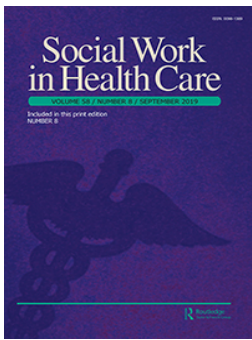


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Characterizing behavioral health-related emergency department utilization among children with Medicaid: Comparing high and low frequency utilizers

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ABSTRACT

While the frequency of children's behavioral health (BH)-related visits to the emergency department (ED) is rising nationwide, few studies have examined predictors of high rates of ED use. This study examines Florida Medicaid claims (2011–2012) for children age 0–18 who were seen in an emergency department (ED) for behavioral health (BH) conditions. A logistic regression model was used to explore factors associated with frequent ED use and patterns of psychotropic medication utilization. The majority (95%) of patients with at least one BH-related ED visit had three or fewer of these visits, but 5% had four or more. Seventy-four percent of ED visits were not associated with psychotropic medication, including over half (54%) of visits for attention deficit hyperactivity disorder (ADHD). Frequent ED use was higher among older children and those with substance use disorders. The implementation of interventions that reduce non-emergent ED visits through the provision of care coordination, social work services, and/or the use of community health workers as care navigators may address these findings.

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Introduction

Recent studies have highlighted families' increasing use of the emergency department (ED) for treatment of their children's behavioral health (BH) conditions (Mapelli, Black, & Doan, 2015; Pittsenbarger & Mannix, 2014; Simon & Schoendorf, 2014; Torio, Encinosa, Berdahl, McCormick, & Simpson, 2015). For example, between 2010 and 2015 the number of BH-related ED visits by youth ages 6–24 years increased by 28% from 31.3 to 41.3 visits per 1,000 (Kalb et al., 2019). Another study suggests that youth make an average of about 0.5 million BH-related visits to EDs nationwide per year

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(Pittsenbarger & Mannix, 2014). Various studies over the past two decades have found that BH visits more broadly by all ages account for 1.6–5% of all ED visits, depending on the methodology used and the study time period (Christodulu, Lichenstein, Weist, Shafer, & Simone, 2002; Grupp-Phelan, Harman, & Kelleher, 2007; Pittsenbarger & Mannix, 2014; Sills & Bland, 2002; Weiss, Wier, Stocks, & Blanchard, 2014).

The rising percentage of BH-related pediatric ED visits may be related to access to outpatient BH care services. Access in many communities continues to present serious challenges, making EDs sometimes the most accessible resource in the community for health care (Aratani & Addy, 2014; Cloutier et al., 2010; Dolan, Mace, American Academy of Pediatrics, & American College of Emergency Physicians, 2006; Frosch, dosReis, & Maloney, 2011; Huffman et al., 2012; Newton, Rathee, Grewal, Dow, & Rosychuk, 2014). In order to facilitate access, some families of pediatric patients rely on the emergency medical system (EMS) for transport to the ED, and recent research suggests that these BH patients make up a significant portion of pediatric EMS transports (Fishe & Lynch, 2019).

Another implication of the growing numbers of BH-related ED visits among children, especially those who have recurrent visits, is the visits' contribution to rising health care costs. Approximately 24% of child and adolescent ED visits for BH conditions result in hospitalization (Huffman et al., 2012). The average ED visit for a BH condition costs anywhere between \$661 for a condition like attention-deficit/hyperactivity disorder (ADHD) (Leibson et al., 2006) to \$3,277 for a psychiatric emergency (Rogers et al., 2015). Other associated costs may result from ED overcrowding or boarding patients with BH conditions in EDs, sometimes for days, due to lack of bed availability in an inpatient psychiatric unit (Hoffmann, Stack, Samnaliev, Monuteaux, & Lee, 2019; Nolan, Fee, Cooper, Rankin, & Blegen, 2014). Total health care costs multiply when the same patient frequently returns to the ED for BH treatment (Rogers et al., 2015; Szabo, 2014). For example, ED visits for youth with depression in the US were estimated to cost \$443.8 million (Sun, Abraham, Slack, & Skrepnek, 2014).

In response to rising levels of BH-related ED utilization among children and the associated increases in health expenditures, health reform efforts have focused on a variety of interventions in order to reduce ED visits, including improvements in care coordination and the promotion of integrated physical and behavioral healthcare in primary care settings (Lynch, Greeno, Teich, & Delany, 2016; McManus, Cramer, Boshier, Akpinar-Elci, & Van Lunen, 2018). In addition, innovative programs that include the establishment of multi-disciplinary teams have been developed in EDs to address the needs of pediatric patients with BH conditions (Roman, Matthews-Wilson, Dickinson, Chenard, & Rogers, 2018). Other efforts have also focused on the development of community paramedicine initiatives where

prehospital providers provide BH referrals, care coordination, as well as other services to help reduce BH-related ED visits (Creed et al., 2018; Prener & Lincoln, 2015).

While there has been a considerable amount of literature that describes BH-related ED visits, further study is needed to better understand children's use of the ED, particularly those with repeat visits that generate considerable costs and require higher levels of coordination. Specifically what is unknown is the link between patient demographic characteristics (e.g., race, gender, age, socioeconomic status), BH service utilization factors (e.g., treatment with psychotropic medication), the context of this use (i.e., ED arrival time), and how these factors contribute to high use (Pines et al., 2011). To date, studies in this area have solely focused on a single hospital's experience, limiting generalizability and likely underestimating high use, as children may visit more than one hospital for care. A recent systematic literature review investigated the predictors of repeat pediatric BH-related ED visits, as well as the differences between repeat and non-repeat visitors, and found only 11 studies published since 1980 that met inclusion criteria (Leon et al., 2017). All of those studies were conducted using either chart review or administrative data, and of the studies that were conducted in the United States, all were at hospitals in urban centers. No studies have been conducted with state level insurance claims data and none focused on ED utilization by children and adolescents from low income families exclusively, although socioeconomic status has been examined as a predictor of ED utilization in several studies (Frosch et al., 2011; Newton et al., 2010, 2012).

Studies suggest that a variety of factors, such as demographic or clinical characteristics and BH utilization patterns, may be associated with frequent ED utilization. Demographic factors, such as age, race/ethnicity, and gender, may play a role in repeat ED visits among children with BH disorders. Studies indicate that older youth with BH conditions may be more likely to be repeat ED visitors (Leon et al., 2017). Furthermore, studies have investigated the role of race/ethnicity in repeat ED visits, finding that children who are non-White may be more likely to have multiple ED visits (Goldstein, Frosch, Davarya, & Leaf, 2007; Newton et al., 2012). Among the transition age youth and adult populations, those who frequently use the ED for BH conditions are more likely to be male, non-Hispanic/Latino, or White; most of these individuals (80%) did not have any ED visits with a primary psychiatric diagnosis, and were characterized by medical, psychiatric, and substance abuse comorbidity (Aratani & Addy, 2014; Brennan, Chan, Hsia, Wilson, & Castillo, 2014).

Clinical characteristics, such as specific BH diagnoses, may also play a role in ED visit frequency: children with more severe diagnoses, such as mood or psychotic disorders, may be more likely to make frequent ED visits, possibly because they are more likely to have a psychiatric emergency (Newton et al.,

2010). In addition to clinical characteristics, ED utilization patterns, like ED arrival time, have been found to play a role in frequent utilization (Cole, Turgay, & Mouldey, 1991; Soto et al., 2009). Finally, outpatient BH service utilization patterns (e.g., availability of alternative outpatient services in a particular geographic area) may play a role in frequent pediatric ED visits. The findings of the systematic literature review (reported above) indicate that only a handful of studies (about five) examined the relationship between past or current behavioral services and repeat ED visits (Leon et al., 2017), and only one study examined treatment with psychotropic medication as a factor related to repeat ED visits, finding that children who used these medications were more likely to have repeat ED visits (Cloutier et al., 2017).

Family socioeconomic status may also be a factor that increases the likelihood of children making ED visits for BH care (Brennan et al., 2014; Hsia, Nath, & Baker, 2014; Pittsenbarger & Mannix, 2014). For some low income families, the ED is an important setting where they seek physical and mental health care, since it is open 24 hours a day and can accommodate caregivers' work schedules, which may not permit paid time off for health care appointments during primary care or specialty health providers' regular business hours (Gordon, 1999). In addition, the ED may be a place where other social needs are presented, such as food insecurity or lack of a regular source of care (Christakis, Mell, Koepsell, Zimmerman, & Connell, 2001; Gordon, Chudnofsky, & Hayward, 2001), and therefore social work services that address these social determinants of health are vital because they potentially reduce ED- and hospital-related costs, including demand for physicians and nurses (Auerbach & Mason, 2010; Gordon, 2001; Keehn, Roglitz, & Bowden, 1994; Wrenn & Rice, 1994).

The purpose of this study was to describe the use of the ED by youth with BH conditions from low-income families who reside within a single state. The current study had three objectives. The first objective was to identify and describe the proportion of youth with a BH diagnosis who frequently visit the ED, and to describe their demographic, diagnostic, and ED arrival time characteristics. Since one past study found that medication-only BH treatment may be a factor in repeat ED visits, the second aim was to describe the types of psychotropic medications that were prescribed for these youth before and during the ED visit, as well as any changes in medication that may have occurred before and during the visit (Cloutier et al., 2017). The third objective was to analyze the demographic, clinical, and medication-related factors associated with high use of the ED for this population.

Methods

Design and data source

This study has approval from the University of Florida-Jacksonville IRB and also SAMHSA's Research Confidentiality Officer. The study used a retrospective, observational design. All ED visits with a BH diagnosis made by youth from low income families between October 2011- June 2012 were selected for this study from a public dataset maintained by the Florida Agency for Healthcare Administration that contained statewide Medicaid claims for ED visits for any condition. The claims of youth in the state's Medicaid program were examined if the youth were 18 years old or younger and from families with incomes up to 133% of the federal poverty level (Florida Department of Children and Families, 2015). These data from Florida's Medicaid program, including both comprehensive and health maintenance organization plan types, were merged with Medicaid medication claims using a unique identification number. For the purposes of this study, low income status was defined as the Medicaid eligibility criteria for that state.

Sample selection

Claims from ED visits made by youth ages 18 years old and younger were selected for analysis if they were associated with an International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) BH diagnosis code (290.00–316.99). Claims with any listed BH diagnosis were selected since research suggests that all diagnoses in the claim (regardless of whether they are primary or secondary) should be considered because they may have relevance to the reason for the ED visit (Senathirajah, Owens, Mutter, & Nagamine, 2011). This approach meant that mental health and substance use diagnoses could be found in any one of the nine diagnosis fields within the claims data for a given case.

Outcome variable

A binary categorical outcome variable was constructed by counting ED visits in date order by the patient's identification number, using the selection criteria defined above. This technique was used to identify the first BH-related ED visit during the study period, but this visit may not necessarily represent the first or last visit during a series of BH services that were provided in order to treat a clinical condition, which overlapped either the study start or end dates (i.e., an initial ED visit that occurred prior to the study period or a subsequent ED visit after the study period). This variable was dichotomized into those youth with four or more ED visits during the study period, classified as high utilizers following a definition used by

another study, versus youth with three or less (but at least one) ED visits who were defined as low utilizers (Neuman et al., 2014).

Predictor variables

Demographic and clinical characteristics variables

Demographic characteristics included the child's age (categories included less than 5 years, 5–9, 10–14, or 15–18 years), and gender (categories included male or female). Race (categories included White, African American, or other) and ethnicity (categories included Hispanic or Latino, non-Hispanic or Latino, other) were also selected as demographic variables. In order to assess clinical characteristics of the children, we used a BH diagnosis variable. This variable was categorized as the individual ever having any of these mutually exclusive ICD-9-CM diagnosis categories: ADHD; substance use disorders; anxiety, somatoform and dissociative disorders; pervasive developmental disorders; episodic mood disorders; or other BH disorders, as well as comorbid BH disorders.

BH services access variables

In order to assess access to BH services, we included two variables. The first was ED arrival time (day of week). This variable captured day of the week, and it was categorized as the patient ever having had an ED visit only on weekdays, weekends, or a combination of the two. The second variable was a system-level variable related to access to BH providers. This variable was defined as residence in a county designated as a mental health professional shortage area (using the Health Resources and Services Administration definition) (Health Resources & Services Administration, n.d.). This variable included the categories “mental health professional shortage county” or “non-mental health professional shortage county.”

BH services utilization variables

These variables were defined as treatment with psychotropic medication. In addition to the role of prior psychotropic medication usage as a factor in repeat ED visits, this study focuses on medication-only BH treatment (i.e., no psychotherapy) connected with the ED visit since other research has indicated that this kind of treatment is more common than the combination of medication and psychotherapy or psychotherapy alone (dosReis et al., 2014; Finnerty et al., 2016). Medication claims were merged with ED claims for all cases that had claims filled for prescriptions for any medical or psychiatric indication. Psychotropic medications were identified, categorized by American Hospital Formulary Service (AHFS) therapeutic class (American Society of Health System Pharmacists, 2016), and the final list of medications was reviewed by a psychiatrist for accuracy. Next, psychotropic medications

were analyzed by therapeutic class. A therapeutic class variable was categorized as the patient ever having had a prescription for the following classes alone: stimulants, antipsychotics, antidepressants, alpha/beta blockers, or other therapeutic classes; a combination of therapeutic classes; or no treatment with psychotropic medication at all (either there was no treatment associated with the period before or during the ED visit, or there was no prescription claim).

Since some ED visits may be precipitated by the need for a new prescription, a refill, or changes to a psychotropic medication, a total of six mutually exclusive medication patterns were assessed using the prescription claims to examine whether they were associated with the ED visit. We deemed the 90 day period prior to the ED visit to be a clinically relevant time period for psychotropic medications to be associated with a target ED visit (Finnerty et al., 2016). As a result, medication claims that occurred between July-October 2011 were also included in the analysis to account for an ED visit that occurred between October-December 2011. The first five psychiatric prescription patterns, which represented treatment with medications, were coded as A) There was at least one psychotropic drug where the drug was only prescribed during the 90 days *before* the ED visit; B) There was at least one psychotropic drug where the drug was only prescribed *during* the ED visit; C) There was at least one psychotropic drug where there was *no change* in the prescribed dosage between 90 days before the ED visit and the dosage prescribed during the ED visit, thus representing a prescription refill; or D) There was at least one psychotropic drug where there was *a change* in the prescribed dosage between 90 days before the ED visit and during the ED visit. A fifth pattern was an “other” psychiatric prescription pattern resulting from any combination of patterns A-D, including cases where E) There was a change of medication between therapeutic classes, change of medication within a therapeutic class, as well as various combinations of psychotropic medications (known as “layering”) associated with the ED visit. The sixth pattern indicated F) No treatment with psychotropic medication associated with the target ED visit.

Analysis plan

SAS version 9.4 was used to conduct descriptive and categorical data analyses using a person-level dataset (SAS Institute Inc., 2013). Frequencies and percentages were calculated for all demographic variables. Binary logistic regression was used to analyze whether there was any relationship between child demographic characteristics, ED arrival time information, psychiatric diagnoses, psychiatric medication therapeutic classes, psychiatric prescription patterns (A-F), and mental health professional shortage area with the dependent variable, which was the count of child visits to the ED due to a BH

condition, dichotomized into high versus low utilizers. Since cell sizes for certain psychiatric prescription patterns were too small for analysis (A-B) in the regression model, these patterns were recoded as one group with patterns C-D. As the objective was to determine the most parsimonious model, we began by testing a series of nested models that included individual- and system-level variables. We used the Vuong test to determine whether the change in fit between models was statistically significant (SAS Inc., 2011).

Results

Our data capture 22,445 ED visits made by 13,009 youth from low-income families who had a BH-related ED visit in Florida. These visits represented 1.2% of all ED visits made by youth with Medicaid during the study period ($N = 1,852,465$). Table 1 presents the demographic and ED utilization characteristics of 13,009 youth from low-income families who made at least one ED visit with a BH diagnosis. More than half of the youth were between 15–18 years old (53%), and a similar proportion were male (57%). Nearly two-thirds of the youth were White (67%) and the vast majority were non-Hispanic/Latino (80%). Just under three-quarters (71%) of the youth made

Table 1. Demographic and ED utilization characteristics of children ages 0–18 years from low income families who made behavioral health related ED visits ($N = 13,009$).

	Frequency	Percentage
Age (years)		
< 5	670	5.15
5–9	2,090	16.07
10–14	3,304	25.4
15–18	6,945	53.39
Race		
Black or African American	3,081	23.68
White	8,708	66.94
Other	1,220	9.38
Ethnicity		
Hispanic or Latino	2,434	18.71
Non-Hispanic or Latino	10,427	80.15
Unknown	148	1.14
Gender		
Female	5,648	43.42
Male	7,361	56.58
Mental Health Professional Shortage Area		
Non-mental health professional shortage county	9,337	71.77
Mental health professional shortage county	3,546	27.26
Unknown	126	0.97
Day of week		
Ever had ED visit on weekends only	3,120	23.98
Ever had ED visit on weekdays only	9,207	70.77
Ever had ED visits on weekdays & weekends	682	5.24
Number of ED visits		
3 ED visits or less	12,428	95.53
4 ED visits or more	581	4.47

visits only during a weekday. The vast majority of youth who had an ED visit with a BH diagnosis had only up to three visits (95%). About 5% of youth had four visits or more during one year and could be classified as frequent ED users (Brennan et al., 2014). The most common BH diagnoses among youth with psychiatric ED visits were substance use disorders (31%) and ADHD only (26%; Supplemental Digital Material (SDM) 1).

Stimulants were prescribed to 7% of youth before or during BH-related ED visits (SDM 2). Among youth with an ADHD diagnosis only, which is commonly treated with stimulants, 54% had pattern F, indicating no current treatment with psychotropic medication (data not shown). Substance use disorder (ICD-9-CM category is “nondependent abuse of drugs”) is an example of a diagnosis that is not commonly treated with the psychotropic medications included in this study. While the vast majority of youth with this diagnosis alone had only an ED visit and no psychotropic medication treatment during the 90 days before or during the ED visit (93%; pattern F), 7% had one of the other prescription patterns (patterns A-D; data not shown).

Goodness of fit statistics for the nested models are available in SDM 3. The final model dropped several variables that were statistically insignificant, including ethnicity, sex, psychiatric medication therapeutic class, and mental health professional shortage area. Table 2 presents the binary logistic regression results with the outcome variable for the final model ($X^2 = 2078.37$,

Table 2. Children ages 0–18 years from low income families who made behavioral health related ED visits – Binary logistic regression results (N = 13,009).

Predictor	Odds Ratio	95% CI		P
Intercept				< 0.0001***
Age ¹				
<5 years	0.39	0.15	1.01	0.05*
5–9 years	0.27	0.11	0.69	0.01**
10–14 years	0.25	0.10	0.64	0.004**
Race ²				
African American	1.51	1.12	2.03	0.01**
Other	0.94	0.65	1.37	0.74
Day of week ³				
Weekdays only	1.07	0.80	1.42	0.64
Combined weekdays & weekends	0.24	0.16	0.35	< 0.0001***
Behavioral health diagnosis ⁴				
ADHD	0.44	0.30	0.65	< 0.0001***
Non-dependent abuse of drugs	1.71	1.09	2.67	0.02*
Anxiety, dissociative and somatoform disorders	0.70	0.45	1.10	0.12
Episodic mood disorders	0.39	0.23	0.68	0.001**
Pervasive developmental disorders	0.63	0.36	1.11	0.11
Comorbid behavioral health diagnoses	0.26	0.16	0.43	< 0.0001**
Prescription pattern ⁵				
Patterns A-D only	4.08	2.62	6.35	< 0.0001**
Pattern E	0.01	0.01	0.02	< 0.0001**

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; comparison group is 1 – Age 15–18 years old; 2 – White; 3 – Weekend only; 4 – Other behavioral health conditions; 5 – No treatment with psychotropic medication (Pattern F).

$p < .0001$). Youth who were classified as high ED utilizers had lower odds ratios of being in a younger age category (<5 (0.39), 5–9 (0.27), and 10–14 (0.25) years old, respectively ($p < .05$)) compared with being 15–18 years old. Youth who were African American had higher odds (1.51, $p < .01$) of making four or more ED visits than White youth. There was a lower odds ratio among high ED utilizers for arrivals that occurred on weekdays and weekends, compared with weekends only (0.24; $p < .001$). Youth with a substance use disorder diagnosis had higher odds (1.71, $p < .05$) of having four or more ED visits compared to youth with other BH diagnoses. Youth who were high ED utilizers had higher odds ratios for psychotherapeutic prescription patterns A-D (4.08, $p < .001$) (compared to those with no treatment with psychiatric medications) than children who made 3 ED visits or less.

Discussion

One of the objectives of this study was to determine the proportion of youth with BH conditions who were frequent ED utilizers. This study found that among the youth with at least one psychiatric ED visit, less than 5% were frequent ED users who had four visits or more. Neuman et al. (2014) found that frequent ED utilizers with four or more visits comprised 8% of visits among children for any condition. Other existing studies measured repeat visits as more than one ED visit rather than the frequent utilization threshold used in this study, and so the repeat visit rates they found are not comparable (Frosch et al., 2011; Newton et al., 2010). Nevertheless, a practice implication stemming from this finding is that a small but important proportion of youth may be frequent utilizers and need specialized BH interventions in the ED, followed by care coordination to facilitate the delivery of outpatient mental health care. Improving ED physicians' access to BH providers, such as social workers, psychologists, and psychiatrists, both onsite in the ED and in the community would assist in this effort (Moore et al., 2016). The presence of BH providers and/or specialized BH teams assigned to the ED may reduce overall and repeated BH-related visits. In addition, focusing intensive outpatient resources on the small proportion of patients with observed frequent ED use may help identify and address underlying factors that may benefit from medication or other BH interventions.

Another objective of this study was to analyze the demographic, clinical, and BH service utilization factors that were associated with high use of the ED by youth from low income families. Youth who were high utilizers had lower odds of being less than 5, 5–9, or 10–14 years old compared with being 15–18 years old, meaning that high utilizers were more likely to be older youth. The finding that older age is associated with repeat ED visits is consistent with past research on this topic (Newton et al., 2010). Youth who made four or more BH-related ED visits were more likely to have had

some treatment with psychotropic medication (patterns A-D) compared with no psychiatric prescription pattern. This finding is consistent with past research that indicates past BH service utilization may be predictive of repeat ED visits (Leon et al., 2017). The practice implication from these findings is that knowing which types of children are more likely to be high ED utilizers may assist providers in targeting interventions to the child's age, so that their needs are met and, in turn, these actions may help reduce avoidable ED utilization.

High utilizers had greater odds of having a substance use disorder diagnosis alone compared with other BH diagnoses. This result is consistent with a study conducted in France that found substance use increased the chance of repeat ED visits (Boyer et al., 2013). The results of our study suggest that most children with substance use disorders do not have treatment with medications prior to or during the ED visit, perhaps because the diagnosis on their claim was abuse rather than dependence. Some children with this diagnosis may also return to the ED because they or their families may not have access to or interest in seeking substance use treatment (Ali, Teich, & Mutter, 2015). A practice implication related to this finding is that the use of multidisciplinary BH liaison programs in EDs may facilitate treatment access for these children, as well as close contact with the patient's pediatrician (Keehn et al., 1994; Moore et al., 2016; Sheridan et al., 2016).

In addition, ADHD also was associated with higher numbers of ED visits. ADHD is a diagnosis that is typically treated with stimulants that are prescribed by primary care providers (Leslie, Stallone, Weckerly, McDaniel, & Monn, 2006; Leslie, Weckerly, Plemmons, Landsverk, & Eastman, 2004). It is concerning that 54% of the ADHD diagnosis-related ED visits were associated with no treatment with psychotropic medications. The relatively low use of pharmaceutical treatment reported in this study and by other studies (Zuvekas & Vitiello, 2012) suggests that low income families may face challenges with accessing regular treatment in primary care or specialty BH care settings and may be unable to afford medications (Steinman, Shoben, Dembe, & Kelleher, 2015). These challenges may be related to their high levels of social need, including food insecurity or money to pay for utilities, as well as a lack of regular transportation (Gordon et al., 2001). Another explanation is that ED visits may represent cases where the medication is not having the desired effect and needs adjustment.

The finding regarding the association of ADHD with high ED utilization suggests implications for both practice and research. The presence of multidisciplinary BH teams in the ED would provide staff who could take responsibility for referrals to community resources and follow-up (i.e., discharge planning) (Grupp-Phelan, 2009). The implementation of interventions that reduce non-emergent ED visits through the provision of care coordination, social work services, and/or the use of community health workers as care

navigators may also address these issues (Enard & Ganelin, 2013; Grossman, Rich, & Johnson, 1998; Ross, Roberts, Campbell, Solomon, & Brouhard, 2004; Sturm, Hirsh, Weselman, & Simon, 2014). Further research on connections from the ED to primary care and specialty BH care settings is needed, specifically examining programs that link patients to care and long-term follow-up.

Limitations

This study was limited by data availability. Other studies have noted the seasonal fluctuation of BH-related ED visits among youth related to the school calendar, noting that in particular the number of such visits rises during the school year compared with the summer months (Goldstein, Silverman, Phillips, & Lichenstein, 2005; Soto et al., 2009). The methodological requirement for a 90 day clinically relevant period in order to assess psychiatric medication utilization prior to the ED visit meant that we could not assess ED visits that were made in September 2011, the first month of the school year, with the available 12 months of data. So while the ED utilization results in this study may be slightly underestimated, the vast majority of the school year when ED visits are known to rise is included in the study analyses.

Another limitation was lack of access to claims for other psychosocial interventions that may have been provided to youth along with prescriptions for psychotropic medications. Having this information would have presented a fuller picture of the treatment that youth may receive in healthcare settings outside of the ED before the ED visit. Perhaps some children with ADHD who received no treatment with stimulants prior to the ED visit received psychosocial interventions; however, regardless of diagnosis, the receipt of medication combined with psychosocial interventions is less common than treatment with medication alone (Ali, Sherman, Lynch, Teich, & Mutter, 2019). While these instances are likely to represent a smaller proportion in comparison to treatment with stimulants, the related insurance claims would not have been captured in the data (Olfson, Druss, & Marcus, 2015; Olfson, King, & Schoenbaum, 2016).

Furthermore, it should be noted that there is no consensus among researchers about the number of ED visits that constitutes frequent utilization (Doupe et al., 2012). Others have noted that research studies on this topic would be strengthened if there was greater consensus in the field regarding the time period during which a subsequent ED visit may be regarded as a repeat visit (Leon et al., 2017).

Conclusion

The Triple Aim of health care is improving person-level care and population health while reducing health care costs (Berwick, Nolan, & Whittington, 2008). An implication for the Triple Aim from this study is that improvements in population health, and in turn reductions in health care costs may be achieved by addressing certain social determinants of health (Moniz, 2010; Waitzkin, 2016). These include advancing access to primary health care and preventive services, as well as improving the health system's capacity to harmonize care delivery across different settings through the integration of physical and behavioral healthcare. This study shows some of the factors that are associated with high levels of repeat ED visits made by youth with BH conditions from low income families. The implementation of medical homes (Monti & Rosner, 2015) and regular follow-up after an ED visit (Lynch et al., 2018) may support improvements in population health by improving access to BH care outside of the ED, possibly reducing ED visits by youth (Moore et al., 2016). Improvements in ED providers' access to community-based BH resources related to treatment of substance use and ADHD are urgently needed so that quality of care improves, health care costs are controlled, and youth experience fewer BH crises.

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Disclaimer

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Disclosure statement

The authors have no conflicts of interest to report.

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