patient was discharged home, transferred to another facility, or left against medical advice.

Outcome Variables of Interest

Patient LOS (in hours) served as the principal outcome across analyses. It was calculated by subtracting arrival hour from discharge hour using 24 hour notation; if the LOS was longer than one day, the LOS was calculated as (LOS days*24) + (hour discharge-hour arrival). The dataset indicated only ED arrival and departure times; therefore, it was not possible to identify time from disposition decision to actual disposition. Prior research has indicated that ED LOS in excess of 6 hours is a viable proxy for the occurrence of boarding in adult and child patients who are transferred or admitted;[6] however, pediatric literature has also used LOS ≥ 12 hours.[8] Thus, both criteria were used in the descriptive analysis of boarding for the sake of comparability.

Predictor Variables

Primary psychiatric problems for purposes of the study were grouped based on contemporary classification systems[17], and included anxiety disorders (i.e., ICD-9-CM codes 300.00-300.9, 308.0-308.9, 309.81, 313.0-313.83), attention deficit hyperactivity disorder (ADHD) (i.e.,312.00-312.9, 313.81, 314.00-314.9), impulse control disorders (i.e., 213.30-312.39), mood disorders (i.e., 293.83, 296.00-296.99, 300.4, 311), schizophrenia and other psychotic disorders (i.e., 293.81, 293.82, 295.00-295.95, 297.0-298.9), alcohol and substance disorders (i.e., 291.0-291.9, 303.00-313.93, 305.00, 292.0-292.9, 304.00-305.93, 648.30-648.34, 655.50-655.53, 760.72-760.75, 779.5, 965.00-965.09), and intentional self-harm and suicidality (i.e., E950.0-E959.0). It was not possible to distinguish within the dataset between self-harm intended to result in death versus non-suicidal self-injury. The diagnosis was determined from the ICD-9 code listed as the primary diagnosis (the primary reason for the ED visit) using the Clinical Classifications Software provided by HCUP.[17] Consistent with others,[13,18] we excluded patients with first-listed diagnoses of Autism Spectrum Disorders (ASD), and intellectual and developmental disabilities given significant heterogeneity with regards to reason for presentation. We did not exclude patients with comorbid ASD or intellectual or developmental disabilities.

Frequencies of patient, hospital and encounter characteristics are presented in Table 1. The age of the population was limited to <18 years, following research precedent.[8,13,19] We followed the methods of others[7] who divided race/ethnicity into Caucasian only, African American only, Asian only, Hispanic only, and other/unknown (which included none reported, multiple reported or Alaskan or Hawaiian Native). Hospital characteristics were obtained from the AHCA 'Florida Health Finder' online query tool.[20] Primary payer represented the expected primary payer at time of discharge. The traditional Medicare (fee-for-service) and Medicare managed care organization (MCO) were merged due to small cell sizes. Finally, as previously stated, the dataset dispositions did not include admission to the same hospital; therefore, it was not possible to include children who were admitted to the same hospital from the ED.

Analytic Plan

To examine the relationship between hospital factors and LOS, generalized linear mixed models (GLMMs) were estimated using the lme4 package in the R statistical programming environment.[2122] We assumed a negative binomial distribution for the GLMMs to account

for LOS behaving as a count variable, while random intercepts corresponding to hospital unit were utilized. To evaluate the omnibus impact of predictors, models with fixed effects predictors were compared to intercepts-only models by comparing the deviance of each fixed-effects model to the deviance of the intercept-only model, which follows a X^2 distribution with degrees of freedom corresponding to the difference in number of parameters between models.[23] Post-hoc group comparisons for pairwise comparisons were computed using the Tukey Honestly Significant Difference test via the multcomp package[24] in R, which adapts traditional Tukey comparisons to GLMMs. Statistical significance was defined by $p<.05$.

Results

Table 1 presents the mean LOS by sample characteristics. The mean age of the sample was 14.1±3.3 years and the composition was 52.5% female. Mean LOS for patients was 5.96 hours with a standard deviation (SD) of 8.64 hours. With regard to boarding, 10,896 patients who were transferred to another facility, 58% of patients had LOS > 6 hours (boarded) and 22.7% of patients had LOS ≥ 12 hours.

Psychiatric diagnosis was significantly associated with LOS ($p<.01$). Patients identified as having suicidal thoughts or actions had the longest LOS. In contrast, anxiety disorders were associated with the shortest LOS compared to all other groups (all pairwise comparisons $p<.01$). Only three pairwise comparisons were not significantly different with regard to LOS: schizophrenia versus mood disorders, mood disorders and impulse control disorders, and substance use disorders versus ADHD; all other pairwise comparisons were significantly different ($p<.05$).

Gender was significantly associated with LOS with males having shorter LOS compared to females ($p<.01$). Age was significantly associated with LOS. Post-hoc tests showed that patients aged 5-9 years had the shortest LOS compared to all other groups (all pairwise comparisons $p<.05$), while those 15-17 years had the longest LOS (all pairwise comparisons $p<.01$). Race/ethnicity was significantly associated with LOS ($p<.01$). In post-hoc comparisons, we failed to find a difference between Caucasian, African-American and Asian, and between Hispanic, Asian, and other/unknown race and ethnicities. Hispanic patients stayed longer than Caucasian patients did ($p<.01$) or African American patients did ($p<.01$). Conversely, patients with other or unknown race and ethnicity stayed less time than Caucasian patients did ($p<.01$) or African American patients did ($p<.01$).

Primary payer was significantly associated with LOS ($p<.01$). Patients with traditional Medicaid stayed significantly longer compared to patients with commercial insurance ($p<.001$), Medicaid MCO ($p<.001$), and no insurance. Patients with VA/TriCare stayed longer than commercially insured patients and Medicaid MCO, uninsured, and other/unknown (all pairwise comparisons $p<.05$). No other post-hoc pairwise comparisons for primary payer were significantly different.

Disposition was significantly associated with LOS ($p<.01$). Specifically, patients transferred to a psychiatric facility had the longest LOS ($p<.01$), while patients discharged or who left

against medical advice had the shortest LOS (all pairwise comparisons $p<.01$), but not significantly different from each other.

Hospital characteristics were associated with LOS ($p<.01$). Hospitals with fewer than 25 beds were associated with shorter LOS compared to hospitals with >400 beds ($p<.01$). Similarly, hospitals with 25-100 beds had significantly shorter LOS compared to hospitals with 200-300 beds ($p<.01$) and >400 beds ($p<.001$). All other pairwise comparisons for hospital size were nonsignificant. Hospitals designated as rural had a significantly shorter LOS compared to non-rural hospitals ($p<.01$). There was not a significant difference between teaching and non-teaching hospitals, nor for-profit and non-profit hospitals.

Please see Table 2 for proportions of boarding by disorder and demographic information. Fifty-eight percent of patients had ED LOS over 6 hours, while 22.7% of patients stayed at least 12 hours. In terms of diagnoses, 63.5% of patients with impulse control disorders had stays over 6 hours, but only 14.2% had stays over 12 hours. Less than half of patients with alcohol- and substance-related disorders stayed longer than 6 hours (46.4% and 47.3%, respectively). Nearly the same proportion of each gender were in the ED at 6 and 12 hours. Proportions of boarders increased with patient age, regardless of cut point. With respect to patient race and ethnicity, at 6- and 12- hours, Hispanic patients had the highest proportions of boarding, while Asian patients had the lowest.

Please see Table 3 for proportion of boarding by visit and hospital characteristics. The proportions patients staying over 6 hours, by primary payer, ranged from 57.4% for commercial insurance to 77.5% for Medicare. At the 12-hour threshold, 20.8% of commercially-insured were boarding, while the 27.2% of uninsured patients, 22.5% of Medicaid, 26.8% of Medicare, 26.2% KidCare, and 26.2% of TriCare beneficiaries were boarding. No discernable pattern emerged in terms of hospital size. Proportions of boarding for teaching status, rural status, ownership, and disposition generally decreased over time.

Discussion

We report on correlates of LOS in pediatric patients presenting to the ED with a primary psychiatric diagnosis. The average LOS was nearly six hours. Longer ED LOS was associated with self-harm behaviors, impulse control disorders, mood disorders, psychotic disorders, being aged 15-17 years, Hispanic ethnicity, and having VA/TriCare insurance. Additionally, patient visits that resulted in transfer to another hospital or psychiatric facility, and presentation in large hospitals were also associated with longer LOS. We did not find a difference based on hospital location (urban vs. rural), teaching status, nor hospital profit status. In addition, we found 58% of transferred patients stayed longer than 6 hours and 22.7% stayed 12 or more hours.

Patients with exhibiting intentional self-harm and suicidality had the longest LOS, staying about 9 hours, which supports our hypothesis that patients who pose a danger to themselves would have the longest stays, and is congruent with past findings.7,8,13 Despite the longest LOS, patients exhibiting self-harm did not have longer rates of boarding at either 6 or 12 hours. Consistent with our hypothesis, schizophrenia and psychosis were associated with

longer LOS. We also found longer LOS was positively associated with impulse control and mood disorders. This may reflect the use of observation to ensure that patients no longer present a risk to themselves or others or until appropriate inpatient or outpatient treatment could be arranged. Patients with alcohol or substance use disorders, ADHD and disruptive behaviors experienced similar magnitudes of LOS, but shorter LOS compared to patients with mental disorders (i.e. psychoses or self-harm). For these patients, inpatient admission or transfer is not necessary, yet they may benefit from time to de-escalate in the ED. We hypothesized that substance use would be associated with longer LOS, but we failed to find support for this notion. Anxiety disorders were associated with the lowest LOS, perhaps reflecting lower perceived risk by providers of immediate harm relative to patients with mood disorders or suicidality.[25] We did not directly analyze the impact of secondary diagnoses on LOS, because we assumed that symptoms related to the primary diagnosis were the impetus for the ED visit.

Demographic factors were also important predictors of LOS. In contrast to another study,[7] we found that females exhibited a significantly longer LOS compared to males, although the difference was only 16 minutes. This may reflect additional diagnostics such as pregnancy tests or medical clearance for self-harm,[26] which is more common in female adolescents.[27] The proportion of boarding was nearly the same in males and females. Age was positively associated with LOS, with 15-17 year olds having the longest LOS and children <9 years having the shortest LOS. This seems to contradict previous findings, and our hypothesis, that children 6-13 years were more likely to have a longer LOS compared to older and younger children.[7] The discrepancy may be due to increased heterogeneity and a larger sample size in our study. Our findings may suggest that older children were more likely to have a disorder requiring more time for assessment, stabilization or treatment compared to younger children since serious mental illness typically has a later onset.[28-30] In terms of boarding, the youngest group (i.e., <5 years) had the lowest proportion with the other age groups having similar proportions.

We found that average LOS varied by patient race. Hispanic patients stayed, on average, 49 minutes longer than Caucasian and 29 minutes more than African American patients did, but there was no difference between Caucasian and African American patients. Similarly, Hispanic patients experienced the highest proportion of boarding while Asian patients had the lowest. Our findings in part support earlier work demonstrating significantly longer ED wait times for Hispanic and African American compared to Caucasian patients.[31,32] More specifically, the longer LOS of Hispanic patients might be explained, at least in part, by delays due to a language barrier.[33] Alternative explanations include differences in insurance, [34] or differences in usual source of care.[35] Regarding payer source, the mean LOS varied somewhat, although the largest difference was only 39 minutes (between KidCare and Medicaid). Medicaid and VA/Tricare/other governmental insurance were associated with longer LOS relative to private insurance. The difference between primary payers may reflect additional administrative barriers such as prior authorization or confirmation of coverage. Nonetheless, that the difference was relatively small supporting the notion that patients were treated based on clinical factors rather than financial factors. Interestingly, uninsured patients were not different from insured patients in terms of mean LOS. This was contrary to what

was hypothesized,[36,37] given the ever-increasing costs of care and focus on patient satisfaction scores.

Visit disposition was significantly associated with LOS. Patients who left against medical advice and patients who were discharged home had similiarly short LOS. This may suggest that patients were leaving after being assessed, but before being formally discharged. Consistent with our hypothesis and the work of others,[7] transfers stayed nearly twice as long as those discharged home (9.3 hours vs. 4.8 hours). This implies that discharges might be easier to arrange, though not necessarily better clinically compared to transfers. Moreover, delays in transfer were common and potentially dangerous. Researchers have found that patients may experience harm from lack of appropriate care during this waiting period.[2,3] An increasing literature base has described the shortage of mental health services as a significant contributor to long LOS and boarding.[38-42] Shortages exist in terms of inpatient beds, mental health specialists, outpatient services, partial-hospitalization, care coordination, and other support services.[12,38,39,43] In light of the long LOS, more work is needed mitigate patient flow problems.

Hospital factors, with the exception of size and rural designation, were not associated with LOS in pediatric patients with mental disorders, in contrast with our hypotheses. We found that increasing size of the hospital, as measured by number of beds, was positively associated with LOS in our sample as hypothesized. The LOS in 25-100 bed hospitals was over 2.5 hours longer than LOS in hospitals with over 400 beds. Our findings may reflect that smaller hospitals were discharging patients due to limited specialty pediatric psychiatry, while larger hospitals would be more likely to provide specialty service, but were overburdened. We did find that rural hospitals kept patients, on average, 95 minutes less compared to non-rural hospitals. Rural hospitals tend to have fewer beds compared to urban hospitals due to differences in population density. We failed to find a significant difference in terms of teaching status and profit status of the hospital. This lack of difference in rural hospitals is in contrast to previous work.[7] We failed to find a difference between teaching and non-teaching hospitals, despite studies examining the effect of trainees on LOS in pediatric EDs, in which medical trainees ordered more diagnostic procedures that added to the LOS.[44] Finally, we did not find a difference between hospital ownership types, suggesting that profit motivations did not influence care received.

Limitations

This study has some limitations. First, given the nature of archival data, we were not able to determine causation through randomization. Second, we were unable to analyze patients admitted to the same hospital due to limitations of the dataset; however, patients who were treated and released or transferred also constitute a sizeable, if not the largest, proportion of visits to the ED. In fact, within a pediatric research network, only 30% of pediatric psychiatry patients seen in the ED were admitted to the same hospital.[9] Despite this limitation, our research provides insights on the vast majority of ED visits. Third, the study may not be generalizable beyond treat and release-and-transfer patients seen in Florida EDs. Fourth, we excluded patients with primary autism spectrum disorders and developmental or intellectual disorders on the grounds that these patients are unlikely to seek emergency care

for these conditions; it is more likely that these patients are experiencing symptoms from a secondary disorder. This is different from other included patients that are probably seeking care for their primary listed mental disorder. We acknowledge that patients with these disorders do, in fact, contribute to long LOS and future research should examine them in more detail. Finally, we did not have detailed information for time points during the ED session, so we dichotomized LOS using 6-hour and 12-hour cut points. As such, we felt that it would not be appropriate to use inferential statistics to investigate boarding. Despite these limitations, this study is generally consistent with the findings of other research examining LOS and boarding in pediatric patients.

This study utilized the largest publicly available database in terms of visits and number of facilities to investigate an emerging topic in the pediatric population. We found that LOS of psychiatric pediatric patients was related to psychiatric diagnosis. The most salient difference in LOS was between patients who were discharged home or left against medical advice versus patients who were transferred to another health or psychiatric facility. We also found that large hospitals and non-rural hospitals were associated with longer LOS compared to small and rural hospitals, respectively. We observed some difference across primary payer, but the differences were small, suggesting that patient care was not financially motivated. We failed to find differences by other hospital factors, implying that patient care is relatively stable across hospital settings. Children and adolescents with serious psychiatric disorders may be held in the ED longer than necessary and may benefit from more prompt specialty care. This study provides a basis for inclusion and examination of additional variables related patient and hospital characteristics in future research.

Acknowledgements

This research was supported by the National Institutes of Health under National Institute of Mental Health grant F31 MH094095 (De Nadai). The opinions expressed in this manuscript are that of the authors and do not reflect the opinions of the National Institutes of Health.

REFERENCES

1. Nicks BA, Manthey DM. The impact of psychiatric patient boarding in emergency departments. Emerg Med Int 2012;2012:360308. [PubMed: 22888437]
2. Bekmezian A, Chung PJ. Boarding admitted children in the emergency department impacts inpatient outcomes. Pediatric emergency care 2012;28:236–42. [PubMed: 22344211]
3. Fieldston E, Jonas J, Scharko AM. Boarding of pediatric psychiatric patients is a no-fly zone for value. Hosp Pediatr 2014;4:133–4. [PubMed: 24785554]
4. Bujoreanu S, White MT, Gerber B, Ibeziako P. Effect of timing of psychiatry consultation on length of pediatric hospitalization and hospital charges. Hosp Pediatr 2015;5:269–75. [PubMed: 25934811]
5. Chang G, Weiss A, Kosowsky JM, Orav EJ, Smallwood JA, Rauch SL. Characteristics of adult psychiatric patients with stays of 24 hours or more in the emergency department. Psychiatric services (Washington, DC) 2012;63:283–6.
6. Nolan JM, Fee C, Cooper BA, Rankin SH, Blegen MA. Psychiatric boarding incidence, duration, and associated factors in United States emergency departments. Journal of emergency nursing: JEN : official publication of the Emergency Department Nurses Association 2015;41:57–64. [PubMed: 25034663]
7. Case SD, Case BG, Olfson M, Linakis JG, Laska EM. Length of Stay of Pediatric Mental Health Emergency Department Visits in the United States. Journal of the American Academy of Child & Adolescent Psychiatry 2011;50:1110–9. [PubMed: 22023999]

8. Wharff EA, Ginnis KB, Ross AM, Blood EA. Predictors of psychiatric boarding in the pediatric emergency department: implications for emergency care. Pediatr Emerg Care 2011;27:483–9. [PubMed: 21629148]
9. Mahajan P, Alpern ER, Grupp-Phelan J, et al. Epidemiology of psychiatric-related visits to emergency departments in a multicenter collaborative research pediatric network. Pediatr Emerg Care 2009;25:715–20. [PubMed: 19864967]
10. Santiago LI, Tunik MG, Foltin GL, Mojica MA. Children requiring psychiatric consultation in the pediatric emergency department - Epidemiology, resource utilization, and complications. Pediatric emergency care 2006;22:85–9. [PubMed: 16481922]
11. Mansbach JM, Wharff E, Austin SB, Ginnis K, Woods ER. Which psychiatric patients board on the medical service? Pediatrics 2003;111:e693–8. [PubMed: 12777587]
12. Newton AS, Rathee S, Grewal S, Dow N, Rosychuk RJ. Children's Mental Health Visits to the Emergency Department: Factors Affecting Wait Times and Length of Stay. Emergency medicine international 2014;2014:897904-. [PubMed: 24563785]
13. Waseem M, Prasankumar R, Pagan K, Leber M. A retrospective look at length of stay for pediatric psychiatric patients in an urban emergency department. Pediatr Emerg Care 2011;27:170–3. [PubMed: 21346682]
14. Weiss AP, Chang G, Rauch SL, et al. Patient- and practice-related determinants of emergency department length of stay for patients with psychiatric illness. Ann Emerg Med 2012;60:162–71.e5. [PubMed: 22555337]
15. Karaca Z, Wong HS, Mutter RL. Duration of patients' visits to the hospital emergency department. BMC Emerg Med 2012;12:15. [PubMed: 23126473]
16. HCUP SEDD Database Documentation. Agency for Healthcare Research and Quality, 2016 (Accessed Feb 22, 2016, at https://www.hcup-us.ahrq.gov/db/state/sedddbdocumentation.jsp.)
17. CCS HCaUP. Clinical Classification Software for ICD-9-CM. Rockville, MD: Agency for Healthcare Research and Quality; 2015.
18. Newton AS, Rathee S, Grewal S, Dow N, Rosychuk RJ. Children's Mental Health Visits to the Emergency Department: Factors Affecting Wait Times and Length of Stay. Emerg Med Int 2014;2014:897904. [PubMed: 24563785]
19. Pittsenbarger ZE, Mannix R. Trends in pediatric visits to the emergency department for psychiatric illnesses. Academic emergency medicine : official journal of the Society for Academic Emergency Medicine 2014;21:25–30. [PubMed: 24552521]
20. Facility/Provider Locator 2015 (Accessed May 30, 2015, at http://www.floridahealthfinder.gov/facilitylocator/FacilitySearch.aspx.)
21. Bates D, Maechler M, Bolker B, Walker S. Fitting Linear Mixed-Effects Models Using lme4. Journal of Statistical Software 2015;61:1–48.
22. R: A language and environment for statistical computing. R Foundation for Statistical Computing, 2015 (Accessed October 15, 2015, at https://www.R-project.org.)
23. Snijders TAB, Bosker RJ. Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling. London, UK: Sage Publications Ltd.; 2011.
24. Hothorn T, Bretz F, Westfall P, Heiberger RM, Schuetzenmeister A. Mutltcomp Package for R. 2013.
25. Goldston DB, Daniel SS, Erkanli A, et al. Psychiatric diagnoses as contemporaneous risk factors for suicide attempts among adolescents and young adults: Developmental changes. Journal of Consulting and Clinical Psychology 2009;77:281–90. [PubMed: 19309187]
26. Donofrio JJ, Santillanes G, McCammack BD, et al. Clinical Utility of Screening Laboratory Tests in Pediatric Psychiatric Patients Presenting to the Emergency Department for Medical Clearance. Annals of emergency medicine 2014;63:666–75.e3. [PubMed: 24219903]
27. Cash SJ, Bridge JA. Epidemiology of Youth Suicide and Suicidal Behavior. Current opinion in pediatrics 2009;21:613–9. [PubMed: 19644372]
28. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. LIfetime prevalence and age-of-onset distributions of dsm-iv disorders in the national comorbidity survey replication. Archives of general psychiatry 2005;62:593–602. [PubMed: 15939837]

29. Merikangas KR, Nakamura EF, Kessler RC. Epidemiology of mental disorders in children and adolescents. Dialogues Clin Neurosci 2009;11:7–20. [PubMed: 19432384]
30. Jones PB. Adult mental health disorders and their age at onset. The British Journal of Psychiatry 2013;202:s5–s10.
31. James CA, Bourgeois FT, Shannon MW. Association of race/ethnicity with emergency department wait times. Pediatrics 2005;115:e310–5. [PubMed: 15741357]
32. Schrader CD, Lewis LM. Racial Disparity in Emergency Department Triage. The Journal of emergency medicine 2013;44:511–8. [PubMed: 22818646]
33. Hampers LC, Cha S, Gutglass DJ, Binns HJ, Krug SE. Language barriers and resource utilization in a pediatric emergency department. Pediatrics 1999;103:1253–6. [PubMed: 10353938]
34. Venkat A, Onyekwere U, O'Neill JM, et al. Original Contribution: Racial disparities in insurance reimbursement for physician professional services in the ED. American Journal of Emergency Medicine 2014;32:1060–7. [PubMed: 25085283]
35. Samnaliev M, McGovern MP, Clark RE. Racial/Ethnic Disparities in Mental Health Treatment in Six Medicaid Programs. Journal of Health Care for the Poor and Underserved 2009:165. [PubMed: 19202255]
36. Park JM, Park LT, Siefert CJ, Abraham ME, Fry CR, Silvert MS. Factors associated with extended length of stay for patients presenting to an urban psychiatric emergency service: a case-control study. The journal of behavioral health services & research 2009;36:300–8. [PubMed: 19089640]
37. Mainous AG 3rd, Diaz VA, Everett CJ, Knoll ME Impact of insurance and hospital ownership on hospital length of stay among patients with ambulatory care-sensitive conditions. Annals of family medicine 2011;9:489–95. [PubMed: 22084259]
38. Bender. D; Pande NL M A Literature Review: Psychiatric Boarding. Washington D.C.: Office of Disability, Aging and Long-Term Care Policy, Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services; 2008. Report No.: #HHS-100–03-0027.
39. Bender D; Pande NL M. Psychiatric Boarding Interview Summary: U.S. Department of Health and Human Services; 2009 1 9, 2009.
40. Dolan MA, Mace SE. Pediatric mental health emergencies in the emergency medical services system. Pediatrics 2006;118:1764–7. [PubMed: 17015573]
41. Geller JL, Biebel K. The premature demise of public child and adolescent inpatient psychiatric beds - Part I: Overview and current conditions. Psychiatric Quarterly 2006;77:251–71. [PubMed: 16912929]
42. Alakeson V, Pande N, Ludwig M. A plan to reduce emergency room 'boarding' of psychiatric patients. Health affairs (Project Hope) 2010;29:1637–42. [PubMed: 20820019]
43. Chang G, Weiss AP, Orav EJ, et al. Bottlenecks in the emergency department: the psychiatric clinicians' perspective. General hospital psychiatry 2012;34:403–9. [PubMed: 22516215]
44. James CH M; Johnston P; Sanders B; Shannon M Effect of Trainees on Length of Stay in the Pediatric Emergency Department. Academic Emergency Medicine 2009;16:859–65. [PubMed: 19673709]

Table 1:

Mean ± Standard Deviation (SD) LOS by Sample Characteristics (n=44,328)

	N	Mean ± SD LOS
Diagnosis		
Anxiety Disorders	12,310	4.35±8.05
Attention-Deficit, Conduct, And Disruptive Behavior Disorders	4,287	4.86±6.69
Impulse Control Disorders	388	7.39±5.62
Mood Disorders	10,386	7.82±8.88
Schizophrenia And Other Psychotic Disorders	1,631	7.99±8.13
Alcohol-Related Disorders	5,996	5.44±8.95
Substance-Related Disorders	6,130	5.10±9.26
Intentional Self-Injury and Suicidality	3,200	9.03±8.97
Gender		
Male	21,041	5.82±8.23
Female	23,287	6.09±9.00
Age		
<5 y	1,015	4.92±9.05
5-9 y	3,362	4.70±7.24
10-14 y	13,857	6.03±8.40
15-18 y	26,094	6.13±8.90
Race/Ethnicity		
Caucasian	24,266	5.82±7.85
African American	8,643	6.16±8.96
Asian	193	5.01±7.03
Hispanic	5,876	6.64±11.74
Other/Unknown	5,350	5.57±7.46
Payer		
Commercial	12,721	5.83±8.74
Medicare	247	5.66±6.16
Medicaid	11,047	6.23±8.98
Medicaid MCO	11,026	5.85±8.46
KidCare	1,463	5.58±6.72
VA/TriCare	1,857	6.12±8.04
Uninsured	5,448	6.04±8.80
Other/Unknown	519	5.82±8.70
Disposition		
Transferred	5,276	9.26±8.40
Discharged	32,665	4.81±8.39
Psychiatric Facility	5,620	9.77±8.61
Left Against Medical Advice	767	4.54±6.84
Size		
<25 beds	570	5.17±12.55

	N	Mean ± SD LOS
25-100 beds	3,122	3.99±5.02
100-200 beds	5,835	5.54±10.37
200-300 beds	12,195	6.22±7.59
300-400 beds	5,700	5.24±6.63
>400 beds	16,906	6.56±9.54
Teaching Status		
Teaching	7,231	6.16±8.23
Non-teaching	37,097	5.92±8.72
Rural Status		
Rural	1,566	4.43±8.78
Not Rural	42,762	6.02±8.63
Ownership		
For-Profit	15,698	5.91±8.16
Non-Profit	28,630	5.99±8.89

Table 2:

Boarding (LOS > 6 or ≥12 hours) for Patient Encounters by Diagnosis and Patient Characteristics (n=10,896)

Factor	*n eligible*[*]	LOS > 6 hr.		LOS ≥ 12 hr.	
		n	%	n	%
OVERALL	*10,986*	6,425	58.01	2,472	22.69
Diagnosis					
Anxiety Disorders	909	560	61.61	234	25.74
Attention-Deficit, Conduct, And Disruptive Behavior Disorders	729	343	59.53	173	23.73
Impulse control, NEC	181	115	63.54	27	14.92
Mood Disorders	4,879	3,022	61.94	1,168	23.94
Schizophrenia And Other Psychotic Disorders	850	503	59.18	193	22.71
Alcohol-Related Disorders	351	163	46.44	63	17.95
Substance-Related Disorders	641	303	47.27	123	19.19
Suicide And Intentional Self-Inflicted Injury	2,356	1,325	56.24	491	20.84
Gender					
Male	4,986	2,928	58.72	1,120	22.46
Female	5,910	3,497	59.17	1,352	22.88
Age					
<5 y	89	15	16.585	6	6.74
5-9 y	511	293	57.34	106	20.74
10-14 y	3,849	2,296	59.65	868	22.55
15-18 y	6,447	3,821	59.27	1,492	23.14
Race/Ethnicity					
Caucasian	6,321	3,587	56.75	1,353	21.40
African American	2,136	1,302	60.96	515	24.11
Asian	40	18	45.00	7	17.50
Hispanic	1,063	734	69.05	297	27.94
Other/ Unknown	1,336	784	58.68	300	22.46

[*] The number of patients who were transferred for each row.

Boarding is defined as having a LOS > 6 hours or LOS ≥ 12 hours.

Table 3:

Boarding (LOS> 6 or LOS≥ 12 hours) for Patient Encounters by Hospital and Disposition Characteristics (n=10,896)

Factor	*n eligible*[*]	LOS > 6 hr.		LOS ≥ 12 hr.	
		n	%	n	%
Payer					
Commercial	2,797	1,605	57.38	581	20.77
Medicare	71	55	77.46	19	26.76
Medicaid	3,202	1,858	58.03	720	22.49
Medicaid MCO	2,689	1,624	60.39	596	22.16
KidCare	356	350	59.22	155	26.19
VA/TriCare	591	658	60.76	295	26.23
Uninsured	1083	213	59.83	79	27.24
Other/ Unknown	107	62	57.94	27	25.23
Hospital Size					
<25 beds	70	31	44.29	11	15.71
25-100 beds	610	291	47.70	105	17.21
100-200 beds	1,288	703	54.58	235	18.25
200-300 beds	3,846	2,462	64.01	912	23.71
300-400 beds	1,401	630	44.97	230	16.42
>400 beds	3,681	2,308	62.70	979	26.60
Teaching Status					
Teaching	1,753	1,146	65.37	353	20.14
Non-teaching	9,143	5,279	57.74	2,119	23.18
Rural Status					
Rural	255	110	43.14	41	16.08
Not Rural	10,641	6,315	59.35	2,431	22.85
Ownership					
For-Profit	5,209	2,832	63.18	1,102	21.16
Non-Profit	5,687	3,593	54.37	1,370	24.09
Disposition					
Transferred	5,276	2,950	55.91	1,229	23.29
Psychiatric Facility	5,620	3,475	61.83	1,243	22.12

[*] The number of patients who were transferred for each row.

Boarding is defined as having a LOS > 6 hours or LOS ≥ 12 hours.