**Integrated Care is Associated with Increased Behavioral Health Access and Utilization for
Youth in Crisis**

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Author Note

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Abstract

Introduction: Pediatric integrated care is well-positioned to play a substantial role in suicide prevention; however, few studies have investigated the impact on identification and treatment of this vulnerable population. **Method:** We investigated differences in service utilization for youth experiencing a behavioral health (BH) crisis in a large, predominantly rural health system by comparing outcomes for 171 youth who received a BH crisis evaluation in an integrated care setting to 171 youth presenting to the emergency department at the main hospital campus (ED) using a retrospective cohort study design. **Results:** Integrated care patients were less likely to be male, more likely to be diagnosed with an Adjustment Disorder and less likely to be diagnosed with Autism Spectrum Disorder. Youth evaluated in integrated care were more likely to receive a psychiatric admission, had a shorter latency to the next BH appointment, and had higher rates of engagement with at least one BH visit in the year following the evaluation. A reduction in frequency of psychiatric admission was observed in the year after the index date with 3 integrated care patients (versus 18 on index date) and 5 ED patients (versus 6 on index date) admitted. **Discussion:** Opportunities for future research on cost-effectiveness of care and continuous improvement towards best practices for youth suicide prevention are discussed. Overall, this study is among few others investigating the potential for pediatric integrated care models to contribute to youth suicide prevention and the study demonstrated promising increases in access and engagement with timely behavioral health care.

Keywords: integrated care; crisis evaluation; adolescents; behavioral health

Integrated Care is Associated with Increased Behavioral Health Access and Utilization for Youth in Crisis

Suicide is the second leading cause of death for children and adolescents in the United States, with an estimated 6,800 deaths in 2018 (CDC, 2020). The number of youths who have attempted (7.4%), considered a plan (13.6%), and seriously considered suicide (17.2%) is alarming (CDC, 2018), and these rates have increased in the last decade (Curtin & Heron, 2019). Youth in crisis often present to the emergency department (ED; Burstein, Agostino, & Greenfield, 2019); from there, suicide risk is assessed, and a disposition made for whether psychiatric admission is warranted. Adolescents are at greatest risk for a return of suicidal ideation and non-suicidal self-injurious behavior in the six months following discharge from a psychiatric inpatient unit (Prinstein, Nock, Simon, Aikins, Cheah, & Spirito, 2008), thus underscoring the importance of effective care coordination for youth experiencing a mental health crisis.

Primary care is a setting with largely untapped potential to contribute to youth suicide prevention efforts. A recent literature review identified that the most common and important components present in primary care suicide interventions are providing provider education and tools for effectively screening and managing both symptoms of depression and suicidality (Dueweke & Bridges, 2018). Luoma, Martin, and Person (2002) found that 75% of adolescents who completed suicide had contact with a primary care clinician (PCC) during the year prior to completing suicide and 50% had contact with their PCC within 30 days of completing suicide. Despite the high frequency of contact with patients at risk of completing suicide, PCCs identify less than 25% of youth with depression or anxiety disorders (Richardson, Russo, Lozano, McCauley, & Katon, 2010). Further complicating identification efforts, research indicates that an

estimated 20% of youth who attempt suicide lack severe depressive symptoms (e.g., Asarnow et al., 2008). Unfortunately, even when youth are identified as needing follow-up care for depression and/or suicidality, there is high variability in referrals (Wissow et al., 2013).

Limitations of current practices are consistent with self-reported beliefs of pediatric residents and training directors that they lack training to adequately assess suicidality (Schoen, Bogetz, Hom, & Bernert, 2019; Sudak, Roy, Sudak, Lipschitz, Maltsberger, & Hendin, 2007).

Although enhanced training and education of PCCs in adolescent suicide is crucial, it is also important that primary care offices have adequate resources to triage and manage these patients when they are identified. Integrated care has the potential to improve identification and care for at-risk youth. Research indicates that integrating behavioral health providers (BHPs) into primary care settings increases patient access to skilled mental health professionals and increases the likelihood that patients follow through with mental health referrals. For example, approximately 80% of children follow through with a referral to a BHP integrated within the primary care setting, whereas just over 45% of children followed through with a referral to a mental health provider in the community (Valleley, Clarke, Lieske, Cortmaker, Foster, & Evans, 2008). Families are more likely to have higher adherence rates with treatment recommendations when the BHP is integrated within the primary care clinic (40%) compared to outpatient mental healthcare provided within the community (20%; Valleley et al., 2008).

The role of psychiatric medication is another topic in youth suicide prevention to better understand. Youth with comorbid diagnoses are more likely to be prescribed multiple medications (Kearns & Hawley, 2018; McIntyre & Jerrell, 2009). It also appears important that highly impaired youth receive timely BH services, as psychiatric comorbidity is a risk factor for suicide (Wunderlich, Bronisch, & Wittchen, 1998). Additionally, although several studies have

demonstrated the effectiveness of SSRIs in reducing subsequent suicide attempts (e.g., Gibbons, Huur, Bhaumik, & Mann, 2006), other studies have demonstrated that youth on multiple medications may actually be more likely to have subsequent inpatient hospitalizations (Fontanella, Bridge, & Campo, 2009). In adult populations, integrated care has demonstrated effectiveness for individuals with a depression diagnosis, including high rates of care continuity with PCCs, completed behavioral health appointments, and use of antidepressants (Felker et al., 2006).

Providing patients, particularly those at risk of attempting or completing suicide, with crisis evaluations in the primary care setting may reduce emergency room use for crisis evaluations. A recent study indicated that when psychology residents were integrated in primary care offices, psychologists were able to safety plan with the majority of crisis patients scheduled, thereby decreasing the number of adolescents who would have otherwise been sent to the ED (Pereira, Wallace, Brown, & Stancin, 2020). These data indicate the importance of effective screening, identification, and triage of at-risk patients to connect adolescents with appropriate services and reduce inappropriate referrals to the ED. Although research in this area is promising, further research is needed to demonstrate the added benefit of psychologists completing crisis evaluations in primary care offices.

The purpose of this study is to examine the acute and follow-up outcomes of crisis evaluations completed in pediatric PCBH compared with those completed in an ED within the same health system. Specifically, we examined whether there were differences in demographic characteristics, psychiatric medications and diagnoses, and admission dispositions on the date of the crisis evaluation. We also assessed for differences in the year following the crisis evaluation on engagement in outpatient BH care, psychiatric admissions, and psychiatric medication refills.

We hypothesized that youth evaluated in primary care would have lower hospitalization rates both at the crisis evaluation and in the year following, quicker access and higher levels of engagement in outpatient BH treatment, and higher levels of medication refills.

Method

Design

A retrospective cohort study was used to compare the effect of receiving a crisis evaluation in integrated care to the ED between 9/1/2016 and 9/1/2018. The index date for each participant was considered the first crisis evaluation completed within the project period, and a one-year follow-up period of 365 days after this date was used.

Participants

This study took place in a large, predominantly rural health system in the Northeast US. Participants were included from ten pediatric primary care behavioral health (PCBH) clinics and the ED located at the hospital main campus. PCBH clinics were staffed with pediatric psychologists and postdoctoral fellows each weekday. BHPs are located at the same practice as PCCs and routinely complete warm handoffs, curbside consultations, attend primary care team meetings and huddles, and engage in group and individual brief, problem-focused psychotherapy with children and families. Additionally, BHPs complete same-day crisis evaluations. To facilitate access to crisis evaluations in the ED, physicians place orders that are completed by a pediatric psychologist or psychology predoctoral intern.

In total, 171 patients who completed a mental health crisis evaluation in one of our ten PCBH clinics and 171 randomly selected patients who completed a pediatric psychology consult in the ED between 9/1/2016 and 9/1/2018. Individuals 21 or older were excluded because they

are not routinely served by pediatric psychology providers in primary care. The IRB reviewed and approved the procedures used in this study.

Procedure

PCBH Sample

PCBH participants comprised patients who were given scheduling priority with a PCBH provider due to a perceived mental health crisis as part of standard PCBH practice. The main determining factor for such visits was whether the PCC, school, or family would have sent the patient to the ED if the PCBH appointment was not available. A patient registry was developed by adopting a procedure that all PCBH providers route the patient encounter to the PCBH team member responsible for maintaining the registry along with pertinent information included in an electronic health record documentation template shared with all BHPs to the clinical champion with the inclusion information. The total number of unique patients in the registry during the project period numbered 175. Study personnel reviewed each registry entry to confirm eligibility based on the following criteria: a) age 0-21 years and still in high school at time of crisis evaluation; and b) completed a crisis evaluation on the date in the registry. After review, one patient was excluded due to age and/or educational status, two were excluded because the encounter was determined to be a follow-up appointment rather than a crisis evaluation, and one was excluded because the documentation did not reflect that a crisis evaluation had been completed. In accordance with IRB regulations, an authorized data broker extracted and de-identified study data.

ED Sample

To define the ED comparison sample for the study, an IRB-approved data broker first used discrete data fields in the EHR for consult orders placed with for pediatric psychology to

construct a sample of all pediatric patients who presented in the ED at the main campus of the health system during 8 am to 5 pm on a weekday for whom a pediatric psychology consult was completed to determine a psychiatric admission disposition during the study period ($N = 735$). Then, a random sample of 171 consults during the study period were selected for inclusion in the present study to match the PCBH sample. The first consult for each patient within the project period was considered the index date, and EHR data was extracted for each patient included in the ED sample.

Electronic Phenotypes Used to Characterize Study Outcomes

Variables included in the analyses were created using EHR data. Next, we describe how these electronic phenotypes were developed.

Demographic Characteristics

Sex. The biological sex of the participant was determined by the value listed in the header bar in the EHR at the time of data extraction.

Age. Age of the participant was determined by computing a variable within SPSS subtracting the date of the first crisis evaluation after 9/1/16 from the date of birth listed in the EHR.

Race and Ethnicity. The race and ethnicity of the participant was determined by the value listed in the demographics table in the EHR.

Clinical Characteristics at Index Date

Psychiatric Medications. Medication orders and medication reconciliation tables for any psychotropic medication prior to the index date were used. Categories of psychiatric medications are as follows: α agonist, Selective Serotonin Reuptake Inhibitor, Mood Stabilizer, Anxiolytic, Second Generation Antipsychotic, Selective Norepinephrine Reuptake Inhibitor, and

Psychostimulant. For use in analyses, presence of ≥ 1 medication was computed to compare the association of any psychiatric medication across groups. Another count variable was created based on the number of unique medications prescribed for each participant.

Psychiatric Diagnoses. This variable was computed based on all psychiatric billing diagnoses provided at the crisis evaluation appointment completed on the index date. From these diagnoses, we constructed the following ICD-10 diagnosis categories (see supplementary materials for a list of ICD codes included in each category): Substance Abuse, Delusional Disorder, Bipolar Disorder, Depressive Disorder, Anxiety Disorder, Obsessive Compulsive Disorder, Post Traumatic Stress Disorder, Adjustment Disorder, Intellectual Disability, Autism Spectrum Disorder, Attention-Deficit/Hyperactivity Disorder, Conduct Disorder, Oppositional Defiant Disorder, Disruptive Behavior Disorder, and Mental Disorder, Not Otherwise Specified.

Clinical Outcomes of Crisis Evaluation

Psychiatric Admissions. This was determined by identifying whether the participant was hospitalized for inpatient psychiatric care at time of index date based on presence of a psychiatric admission order. To determine psychiatric admissions related to the crisis evaluation, we used admission orders on the index date. To determine psychiatric admissions in the follow-up period, we used admission orders in the 365 calendar days following the index date.

Outpatient Behavioral Health Care. Outpatient behavioral health engagement rates were determined using a count of ≥ 1 completed behavioral health appointments in the 365 days following the index date. A count variable was also created summing the number of completed outpatient BH appointments that were scheduled during the one-year follow-up period after the index date for each patient. The latency from the crisis evaluation to next BH appointment was

computed using the difference between the index date and the date of the next completed BH appointment.

Psychiatric Medication Refills. The number of medication refill orders completed in the follow-up period were computed for each medication category for each patient.

Results

Demographic variables, psychiatric diagnoses, rates of hospitalization following crisis evaluation, number of follow-up outpatient BH appointments attended, and days between consult to follow-up are presented in Table 1; medication refills are presented in Table 2. These indicators were compared between PCBH and ED groups using the Chi-square or Fisher's exact test, and two-sample T-test or Wilcoxon rank sum test, as appropriate. PCBH served significantly fewer male patients for mental health crisis compared with ED (34.5% vs. 46.8%, $p = .021$). Patients seen in PCBH clinics for evaluation were more likely to have a primary diagnosis of an Adjustment Disorder ($p < .001$) and less likely to be diagnosed with an Autism Spectrum Disorder ($p = .006$). Patients seen in PCBH clinics for evaluations were less likely to have a prescription for an anxiolytic ($p = .002$) or second-generation antipsychotic ($p = .006$) medication prior to the date of encounter.

Differences in hospitalization rates and follow-up care were also observed between groups. Six (3.5%) of the ED patients were admitted for psychiatric concerns on the index date, compared with 18 (10.5%) PCBH patients, $p = .011$. PCBH patients (70.2%) were more likely than ED patients to have complete a follow-up BH appointment within the health system during the follow-up period (36.8%), $p < .001$. Despite higher psychiatric hospitalization rates on the index date, PCBH patients were seen a median of 8 days after their evaluation, which was 6 days sooner than the median latency for ED patients, $p = .003$. No differences were observed in total

BH utilization between groups in the follow-up period, $p = .068$. No differences were observed across groups in psychiatric admissions in the follow-up period; however, it is noteworthy that the hospitalization rate was comparable to the index date for ED (3.5% index, 2.9% follow-up) and lower for PCBH (10.5% index, 1.7% follow-up). The only difference in psychiatric medication refills observed in the follow-up period was for alpha agonists, with a higher number of refills in the PCBH group, $p = .002$.

Discussion

This study compared baseline characteristics and clinical outcomes of youth presented for a crisis evaluation in a pediatric PCBH setting to youth in an ED at the main hospital campus in the same health system. Consistent with previous literature (e.g., Gardner et al., 2010), fewer male patients were seen in PCBH for crisis evaluations compared to the ED (i.e., 33.9% vs 46.8%, $p = .021$). Of note related to psychiatric diagnoses on the index date, youth served in PCBH were more likely to be diagnosed with Adjustment Disorder ($p < .001$) and less likely to be diagnosed with an Autism Spectrum Disorder (ASD; $p = .006$) compared to the ED. This difference may reflect that PCBH clinicians engage in short-term, problem-focused treatment and so BHPs may diagnose patients with less severe psychiatric disorders especially when little formal assessment is completed.

Youth served in PCBH evidenced a higher rate of hospitalization compared to youth presenting to the ED (10.5% vs 3.5%, $p = .011$). This finding was contrary to study hypotheses, suggesting that a substantial proportion of youth presenting to the ED have less severe presenting problems and may instead benefit from increased access to crisis evaluations in an outpatient setting. Given the definition of a crisis evaluation used in this study is explicitly that the patient would have presented to the ED if this service was not available suggests that the option of

completing a crisis evaluation in our PCBH prevented unnecessary ED utilization in roughly 90% of cases. At the index date within the ED sample, 6 patients were admitted versus 5 in the follow-up period whereas in the PCBH sample 18 were admitted on the index date versus 3 in the follow-up period. This reduction in frequency of admissions in the follow-up period for the PCBH group is encouraging, but should be interpreted with caution as the differences were nonsignificant and may be related to methodological limitations of the study design as noted below or low base rate of this outcome within the samples.

Despite a higher inpatient hospitalization rate, youth served in PCBH connected with a mental health professional after a crisis evaluation in significantly less time than youth presenting to the ED. The results from the present study support the claim that PCBH increases access to BH care for patients, particularly for those in urgent need. There were no significant differences between youth seen in PCBH and the ED in total BH utilization after the crisis evaluation. However, a substantially higher percentage of youth seen in PCBH returned for follow-up BH appointments the year following their crisis evaluation compared to the ED sample (i.e., 70.2% vs 36.8%, $p < .001$). When youth are in crisis or their parents are concerned about their child's mental health, they often contact their child's PCC, which may allow ease of access to BH services within PCBH if services are needed in the future. Further, BHPs develop rapport with youth and their families during crisis evaluations and subsequent BH appointments resulting in development of a therapeutic relationship and may contribute to return to BH services if issues arise in the future.

Finally, contrary to study hypotheses few differences were observed in psychiatric medication use between the two groups at the index date or in the follow-up period. This may suggest high variability in prescribing practices under usual care conditions in line with prior

research (e.g., Mayne et al., 2016), and warrants further investigation into how to best partner with primary care clinicians to navigate the professional and ethical challenges of managing psychiatric medications for youth (Shahidullah, Hostutler, & Forman, 2019).

Limitations and Future Directions

The findings in the present study should be interpreted in the context of its methodological limitations. First, the retrospective observational cohort design leaves open the possibility that differences in unmeasured risk status across groups may account for observed differences. For example, patients without integrated behavioral health may be more likely to use ED services due to lack of access to preventive or acute BH services in the primary care setting. Although clinical acuity does not appear to be a factor that would introduce bias to the study findings, without clinical outcome measurement available in the present study, it is unknown to what extent psychiatric functioning at the index date is a determinant of study outcomes. Patient characteristics and preferences to self-select for treatment in ED settings may also have influenced study outcomes. Given the sample comprised patients from one health system, interpretations of generalizability to other settings should be made with consideration for any differences in demographic and clinical characteristics, as well as other limitations in the study design.

This study highlighted the differences in BH utilization for mental health crises in two service lines within the same health system. Given a higher proportion of the services were delivered in an outpatient setting for the PCBH group, future investigations of potential cost savings appear warranted. Although it is encouraging that more patients in PCBH clinics completed BH follow-up appointments in the year after the crisis evaluation, clinical effectiveness of the PCBH and ED services cannot be determined. Collecting these data in future

prospective research would enable examination of cost-effectiveness; this is of particular relevance given psychiatric admission rates on the index date of only 3.5% within the ED sample in this study. Our findings also highlight opportunities to build partnerships between primary care and EDs within the health system to engage in continuous improvement initiatives using best practice models. Both the PCBH and ED models in the present study are primarily dependent on the patient initiating care. Population behavioral health screening may help to detect more youth at risk for suicide and adopting suicide-specific interventions and a standardized treatment algorithm may help to increase operational, clinical, and financial metrics associated with suicide prevention services.

Conclusion

Patients presenting to the ED for evaluation received a psychiatric admission 3.5% of the time, indicating that there is room for improvement in coordination of care to support more cost-effective ED utilization for these patients. Favorable outcomes were demonstrated for PCBH in timely engagement in follow-up BH care, suggesting that pediatric integrated care can offer increased access to and coordination of care for these at-risk youth. Future research is needed to determine whether patterns of service utilization observed in this study also extend to cost savings of PCBH services. Prospective studies are also needed to investigate clinical effectiveness of PCBH and ED services, which may also identify opportunities for increasing quality of care across the health system through adopting best practice models. Overall, PCBH crisis services show promise as a method to improve youth suicide prevention efforts.

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Table 1

Group Differences in Demographic and Clinical Characteristics, and Clinical Outcomes for Participants at the Index Date and the One Year Follow-up Period

Characteristic	ED		PCBH		<i>p</i>
	<i>n</i>	%	<i>n</i>	%	
Demographics					
Age	13.9	2.9	14.4	2.9	0.088
Male	80	46.8	59	34.5	0.021
Race (White)	161	94.2	158	92.4	0.517
Hispanic or Latino	4	2.3	9	5.3	0.157
Psychiatric Medications					
≥ 1 Medication	53	31.0	46	26.9	0.404
Medications prescribed	3	1, 11	3	2, 8	0.815
α agonist	18	10.5	10	5.9	0.115
SSRI	60	35.1	75	43.9	0.097
Mood Stabilizer	17	9.9	10	5.9	0.160
Anxiolytic	18	10.5	4	2.3	0.002
SGA	24	14.0	9	5.3	0.006

Characteristic	ED		PCBH		<i>p</i>
	<i>n</i>	%	<i>n</i>	%	
SNRI	4	2.3	0	0	0.123
Psychostimulant	19	11.1	24	14.0	0.414
Psychiatric Diagnosis					
Nicotine Dependence	3	1.8	0	0	0.117
Substance Abuse	1	0.6	0	0	0.491
Delusional Disorder	2	1.2	0	0	0.240
Bipolar Disorder	4	2.4	0	0	0.057
Depressive Disorder	92	56.1	91	53.5	0.637
Anxiety Disorder	11	6.7	10	5.9	0.756
OCD	0	0	1	0.6	0.999
PTSD	3	1.8	0	0	0.117
Adjustment Disorders	13	7.9	43	25.3	< .001
ID	1	0.6	0	0	0.491
ASD	7	4.3	0	0	0.006
ADHD	5	3.1	4	2.4	0.747
CD	2	1.2	0	0	0.240

Characteristic	ED		PCBH		<i>p</i>
	<i>n</i>	%	<i>n</i>	%	
ODD	8	4.9	2	1.2	0.058
DBD	11	6.7	19	11.2	0.153
Mental Disorder NOS	1	0.6	0	0	0.491
Clinical Outcomes					
Psychiatric admission at index date	6	3.5	18	10.5	0.011
Psychiatric admission in follow-up period	5	2.9	3	1.7	0.723
≥ 1 BH encounter in follow-up	63	36.8	120	70.2	< .001
^a Number of BH appointments in follow-up period	4	9	6	10	0.068
^a Latency from index date to next BH appointment	18	49	8	12	0.003

Note. *N* = 342 (*n* = 171 for each condition). SSRI, selective serotonin reuptake inhibitor; SGA, second generation antipsychotic; SNRI, selective norepinephrine reuptake inhibitor.

^a median and interquartile range are presented

Table 2

Medication Refills During the One Year Follow-Up Period

Characteristic	ED		PCBH		<i>p</i>
	<i>n</i>	<i>Mdn</i>	<i>n</i>	<i>Mdn</i>	
α agonist	48	1	16	5	.002
SSRI	161	2	261	2	.381
Mood Stabilizer	36	2	20	1	.677
Anxiolytic	7	0	20	0	.677
SGA	76	1	20	0	.147
SNRI	13	1	0	--	---
Psychostimulant	108	0	167	0	--

Note. $N = 342$ ($n = 171$ for each condition). SSRI, selective serotonin reuptake inhibitor; SGA, second generation antipsychotic; SNRI, selective norepinephrine reuptake inhibitor.