

Original Research Article

Universal Pediatric Suicide Risk Screening in a Health Care System: 90,000 Patient Encounters

Kimberly Roaten, Ph.D., C.R.C., Lisa M. Horowitz, Ph.D., M.P.H., Jeffrey A. Bridge, Ph.D., Christian R.R. Goans, Ph.D., Chris McKintosh, R.N., Russell Genzel, M.S.N., R.N., C.E.N., Celeste Johnson, D.N.P., A.P.R.N., P.M.H., C.N.S., Carol S. North, M.D., M.P.E.

Background: Suicidal behavior is increasing among US youths. Contact with the health care system is common in the months before suicide. **Objective:** To assess the characteristics of suicide risk among youths presenting for health care, universal screening results from a large hospital system were analyzed. **Methods:** A retrospective analysis of the Ask Suicide-Screening Questions tool administered to patients aged 10–17 years in a hospital system including an emergency department, inpatient medical units, and primary care clinics was conducted. Demographic and clinical data from 3 years of encounters were analyzed. **Results:** The sample consisted of 91,580 pediatric encounters, predominantly white Hispanic and women, with one-third speaking Spanish. Across health care settings, 2.9% of encounters produced positive suicide risk screens, with the highest rate in the emergency department (8.5%). Acute positive screens, indicating imminent risk for suicidal behavior, accounted

for 0.3% of all encounters. Approximately one-fourth (27.6%) of encounters for psychiatric presenting problems screened positive compared with 2.3% for nonpsychiatric encounters. Higher rates of positive screens were present among encounters for psychiatric presenting problems across all settings. Positive screens were less common among preteen (1.8%) than adolescent (3.1%) encounters ($\chi^2 = 65.50$, $P < 0.001$). **Conclusions:** Universal screening detected suicide risk in approximately 3% of pediatric health care encounters. Screening identified risk in encounters among preteen and adolescent patients, with a higher prevalence of positive screens in encounters for youths presenting with psychiatric problems and for emergency department visits. Acute positive screens were rare, occurring in less than half of 1 percent of encounters.

(Journal of the Academy of Consultation-Liaison Psychiatry 2021; ■:■-■)

Key words: suicide risk screening, health care systems, suicide, youth, hospital, risk

INTRODUCTION

Youth suicide is a significant and growing worldwide public health concern. In the United States, suicide is the second leading cause of death among children ages 10–17 years, accounting for 1825 deaths in 2018 and one third of all youth deaths.¹ Among high school age youths, the current year prevalence of suicidal thoughts (17%), plans (13%), and attempts (7%) is alarmingly high.² Rates of emergency department (ED) encounters and inpatient hospitalizations for suicidal ideation and suicide attempts have nearly doubled among children

Received September 8, 2020; revised December 1, 2020; accepted December 1, 2020. From the Parkland Health & Hospital System (K.R., C.R.R.G., C.M., R.G., C.J.), Dallas, TX; Department of Psychiatry, The University of Texas Southwestern Medical Center (K.R., C.S.N.), Dallas, TX; Office of the Clinical Director (L.M.H.), National Institute of Mental Health, National Institutes of Health, Bethesda, MD; Abigail Wexner Research Institute at Nationwide Children's Hospital (J.A.B.), Columbus, OH; Pediatrics, Psychiatry & Behavioral Health, The Ohio State University College of Medicine (J.A.B.), Columbus, OH. Send correspondence and reprint requests to Kimberly Roaten, PhD, CRC, Department of Psychiatry, UT Southwestern Medical Center, 5323 Harry Hines Blvd, Dallas, TX 75390-8898; e-mail: Kimberly.Roaten@UTSouthwestern.edu

© 2020 Academy of Consultation-Liaison Psychiatry. Published by Elsevier Inc. All rights reserved.

90,000 Pediatric Suicide Risk Screenings

over the last decade.^{3,4} While rates of suicide are higher among male than female youths, the gap between these rates is also narrowing, driven by a disproportionate increase in the rates for young women relative to men.⁵

As a result of increasing attention to suicide prevention policy and research over the past 3 decades, the Office of the Surgeon General and The Joint Commission have both recommended suicide risk screening in medical settings as part of a comprehensive approach to prevention.^{6,7} In particular, The Joint Commission's Sentinel Event Alert 56 recommended screening all medical patients for risk using brief, validated, and evidence-based tools.⁷ Despite these efforts, suicide rates across the lifespan increased by 33% during this period⁸; and in young people, 10–24 years of age, increased 56% over the past decade,⁹ with suicide among 10- to 14-year-old people now equivalent to motor vehicle injuries as a leading cause of death.¹⁰

Targeting high-risk populations such as youths with behavioral health issues is an intuitive approach to suicide risk screening; yet, young people struggling with mental health concerns may not discuss their suicidal thoughts if not asked directly. Moreover, medical illness is an often overlooked risk factor for suicide.¹¹ Death registry studies have shown that greater proportions of youths who die by suicide have visited health care providers within 6 months of death compared with controls.¹² Given that most health care settings do not conduct universal suicide risk screening, many at-risk youths go unrecognized, leading to missed opportunities for prevention, such as pairing screening with interventions such as Caring Contacts,^{13–15} safety planning, and telephone follow-up.^{16,17}

The ideal age to begin universal screening is unknown. Despite suicide being the ninth leading cause of death for children ages 5–11 years, children younger than the age of 12 years are an understudied cohort for suicidal behaviors.^{1,18} Among youths presenting to the ED for chief complaints of suicidal ideation and suicide attempts, for which rates doubled in the past decade, 43.1% of the encounters were for children ages 5–11 years.⁴ Furthermore, of a sample of preteen patients ages 10–12 years presenting to the ED, 29.1% screened positive for suicide risk; of which, 17% reported a past suicide attempt.¹⁹ Further research is necessary to characterize the prevalence of suicide risk among youths across health care settings.^{4,18,19}

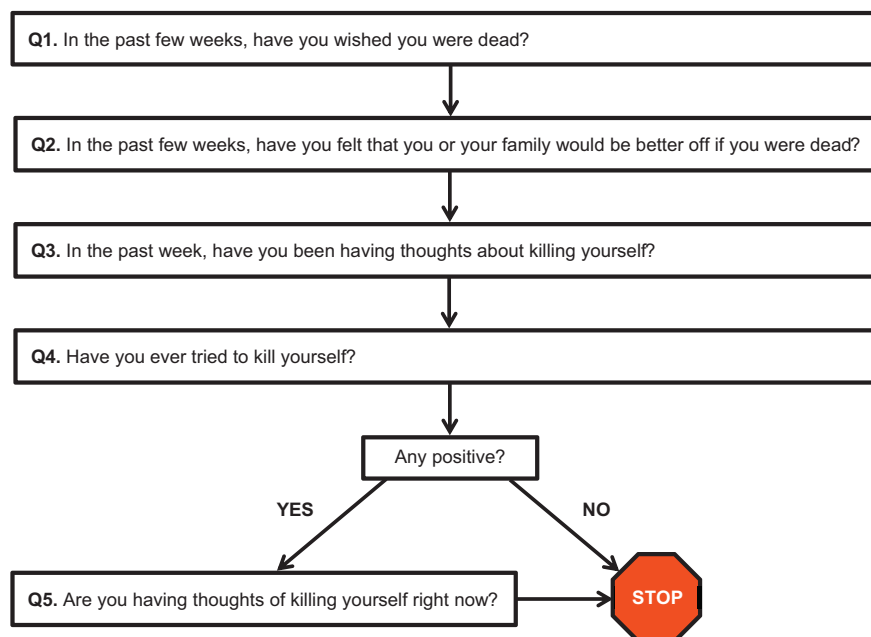
Parkland Health & Hospital System implemented an adult universal suicide risk screening program in

February 2015.²⁰ These efforts were expanded to include universal screening in pediatric encounters in May 2015, and since then, nearly 3 million screenings have been completed. To our knowledge, these programs are the first in the country to meet and exceed The Joint Commission recommendations regarding hospital-wide suicide risk detection and can provide valuable risk prevalence information to inform suicide prevention practices in other systems. The purpose of this descriptive study is to report the frequency of risk identification across health care venues including an emergency department and outpatient primary care clinics. A secondary aim is to compare and contrast screening results in encounters for nonpsychiatric and psychiatric chief complaints. Better estimation of the prevalence of suicide risk in pediatric health care encounters could help guide future screening and prevention practices.

MATERIALS AND METHODS

At Parkland Health & Hospital System, suicide risk screenings are conducted as a component of every general (nonpsychiatric) pediatric patient-provider encounter in the system, mirroring the process for adult encounters.²⁰ Parkland Health & Hospital System includes 1 ED with more than 240,000 encounters per year, an 882-bed hospital, and 20 community-oriented (outpatient) primary care clinics. The majority of pediatric suicide risk screenings are completed in outpatient clinics, and a smaller proportion are conducted in the ED and inpatient medical/surgical units. The screening is administered verbally by nursing staff during the triage or check-in process and entered into the electronic health record for each encounter with no limitations on frequency of screening administrations over time for unique patients. Screenings for non-English-speaking patients are administered using contracted telephone interpretation services. Parents/guardians of patients aged 12 years and older are instructed to leave the room during the screening process, though if they refuse, which is rare, screening is conducted in front of them. Patients who screen positive are then evaluated by behavioral health providers who determine risk level and develop the treatment plan, culminating in a disposition decision. Although the pediatric screening program was initially implemented with youths aged 12–17 years, it was expanded

FIGURE 1. Item Flow for the Ask Suicide-Screening Questions



in March 2018 to include younger children aged 10 years and older.

The Ask Suicide-Screening Questions (ASQ) tool was used for screening (Figure 1).²¹ The ASQ is a 4-item instrument that rapidly identifies patients in need of further mental health evaluation. The first 3 items (Q1–Q3) assess recent passive and active suicidal ideation and burdensomeness, while the fourth item (Q4) asks about past suicide attempts. A fifth item (Q5), asked only after a positive response to 1 of the first 4 items, assesses acuity by inquiring about current suicidal ideation. Endorsement of current suicidal ideation by responding “yes” to the acuity item is considered an “acute” positive screen, requiring full safety precautions and assessment. A “no” response to the acuity item and a “yes” to any of questions 1–4 indicate a “nonacute” positive screen, requiring a brief safety assessment to determine if a full mental health evaluation and/or safety precautions are necessary. The subsequent care for positive and acute-positive screens was individualized and determined by the provider conducting the assessment. In addition to the ASQ items, data presented in this study include a discharge disposition for the ED and inpatient encounters.

The University of Texas Southwestern Institutional Review Board determined that the deidentified data analyzed for this study were exempt from full

institutional review board review and oversight. Data reported for this study were retrieved from the electronic health record in the period of May 20, 2015 to August 6, 2018, yielding a total of 92,862 encounters with screening data. These data were imported into SAS 9.4 (SAS Institute Inc., Cary, North Carolina) for analysis.

Variable Categorization

A variable was created to stratify the sample into pre-teen (ages 10–12 y) and adolescent (ages 13–17 y) groups. An additional variable was created to reflect any positive response on ASQ items Q1–Q4. A list of the presenting problems for all pediatric encounters was compiled from the entire collection of International Classification of Diseases text variables used to signify the presenting problems. A psychiatric presenting problem was defined as any emotional, cognitive, or behavioral chief complaint based on expert-blinded clinical impression. This list was independently reviewed by 2 expert raters (L. Horowitz, J. Bridge) to determine whether each problem was psychiatric or nonpsychiatric, and excellent interrater reliability was obtained ($\kappa = .83$). Discrepant independent ratings were then resolved by consensus discussion of the 2 raters and a third expert (K. Roaten). These final consensus ratings were incorporated into a variable

90,000 Pediatric Suicide Risk Screenings

representing whether each encounter involved a psychiatric or nonpsychiatric presenting problem.

Data from this study are summarized as counts, proportions, means, and standard deviations. A multiple logistic regression model was tested to predict psychiatric presenting problems (dependent variable) from several demographic variables including sex, age, race/ethnicity, and insurance status as independent predictors entered simultaneously into the model. Multiple logistic regression models were also used (PROC LOGISTIC in SAS) to determine associations of ASQ results (positive screen, suicide attempt history, and acuity item, 1 dependent variable per model) with psychiatric presenting problems (independent variable) adjusted for sex, age, race, ethnicity, and insurance status with all covariates entered simultaneously into the models. These independent covariates were specifically included in the models based on analysis demonstrating each of these variables to be significantly associated with psychiatric presenting problems independent of one another in a single regression model.

RESULTS

Of the 92,862 encounters in the data set, 1271 were missing data and 11 had inconsistent responses and were removed from the data set, yielding a total of 91,580 encounters. [Table 1](#) presents the demographic characteristics of the total sample and by each demographic characteristic with and without a psychiatric presenting problem. These encounters included patients ranging in age from 10 to 17 years, with a mean age of 14.9 (SD = 1.8) years. Patients represented in these encounters were predominantly girls (63.3%) and white Hispanic (72.0%). Two-thirds spoke predominantly English and most of the remainder spoke Spanish (32.8%). Medicaid was the payer for more than half of the encounters (55.7%), and most of the remainder were split between commercial insurance (22.1%) and charity/self-pay (20.9%). The majority of screenings took place in the outpatient clinics ($N = 79,616$; 86.9%), followed by the ED ($N = 9577$; 10.5%), and then the inpatient medical/surgical units ($N = 2387$; 2.6%). A lower proportion of encounters were for patients with psychiatric presenting problems ($N = 2145$; 2.3%).

Compared with encounters for nonpsychiatric problems, results revealed that encounters for

psychiatric problems were significantly more likely to be associated with male sex, white non-Hispanic race/ethnicity, English-speaking patients with Medicaid, and ED screening location (see Significance column in [Table 1](#)).

[Table 2](#) presents suicide risk screening results by location, for all patient encounters, and separately by age group. In the total set of encounters across all venues, 2.9% of visits produced positive screens. The proportion of positive screens was higher in the ED (8.5%) than in the outpatient clinics (2.2%) and inpatient units (2.1%) for all encounters and in psychiatric and non-psychiatric presenting problems encounters. Of encounters with a positive screen, nearly half (46.8%) consisted of a sole affirmative response to the suicide attempt history item (Q4). The proportion of the total set of encounters that was positive on the acuity item (Q5) was 0.3%, which comprised 10.1% of the total positive screens. [Table 2](#) also compares proportions of encounters separately for psychiatric and nonpsychiatric presenting problems. Positive screen rates for encounters with nonpsychiatric presenting problems were 2.3% overall (1.4% for preteens and 2.4% for adolescents) and for encounters with psychiatric presenting problems were 27.6% overall (19.0% for preteens and 28.7% for adolescents).

Each row of [Table 2](#) presents odds ratios with confidence limits adjusted for effects of demographic variables in a regression model predicting ASQ screening results. Secular variables (month, season, year) were not included as independent covariates in the model because bivariate analysis found no significant associations between the secular variables and the screening results. The encounters for psychiatric presenting problems had significantly higher proportions of positives in all 3 screening locations compared with encounters for a nonpsychiatric presenting problems. For example, in the ED, patient encounters with psychiatric presenting problems were significantly more likely to screen positive compared with encounters for nonpsychiatric presenting problems (52.4% vs. 4.6%; odds ratio = 22.34, 95% confidence interval: 18.55–26.92). These associations were similar in both age groups except where odds ratios were not available for the preteens.

[Table 3](#) shows ED encounter dispositions by presenting problem. For all ED encounters, “discharge to home” occurred for the vast majority (89.8%) of the screenings, followed by left before treatment completed/

TABLE 1. Sample Characteristics by Presenting Problem: Psychiatric vs. Nonpsychiatric

	Total sample (91,580)	Psychiatric presenting problem (2145)	Nonpsychiatric presenting problem (89,435)	Significance
Age: mean (SD) years				
Total sample	14.9 (1.8)	15.0 (1.7)	14.9 (1.8)	$t = -0.35, P = 0.723$
Preteens	11.8 (0.6)	11.7 (0.6)	11.8 (0.6)	$t = 0.13, P = 0.896$
Teens	15.4 (1.4)	15.3 (1.4)	15.4 (1.4)	$t = 2.73, P = 0.006$
	% (n)	% (n)	% (n)	OR (95% CI)
Sex				
Female	63.3 (57,953)	52.9 (1135)	63.5 (56,818)	0.65 (0.59, 0.70) [†]
Race/Ethnicity	100.0 (88,449)	100.0 (2022)	100.0 (86,427)	
White Hispanic	72.0 (63,704)	60.2 (1225)	71.7 (62,479)	0.59 (0.54, 0.64) [†]
White non-Hispanic	4.9 (4364)	10.8 (228)	4.7 (4136)	2.53 (2.20, 2.29) [†]
Black Hispanic	0.6 (483)	0.4 (8)	0.5 (475)	0.72 (0.36, 1.45)
Black non-Hispanic	20.9 (18,495)	25.3 (531)	20.4 (17,964)	1.36 (1.23, 1.50) [†]
Asian/Pacific Islander	1.5 (1348)	1.4 (29)	1.5 (1319)	0.94 (0.65, 1.36)
American Indian	0.1 (54)	0.1 (1)	0.1 (53)	—
Other	0.0 (1)	0.0 (0)	0.0 (1)	—
Language	100.0 (91,471)	100.0 (2138)	100.0 (89,333)	
English	66.6 (60,871)	72.2 (1543)	66.4 (59,328)	1.31 (1.19, 1.44) [†]
Spanish	32.8 (29,940)	27.5 (587)	32.9 (29,353)	0.77 (0.70, 0.85) [†]
Other languages (44)	0.7 (660)	0.4 (8)	0.7 (652)	0.51 (0.25, 1.03)
Payer	100.0 (90,935)	100.0 (2144)	100.0 (88,791)	
Funded				
Medicaid	55.7 (50,643)	49.5 (1061)	55.8 (49,582)	0.77 (0.71, 0.84) [†]
Commercial	22.1 (21,078)	21.3 (456)	23.2 (20,622)	0.89 (0.80, 0.99) [*]
Tricare/CHAMPVA	0.0 (24)	0.1 (2)	0.0 (22)	—
Medicare	0.0 (6)	0.1 (1)	0.0 (5)	8.29 (0.97, 70.95)
Workers' compensation	0.0 (6)	0.0 (0)	0.0 (6)	—
Unfunded				
Charity/Self pay	20.9 (18,983)	28.8 (618)	20.7 (18,365)	1.55 (1.41, 1.71) [†]
Pending	0.2 (195)	0.3 (6)	0.2 (189)	1.32 (0.58, 2.97)
Screening location	% (n)	% (n)	% (n)	OR (95% CL)
Outpatient	86.9 (79,616)	62.2 (1334)	87.5 (78,282)	0.23 (0.21, 0.26) [†]
ED	10.5 (9577)	36.6 (784)	9.8 (8793)	5.28 (4.83, 5.78) [†]
Inpatient	2.6 (2387)	1.3 (27)	2.6 (2360)	0.47 (0.32, 0.69) [†]

Note that sample numbers not provided for categories with no missing data. Odds ratios represent associations between psychiatric presenting problem and each demographic characteristic, in unadjusted comparisons.

CI = confidence interval; ED = emergency department; OR = odds ratio.

* $P < 0.05$.

† $P < 0.001$.

against medical advice (6.0%), transfer to another facility (4.1%), and admission to Parkland (0.1%). Transfer to another facility was significantly associated with a positive screen (17.8% vs. 2.8%; $\chi^2 = 422.24$, $df = 1$, $P < 0.001$), as was a positive acuity item (33.8% vs. 3.4%; $\chi^2 = 477.20$, $df = 1$, $P < 0.001$) (not shown in table). Of the subset of the ED patient encounters with positive screens, 92.2% had “discharge to home” (not shown in table). For all inpatient medical/surgical encounters, “discharge to home” also occurred for most (97.5%), followed by left before treatment completed/against medical advice (0.8%), then transfer to another facility (1.7%). Among those with suicidal ideation

(Q3), a history of suicidal behavior/attempt (Q4) made discharge home less likely.

DISCUSSION

Using ASQ suicide risk screening data from more than 90,000 pediatric encounters, we estimated the prevalence of positive screens to be lower than 3% for 10- to 17-year old people. To our knowledge, this is the first study to estimate the prevalence in a large data set of young medical patients and compare suicide risk screening rates between encounters for psychiatric and nonpsychiatric presenting problems.

90,000 Pediatric Suicide Risk Screenings

TABLE 2. Screening Results by Age Groups, Screening Location, and Presenting Problem

	Total %	Psychiatric presenting problem %	Nonpsychiatric presenting problem %	OR* (95% Wald CI)
Overall				
All Screening Locations	(n = 91,850)	(n = 2145)	(n = 89,435)	
Positive screen on ASQ	2.9	27.6	2.3	16.22 (14.49, 18.16) [‡]
ASQ suicide attempt history (Q4)	2.1	18.6	1.7	12.98 (11.39, 14.78) [‡]
ASQ acuity item (Q5)	0.3	8.7	0.1	93.50 (70.87, 123.35) [‡]
Outpatient	(n = 79,616)	(n = 1334)	(n = 78,282)	
Positive screen on ASQ	2.2	12.7	2.1	7.50 (6.29, 8.95) [‡]
ASQ suicide attempt history (Q4)	1.6	8.2	1.5	6.19 (5.00, 7.67) [‡]
ASQ acuity item (Q5)	0.1	0.7	0.1	15.73 (7.82, 31.61) [‡]
ED	(n = 9577)	(n = 784)	(n = 8793)	
Positive screen on ASQ	8.5	52.4	4.6	22.26 (18.49, 26.81) [‡]
ASQ suicide attempt history (Q4)	5.9	35.6	3.3	15.35 (12.56, 19.13) [‡]
ASQ acuity item (Q5)	2.2	21.7	0.4	60.12 (41.04, 88.07) [‡]
Inpatient Medical/Surgical	(n = 2387)	(n = 27)	(n = 2360)	
Positive screen on ASQ	2.1	48.2	1.5	77.60 (28.63, 210.30) [‡]
ASQ suicide attempt history (Q4)	1.8	44.4	1.3	78.17 (28.06, 217.74) [‡]
ASQ acuity item (Q5)	0.3	22.2	0.1	—
Preteens (ages 10–12 y)				
All Screening Locations	(n = 12,110)	(n = 232)	(n = 11,878)	
Positive screen on ASQ	1.8	19.0	1.4	17.21 (11.84, 25.00) [‡]
ASQ suicide attempt history (Q4)	0.9	9.5	0.7	16.72 (10.17, 27.50) [‡]
ASQ acuity item (Q5)	0.1	4.3	0.1	88.67 (32.85, 239.30) [‡]
Outpatient	(n = 11,576)	(n = 202)	(n = 11,374)	
Positive screen on ASQ	1.6	11.9	1.4	10.52 (6.62, 16.70) [‡]
ASQ suicide attempt history (Q4)	0.8	5.5	0.7	8.83 (4.54, 17.18) [‡]
ASQ acuity item (Q5)	0.1	0.5	0.1	8.42 (1.01, 70.04) [‡]
ED	(n = 534)	(n = 30)	(n = 504)	
Positive screen on ASQ	6.2	66.7	2.6	71.33 (25.82, 191.10) [‡]
ASQ suicide attempt history (Q4)	3.0	40.0	0.8	82.86 (22.79, 301.24) [‡]
ASQ acuity item (Q5)	1.7	30.0	0.0	—
Inpatient Medical/Surgical [†]	—	—	—	—
Adolescent (ages 13–17 y)				
All Screening Locations	(n = 79,443)	(n = 1913)	(n = 77,530)	
Positive screen on ASQ	3.1	28.7	2.4	16.07 (14.27, 18.09) [‡]
ASQ suicide attempt history (Q4)	2.3	19.7	1.9	12.65 (11.05, 14.74) [‡]
ASQ acuity item (Q5)	0.3	9.2	0.1	93.21 (69.79, 124.50) [‡]
Outpatient	(n = 68,040)	(n = 1132)	(n = 66,908)	
Positive screen on ASQ	2.4	12.8	2.2	7.09 (5.86, 8.59) [‡]
ASQ suicide attempt history (Q4)	1.8	8.7	1.7	5.90 (4.70, 7.41) [‡]
ASQ acuity item (Q5)	0.1	0.8	0.1	16.67 (7.92, 35.07) [‡]
ED	(n = 9043)	(n = 754)	(n = 8289)	
Positive screen on ASQ	8.7	51.9	4.7	20.77 (17.17, 25.12) [‡]
ASQ suicide attempt history (Q4)	6.1	35.4	3.4	14.23 (11.60, 17.47) [‡]
ASQ acuity item (Q5)	2.2	21.4	0.5	53.41 (36.32, 78.52) [‡]
Inpatient Medical/Surgical	(n = 2360)	(n = 27)	(n = 2333)	
Positive screen on ASQ	2.1	48.2	1.5	77.71 (28.69, 210.50) [‡]
ASQ suicide attempt history (Q4)	1.8	44.4	1.3	77.96 (28.04, 216.79) [‡]
ASQ acuity item (Q5)	0.3	22.2	0.1	—

ASQ = Ask Suicide-Screening Questions; CI = confidence interval; ED = emergency department; OR = odds ratio.

* Nonpsychiatric is the reference group; adjusted for sex, age, white race, Hispanic ethnicity, and no/public insurance.

[†] Only 27 encounters, 0 positive screens, all nonpsychiatric presenting problems.

[‡] $P < 0.001$.

In this study, demographic variables such as male sex, white non-Hispanic race/ethnicity, and indicators of low socioeconomic status were associated with higher rates of psychiatric presenting problems, suggesting an associated increase in suicide risk. As expected, in inpatient medical/surgical and ED settings, where psychiatric presenting problems are often acute, encounters with psychiatric presenting problems were far more likely than those with nonpsychiatric presenting problems to screen positive for suicide risk. Among encounters for preteens with psychiatric presenting problems, two-thirds screened positive and nearly one-third endorsed the acuity item. A similar pattern was revealed among adolescent encounters, with approximately half of the ED encounters for a psychiatric presenting problem being associated with a positive screen and 21.4% with endorsement of the acuity item. Taken together, these findings underscore the prevalence of heightened risk among pediatric patients seeking psychiatric care in acute settings. Importantly, in the total sample, 2.3% of the nonpsychiatric encounters had a positive suicide risk screen, suggesting that a significant number of pediatric medical patients may have risk that goes undetected without standardized screening. These findings also apply to preteens as evidenced by a positive screen rate of 1.4% in encounters for nonpsychiatric presenting problems, consistent with findings from recent studies,^{18,19,22,23} and reinforcing the potential value of universal suicide risk screening for youths as young as age 10 years in health care settings.

For youth encounters with nonpsychiatric presentations, those in the ED had the highest rate of positive screens (4.6%), but only 0.4% of nonpsychiatric ED encounters resulted in acute positive screens. In other words, only 40 of every 10,000 suicide screenings completed during nonpsychiatric encounters in the ED revealed imminent risk. Importantly, endorsement of the acuity item (imminent thoughts of suicide) was rare in non-psychiatric encounters across all settings. We found that the vast majority of identified risk could be addressed with a nonurgent but robust response such as connection to outpatient care, rather than costly, time-intensive, and intrusive measures, such as 1:1 observation, boarding, and involuntary detention. Examination of the disposition outcomes in this study revealed that most encounters with positive screens in the ED and inpatient samples resulted in discharge home rather than to a higher level of care. The key to efficiently and

effectively managing identified suicide risk is in the creation of robust clinical pathways involving safety planning, lethal means counseling, and referral to outpatient care.

Notably, nearly half of the positive screens were a single “yes” to the question assessing a history of suicide attempts, affirming the public health crisis of suicidal behavior among American youths. Nevertheless, this sole “yes” to past behavior, in the absence of current warning signs, may not require further intervention during the encounter. Youth suicide risk screening clinical pathways have been developed for further guidance in medical settings and consist of a 3-tiered approach with the second tier consisting of a brief suicide safety assessment.²⁴ Through the use of a brief suicide safety assessment²⁵ following a positive screen, clinicians can efficiently care for patients who screen positive and determine whether a patient requires an urgent mental health evaluation during the encounter or if an outpatient mental health referral is sufficient or indicated. Brief suicide safety assessments require minimal training and may be administered by nonpsychiatric health care providers. The key for successful implementation of suicide screening programs is not necessarily by adding resources, which is often prohibitive; rather, through the thoughtful response to positive screens. It is not necessary or appropriate to respond to all positive screens as if the individual is in imminent danger. Instead, guidelines must be created to optimize existing resources. At Parkland Health & Hospital System, the implementation of universal screening was supported by expansion of social worker engagement in clinical decision-making. In systems with limited or no access to mental health expertise, other strategies including training of nonpsychiatric personnel to assess risk and leveraging telehealth resources may be used.

This descriptive study examined data within encounters in which standardized suicide screening was conducted. This study’s most notable strength is the compilation of data from these encounters over 3 consecutive years yielding an unprecedented sample size for systematic suicide risk screening. Furthermore, the study encounters were diverse in terms of race/ethnicity, languages spoken, and in the inclusion of underserved youths as young as 10 years of age. The ASQ was well-suited for screening, as it was brief, and nurses were able to administer the tool in less than a minute. There is now a toolkit associated with the ASQ that aids with implementation (www.nimh.nih.gov/ASQ).²⁶

90,000 Pediatric Suicide Risk Screenings

TABLE 3. Emergency Department Disposition by Presenting Problem and ASQ Results

	Discharge to home <i>N</i> (% of row)	Left before treatment completed/AMA <i>N</i> (% of row)	Parkland admit <i>N</i> (% of row)	Transfer to another facility <i>N</i> (% of row)
Total (<i>N</i> = 9395)	8439 (89.8)	563 (6.0)	9 (0.1)	384 (4.1)
Negative screen (<i>N</i> = 8583)	7791 (90.8)	543 (6.3)	9 (0.1)	240 (2.8)
Nonacute positive screen (<i>N</i> = 605)	512 (84.6)	19 (3.1)	0 (0.0)	74 (12.2)
Acute positive screen (<i>N</i> = 207)	136 (65.2)	1 (0.5)	0 (0.0)	70 (33.8)
Nonpsychiatric presenting problem (<i>N</i> = 8615)	7803 (90.6)	551 (6.4)	9 (0.1)	252 (2.9)
Negative screen (<i>N</i> = 8212)	7451 (90.7)	532 (6.5)	9 (0.1)	220 (2.7)
Nonacute positive screen (<i>N</i> = 366)	324 (88.5)	18 (4.9)	0 (0.0)	24 (6.6)
Acute positive screen (<i>N</i> = 37)	28 (75.7)	1 (2.7)	0 (0.0)	8 (21.6)
Psychiatric presenting problem (<i>N</i> = 780)	636 (81.5)	12 (1.5)	0 (0.0)	132 (16.9)
Negative screen (<i>N</i> = 371)	340 (91.6)	11 (3.0)	0 (0.0)	20 (5.4)
Nonacute positive screen (<i>N</i> = 239)	188 (78.7)	1 (0.4)	0 (0.0)	50 (20.9)
Acute positive screen (<i>N</i> = 170)	108 (63.5)	0 (0.0)	0 (0.0)	62 (36.5)

ASQ = Ask Suicide-Screening Questions.

There are several potential study limitations. Parkland Health & Hospital System is a safety-net, urban hospital system serving underinsured and uninsured populations and a large proportion of Hispanic patients, which may limit generalizability, particularly to systems with a larger proportion of patients with high socioeconomic status. In addition, outcome data were limited to ED and hospital disposition. Outcomes such as subsequent suicide or suicide attempts, provider risk stratification, and utilization of higher levels of care were not available, limiting the ability to evaluate long-term efficacy and estimate false positive results. Presenting problems were categorized based on text and not actual International Classification of Diseases encounter diagnostic codes, so there was potential for misclassification. Moreover, nearly half of the positive screens were due to a history of suicide attempt and we were unable to establish whether or not this prior behavior was known to family or providers. Finally, the study design did not allow for collection of data regarding the potential negative effects of risk detection related to screening such as patient frustration with safety measures or extended encounter length for additional assessment.

Future studies are needed to examine robust outcome data beyond the index encounter over a sufficient period of time to determine whether screening can facilitate the effective implementation of interventions to reduce suicidal behaviors. While the ASQ was not developed as a predictive tool, there are now data available demonstrating the predictive validity of the ASQ²⁷ as an effective method of identifying

risk for subsequent suicidal behavior or death by suicide. Additional research is needed to confirm and expand the predictive validity findings via the study of other short- and long-term clinical outcomes.

Further research is also needed to enhance clinical decision support structures to link individuals identified through the screening process to appropriate interventions and determine if the needs of patients identified through screening are adequately addressed. Once established, cost analysis studies will be needed to determine financial impact and cost effectiveness. These programs and interventions must then be studied among diverse populations to maximize generalizability to other health care systems. Future studies should also examine the complex relationship between demographic variables such as socioeconomic status and race/ethnicity with suicide risk screening in health care settings.

The results of this study revealed the prevalence of suicide risk among pediatric encounters with nonpsychiatric and psychiatric chief complaints in a large healthcare system. More than 97% of all pediatric patient encounters were negative for suicide risk, and almost all with positive screens were not acute. The results also demonstrated that suicide risk is present among pediatric patients presenting for nonpsychiatric care and among 10- to 12-year-old people, underscoring the potential value of improving risk detection through standardized screening practices. The knowledge generated from this program provides a starting point for consideration of the types and amounts of resources needed to support expanded suicide risk screening in other health care settings.

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

Funding: This research was supported in part by the Intramural Research Program of the NIMH (Annual Report Number ZIAMH002922).

Acknowledgments: The authors would like to thank Annabelle Mournet for assisting in the preparation and editing of the manuscript. Additionally, they thank the CCO of PHHS, Dr. Roberto de la Cruz for his support of screening, and the nurses, social workers, providers, and the IT department at PHHS.

References

1. CDC National Center for Injury Prevention and Control: Web-based injury statistics query and reporting system (WISQARS). Available from: [cdc.gov/injury/wisqars/index.html](https://www.cdc.gov/injury/wisqars/index.html)
2. Kann L, McManus T, Harris WA, et al: Youth risk behavior surveillance - United States, 2017. *MMWR Surveill Summ* 2018; 67
3. Plemmons G, Hall M, Doupnik S, et al: Hospitalization for suicide ideation or attempt: 2008–2015. *Pediatrics* 2018; 141:e20172426
4. Burstein B, Agostino H, Greenfield B: Suicidal attempts and ideation among children and adolescents in U.S. Emergency Departments, 2007–2015. *JAMA Pediatr* 2019; 173:598–600
5. Ruch DA, Sheftall AH, Schlagbaum P, Rausch J, Campo JV, Bridge JA: Trends in suicide among youth aged 10 to 19 years in the United States, 1975 to 2016. *JAMA Netw Open* 2019; 2:e193886
6. U.S. Surgeon General, National Action Alliance for Suicide Prevention: National strategy for suicide prevention: goals and objectives for action 2012. Washington DC: US Department of Health and Human Services; 2012
7. The Joint Commission: Detecting and treating suicide ideation in all settings. Sentinel event alert, issue 56; 2016. Available from: [jointcommission.org/assets/1/18/SEA_56_Suicide.pdf](https://www.jointcommission.org/assets/1/18/SEA_56_Suicide.pdf).
8. Hedegaard H, Curtin SC, Warner M: Suicide mortality in the United States, 1999–2017. *NCHS Data Brief*, no 330. Hyattsville, MD: National Center for Health Statistics; 2018
9. Curtin SC, Heron M: Death rates due to suicide and homicide among persons aged 10–24: United States, 2000–2017. *NCHS Data Brief*, no 352. Hyattsville, MD: National Center for Health Statistics; 2019
10. QuickStats: Death rates for motor vehicle traffic injury, suicide, and homicide among children and adolescents aged 10–14 years — United States, 1999–2014. *MMWR Morb Mortal Wkly Rep* 2016; 65:1203
11. Peña JB, Caine ED: Screening as an approach for adolescent suicide prevention. *Suicide Life Threat Behav* 2006; 36:614–637
12. Fontanella CA, Warner LA, Steelesmith D, Bridge JA, Sweeney HA, Campo JV: Clinical profiles and health services patterns of medicaid-enrolled youths who died by suicide. *JAMA Pediatr* 2020; 174:470–477
13. Horowitz LM, Roaten K, Pao M, Bridge JA: Suicide prevention in medical settings: the case for universal screening. *Gen Hosp Psychiatry* 2020; 63:7–8
14. Motto JA: Suicide prevention for high-risk persons who refuse treatment. *Suicide Life Threat Behav* 1976; 6:223–230
15. Reger MA, Luxton DD, Tucker RP, et al: Implementation methods for the caring contacts suicide prevention intervention. *Prof Psychol Res Pr* 2017; 48:369–377
16. Miller IW, Camargo CA Jr, Arias SA, et al: Suicide prevention in an emergency department population: the ED-SAFE study. *JAMA Psychiatry* 2017; 74:563–570
17. Stanley B, Brown GK, Brenner LA, et al: Comparison of the safety planning intervention with follow-up vs usual care of suicidal patients treated in the emergency department. *JAMA Psychiatry* 2018; 75:894–900
18. Tishler CL, Reiss NS, Rhodes AR: Suicidal behavior in children younger than twelve: a diagnostic challenge for emergency department personnel. *Acad Emerg Med* 2007; 14:810–818
19. Lanzillo EC, Horowitz LM, Wharff EA, Sheftall AH, Pao M, Bridge JA: The importance of screening preteens for suicide risk in the emergency department. *Hosp Pediatr* 2019; 9:305–307
20. Roaten K, Johnson C, Genzel R, et al: Development and implementation of a universal suicide risk screening program in a safety-net hospital system. *Jt Comm J Qual Patient Saf* 2018; 44:4–11
21. Horowitz LM, Bridge JA, Teach SJ, et al: Ask suicide-screening questions (ASQ): a brief instrument for the pediatric emergency department. *Arch Pediatr Adolesc Med* 2012; 166:1170–1176
22. Bridge JA, Asti L, Horowitz LM, et al: Suicide trends among elementary school-aged children in the United States from 1993 to 2012. *JAMA Pediatr* 2015; 169:673–677
23. Sheftall AH, Asti L, Horowitz LM, et al: Suicide in elementary school-aged children and early adolescents. *Pediatrics* 2016; 138:e20160436
24. Brahmbhatt K, Kurtz BP, Afzal KI, et al: Suicide risk screening in pediatric hospitals: clinical pathways to address a global health crisis. *Psychosomatics* 2019; 60:1–9
25. National Institute of Mental Health: Brief suicide safety assessment. Screening youth for suicide risk in medical settings. Available from: <https://www.nimh.nih.gov/ASQ>
26. National Institute of Mental Health: ASQ suicide risk screening toolkit. Screening youth for suicide risk in medical settings. Available from: <https://www.nimh.nih.gov/ASQ>
27. Devylder JE, Ryan TC, Cwik M, et al: Screening for suicide risk among youths with a psychotic disorder in a pediatric emergency department. *Psychiatr Serv* 2020; 71:205–208