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Identification of At-Risk Youth by Suicide Screening in a Pediatric Emergency Department

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Abstract

Objective—The pediatric emergency department (ED) is a critical location for the identification of children and adolescents at risk for suicide. Screening instruments that can be easily incorporated into clinical practice in EDs to identify and intervene with patients at increased suicide risk is a promising suicide prevention strategy and patient safety objective. This study is a retrospective review of the implementation of a brief suicide screen for pediatric psychiatric ED patients as standard of care.

Methods—The ASQ (Ask Suicide Screening Questions) was implemented in an urban pediatric ED for patients with psychiatric presenting complaints. Nursing compliance rates, identification of at-risk patients and sensitivity for repeated ED visits were evaluated using medical records from 970 patients.

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Compliance with Ethical Standards

Disclosure of Potential Conflicts of Interest: The authors declare that they have no conflict of interest.

Ethical Approval: The Johns Hopkins University School of Medicine Institutional Review Board approved this medical record review of data collected as standard of care. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent: For this type of study formal consent is not required.

Results—ASQ was implemented with a compliance rate of 79%. 53% of the patients who screened positive (237/448) did not present to the ED with suicide-related complaints. These identified patients were more likely to be male, African American and have externalizing behavior diagnoses. The ASQ demonstrated a sensitivity of 93% and specificity of 43% to predict return ED visits with suicide-related presenting complaints within six months of the index visit.

Conclusions—Brief suicide screening instruments can be incorporated into standard of care in pediatric ED settings. Such screens can identify patients who do not directly report suicide-related presenting complaints at triage and who may be at particular risk for future suicidal behavior. Results have the potential to inform suicide prevention strategies in pediatric EDs.

Keywords

Suicide; Emergency Department; Screening; Pediatrics

Introduction

Suicide is now the 2nd leading cause of death in both 10–14 year olds and 15–19 year olds, with rates remaining relatively stable since 1990 (Centers for Disease Control and Prevention (CDC), 2016). According to the most recent data from the Youth Risk Behavior Survey, 8.6% of American high school students report that they have attempted suicide in the last year and 3% made a suicide attempt that required medical treatment (CDC, 2016). Across all ages, adolescents aged 15 to 19 years visit the ED for self-harm behaviors more frequently than any other age group (Ting, Sullivan, Boudreaux, Miller, & Camargo, 2012). Given the relationship between past history of suicidal thoughts and behaviors with death by suicide, it is possible that intervening with adolescents who think about and attempt suicide may result in a reduced suicide rate, reduced health care burden and, because of their developmental stage, a significant number of life-years saved.

The pediatric ED is an important setting for identifying children and adolescents at risk for suicide in order to intervene ideally *before* youth attempt or die by suicide (Horowitz, Ballard & Pao, 2009). Not only do many children and adolescents present to the ED for treatment of their suicidal thoughts or after a suicide attempt, ED patients without suicide-related complaints often report suicide risk factors, such as depression, anxiety, aggression, and drug or alcohol abuse (Mahajan et al., 2009; Sheridan et al., 2015). Furthermore, subgroups of children and adolescents use the ED as their primary source of medical care and may not utilize primary care or mental health services; therefore, the ED clinician may be the sole health care provider able to detect suicidal thoughts (Wilson & Klein, 2000). Even when these patients report thoughts of self-harm, they may not receive needed assessments and resources; reviews of Medicaid records suggest that only 39% of youth who present to the ED for self-harm receive a mental health evaluation before discharge and only 43% are linked to mental health outpatient resources (Bridge, Marcus & Olfson, 2012). Standard of care in the ED may also be heterogeneous, with different levels of access to mental health providers across EDs (Grupp-Phelan et al., 2009; Cappelli et al., 2012). Thus, the pediatric ED population forms a particularly underserved population of youth who experience high risk for suicidal behavior.

Screening in the ED is therefore a unique opportunity for suicide prevention. Screening creates a context with at risk youth and their families to discuss suicide risk, identify risk levels, and engage them in prevention efforts. Through screening, ED clinicians can initiate early prevention strategies, such as linkages to treatment, in order to prevent later suicide attempts and potentially save lives. Many ED settings use informal assessments practices; standardized assessment allows clinicians to link positive responses to specific clinical interventions and permits researchers to track the prevalence of acute suicide risk in their ED population. All of these reasons have led the National Action Alliance for Suicide Prevention (NAASP), the group charged with implementing the National Suicide Prevention Strategy, as well as the Joint Commission, to recommend screening for suicide risk in EDs as critical patient safety and suicide prevention initiatives (National Action Alliance for Suicide Prevention Research Prioritization Task Force, 2014; The Joint Commission, 2010; The Joint Commission, 2016). In fact, the NAASP has identified suicide screening efforts that can be easily incorporated into healthcare settings as an “urgent priority” for prevention efforts.

Suicide risk screening in pediatric EDs requires validated instruments and effective screening procedures which fit the needs of the healthcare setting (Boudreaux & Horowitz, 2014). Few, if any, analyses have addressed the implementation of suicide screening instruments in real-world settings. This study is a systematic examination of suicide risk screening as routine care for patients presenting to the ED for psychiatric reasons using a brief screen (Ask Suicide Screening Questions or ASQ) in an urban ED (Horowitz et al., 2012). ED screening for suicidal behavior may be particularly relevant for urban environments, in which many children and adolescents are exposed to violence, trauma and stress, which may lead youth to seek emergency treatment (Breslau, 2009). In particular, screening interventions that can identify African American youth are sorely needed. Most research on suicidal behavior has focused on European-American youth, yet the suicide rates in African American children have recently increased (Bridge et al., 2015). These youth are particularly hard to reach with services, are less likely to seek mental health treatment when needed and are more likely to isolate from supportive social groups when distressed (Goldston et al., 2008; Langhinrichsen-Rohling, Friend, & Powell, 2009; Molock, Puri, Matlin, & Barksdale, 2006). There is the potential that through such screening, youth with suicidal thoughts can be identified *before* they go onto make attempts.

This study had several goals: 1) to examine nursing compliance with administration and the degree to which patient characteristics impact nursing compliance; 2) to describe the relationship between screening results and primary complaint, demographics and disposition; 3) to identify the added value of the ASQ in identifying children and adolescents for whom suicide risk may have otherwise gone undetected; 4) to evaluate the relationship between ASQ screening results and repeat visits to the ED for suicide-related reasons.

Methods

This was a retrospective cohort study of a consecutive case series of patients in the Johns Hopkins Hospital Pediatric ED from March 2013 through August 2014 (76 weeks/18 months), where the ASQ was implemented as a selective prevention strategy. ED nursing

staff used the ASQ as a standard of care during intake procedures for patients entering the ED for psychiatric reasons. The Johns Hopkins Pediatric ED is part of an urban academic pediatric medical center with approximately 30,000 patient visits per year. Eligible patients for this analysis were ages 8 through 18 years and presented with a psychiatric presenting complaint. No patients were excluded on the basis of sex, minority status, or insurance type. This medical record review was approved by the Johns Hopkins School of Medicine Institutional Review Board.

Screening Assessment

The *Ask Suicide Screening Questions* (ASQ) is a 4-item non-proprietary suicide screening instrument that can be administered to patients in the ED for psychiatric or non-psychiatric reasons, aged 10 to 21 years, by nurses regardless of psychiatric training (Horowitz, et al., 2012). All questions are asked to the patient and a “yes” response to any of the four items is considered a positive screen. The four items are the following: “In the past few weeks, have you wished you were dead?”, “In the past few weeks, have you felt that you or your family would be better off if you were dead?”, “In the past week, have you been having thoughts about killing yourself?”, and “Have you ever tried to kill yourself?” The ASQ was developed from a study of 524 patients across three pediatric EDs using the *Suicide Ideation Questionnaire* (SIQ) as the criterion standard (Reynolds, 1987). In the initial development study, for psychiatric patients, the ASQ was found to have a sensitivity of 97.6%, a specificity of 65.6% and a negative predictive value of 96.9% compared with the SIQ. Evaluations are underway to determine if other scoring methods, including adding the number of “yes” responses, would be a beneficial screen, but no empirical data has been published as of yet.

Implementation Procedures

This screening effort involved an interdisciplinary team with trans-disciplinary collaboration, including emergency medicine physicians, emergency department nurses, epidemiologists and psychologists involved in the creation of the screening instrument. After discussion among the team, the ASQ was presented to a hospital-wide multidisciplinary group charged with monitoring changes to the Electronic Medical Record (EMR). Once the group agreed to adopt the ASQ as standard of care, the screen was built into the EMR. Several factors facilitated ASQ implementation and sustainability in this setting including the Joint Commission’s National Patient Safety Goal requiring behavioral health care organizations, psychiatric hospitals, and general hospitals treating individuals for emotional or behavioral disorders, to identify individuals at risk for suicide. The characteristics of the screen also contributed to the decision to implement as the ASQ is very brief, easily scored and in the public domain. The ASQ was added to the EMR in the pediatric ED for patients presenting with psychiatric concerns in March of 2013.

Before implementation, the nurses were trained via a series of brief in-services on the floor of the ED; charge nurses were given additional training in order to facilitate monitoring of the screening efforts. The nursing department for this ED is around 60 individuals; over 35 are specifically trained on triage assessment. The trainer was a clinical psychology postdoctoral fellow who was part of the team that developed and conducted validation

studies of the ASQ instrument. After a few months of implementation, an additional presentation was made to the charge nurses in June 2013 to share initial compliance rates and problem-solve any administration concerns. While the trans-disciplinary team was involved throughout to troubleshoot any concerns, the continued use of the ASQ was primarily due to the nursing and physician champions, who ensured that screening continued to be done throughout the year.

The ASQ was administered at triage with the triage nurse, in front of the parent/guardian who brought the patient into the ED. Information on positive screens on the ASQ was relayed to ED physicians, nurses and social workers. Of note, the ASQ was developed on patients aged 10 to 21 years. Given feedback from nursing staff that suicidal patients often present to the ED who are younger than 10 years of age, it was agreed that the ASQ would be administered to patients ages 8 to 18 years. Age 8 years had been the lower age limit used for an instrument that was the precursor to the ASQ (Horowitz et al., 2001).

Study Procedures

The retrospective chart review was conducted by querying the ED's electronic health records database to identify patients who presented to the ED with psychiatric complaints over the 76 weeks of review. The patient's arrival date, gender, age, race, insurance status, presenting complaint, ASQ responses, disposition, and discharge diagnoses were extracted from the medical record. Only the index visit was used during the study period; repeat visits were excluded from initial analyses. As there were 16 discrete presenting complaint and 16 discharge diagnosis categories, these classifications were collapsed into clinical categories through the consensus of two licensed clinical psychologists and one psychology postdoctoral fellow. Presenting complaints were mutually exclusive (a patient had only one presenting complaint), but patients could receive more than one discharge diagnosis. Patients under age 8 and over 18 years were excluded from the analysis, in addition to patients with a recorded diagnosis of mental retardation, developmental delay, and autism/Asperger's. Although these individuals may have been at risk for suicide, no validated suicide screening instruments currently exist for this population (Ludi et al., 2012; Segers & Rawana, 2014).

In an additional analysis, the relationship between ASQ response on index visit and repeat visits in the subsequent six months after index ED visit was evaluated. In order to be included in this subanalysis, patients had to have at least six months of follow-up data available in the study period; therefore only patients with index visits before February 2014 were included.

Statistical Analysis

Univariate analyses were used to describe: 1) nursing compliance rates; 2) characteristics of patients with dichotomized screening results (positive or negative) on the ASQ; and 3) characteristics of patients who screened positive on the ASQ by presenting complaint to identify youth whose suicide risk may have otherwise been undetected during the visit. Sensitivity and specificity analyses were used to evaluate the relationship between ASQ response on index visit and repeated visits for psychiatric and suicide-related reasons in the

six months after index visit. SPSS version 21.0 (IBM, 2012) was used for all analyses and statistical significance was considered at $p < .05$.

Results

During the study period, there were 1484 consecutive patient visits for psychiatric reasons in the 8–18 year age range. Of these patient visits, 400 were repeated visits (27%), resulting in 1084 unique patients. 114 patients were excluded from analysis due to diagnoses of mental retardation, developmental delay, and autism/Asperger's.

In total, 970 patients were included in the analysis. The average age was 13.4 years ($SD=2.6$), the sample was 53% female and 66% African American. Of this sample, 288 (30%) were hospitalized or transferred to another facility after their visit.

Nursing Compliance with Screening

Over three-fourths of patients were screened (768/970), resulting in a 79% nursing compliance rate. Characteristics of patients who were and were not screened during their visit are presented in Table 1. There was no significant age difference between patients who were and were not screened. Nurses were more likely to screen females, patients with suicide-related chief complaints, and patients who presented with emergency petitions for a mental health evaluation. Nurses were less likely to screen patients with internalizing symptoms, alcohol or drug overdoses, and bizarre behavior or hallucinations.

Characteristics of Patients who screened Positive on the ASQ

Of the psychiatric patients screened, over half screened positive for suicide risk (448/768, 58%). Demographic and clinical characteristics of patients who screened positive as compared to negative on the ASQ are presented in Table 2. Patients who screened positive were more likely to be older, female, have a suicide-related presenting complaint, and be hospitalized or transferred on their visit compared to those who screened negative. Patients who screened positive were less likely to present to the ED with an externalizing behavior or emergency petition/mental health evaluation presenting complaint.

Characteristics of Patients who screened Positive on the ASQ by Presenting Complaint

Of those 448 psychiatric patients who screened positive on the ASQ, 237 (53%) presented *without* suicide-related chief complaints. In order to focus on patients who may have been identified by the screening procedures, Table 3 displays patients who screened positive on the ASQ by presenting complaint. Patients who did not have a presenting complaint related to suicide, but screened positive on the ASQ (and may have gone undetected had they not been screened) were older, more likely to be male, African American, have Bipolar Disorder, ADHD, CD, ODD, or Aggression noted in the medical record. These patients were less likely to endorse the first three items of the ASQ, which are primarily related to suicidal thoughts, and were more likely to endorse the final item, which relates to past suicidal behavior. In addition, they were less likely to be hospitalized or transferred post discharge.

Subsample Analysis of Sensitivity/Specificity

Of the subsample of patients with six months post ASQ screening follow-up data available ($n=618$), 131 made at least one repeated visit to the ED for psychiatric reasons (21%). 32 of these patients (32/618 or 5% of sample with follow-up data) made a repeat visit to the ED with suicide risk as the presenting complaint. Of those 32 patients with repeat visits for suicide-related reasons, 28 had screened positive on the ASQ on index visit, 2 had screened negative on the ASQ and 2 were not screened. Due to the two individuals who were not screened with the ASQ on index visit, the overall sensitivity of the entire patient population was 88%, 95% CI: 71%–96%. As a further sub-analysis, we focused on patients that did not have a presenting complaint of suicide risk on index visit ($n=329$). Of these patients, 7 made a repeat visit to the ED with suicide as the presenting complaint (7/329 or 2%), 5 of which had screened positive on the ASQ on index visit, 1 had screened negative and 1 was not screened. Sensitivity and specificity values are presented in Table 4 for all patients with follow-up data. Sensitivity values for suicide-related outcomes ranged from 83% to 93%, while specificity values were lower from 43% to 58%. Including the 1 patient who was not screened, sensitivity values fell to 71%, 95% CI: 31%–95%.

As males were less likely to be screened than females, a subanalysis of sensitivity/specificity for repeated ED visit for suicide-related complaints was conducted. Screening positive on the ASQ was associated with 100% sensitivity in predicting repeat ED visits for suicide-related complaints and 58%, 95% CI: 55%–99%, specificity in males. For females, there was 90%, 95% CI: 69%–98%, sensitivity and 32%, 95% CI: 30%–33%, specificity for the same outcome.

Discussion

The implementation of the ASQ into clinical care highlights the use of ED screening as a potential prevention opportunity. The ASQ was implemented for patients with psychiatric presenting complaints in an urban pediatric ED with a nursing screening compliance rate of 79%. Of the psychiatric patients screened, approximately 53% screened positive that did not come into the ED with suicide-related presenting complaints, suggesting the importance of screening all psychiatric patients for suicide risk. These results are similar to previous analysis of nursing-initiated suicide screening in pediatric and adult ED samples (Folse & Hahn, 2009). These newly identified patients were more likely to be male, African American and have diagnoses of Bipolar or externalizing behaviors; youth who are at risk for suicide, but who historically are often not identified as being “at risk” by psychiatric services (King, O’Mara, Hayward, & Cunningham, 2009; Larkin & Beautrais, 2010). The ASQ also demonstrated sensitivity of over 83% to predict which patients would return to the ED in the next six months with suicide-related presenting complaints. Therefore, ED suicide screening may identify at risk youth who are important targets for suicide prevention efforts.

Results suggest that brief suicide risk screening instruments can be incorporated into standard of care with a relatively high nursing compliance rate. As the ASQ was a four item screen with dichotomous responses (yes/no), nurses without extensive psychiatric training were able to administer and score the assessment. The use of a standardized assessment may have been particularly beneficial, as evaluations of ED nursing attitudes towards patients

who self-harm have found overall sympathetic reactions but uncertainty about how to assess and manage these patients (McCann, Clark, McConnachie, & Harvey, 2007). It was not possible to discern whether difficulties with compliance were concentrated with a small number of nurses or spread throughout the workforce, although the relatively large number of nurses ($n > 35$) and differences in screening by presenting complaints suggests the latter. Additional training of all nurses on the importance of screening specific patient subpopulations may improve compliance rates. There were lower compliance rates of screen administration for patients with internalizing, externalizing and alcohol-related presenting complaints. In future training with nurses, additional education about the link between internalizing, externalizing and alcohol-related disorders with suicide may be beneficial in explaining the rationale for suicide risk screening. The low levels of screening of patients in the ED for alcohol and drug overdose may have been due to an inability on the part of patients to respond to screening questions at triage. As alcohol is a critically important suicide risk factor in adolescents, a clinical practice pathway may be indicated for overdose patients to ensure that suicide screening occurs after the effects of intoxication have dissipated, but before ED discharge (Lahti, Harju, Hakko, Riala, & Rasanen, 2014).

The characteristics of the patients identified by screening highlights the potential utility of suicide screening in urban EDs. These study results suggest that many more patients are experiencing suicidal thoughts than patients who report suicidal behavior as a presenting complaint. If not asked directly, these patients may not disclose these thoughts at triage. The finding that males were more likely to be identified by screening than females is particularly significant as male adolescents are 2–3 times more likely to die by suicide than females (CDC, 2016). Suicidal ideation may also be a better predictor of later suicidal behavior in adolescent females than in adolescent males (King, Jiang, Czyz, & Kerr, 2014). Additionally, youth identified by screening were more likely to be African-American; as the suicide rates in black children in the United States have recently increased, approaches that proactively identify this at-risk population remain critically important (Bridge et al., 2015). Patients who screened positive and presented without suicide-related chief complaints were more likely to report aggressive, impulsive behavior, which is a potential endophenotype for suicidal behavior, and may represent a particularly at-risk subgroup of suicide attempters (Mann et al., 2009; Pena, Matthieu, Zayas, Masyn, & Caine, 2012). It is interesting to note that these newly identified individuals were less likely to report suicidal ideation, but were just as likely to report a past history of suicide attempt. Although a past history of suicide attempt may not signify an acute crisis, it more accurately predicts future death by suicide than any other suicide risk factor (Suominen et al., 2004). Thus, screening in the ED has significant potential as a prevention strategy for youth at high risk for suicidal behavior and death by suicide.

Sensitivity and specificity analyses highlight the ability of brief suicide risk screening approaches to identify individuals who will return to the ED for suicide-related reasons, with similar results as other previously published analyses (King, Berona, Czyz, Horwitz, & Gipson, 2015). These analyses underscore the importance of connecting positive responses on these screens to appropriate referrals for treatment. At the time of submission, only patients with psychiatric complaints are screened, the follow-up plan fits easily into standard of care at Hopkins and many other EDs. In this particular ED, social workers conduct the

follow-up evaluation and the addition of the ASQ screen may ensure that social workers have more detailed, standardized information about their historical and current suicide risk prior to their assessment. Key leadership and stakeholders are currently examining how they might enhance standard of care consistent with research (Motto & Bostrum, 2001) and national guidelines (Knesper, 2010; National Action Alliance for Suicide Prevention Research Prioritization Task Force, 2014) by adding psychoeducational materials including the National Lifeline for youth and families and identifying resources to follow-up with patients after discharge to ensure continuity of care. Additionally, recent interventions for suicidal youth have been specifically developed for integration into ED settings (Asarnow, Berk, Hughes, & Anderson, 2015; King, Gipson, Horwitz, & Opperman, 2015). It is possible that by connecting these patients to such evidence-based interventions, future suicidal behavior could be prevented. Reduction of suicidal behavior would have the dual benefits of improving clinical functioning in patients as well as reducing the ED burden of repeated visits.

Limitations of this analysis include the use of a single site retrospective review of medical record data, which limits the generalizability of the findings. Additionally, for analyses of repeat ED visits, it is possible that patients may have presented to other EDs in the surrounding area. Analyses of the implementation of screening efforts across multiple sites is indicated to further understand the impact on identification of at-risk youth; such analyses could also use historical cohorts before and after the implementation of screening in order to identify the incremental gains attributable to screening. The presence of parents/guardians in the room during screening may have biased patient responses, although a substantial number of youth who did not have suicidal behavior as a presenting complaint admitted to suicidal ideation or attempt. Presence of parents during screening may also be a factor of age, particularly if screening continues to occur in patients as young as eight years. Future self-report screening efforts evaluating the impact of parental presence on screening response or via computer or paper-and-pencil tests may be indicated. Although interventions such as hospitalization and transfer were included herein, data were not readily available on “lower intensity” interventions that could have occurred after screening, such as informal handoffs to onsite mental health professionals and referrals to outpatient mental health providers. Future research should explore the impact of mental health services other than inpatient psychiatric services on repeat visits for suicidal behavior. Furthermore, when patients were hospitalized or transferred, it is also not known the length of stay of these hospitalizations or what types of treatments were implemented. Lastly, the ASQ was developed for universal implementation in the ED and can be used with both psychiatric and non-psychiatric patients. Future analyses of the use of suicide screening in patients in the ED for medical reasons is another important area of study. Investigation of the ASQ as a universal screening instrument for all pediatric ED patients may be a promising line of inquiry (Larkin & Beautrais 2010), given that children and adolescents who present to EDs with somatic concerns such as headaches and stomachaches as well as other medical concerns may manifest latent or ‘hidden’ risk.

Implications of these results include the ease of implementing brief suicide screening embedded into the electronic medical record and the utility of identifying patients at risk for suicide who may not have otherwise been recognized. At present, no evidence-based

standards exist for ED-based suicide risk screening, triage, risk assessment, and referral. We aimed to illustrate the feasibility and sustainability of integrating screening into routine care. It is hoped that building on projects such as these, further prospective evaluations of screening can be completed, potentially using comparison groups or historical controls. As suicide research requires much ethical consideration to ensure that suicidal patients receive needed treatments and “standard of care” in emergency settings can be difficult to define, rigorous and careful study design would be needed for such an evaluation. Integrating prevention science into this clinical need could have tremendous benefit for both research and clinical care. Strengths of this project included the opportunity to incorporate the ASQ into the EMR as well as the strong multidisciplinary team, including physician and nursing champions for screening efforts. Such investigations can be informative as pediatric EDs plan for compliance with the Joint Commission National Patient Safety Goal 15.01.01, requiring behavioral health care organizations, psychiatric hospitals, and general hospitals treating individuals for emotional or behavioral disorders, to identify individuals at risk for suicide. Thus, if EDs can identify these at-risk psychiatric patients, it is possible that early intervention initiated through ED screening could prevent suicide attempts, leading to reduced rates of suicidal behavior, and potentially, lives saved.

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Pediatric ED Patients with Psychiatric Complaints: Comparing those who were screened with the ASQ to those who were not screened.

Table 1

Demographic	Not Screened with ASQ (n = 202)				Screened with ASQ (n = 768)			
	Mean	SD	Mean	SD	Mean	SD	t	p
Mean age	13.4	2.9	13.4	2.5	-3	.75		
	n	%	n	%	OR*	p		
Males	112	55	341	44	0.64	.005		
African American Race	137	68	507	66	0.92	.63		
Medicaid Insurance	138	68	536	70	1.07	.69		
Presenting Complaint								
Suicide Ideation or Attempt	24	12	230	30	3.17	<.001		
Externalizing: aggression, ADHD, violence	44	22	147	19	0.85	.40		
Internalizing: depression, anxiety, OCD, PTSD	35	17	22	3	0.14	<.001		
Alcohol or drug overdose	14	7	4	1	0.07	<.001		
Bizarre behavior or hallucinations	18	9	23	3	0.32	<.001		
Emergency petition or mental health evaluation	67	33	342	45	1.62	.004		
Disposition								
Hospital Admission or Transfer	43	23	245	33	1.66	.008		

Notes. OR: Odds Ratios; ADHD: Attention-Deficit Hyperactivity Disorder; OCD: Obsessive-Compulsive Disorder; PTSD: Post-Traumatic Stress Disorder.

* odds of being screened with the ASQ during ED visit

Demographics, Presenting Complaints, and Discharge Diagnosis of Patients who Screened Positive on the ASQ compared to those who Screened Negative

Table 2

Demographic	ASQ Negative (n = 320)		ASQ Positive (n = 448)		t	p
	Mean	SD	Mean	SD		
Mean age	13.0	2.7	13.8	2.4	-4.3	<.001
	n	%	n	%	OR*	p
Males	183	57	158	35	0.41	<.001
African American Race	235	73	272	61	0.56	<.001
Medicaid Insurance	242	76	294	66	0.62	<.001
Presenting Complaint						
Suicide Ideation or Attempt	19	6	211	47	14.10	<.001
Externalizing: aggression, ADHD, or violence	99	31	48	11	0.27	<.001
Internalizing: depression, anxiety, OCD, PTSD	7	2	15	3	1.55	.35
Alcohol or Drug overdose	2	1	2	1	0.71	.74
Bizarre Behavior or Hallucinations	12	4	11	3	0.65	.30
Emergency Petition or Mental Health Evaluation	181	57	161	36	0.43	<.001
Disposition						
Hospital Admission or Transfer	73	23	172	41	2.24	<.001

Notes. ADHD: Attention-Deficit Hyperactivity Disorder; CD: Conduct Disorder; OCD: Obsessive-Compulsive Disorder; PTSD: Post-Traumatic Stress Disorder

* odds of screening positive on the ASQ compared to screening negative

Table 3
 Demographics, Discharge Diagnoses, Disposition and Response to ASQ items of Patients who Screened Positive on the ASQ with and without Presenting Complaints of Suicidal Thoughts or Behaviors

Demographic	Presenting complaint: suicide ideation or attempt (n = 211)		Presenting complaint: other than suicide ideation or attempt (n = 237)		t	p
	Mean	SD	Mean	SD		
Mean age	14.0	2.2	13.5	2.6	2.16	.03
	n	%	n	%	OR*	p
Males	61	29	97	41	1.70	.008
African American Race	114	54	158	67	1.70	.006
Medicaid Insurance	119	56	175	74	2.18	<.001
Discharge Diagnosis (not mutually exclusive)						
Depression or Mood Disorder	86	41	85	36	0.81	.29
Bipolar Disorder	13	6	35	15	2.64	.004
Anxiety, Panic, PTSD, or OCD	42	20	45	19	0.94	.81
ADHD, CD, ODD, or Aggression	40	19	97	41	2.96	<.001
Alcohol or Drug Disorder	3	1	0	0	--	--
Schizophrenia or Psychosis	3	1	6	3	1.80	.41
Response by ASQ item (not mutually exclusive)						
In the past few weeks, have you wished you were dead?	182	88	154	66	0.28	<.001
In the past few weeks, have you felt that you or your family would be better off if you were dead?	142	71	132	59	0.58	.008
In the past week, have you been having thoughts about killing yourself?	173	84	154	66	0.38	<.001
Have you ever tried to kill yourself?	108	55	126	55	1.03	.88
Disposition						
Hospital Admission or Transfer	96	48	76	34	0.54	.002

Notes. ADHD: Attention-Deficit Hyperactivity Disorder; CD: Conduct Disorder; OCD: Obsessive-Compulsive Disorder; PTSD: Post-Traumatic Stress Disorder

* predicts odds of coming to the ED with a presenting complaint other than suicidal thoughts/attempt

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Table 4

Sensitivity and Specificity of ASQ for Repeated ED visits by Six Month Follow-Up

		Six Months After Index Visit			
		No Repeat Psychiatric Visits	Repeat Psychiatric Visit	No Visit with Suicide Presenting Complaint	Visit with Suicide Presenting Complaint
A. All patients with Six Month Follow-up Data and were screened with the ASQ on Index visit regardless of Presenting Complaint on Index Visit (n = 474)					
ASQ Negative		152	44	194	2
ASQ Positive		218	60	250	28
Total		370	104	444	30
	Sensitivity [95% CI]:		57% [49%–66%]		93% [77%–99%]
	Specificity [95% CI]:		41% [39%–44%]		43% [43%–44%]
B. Patients with Presenting Complaints other than Suicide and were screened with ASQ on Index Visit and had Six Month Follow-up Data (n = 329)					
		Six Months After Index Visit			
		No Repeat Psychiatric Visits	Repeat Psychiatric Visit	No Visit with Suicide Presenting Complaint	Visit with Suicide Presenting Complaint
ASQ Negative		145	43	187	1
ASQ Positive		104	37	136	5
Total		249	80	323	6
	Sensitivity [95% CI]:		46% [36%–56%]		83% [37%–99%]
	Specificity [95% CI]:		58% [55%–62%]		58% [57%–58%]