Development and Implementation of a Universal Suicide Risk Screening Program in a Safety-Net Hospital System

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Background: Many individuals who die by suicide present for nonbehavioral health care prior to death. The risk is often undetected. Universal suicide screening in health care may improve risk recognition. A quality improvement project involving a universal suicide screening program was designed and developed in a large safety-net health care system.

Methods: The steps in developing and implementing this quality improvement program were gathering intelligence, examining resources, designing the screening program, creating a clinical response, constructing an electronic health record screening protocol, clinical workforce education, and program implementation. This project used the Columbia-Suicide Severity Rating Scale, Clinical Practice Screener–Recent, and a preliminary clinical decision support system.

Results: Prevalence data on suicide risk levels are provided for 328,064 adult encounters from the first six months of the screening program. Approximately half of the screens were completed in the outpatient clinics, more than 40% in the emergency department (ED), and slightly less than 5% in the hospital inpatient units. In the ED, 6.3% of the screens were positive, as were 1.6% in the inpatient units, and 2.1% in the outpatient clinics. The odds of a positive suicide screening in the ED was 4.29 times higher than the inpatient units and 3.13 times higher than the outpatient clinics.

Conclusion: A new quality improvement program for universal suicide screening was successfully implemented in a large safety-net health care system. The burden to the system from universal screening was not overwhelming and was managed effectively through thoughtful allocation of clinical resources.

Suicide is a significant public health concern; it is the 10th leading cause of death in the United States, and the suicide rate has been increasing over the past decade. Each year more than 44,000 Americans die by suicide and more than half a million receive emergency care for nonfatal, self-inflicted injuries. Taken together, these injuries and deaths result in an estimated total cost of more than $50 billion dollars in health care-related expenses and lost productivity.

The Joint Commission considers suicide to be a sentinel event, and psychiatric patients to represent a particularly high-risk population in hospital settings. Its National Patient Safety Goal (NPSG) NPSG 15.01.01 requires that all accredited hospitals assess patient suicide risk, but this requirement currently applies only to psychiatric hospitals and patients being treated for emotional or behavioral disorders in general hospitals. Yet there also exists a far larger population of nonpsychiatric patients with lower risk for suicide who collectively yield a substantially larger risk burden. For example, a study of health care utilization patterns in 11 million people enrolled in a consortium of health maintenance organizations found that only a small fraction had died by suicide over a decade. The total number of suicides among service users in the year before their death without identified psychiatric illness, however, amounted to 2,211.

Further, among patients not identified as having psychiatric disorders and an occult risk of suicide. A study of suicidal ideation in 1,590 patients seeking emergency treatment for nonpsychiatric reasons found that 20.1% acknowledged current suicidal ideation, 1.9% reported a suicide plan, and 4 patients returned to the emergency department (ED) after a suicide attempt in the next 45 days. Medical records revealed that 80.6% of the patients with suicidal plans were not identified by ED providers. In response to this situation, in 2016 The Joint Commission released a Sentinel Event Alert highlighting the importance of identifying suicide risk and developing comprehensive treatment plans for patients in all health care settings.

The magnitude of suicide risk potential in nonpsychiatric populations suggests an important opportunity to identify patients with unrecognized risk in medical care settings. To illustrate this point, 45% of people in a health care utilization study who died by suicide had contact with nonbehavioral health providers in the month prior to death, compared to only 19% in contact with mental health providers, and a second study found that 39% of patients who died by suicide had received medical care in an ED in the year prior to death. These findings suggest the potential to expand screening practices to identify unrecognized suicide risk in all inpatients and outpatients. Unfortunately, guidelines for the implementation of such practices have been limited by the lack of evidence regarding the relationship between screening and prevention of suicide.
concluded that the evidence was insufficient to make specific recommendations.\textsuperscript{10} To summarize, little is known about the prevalence of suicide risk in a community health care patient sample, and the methods for implementation of a universal suicide screening program have not been described.

To address this gap, and as the first important step in the process of understanding suicide prevention from a population health perspective, a universal screening quality improvement program was initiated in the Parkland Health & Hospital System (PHHS; Dallas), a safety-net health care system located in an urban setting providing care to local patients, as well as to those from surrounding counties and states who require a higher level of care. Originally proposed in 2012, universal suicide screening was met with concern that it would be an overwhelming undertaking in a system with more than one million annual patient encounters. However, recognition of potentially enormous benefits for patient safety improvement through systematic identification of suicide risk likely otherwise missed among patients presenting with nonbehavioral health problems helped sustain the desire to proceed with plans. This article, which follows the SQUIRE 2.0 standards for reporting quality improvement initiatives,\textsuperscript{11} includes a description of the development and implementation of the suicide screening program, descriptive data on the characteristics of the adults screened during the first six months, and a review of lessons learned.

**Methods**

Development of the Parkland suicide screening program commenced with extensive discussion of the benefits and challenges of universal screening in February 2012. A system with precision approaching perfection would clearly be paramount because of the life-or-death consequences inherent in accurate suicide risk identification. Highly specific screening procedures would be needed to minimize false positives precipitating patient frustration and work-flow disruptions. Universal screening could be prohibitively resource intensive, taxing overburdened systems and outstripping hospital capabilities. Thus, efficiency would be critical. For two and a half years, uncertainties surrounding implementation of universal screening in a large system, coupled with additional resource needs and concerns about potential negative impact, stymied efforts to move forward with a specific plan. Figure 1 illustrates the time line of the steps in this program; development commenced at the end of this 2.5-year discussion period, as we describe in detail, step by step.

**Information Gathering (August–September 2014)**

In 2014 a routine accreditation survey conducted by The Joint Commission at PHHS identified the omission of a suicide risk assessment for a medical inpatient with comorbid substance use disorder. This discovery renewed PHHS’s interest in the potential implementation of universal suicide screening to diminish risk and optimize care. It was decided to exceed NPSG.15.01.01 requirements by expanding suicide screening to all patients at all points of access. A task force, consisting of approximately 20 members, including 2 co-chairs [K.R., C.J.] was created in August 2014 to develop a plan for design and implementation of the systemwide screening program. Its members were chosen to include representatives from key clinical disciplines, including nursing leadership, physician chiefs of services, social work leadership, information technology (IT) representatives, and educational staff. The physician leaders represented specialty services with high patient volumes such as emergency medicine, trauma, and obstetrics/gynecology to gain the support of individuals most likely to be affected by changes to work flow with the initiation of the planned program.

The task force created a plan for development and operationalization of the technical aspects of universal suicide screening. The steps in this process were gathering information about existing screening practices/protocols, examining resources, designing the screening program, creating a

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![Figure 1: The time line of the steps in the program, with development commencing at the end of the 10-month planning and implementation period, is shown. EHR, electronic health record.](image-url)
clinical response, constructing an electronic health record (EHR) screening protocol, clinical workforce education, and program implementation.

The first step, information gathering, entailed the review of existing literature on how similar hospital systems have addressed suicide risk. At the time, this literature consisted of feasibility studies in ED settings,\textsuperscript{12,13} with research limited to suicide risk screening in EDs revealing that screening was conducted nonsystematically and in only a small fraction of patient encounters,\textsuperscript{14} and research in primary care settings providing insufficient evidence to determine the benefit of suicide risk screening.\textsuperscript{15} No studies described successful implementation of universal suicide screening in a hospital system to guide the construction of the PHHS initiative. No studies reported rates of positive suicide screens in similar health care settings that could be extrapolated for estimating the resources needed to address at-risk patients identified through screening at PHHS. The task force determined that this was uncharted territory, leading to the conclusion that a novel system must be created.

**Examining Resources (September 2014–November 2014)**

The task force next focused on determining what resources would be required to address the needs of the potential numbers of patients who might screen positive. Because no estimates of positive suicide screen rates were available, the task force was limited to estimating the number of additional minutes per patient encounter and related provider effort that would be required for each patient identified. Given concerns about the uncertainties of potential positive screening rates and associated resource needs, it was determined that the safest and most feasible plan for implementation would require careful introduction of screening through limited stepwise phases with close monitoring of outcomes to inform resources needed for manageable progression across subsequent phases. The first phase of the program would involve screening adult patients in the ED and inpatient units. The anticipated increase in the volume of patients identified through systematic screening who would then require psychiatric services indicated the need for more clinicians to address suicide risk. It was determined that this could most efficiently be addressed by adding enough social workers to meet the clinical needs of the patients identified by the screening process. For example, patients who endorsed a history of suicidal behavior but none of the other imminent risk screening items would then be evaluated by a social worker but would not automatically be involuntarily detained. When the social workers were informed of these plans, they expressed concerns over the prospect of bearing responsibility for independent evaluation of suicide risk, consistent with findings from focus groups conducted during these preparation phases to elicit perceptions of suicide screening procedures, as has been previously described.\textsuperscript{16} The second phase would expand screening to community-oriented primary care clinics (COPCs) and correctional health services. The third phase would add screening to on-campus outpatient clinics, the ambulatory surgical center, and selected procedural areas pending sufficient numbers of behavioral health providers and social workers.

**Designing the Screening Program and Incorporating It Into the EHR (September 2014–January 2015)**

Another step was selecting the suicide-screening instrument. The primary criteria were (1) validity/reliability, (2) brevity, (3) availability in the public domain, and (4) administration with minimal training. The task force determined that the Columbia-Suicide Severity Rating Scale (C-SSRS), Clinical Practice Screener–Recent,\textsuperscript{17} which also has multiple-language capability and standardized online training, was the best fit for screening adults. Figure 2 lists the screening items and shows the flow through the questions.

Next was the development of a clinical response and construction of the program in the EHR, for which no precedent was available. Given the importance of creating a screening program that maximized both efficiency and accuracy, it was essential that the program be seamlessly integrated into the EHR and that the procedure be simple and user-friendly. The screening was designed to be part of the triage questions asked immediately on patient arrival by nursing staff during all provider encounters. Figure 3 summarizes the patient flow through the encounter and suicide screening process. Screening questions incorporated into the EHR would prompt clinicians to systematically query and record item responses.

The construction of the screening procedure required the creation of branching logic for the C-SSRS and its insertion into the EHR system used by PHHS (Epic Systems Corporation, Verona, Wisconsin). The information technology team constructed a C-SSRS flow pattern in the EHR to accommodate two separate sequences of suicide screening questions based on the responses to the second and sixth questions (see Figure 2). The computerization of these procedures was the first step toward development of a weighting process as a component of clinical decision support (CDS).\textsuperscript{18} After the screening procedures are established and performing adequately, then specific weighting procedures can be developed and tested for scoring the C-SSRS items to generate a valid risk stratification process.

**Clinical Workforce Education (January 2015–May 2015)**

Next, the task force shifted its focus to educating clinical staff on program implementation. A mandatory educational module regarding the suicide screening program was created for nursing and nonnursing clinical staff (for example,
The module was added to the PHHS online system for centralized dissemination of knowledge and education-compliance tracking. The module included basic suicide statistics and risk factors, provided a rationale for universal screening, and concluded with posttest questions. The module for nursing staff also included a requirement to view the online C-SSRS education video. The module for nursing staff also included a requirement to view the online C-SSRS education video.

Assessment of Program Implementation (November 2015)

We present specific information related to the implementation of the Parkland suicide screening program, including data describing the number of screenings completed, demographic characteristics of the patients screened, numbers and proportions of positive screens, and associated dispositions. We also provide information based on changes...
required in the system in response to the clinical impact on
the system, lessons learned from its implementation, esti-
mation of specific associated costs, and anecdotal feedback
about the program from staff.

The first phase of the adult screening program went live
in the ED and inpatient units in February 2015. For 48 hours,
an IT team was available around the clock to address EHR
issues. The IT and clinical teams created a reporting system
that tracks compliance data for screening activities in real
time. ED/inpatient screening compliance, location, and results
are reported daily to unit managers and nursing leader-
ship. The second phase of the program began in May 2015
and included all of the COPCs. COPC compliance and risk
data are generated and distributed to hospital administra-
tion and program leadership on a monthly basis.

One of the key lessons learned in this project was the im-
portance of strategic targeting of resources specific to varying
severity of risk among patients identified by screening. Most
of these patients do not report imminent suicide risk factors
and can be effectively cared for by social work profession-
als, thus circumventing excess patient care demands on the
system’s mental health providers. When the program started,
the additional social workers who were anticipated to meet
the increased need were already hired and in place for phases
1 and 2. As a result, no disruption of hospital work flow
occurred because of this readiness to meet the needs of the
additional at-risk patients. Anecdotally, the lack of confi-
dence expressed by the social workers during the planning
phase regarding their responsibility for conducting inde-
pendent suicide risk assessment dissipated with implemen-
tation of the program and was replaced with enthusiasm about their expanded roles. In addition, non-
mental health providers who participated in the previously
mentioned focus groups offered early feedback that the new
universal suicide screening procedure increased their confi-
dence in patient safety.

Another finding shortly after initiation of this program
was the discovery of a select group of patients who wanted
to leave the facility before being seen by a mental health pro-
vider and who did not meet criteria for involuntary detention
by law enforcement officers—yet were identified as having
potential suicide risk. This group of patients presented a chal-
lenge for clinical management. In response, we developed
a tiered approach for prioritizing these patients identified by
the suicide screening to expedite evaluation by a mental health
provider. This shift in response precipitously elevated the ef-
ciency of the care of these patients and assuaged clinician
fears about their care. Additional education for nursing staff
and law enforcement officers about strategies for engaging
at-risk patients and improving retention of patients in the
facility until the psychiatric evaluation was also provided.

The University of Texas Southwestern Institutional Review
Board (IRB) determined that the data analyzed for this study
were exempt from full IRB review and oversight. Data re-
ported for this study were retrieved from the EHR in the
period covering February 2015 through November 2015 in
a Microsoft Excel (Microsoft Corp., Redmond, Washing-
ton) spreadsheet. This data set was then imported into SAS
9.4 (SAS Institute Inc., Cary, North Carolina) for summa-
rization and analysis. Data from this study are summarized
as counts, proportions, means, standard deviations, and
medians. With such large numbers of observations in the
data set, most comparisons of variables were significant at
a p value of < 0.0001, which led us to examine the odds ratios
(ORs) of bivariate comparisons of variables.

RESULTS

Patient Characteristics

The first nine months postimplementation (February 28,
2015–November 2015) in the ED, hospital inpatient units,
and COPCs involved 328,064 adult patient encounters with
complete suicide screening data. Table 1 lists the demog-
raphics and other characteristics of the adult screening
encounters. In this sample of patients, approximately two
thirds were female, the average age was 43 years, more than
half were Hispanic, and nearly half were never married. Just
more than one half of the patients spoke English as their
primary language, and most of the remainder spoke Spanish.
The top two payer sources were charity and Medicaid, re-
spectively. More than two thirds of ED dispositions were
discharge to home, and about half of the remainder were
admission to the hospital, most often to internal medicine
and obstetrics/gynecology. Inpatient dispositions were over-
whelmingly to home. Fewer than 1 in 10 patients left the
hospital before completing treatment. More than 50% of
the total screenings completed during the first six months
of implementation took place in the COPCs, approximate-
ly 42% in the ED, and slightly less than 5% in the inpatient
units.

Screening Responses by Location and Patient
Characteristics

In 315,378 (96.1%) of the 328,064 completed screenings,
none of the items were positively endorsed. Examination of
the data for pairwise differences in screening locations across
the six items revealed that the odds of positive responses to
each of the items were 3.49 to 7.51 times higher in the ED
than in the inpatient or outpatient settings (Table 2). The
odds of a positive response in inpatient compared to out-
patient settings were 0.70 to 0.95 times for each of the items
except Question (Q)5, and 1.12 for Q5. The odds of any
positive response to any of items Q1–Q6 was 4.29 times
higher in the ED compared to the inpatient units, 3.13 times
higher in the ED compared to the outpatient clinics, and
0.73 times as high in inpatient compared to outpatient set-
tings. In summary, the proportions of positive responses to
items were several times higher in the ED than in the in-
patient and outpatient settings, and in general somewhat
higher in the outpatient than the inpatient setting.
Table 1. Sample Characteristics \( N = 328,064 \)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
<th>% (( n ))</th>
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<tbody>
<tr>
<td><strong>Age (mean, SD years)</strong></td>
<td>42.7 (SD 15.5)</td>
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<tr>
<td><strong>Male Sex (N = 328,064)</strong></td>
<td>31.5 (103,381)</td>
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<td><strong>Race/Ethnicity (N = 326,500)</strong></td>
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<td>57.3 (187,201)</td>
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<td>Black</td>
<td>27.2 (88,751)</td>
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<td>Asian</td>
<td>2.5 (8,158)</td>
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<td>American Indian</td>
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<tr>
<td>Eastern Indian</td>
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<tr>
<td>Other Pacific Islander</td>
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<tr>
<td>Other</td>
<td>0.0 (23)</td>
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<tr>
<td><strong>Marital Status (N = 326,082)</strong></td>
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<td>Single</td>
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<tr>
<td>Married</td>
<td>30.8 (100,378)</td>
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<td>Common law</td>
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<td>Divorced</td>
<td>6.2 (20,287)</td>
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<td>Legally separated</td>
<td>6.0 (19,433)</td>
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<tr>
<td>Widowed</td>
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<td>Significant other</td>
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<td>Other</td>
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<td><strong>Language (N = 327,342)</strong></td>
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<tr>
<td>English</td>
<td>57.2 (187,251)</td>
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<td>Spanish</td>
<td>40.6 (132,747)</td>
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<tr>
<td>Other</td>
<td>2.2 (7,344)</td>
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<td><strong>Payer (N = 328,064)</strong></td>
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<tr>
<td>Charity/Self-Pay</td>
<td>58.1 (190,643)</td>
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<tr>
<td>Medicaid</td>
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<td>Medicare</td>
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<tr>
<td>Commercial</td>
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<td>Pending</td>
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<td>Workers’ Compensation</td>
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<tr>
<td>Other</td>
<td>0.0 (75)</td>
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<tr>
<td><strong>Screening Location (N = 328,064)</strong></td>
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<tr>
<td>Outpatient (COPCs)</td>
<td>53.0 (173,863)</td>
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<td>ED</td>
<td>42.2 (138,414)</td>
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<td>Inpatient</td>
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<td><strong>Disposition from ED (N = 145,374)</strong></td>
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<td>Discharge</td>
<td>71.5 (104,005)</td>
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<td>Admit to Parkland</td>
<td>16.2 (23,508)</td>
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<td>23-hour observation</td>
<td>2.6 (3,747)</td>
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<tr>
<td>Left before treatment completed/against medical advice</td>
<td>7.6 (11,093)</td>
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<tr>
<td>Transfer</td>
<td>2.0 (2,842)</td>
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<tr>
<td>Other</td>
<td>0.1 (175)</td>
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<tr>
<td>Deceased</td>
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<tr>
<td><strong>Admitting Service (N = 27,093)</strong></td>
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<td>Obstetrics/Gynecology</td>
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<tr>
<td>Observation</td>
<td>16.2 (4,401)</td>
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<tr>
<td>Burn, Trauma, and Critical Care</td>
<td>6.0 (1,626)</td>
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<td>Surgery</td>
<td>5.9 (1,604)</td>
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<td>Neurology</td>
<td>2.5 (682)</td>
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<td>Psychiatry</td>
<td>0.7 (187)</td>
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<td><strong>Hospital Disposition (N = 155,297)</strong></td>
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<tr>
<td>Discharge</td>
<td>90.1 (139,888)</td>
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<tr>
<td>Left before treatment completed/against medical advice</td>
<td>8.1 (12,620)</td>
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<tr>
<td>Transfer to other medical hospital/ nursing facility</td>
<td>0.9 (1,380)</td>
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<tr>
<td>Transfer to psychiatric hospital</td>
<td>0.7 (1,025)</td>
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<tr>
<td>Deceased</td>
<td>0.1 (217)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0.1 (167)</td>
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</table>

SD, standard deviation; COPC, community-oriented primary care clinic; ED, emergency department.

A higher percentage of men than women endorsed any positive response to any of the six items (5.7% vs. 3.0%; OR = 1.93, 95% confidence limits [CL] = 1.87, 2.01). Blacks had the highest (5.2%; compared to all others, OR = 1.53, 95% CL = 1.47, 1.59) proportion endorsing any positive response to any of the six items, whites were the second highest (3.5%; compared to all others, OR = 0.72, 95% CL = 0.70, 0.75), and Hispanics were the lowest (1.9%; compared to all others, OR = 0.28, 95% CL = 0.27, 0.29). Patients who were currently married were less likely than those not currently married to endorse any positive response to any of the six items (1.7% vs. 4.8%; OR = 0.34, 95% CL = 0.33, 0.36). Patients who spoke English were more likely than those who did not speak English to endorse any positive response to any of the six items (5.8% vs. 1.3%; OR = 4.76, 95% CL = 4.53, 5.01).

### Responses to Individual C-SSRS Items

Analysis of response patterns to individual C-SSRS items revealed that Q1 regarding passive suicidal ideation elicited a positive response in 2.4% of the sample. The rate of positive endorsement of Q2 regarding active suicidal ideation was less, 1.5%. The three questions that were asked only if Q2 was endorsed had successively lower rates of positive responses: Q3 regarding suicidal method (1.0%), Q4 regarding suicidal intent (0.9%), and Q5 regarding suicide plan (0.6%). Finally, Q6 regarding history of suicidal behavior, which was asked of every patient, was endorsed by 2.4%. Among those who endorsed any positive response to any of the six items, one third (33.3%) of the time the only item positively endorsed was Q6.

### DISCUSSION

This article, in which we describe implementation of a universal suicide screening program in a large safety-net health care system, presents important data that may be used to address identified needs for expanded suicide risk screening, particularly in nonpsychiatric medical settings such as primary care clinics and EDs. This program has brought a paradigm shift from the previous state, in which very few patients served by the system were ever asked about or discussed suicide with providers during health care encounters, to a model in which all patients are systematically screened for suicide risk. There are many poignant examples of the program’s benefits. For example, on the second day, a patient, accompanied by her romantic partner, arrived in the ED for evaluation of a medical problem. She was first screened for any of the six items (5.8% vs. 3.0%; OR = 1.93, 95% confidence limits [CL] = 1.87, 2.01). Blacks had the highest (5.2%; compared to all others, OR = 1.53, 95% CL = 1.47, 1.59) proportion endorsing any positive response to any of the six items, whites were the second highest (3.5%; compared to all others, OR = 0.72, 95% CL = 0.70, 0.75), and Hispanics were the lowest (1.9%; compared to all others, OR = 0.28, 95% CL = 0.27, 0.29). Patients who were currently married were less likely than those not currently married to endorse any positive response to any of the six items (1.7% vs. 4.8%; OR = 0.34, 95% CL = 0.33, 0.36). Patients who spoke English were more likely than those who did not speak English to endorse any positive response to any of the six items (5.8% vs. 1.3%; OR = 4.76, 95% CL = 4.53, 5.01).

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Analysis of response patterns to individual C-SSRS items revealed that Q1 regarding passive suicidal ideation elicited a positive response in 2.4% of the sample. The rate of positive endorsement of Q2 regarding active suicidal ideation was less, 1.5%. The three questions that were asked only if Q2 was endorsed had successively lower rates of positive responses: Q3 regarding suicidal method (1.0%), Q4 regarding suicidal intent (0.9%), and Q5 regarding suicide plan (0.6%). Finally, Q6 regarding history of suicidal behavior, which was asked of every patient, was endorsed by 2.4%. Among those who endorsed any positive response to any of the six items, one third (33.3%) of the time the only item positively endorsed was Q6.

### DISCUSSION

This article, in which we describe implementation of a universal suicide screening program in a large safety-net health care system, presents important data that may be used to address identified needs for expanded suicide risk screening, particularly in nonpsychiatric medical settings such as primary care clinics and EDs. This program has brought a paradigm shift from the previous state, in which very few patients served by the system were ever asked about or discussed suicide with providers during health care encounters, to a model in which all patients are systematically screened for suicide risk. There are many poignant examples of the program’s benefits. For example, on the second day, a patient, accompanied by her romantic partner, arrived in the ED for evaluation of a medical problem. She was first screened for domestic violence, which she denied, but then screened positive for suicide risk. The social worker responded and evaluated the patient privately after asking her partner to leave the room. The patient disclosed that her partner had been holding her captive in a truck. The partner fled the scene, and safe shelter placement and appropriate mental health care was arranged for the patient.
Prior to this study, little was known about the prevalence of suicidal ideation across the different components of health care systems, making it challenging for health care systems to plan for implementation of standardized screening. This study includes prevalence data and demonstrates the feasibility of implementing a systemwide universal suicide screening program. In addition, it provides a road map for the successful development and implementation of the program using a validated instrument. Development of the program included preparatory work toward the formation of a CDS paradigm using the C-SSRS. Further investigation is required to examine the validity and clinical utility of the newly developed CDS. This CDS paradigm has the potential to standardize patient safety procedures and systematize practices in health care institutions through application of an algorithm, which we will test as part of ongoing improvement of the program. The implementation of the procedures in this paradigm led to the efficient and clinically appropriate management of encounters identified as at risk, which did not arise with enough frequency to overburden or overwhelm the system.

An important finding emerging from this program’s implementation is that one third of the patients who provided a positive response on the suicide screening endorsed only the item inquiring about a history of preparatory acts or suicide behavior. This suggests the presence of a substantial proportion of patients who report only non-acute indicators of risk but could still benefit from intervention. This subset of the population may be best served with a brief, targeted risk assessment and provision of outpatient resources rather than a full evaluation from a mental health provider or emergent detention. In the Parkland screening program, these patients typically engage with social workers, reducing the need for mental health providers and more appropriately allocating resources.

The study’s primary strengths are its sample size and diversity. A limitation is that this study was conducted in a single safety-net health care system serving one population, potentially reducing generalizability of findings to other settings. Study variables were limited to encounter characteristics, without patient outcome information beyond hospital disposition. Evidence about burden to the system consisted of anecdote without systematic data.

Moving beyond the implementation of the program as described in this article, the PHHS suicide screening program is continuing in the ED, inpatient hospital units, and the COPCs. Approximately 20,000 patients are screened per month in the ED and 28,000 in the COPCs. As of September 2017, more than 1.6 million suicide screenings have been completed at PHHS. The current focus is reinforcing education and providing feedback about culture change and patient safety improvements to frontline staff. Phase 3 of the program in the on-campus outpatient specialty clinics is awaiting implementation based on funding availability. An initiative is under way to expand PHHS telehealth capabilities to

<table>
<thead>
<tr>
<th>Table 2. Positive Responses to C-SSRS Items by Location</th>
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<tbody>
<tr>
<td>Q1</td>
</tr>
<tr>
<td>----</td>
</tr>
<tr>
<td>% (n)</td>
</tr>
<tr>
<td>ED (N=138,414)</td>
</tr>
<tr>
<td>Inpatient (N=15,979)</td>
</tr>
<tr>
<td>Outpatient (N=173,863)</td>
</tr>
</tbody>
</table>

C-SSRS, Columbia-Suicide Severity Rating Scale; Q, question; ED, emergency department; OR, odds ratio; CL, confidence limit.
expedite clinical responses for at-risk patients and prepare for implementation of phase 3. Further refinements of the functionality of the screening process in the EHR are in process, such as improving the wording of best-practice alerts and automating orders for specific clinical interventions (for example, 1:1 supervision, psychiatry/psychology consult order).

Further research is needed to examine postdisposition outcomes of the screening program such as connection to outpatient mental health care, ED/hospital recidivism for self-inflicted injuries and other behavioral health issues, and mortality due to self-inflicted injuries. In addition, further analysis of specific data regarding resource allocation and the financial effect of implementing such a system is needed. Patients presenting with only nonbehavioral medical complaints should be studied to determine the volume of patients with occult risk who would have been missed without universal suicide screening.

**Conflicts of Interest.** All authors report no conflicts of interest.

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