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Evaluating Current Patterns of Assessment for Self-Harm in Emergency Departments, A Multicenter Study

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Abstract

Objectives—To describe self-harm assessment practices in U.S. emergency departments (EDs) and to identify predictors of being assessed.

Methods—This was a prospective observational cohort study of adults presenting to eight U.S. EDs. A convenience sample of adults presenting to the EDs during covered research shifts was entered into a study log. Self-harm assessment was defined as ED documentation of suicide attempt, suicidal ideation, or non-suicidal self-injury thoughts, behaviors, or both. Institution characteristics were compared relative to percentage assessed. To identify predictive patient characteristics, multivariable generalized linear models were created controlling for weekend presentation, time of presentation, age, sex, and race and ethnicity.

Results—Among 94,354 charts, self-harm assessment ranged from 3.5% to 31%, except for one outlying site at 95%. Overall, 26% were assessed (11% excluding the outlying site). Current self-harm was present in 2.7% of charts. Sites with specific self-harm assessment policies had higher assessment rates. In the complete model, adjusted risk ratios (aRR) for assessment included age ≥ 65 years (0.56, 95% CI = 0.35 to 0.92) and male sex (1.17, 95% CI = 1.10 to 1.26). There was an interaction between these variables in the smaller model (excluding outlying site), with males <65 years of age being more likely to be assessed (aRR 1.14, 95% CI = 1.02 to 1.37).

Conclusions—Emergency department assessment of self-harm was highly variable among institutions. Presence of specific assessment policies was associated with higher assessment rates. Assessment varied based upon patient characteristics. The identification of self-harm in 2.7% of ED patients indicates that a substantial proportion of current risk of self-harm may go unidentified, particularly in certain patient groups.

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INTRODUCTION

Each year, approximately 5 million patients present to U.S. emergency departments (EDs) with psychiatric or behavioral emergencies, including approximately 590,000 with visits for intentional self-harm.[1–4] Self-harm encompasses a spectrum of disorders including suicide attempts, suicidal ideation, and non-suicidal self-injury.[5,6] As available community mental health resources have declined in recent years, the number of patients presenting to EDs with psychiatric complaints in general, and suicidal thoughts and behaviors in particular, has been increasing.[3,4,7–9]

Despite the number of patients identified with self-harm, there is some evidence that current assessment practices may underestimate the amount of self-harm present in ED populations. These ED studies have been limited in that they have either examined only those with actual self-harm attempts, or have only examined small, brief snapshots of an ED population.[2,10–13] In studies using dedicated research staff to enroll consecutive samples of all patients presenting to the ED over short time periods, rates of suicidal ideation among the general ED population ranged from 3% to 11%.[10–13] Many patients with self-harm thoughts or behaviors present to the ED for reasons not related to mental health symptoms. Failing to identify many of these patients, EDs detect suicidal ideation less than 20% of the time.[13] Forty percent of patients who commit suicide have had ED visits within the previous year, most for non-psychiatric complaints.[14] As a result, further understanding of ED suicide assessment practices is warranted. The goal is to identify potential ED solutions to these issues.

The Joint Commission's 2006 approval of National Patient Safety Goal 15A to identify individuals at risk for suicide has resulted in additional focus on self-harm assessment practices in the ED.[15] The Emergency Department Safety Assessment and Follow-up Evaluation (ED-SAFE) study is a prospective, multi-center, interventional trial designed to assess methods of self-harm assessment in the ED, and to identify interventions to improve outcomes in patients with self-harm thoughts or behaviors. One of its primary goals is to determine the effectiveness of implementing protocols for universal self-harm screening by ED clinical personnel. A key initial step in determining the effectiveness of implementing such protocols is to understand current baseline ED assessment practices during normal clinical care.

This article reports the results from the screening and eligibility log of the first phase of data collection for the ED-SAFE study, an observational phase designed to collect baseline data on current ED practice. We describe current self-harm assessment practices in several EDs, identifying institution and patient factors associated with assessment. We also establish a baseline against which to measure future efforts at instituting universal screening and determining the true effect of such interventions in the ED setting. Our primary objective was to describe current self-harm assessment practices in eight US EDs. Our secondary objective was to identify ED and patient characteristics predictive of being assessed for self-harm in the general ED population.

METHODS

Study Design

This was a prospective observational cohort study of self-harm assessment practices for adults presenting to the eight EDs participating in the ED-SAFE study. This study was approved by the local institutional review board at each participating institution.

Study Setting and Population

Sites were selected from among interested hospitals who were participants in the Emergency Medicine Network (EMNet: www.emnet-usa.org) with an attempt to obtain wide geographic distribution. For reporting, we adhered to the STROBE Statement (STrengthening the Reporting of Observational Studies in Epidemiology).[16]

We examined data from the screening and eligibility log of the ED-SAFE study's first phase, Treatment as Usual. The screening and eligibility log was a minimal dataset of all ED patients collected under a waiver of informed consent. Due to its nature, collection of only limited amounts of patient-specific information was allowed by site IRBs. The log's primary purpose was to provide descriptive and contextual information for use in describing the ED-SAFE Treatment as Usual cohort. The study in the current article represents a pre-planned secondary analysis of the log.

All patients at least 18 years of age presenting to one of the participating EDs during a time when research staff were reviewing ED charts were eligible for inclusion in the screening and eligibility log. The study population included all screening and eligibility log patients whose charts were reviewed by research staff. Research staff attempted to review all charts of patients presenting during these times; however, some charts were not reviewed. Specific reasons for not reviewing a chart were not systematically recorded, but some reasons included the patient leaving without being seen by a physician, or no documentation by nurse or physician sufficient to make a determination about self-harm screening (i.e. lack of a completed nursing or physician assessment).

Study Protocol

Research staff at each site reviewed ED charts for approximately five shifts (40 hours) per week for approximately 50 weeks. A convenience sample of shifts was selected by each site individually based on its staffing capabilities, with at least some representation of nights and weekends at each site, although shifts were concentrated during weekday daytime and evening shifts. Implementation was staggered, with two randomly selected hospitals starting every two months beginning in August 2010. Hospitals were randomly assigned to one of four cohorts, which consisted of one hospital with greater than and one hospital with less than the median ED volume. The cohorts were then randomly assigned to start dates. Data collection at the final pair of hospitals ended in January 2012. Research staff had no direct contact with treating clinical staff while compiling the log. However, during the time the log was being created, 60 patients with self-harm were being enrolled for long-term follow-up evaluation at each site as part of the ongoing ED-SAFE Treatment As Usual study (by the same personnel as doing this study), and clinical staff may have been aware of this enrollment, although they were not specifically altering their baseline procedures.

Research staff reviewed the ED charts of patients who were triaged during their shifts. They identified any documented assessments of intentional self-harm thoughts or behaviors, including suicide attempt, suicidal ideation, suicidal thoughts, history of suicide attempt, or non-suicidal self-harm. All ED physician and nursing notes available in the record were reviewed.

Chart review methodology followed recommended practices.[17] Training of site investigators and a lead research coordinator occurred at a two-day study meeting on April 15 and 16, 2010. Site investigators trained research coordinators and research assistants to abstract data at each site. Site-specific training included review of the standardized manual of study procedures, the data abstraction process and standardized forms, and a variable definition codebook. Monthly conference calls were held with site personnel to address and clarify any issues that arose. Although abstractors were not blinded to ED-SAFE study goals and

hypotheses, they were not specifically aware of the hypotheses of this current study. Interrater reliability was not tested. However, to ensure that all patients presenting to the ED were accounted for in the screening and eligibility log (whether or not the chart was reviewed by research staff), cross-validation of the screening log versus electronic ED logs was performed in a randomly selected sample of 5% of enrollment days at each site. Sites received immediate feedback if fewer than 95% of patients presenting to the ED were accounted for in the screening log. All data were entered into a Research Electronic Data Capture (REDCap) database.[18]

Characteristics of the site EDs were collected, including annual volume, hospital type, trauma center level, available psychiatric resources, and policies for self-harm assessment in the ED. Information abstracted from patient charts included triage day of the week, triage time, age, sex, race, ethnicity, and ED assessment for presence of self-harm thoughts or behaviors. The purpose of the screening and eligibility log was to provide minimal data for use in describing baseline ED populations and identification of self-harm for future phases of the ED-SAFE study. The log was not designed as a comprehensive chart review of all ED patients, but was intended to provide baseline data. Therefore, no additional variables were collected.

Day of presentation was coded a priori as weekend (Saturday or Sunday) or weekday. Triage time was initially to be divided into three shifts. However, as only 313 patients were entered into the database on the traditional night shift (2300–0659), triage time was coded as day shift (0700–1459 hours) or evening/night shift (1500–0659 hours). Age was dichotomized a priori at age ≥65 years for the primary analysis, and was retained as a continuous variable in a sensitivity analysis. At five of the eight study hospitals the electronic medical record did not provide separate fields for race and ethnicity. We therefore created a combined race/ethnicity variable, which was recorded as white, Black or African American, Asian, American Indian or Alaska native, native Hawaiian or other Pacific Islander, Hispanic or Latino, or not documented. For the sensitivity analysis, we also created a priori a variable with categories white, non-white, and not documented.[19]

Outcome Measures

The primary outcome variable was ED assessment for self-harm thoughts or behaviors, which was considered present if there was any documentation in the ED record by treating clinicians (including physicians, mid-level providers, and nurses) of either the presence or absence of self-harm thoughts or behaviors, including suicide attempt, history of suicide attempt, suicidal ideation, non-suicidal self-injury thoughts, or non-suicidal self-injury behaviors. The definition of self-harm was kept intentionally broad to provide a complete picture of self-harm assessment practices in ED patients. We sought to determine if there was at least some consideration or assessment of self-harm documented. Each chart was noted to have either no assessment for self-harm documented, no self-harm present in patients who were assessed, current self-harm, past self-harm only, or self-harm of unknown time. We did not distinguish between suicidal and non-suicidal self-harm. However, prior work indicates that the majority of ED patients with self-harm indications have suicidal behaviors or ideation.[20]

Data Analysis

All analyses were conducted using STATA 12 (STATACorp, College Station, TX). Descriptive statistics are reported using proportions with 95% confidence intervals (95% CI), and means with standard deviation (SD). We compared hospital characteristics by sorting hospitals by assessment rate and noting differences in characteristics between those with higher versus lower assessment rates. We constructed multivariable models to identify

patient characteristics predictive of assessment. As the incidence of the primary outcome was greater than 10% in our population, we obtained adjusted risk ratios (RR) rather than odds ratios by creating a multivariable generalized linear model with Poisson distribution and log link.[21–24] In such a model with a binary outcome, it is generally recommended that a robust variance estimator be used to obtain correct standard errors.[21,23] However, this approach would fail to account for clustering by site. Therefore, we used a clustered sandwich estimator to account for within-site correlation.[22] Results are reported as adjusted RRs with 95% CIs.

As one outlying study site (Site 8) was responsible for a large proportion of patients assessed for self-harm (15,109 of 24,075 assessed; 63%), models were created using the entire dataset, and then repeated excluding that one outlying site. Presence of self-harm assessment was the dependent variable. Independent variables were weekend presentation, shift of presentation, age ≥65 years, sex, and race or ethnicity. Each model was tested for interactions between age and sex, sex and race/ethnicity, and age and race/ethnicity. Models were checked for overdispersion using the Pearson chi-square dispersion statistic and for fit using Pearson and deviance goodness of fit tests.[22] Sensitivity analyses were performed substituting age as a continuous variable and using the dichotomous race/ethnicity variable. Fractional polynomial analysis was used to identify any need for transformation of the continuous variable age.

Power analysis—The planned number of charts to be included in the screening log was created in consideration of planned enrollment and sample size needs for the ED-SAFE Treatment as Usual phase, and not specifically for the purposes of this analysis. A total of 78,667 patient charts were to be reviewed for this purpose. With our final sample size of 94,354 in the assessment log and 24,075 assessed, we were able to provide a precision of ± 0.25% for the primary outcome variable of proportion assessed for self-harm. The precision of the values obtained for proportions assessed at each site was less than ± 1%. These provided us with sufficient power to detect any clinically significant differences in proportions between the sites.

RESULTS

The ED-SAFE screening and eligibility log included 102,851 records. After excluding 8,466 (8.2%) records not reviewed by research staff, 11 charts with missing age, and 20 with missing sex, there were 94,354 charts available for data analysis (see Figure 1). Overall characteristics of these charts are shown in Table 1. Mean age was 45 years (SD ±19 years). At all sites, quality checks revealed that <5% of charts were not captured by the screening and eligibility log. Therefore, the figure of 102,851 represents the near-entire population of ED patients triaged during the time study staff was reviewing charts.

Twenty-six percent (n = 24,075) of the charts reviewed by the research staff had documentation of self-harm assessment by the clinical providers. The proportion of patients assessed for self-harm ranged from 3.5% to 31% across seven sites, with one outlying site (Site 8) assessing 95% of its patients (Table 2). This outlying site was responsible for 63% of all patients assessed for self-harm in this study. Excluding this site, the overall proportion of patients assessed for self-harm was 12%.

All study sites were Level 1 trauma centers in urban settings. Seven had affiliated psychiatric inpatient facilities on campus and one (Site 5) transferred psychiatric inpatients to an outside facility. Additional characteristics of the study sites are shown in Table 3. There was no relationship between self-harm assessment and hospital type, annual ED volume, or admission rate. Sites with specific policies for self-harm assessment tended to

have greater rates of assessment, with a mean (excluding the outlying site) assessment proportion of 16% (SD ±11.6%) versus a mean in those without a policy of 8.3% (SD ±6.7%). The policy at these sites, other than Site 8, was for the triage nurse to question patients suspected to be at risk based on chief complaint, patient behavior, or patient history. At Site 8, where 95% were assessed, the policy was to ask a specific self-harm assessment question of each patient in triage.

Results of the multivariable analyses to identify predictors of being assessed (accounting for clustering by site) are shown in Table 4. In the analysis of the complete dataset, patients presenting on weekends or after 3 pm were more likely to be assessed, as were males. Those over 65 years were less likely to be assessed. For race and ethnicity, American Indians and Alaska natives and Hispanics were more likely to be assessed compared to whites. However, this finding was likely an artifact of large proportions of these patients in the population of the outlying site with 95% assessment rate (Site 8), which included 60% (439 of 735) of the entire study's American Indian and Alaska native patients, and 49% (7,099 of 14,558) of the study's Hispanic patients. None of the tested interactions were significant. The Pearson dispersion statistic was 0.74, indicating no overdispersion. There was no evidence of lack of fit using the Pearson and deviance goodness-of-fit tests ($p = 1.0$).

In the sensitivity analyses for the complete dataset, age was not significant when considered either as a continuous covariate or when transformed to age cubed, as suggested by the fractional polynomial analysis (data not shown). Dichotomizing race resulted in increased risk ratios for non-whites for being assessed (adjusted RR = 1.08; 95% CI = 1.04 to 1.12). However, this was also felt to be an artifact of the race/ethnicity profile of Site 8.

In the smaller dataset with the outlying site excluded, weekend and time of presentation were not associated with self-harm assessment. There was a significant interaction between age and sex. Therefore, calculation of the adjusted RR for each of these is only valid when taking the value of the other into account. Table 5 shows that young males are the group more likely to be screened when compared to the reference group of young females. In this smaller model race/ethnicity was not associated with self-harm assessment. The Pearson dispersion statistic was 0.88 indicating no overdispersion. There was no evidence of lack of fit using the Pearson and deviance goodness-of-fit tests ($p = 1.0$).

In the sensitivity analyses for this smaller model, age was not significant when considered either as a continuous covariate or when transformed to age squared, as suggested by the fractional polynomial analysis (data not shown). Dichotomizing race resulted in a trend for decreased assessment among non-whites (adjusted RR = 0.86; 95% CI = 0.73 to 1.01).

Across all eight sites, 2,769 ED patients (2.9%) had some element of self-harm documented on the ED chart, including 2,514 (2.7%) with current endorsement, 119 (0.1%) with only past self-harm, and 136 (0.1%) with self-harm of unknown time. The site-specific proportions of patients with current self-harm ranged from 1.2% to 3.9% (Table 2). The proportion of those assessed with self-harm declined as assessment rates increased.

DISCUSSION

We report the largest study to date examining self-harm assessment practices in U.S. EDs. Particular strengths include the use of several diverse study sites, a prolonged period of enrollment, inclusion of all patients on multiple shifts, and reliance on self-harm assessment by clinical staff rather than research staff. Prior studies have relied on research staff for direct assessment of patients, and focused on single centers or small numbers of centers for short time durations in single geographic areas.[10,12,13] We were able to determine

assessment practices in relation to actual clinical care, rather than interventions delivered by trained research staff.

We found that overall 26% of ED patients were assessed for self-harm by ED staff. Seven of our eight EDs performed targeted rather than universal assessment for self-harm, assessing 12% of their patients (range 3.6% to 32%). The majority of patients are not assessed for self-harm in these EDs. Assessment generally occurred more frequently in those sites which had specific policies governing its use, although the presence of such a policy did not guarantee high assessment rates. At all such sites, the policies consisted of questions regarding self-harm posed by the triage nurses. In this small sample of sites, ED annual volume, admission rate, and type of electronic medical record did not appear to be associated with frequency of self-harm assessment.

These findings seem to indicate that institution of a specific policy can be used to drive ED-based self-harm assessment rates. Although performed by the triage nurses in the study EDs, there are no data quantifying the effectiveness of such a practice. Indeed, inadequacies in triage screening for other conditions raise concerns over its effectiveness. For example, in one study domestic violence screening at triage was positive only 5.8% of the time in women suffering from intimate partner violence.[25] The effectiveness of self-harm assessment when performed by the triage nurse as compared to some other time during the ED stay will be studied in further phases of ED-SAFE.

We also examined ED assessment practices based on patient characteristics. Interpretation of these results is complicated by the need to create two models considering the presence of the outlying site, which accounted for 63% of assessments in the study. Overall, our findings raise the concern that specific self-harm may be under-recognized in specific patients groups including older adults, women, and non-whites.

We also found that adults aged 65 years or older were less likely to be assessed in the complete model (adjusted RR 0.56). Incorporating the interaction term with sex in the smaller model, it appears that this finding is primarily driven by increased assessment rates in young men. Ting et al. also found that older adults were less likely to be assessed in their chart review conducted at the eight ED-SAFE sites.[20] Although national data indicate that the absolute number of suicides is highest in younger age groups, suicide rates per 100,000 population are similar in older and younger adults.[26] Beginning at age 70, suicide rates particularly increase in white men to four times the national average.[26] Additionally, mental health related ED visits and rates of suicidal ideation in the ED do not differ based on age.[3,13] Therefore, our finding of lower self-harm assessment rates among older adults raises the concern that self-harm is under-identified in these patients with current assessment practices.

In our study, men were more likely to be assessed for self-harm, particularly younger men. This finding is consistent with those of Ting et al., where men accounted for 43% of the study population but 51% of those assessed.[20] In national databases, men are more likely to present to the ED for mental health disorders than women (10.0% versus 5.9%).[19] However, other ED studies have found equal rates of depression[12] and suicidal ideation[13,27] between men and women. This raises the concern that women with self-harm are under-recognized by current assessment practices.

For race and ethnicity, the increased rates of self-harm assessment observed among American Indian, Alaska native, and Hispanic populations in the complete model disappeared when the outlying site was removed. In a prior epidemiologic study of ED patients using a national database, there were increased rates of suicide attempt-related visits per 1,000 U.S. population seen among African Americans and Hispanics.[4] Given the rates of

assessment we found, self-harm may be under-identified in these populations under current ED assessment practices, although our results were not statistically significant. Race and ethnicity should continue to be examined in future studies of self-harm assessment.

Current self-harm was identified in only 2.7% of ED patients in our study. This is in contrast to the known high burden of mental illness in the ED population.[19] Over 40% of ED patients have risk factors for suicide and 12% have past suicide attempts.[11,28] Previous studies that have enrolled consecutive samples of ED patients have shown self-harm and suicidal ideation rates ranging from 3% to 12%, varying with the definition used.[10,12] Differences in rates between studies may partially be accounted for by variation in the definition of self-harm, variation in the method of assessment, and differences in ED populations. The 2.7% rate found in our study, although consistent with the lower bound of these estimates, may indicate that self-harm is going undetected in the ED. Forty percent of patients who commit suicide have had ED visits within the previous year, the majority for non-psychiatric complaints.[14] In one study, 12% of ED patients without chief complaints of mental health issues reported suicidal ideation, but this was detected by ED staff under 20% of the time.[13] Our findings raise the concern that a substantial proportion of ED patients with current self-harm are not being identified in current clinical practice. The examination of patient characteristics discussed above raises concern that this deficiency may be greater in older adults, women, and non-whites.

The total percentage of self-harm identified among the entire ED patient population at each individual site ranged from 1.2% to 3.9% (Table 2). This was not related to percentage assessed for self-harm at the site. For example, at the outlying Site 8 with 95% assessment rates, only 2.4% of the entire ED population was identified as having current self-harm. This seems to indicate that expansion of brief triage screening instruments to the entire ED population may not be sufficient to uncover additional cases of self-harm as compared to targeted screening. It is not known if it would be more effective to focus on improving targeted screening or on implementing a more effective screening tool for the entire ED population. A more robust approach may be required. The ED-SAFE study is examining universal ED assessment with a three-question screen administered by the bedside nurse to answer this question.

LIMITATIONS

We do not have specific information on those patients whose charts were not reviewed by the research staff or the individual reasons their charts were not reviewed. It is unknown how these could have affected the study results, although they constituted only 8% of the total population (8,466 of 102,854). Race and ethnicity data were also missing for 2.8% of the population. The presence of one site with a large proportion of study patients might have skewed results. For that reason, we repeated the analyses with that site excluded. Another potential problem was that assessment for self-harm used standard clinical care at each site, without any specific guidance on patient selection or method of assessment. We recognize that non-standardized screening may limit the generalizability of findings, and sites with more developed assessment protocols may achieve different results. However, our intent was to study “usual care” so this issue is inherent to such research. Our findings do represent the real-world experience of eight U.S. EDs. These EDs were similar in that all were at large, urban teaching institutions with research infrastructure, and so generalizability to smaller community and/or rural settings is unclear. Our eight sites do at least provide geographic diversity and differences in ED volumes. Also, we included both university-affiliated and community teaching EDs.

Due to the nature of the screening log data used in this study, we do not know presenting complaints or other relevant patient factors. We were therefore unable to report on the proportion of screenings conducted due to psychiatric complaints versus other reasons. There could also be other unmeasured confounders that affect the likelihood of being assessed for self-harm. The effect of these unmeasured confounders could be magnified by the non-random sampling time in this study. As the majority of research shifts occurred during weekdays, unmeasured patient characteristics occurring more commonly on weekends (e.g. alcohol intoxication) could have a magnified effect. Finally, the results related to proportion of ED patients with self-harm should be interpreted with caution, in that self-harm could only be identified among those assessed and it may have been undetected in others. Future phases of ED-SAFE will address these issues.

CONCLUSIONS

Self-harm assessment practices were highly variable in participating EDs. Excluding one outlying site with near-universal assessment, our seven other EDs assessed an average of 12% of patients for self-harm. Self-harm is rarely identified in the ED, being documented in only 2.7% of ED patients. Older adults were less likely to be assessed, and men, particularly younger men, were more likely to be assessed for self-harm. The varying rates of assessment between various ED subpopulations demonstrate the need for a more rational, standardized approach to self-harm screening. As only 2.7% of patients were identified as having current self-harm despite reported rates of up to 12%,[10,12,13] a substantial proportion of self-harm may go unidentified under current ED assessment practices.

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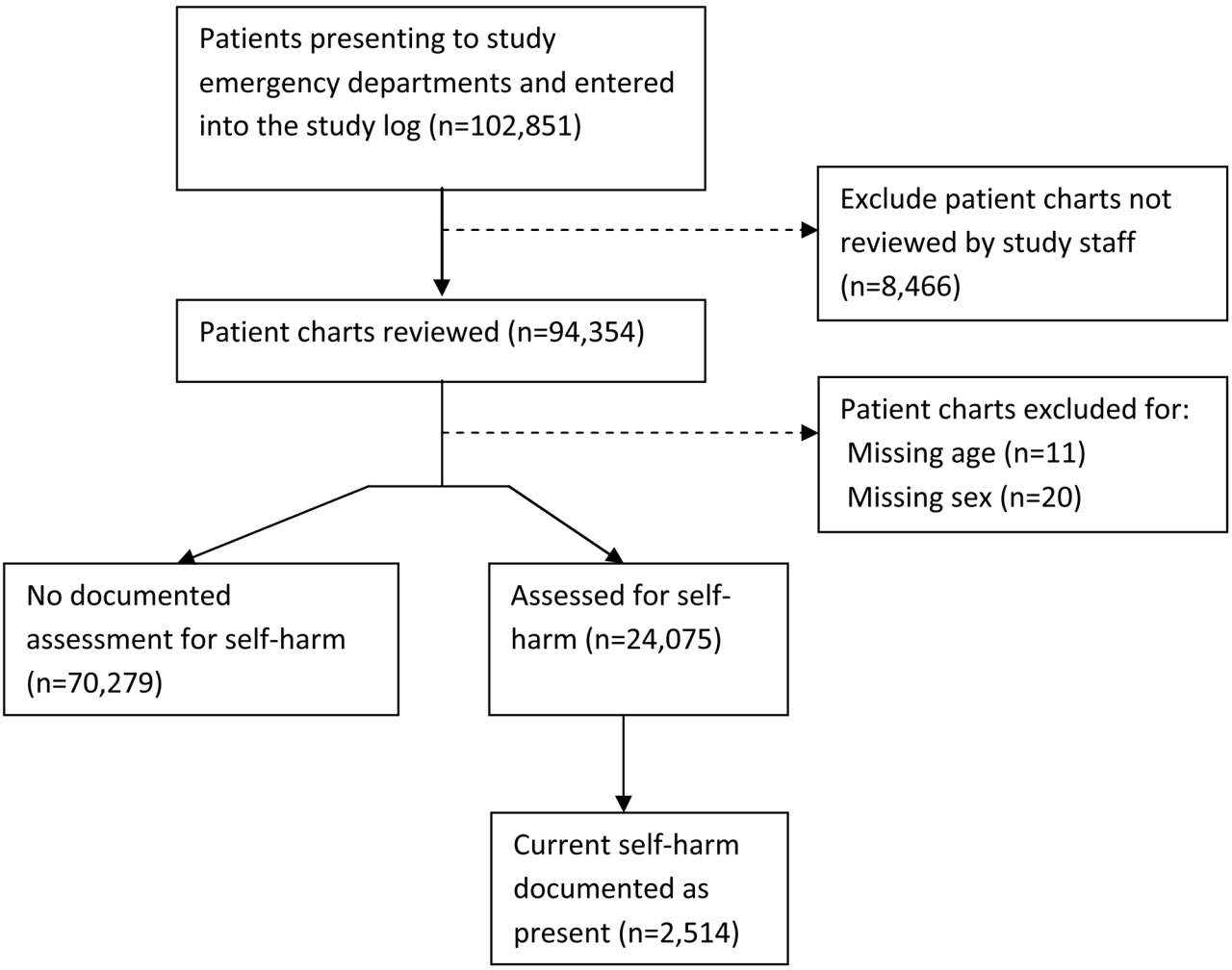

Figure 1.
Flow diagram for inclusion in the ED Safety Assessment and Outcome Evaluation Screening and Eligibility Log

Table 1

Characteristics of 94,354 subjects in the screening and eligibility log whose charts were reviewed by research staff

Patient characteristics	Number of subjects (N=94,354)	Percentage of total study subjects
Presentation on weekend	7,414	7.9
Time of presentation		
Day shift (0700–1459 hours)	56,544	60
Evening/night shift (1500–0659 hours)	37,810	40
Age		
≤65 years	78,988	84
≥65 years	15,366	16
Sex		
Male	42,855	45
Female	51,499	55
Race and ethnicity		
White	52,946	56
Black/African-American	21,501	23
Asian	1,324	1.4
American Indian/Alaska native	735	0.8
Native Hawaiian/Pacific Islander	39	0.04
Hispanic or Latino	14,557	15
Other	562	0.6
Not documented	2,690	2.9
Study site		
1	10,770	11
2	14,866	16
3	15,173	16
4	6,798	7.2
5	12,805	14
6	9,934	11
7	8,062	8.5
8 (outlying) *	15,946	17
Assessed for self-harm by emergency department staff	24,075	26

* The outlying site had a much greater proportion of patients screened than any other site (see Table 2)

Table 2

Patterns of ED assessment for self-harm overall, with the dominant study site excluded, and stratified by study site

Population examined	Total number in screening log	Number assessed for self-harm	Number with current self- harm	Percentage assessed for self-harm at each site (95% CI)	Percentage of total site number with current self-harm (95% CI)	Percentage of those assessed with current self-harm (95% CI)
Complete dataset	94,354	24,075	2,514	26 (25–26)	2.7 (2.6–2.8)	10 (10–11)
Dataset with outlying site (site 8) excluded	78,408	8,969	2,130	11 (11–12)	2.7 (2.6–2.8)	24 (23–25)
Individual site data						
1	10,770	378	125	3.5 (3.2–3.9)	1.2 (0.9–1.4)	33 (28–38)
2	14,866	710	335	4.8 (4.4–5.1)	2.3 (2.0–2.5)	47 (43–51)
3	15,173	820	455	5.4 (5.0–5.8)	3.0 (2.7–3.3)	56 (52–59)
4	6,798	634	264	9.3 (8.6–10.0)	3.9 (3.4–4.4)	42 (38–46)
5	12,805	2,011	433	16 (15–16)	3.4 (3.1–3.7)	22 (20–23)
6	9,934	1,924	268	19 (19–20)	2.7 (2.4–3.0)	14 (12–16)
7	8,062	2,492	250	31 (30–32)	3.1 (2.7–3.5)	10 (9–11)
8 (outlying)	15,946	15,106	384	95 (94–95)	2.4 (2.2–2.6)	2.5 (2.3–2.8)

Table 3

Relationship between ED characteristics and percentage of patients assessed for self-harm

Study site	Percentage assessed for self-harm	Type of hospital	Annual ED volume	ED admission rate, %	ED electronic medical record	Presence of a specific policy for self-harm assessment	Psychiatric social worker available for ED consults	Psychiatrist (resident or attending) available for ED consults
1	3.5	University/tertiary care	48,644	25	Complete	No	No	Yes
2	4.8	University/tertiary care	43,639	25	Partial	Yes	Yes	No
3	5.4	University/tertiary care	55,000	47	Partial	No	Yes	Yes
4	9.3	Community teaching	34,502	17	Complete	Yes	Yes	No
5	16	University/tertiary care	51,414	18	Complete	No	Yes	No
6	19	University/tertiary care	64,684	23	Complete	Yes	Yes	Yes
7	31	Community teaching	27,607	17	Partial	Yes	Yes	Yes
8 (outlying)	95	Community teaching	74,000	23	Partial	Yes	Yes	No

*Complete electronic medical records included records where all aspects of the patient's care including documentation, results, and ordering was electronic. Partial were missing one or more of these elements.

Table 4

Multivariable logistic regression analysis identifying predictors of ED assessment of self-harm, clustered by study site*

	Complete dataset (N=94,354)		Dataset with outlying site excluded (n=78,408)	
Characteristic	**Adjusted Risk Ratio**	**95% CI**	**Adjusted Risk Ratio**	**95% CI**
Weekend presentation	1.30	1.04–1.62	1.27	0.86–1.88
Presentation on evening/night shift (1500–0659 hours)	1.36	1.01–1.85	0.88	0.63–1.22
Age ≥65 years	0.56	0.35–0.92	0.67†	0.36–1.26
Male gender	1.17	1.10–1.26	1.14†	1.02–1.27
Interaction of age x gender	NA		0.83†	0.70–0.98
Race/ethnicity				
White	Referent		referent	
Black or African-American	0.89	0.58–1.37	0.63	0.39–1.03
Asian	0.98	0.70–1.43	0.90	0.67–1.23
American Indian or Alaska native	2.30	1.53–3.47	0.66	0.22–1.94
Native Hawaiian or Pacific Islander	0.64	0.21–1.95	0.22	0.02–1.77
Hispanic or Latino	2.41	1.67–3.48	0.85	0.70–1.03
Other	0.79	0.41–1.54	1.09	0.63–1.87
Not documented	1.91	1.21–3.02	0.45	0.20–1.02

*Controlling for weekend presentation, age, sex, and race/ethnicity

†Interpretation of the adjusted risk ratio for age and sex in the setting of an interaction requires consideration of the interaction coefficient. See text and Table 5

Table 5

Adjusted risk ratios by sex and age for the model created from the dataset with outlying site excluded, accounting for the interaction between the two characteristics

	Dataset with outlying site excluded (n=78,408)	
Sex and Age	**Adjusted risk ratio**	**95% CI**
Females <65 years	referent	
Females ≥65 years	0.67	0.36–1.26
Males <65 years	1.14	1.02–1.27
Males ≥65 years	0.63	0.3–1.33