

Received Date : 31-Mar-2016

Revised Date : 11-Jun-2016

Accepted Date : 14-Jul-2016

Article type : Original Article

Corresponding Author Email ID: jasarnow@mednet.ucla.edu

Emergency Department Youth Patients with Suicidal Ideation or Attempts: Predicting
Suicide Attempts **Through 18-Months of Follow-Up**

Joan Asarnow, Ph.D.¹

Michele Berk, Ph.D.²

Lily Zhang, M.S.¹

Peter Wang¹

Lingqi Tang, Ph.D.¹

¹University of California, Los Angeles. Semel Institute of Neuroscience & Human Behavior. David Geffen School of Medicine at UCLA.

²Stanford University School of Medicine.

Key words: adolescent, suicide attempts, emergency

This work was funded by grant CCR921708 from the Centers for Disease Control and Prevention. Additional support was provided by grant R34 MH078082 from the National Institute of Mental Health. The authors thank the youths, families, staff, and colleagues who made this project possible.

RUNNING HEAD: Suicide Attempts in Youths After ED-Discharge

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/sltb.12309](https://doi.org/10.1111/sltb.12309)

This article is protected by copyright. All rights reserved

This prospective study of suicidal Emergency Department (ED) patients (ages 10-18) examined the timing, cumulative probability, and predictors of suicide attempts through 18-months of follow-up. The cumulative probability of attempts were: 0.15 at 6-months; 0.22 at 1-year; and 0.24 by 18 months. One attempt was fatal, yielding a death rate of .006. Significant predictors of suicide attempt risk included: a suicide attempt at ED presentation (versus suicidal ideation only); non-suicidal self-injurious behavior; and low levels of delinquent symptoms. Results underscore the importance of both prior suicide attempts and non-suicidal self-harm as risk indicators for future and potentially lethal suicide attempts.

Despite extensive research, clinical, and public health initiatives aimed at reducing the youth suicide rate, suicide is the second leading cause of death among youths ages 10-24 in the United States and national statistics indicate that the suicide rate has increased by over 16% during the past decade (CDC, 2015; Office of Disease Prevention and Health Promotion, 2016). Having survived a suicide attempt (SA) is one of the most robust predictors of later suicide death, underscoring the critical need for research aimed at clarifying predictors of SAs and mechanisms contributing to SA risk (Brent et al., 2013; Finkelstein et al., 2015; Hawton et al., 2012, 2015).

The National Strategy for Suicide Prevention emphasizes the Emergency Department (ED) as an important site for suicide prevention (Office of the Surgeon General, 2012; USDHHS, 2001), setting the goal of increasing rates of follow-up treatment after ED/hospital discharge and promoting safety and continuity of care (objectives 7.1 in 2001 and objective 8.4 in 2012). Results with both adults and youths point to increased rates of suicide and premature deaths among ED/hospital patients treated for overdose and other forms of self-harm (Finkelstein et al., 2015; Hawton et al., 2012, 2015). These data in conjunction with observations that most medically serious SAs are treated in EDs highlights the value of studies of youth ED patients presenting with suicidal ideation and/or SAs as one strategy for identifying a high-risk group and clarifying targets for subsequent suicide prevention efforts.

A critical task for suicide prevention is to identify markers of subsequent suicide and suicide attempt risk to allow targeted suicide and suicide attempt prevention. Despite the high risk status of suicidal youth ED patients, however, predictors of SAs in these patients remain to be clarified. Our literature search identified only three studies examining predictors of SAs in ED youth patients presenting with suicidality. Two reports

focused on short-term predictors (King, Berona, Czyz, Horwitz, Gipson, 2015; Spirito, Valeri, Boergers, & Donaldson, 2003). Examining outcomes 2 months after screening in a general medical ED, King et al. (2015) found that the combination of recent/past week suicidal ideation or behavior plus depression and alcohol/substance misuse was associated with significantly increased likelihood of suicidal behavior, as compared to either of these criteria alone. In a sample of patients presenting with SAs at either the ED or pediatric inpatient units, Spirito and colleagues found that youth-reported depressive symptoms and poor family functioning and communication on the Family Assessment Device (FAD) measured at the time of the index SA were significant predictors of repeat SAs at a 3 month follow-up point. However, only depression remained significant in models including both the depression and family measures. Results from both studies underscore the significance of depression in predicting SAs, and are consistent with data from psychological autopsy studies pointing to depression and prior suicide attempts as the most robust predictors of suicide deaths in adolescents (Brent et al., 1993).

Although predictors of suicidal ideation (SI) and SAs are likely to differ, we found one article examining predictors of SI or SAs in a similar ED population over 6 months of follow-up (Greenfield et al., 2008). Youths with continuing suicidality were more likely to: be female; have prior SAs; have a higher number of previous hospitalizations, and higher rates of baseline borderline personality disorder, drug use, and conduct disorder, with marginally higher depression rates. The Spirito et al. (2003) study also examined predictors of SI and found that SI at 3 month follow-up was associated with more depressive symptoms, hopelessness, poorer affective regulation, and poorer family problem-solving skills. Finally, a retrospective medical record review study examining predictors of SAs among youths ages 15-24 years during the 18 months after presentation for psychiatric emergency services found that previous SAs, non-suicidal self-injurious behavior (NSSI), SI intensity and severity, and socioeconomic status were significant predictors (Horwitz, Czyz, & King, 2015).

A larger number of studies have examined suicidal inpatient samples. Although ED and inpatient samples have some overlap, not all suicidal ED patients are hospitalized, hospitalization from the ED is associated with higher parent-reported mental health problems (Hughes, Anderson, Wiblin, & Asarnow, 2016), and some suicidal youths are hospitalized without admission to the ED. Results from studies of suicidal inpatient samples, nonetheless, indicate that SAs during 6-18 months after

hospitalization are predicted by severity of SI at the time of hospitalization, persistent SI, less marked declines in SI over time, and re-emergence of SI (Czyz & King, 2015; Huth-Bocks, Kerr, Ivey, Kramer, & King, 2007; Kerr et al., 2007; King, Kerr, Passarelli, Foster, & Merchant, 2010; Prinstein et al., 2008). Among adolescents hospitalized for suicidality, baseline histories of multiple previous SAs, more severe functional impairment, and having at least one biological parent with mental health problems was also associated with increased risk of an SA within 12-months after hospitalization (King et al., 2010). Related work examining adolescents discharged from a psychiatric hospital for any reason (not limited to suicidality) found that a greater number of SAs prior to hospitalization predicted SAs within a 5-year follow-up period (Goldston et al., 1999). Severity of depressive symptoms and trait anxiety were also associated with increased SA risk and diagnosis of an affective disorder at hospitalization was associated with increased SA risk only among youth with prior SAs.

Results from community and birth cohort studies generally support increased risk among females and youths with SI. Indeed, SI at age 15 was associated with a 12-fold increase in the odds of a SA by age 30 (Reinherz, Tanner, Berger, Beardslee, & Fitzmaurice, 2006). Other variables associated with SA risk in community samples include: childhood sexual abuse histories, heavy drinking, cannabis use, smoking, self-harm in parents and friends, depressive symptoms, depressive disorder, anxiety disorder, and lower socioeconomic status as reflected by having public or no insurance (Mars et al., 2014; Reinherz et al., 2006).

This article extends prior work by examining longer term SA outcomes in one of the largest clinical studies of youth ED patients presenting with suicidality. Focusing on a very high risk sample of youth presenting to the ED for SAs or SI, we: 1) examine the type, timing, and cumulative probability of SAs during the follow-up period; and 2) to evaluate predictors of SAs during the follow-up interval, using variables assessed at the time of the ED visit. Information on the timing, cumulative probability, and predictors of SAs in a high-risk sample of youths presenting to EDs with suicidality has critical importance for the development of protocols and algorithms to guide evaluation, triage decisions, and treatment. Based on results of psychological autopsy studies and prospective studies indicating that prior SAs is one of the most robust predictors of suicide deaths, we predicted that SAs at the time of the ED visit would be a significant predictor of SAs during the follow-up period. Based on two recent studies with samples of depressed youths (Asarnow, Porta et al., 2011; Wilkinson, Kelvin, Roberts, Dubicka, &

Goodyer, 2011) one study with youths at risk for depression (Cox et al., 2012) and one retrospective medical record review study (Horwitz et al., 2015), we predicted that baseline NSSI would be associated with increased risk of SAs during the follow-up interval.

METHODS

Study participants were enrolled in a randomized trial evaluating an enhanced mental health intervention in the ED compared to usual ED care. Detailed descriptions of participants, assessments, interventions and outcomes are available (Asarnow et al., 2008; Asarnow, Baraff et al., 2011; Asarnow, Berk, & Baraff, 2009). The study was reviewed by each site's local IRB. All subjects gave informed assent/consent (as appropriate) and parents gave informed consent. We focus here on participant characteristics, measures, and procedures relevant to primary aims of the current study: examining rates, timing, and predictors of SAs over an 18-month follow-up interval.

Participant Recruitment & Enrollment.

Participants were recruited from two diverse EDs serving different regions of Los Angeles County: ED-A was located within an academic medical center in West Los Angeles and connected to a psychiatric hospital with inpatient services; ED-B was a public-sector ED, within the Los Angeles County Health System serving the greater Southbay area. Consecutive patients (N=181) were recruited between April 2003 and August 2005. Following presentations introducing the study and eligibility criteria, ED personnel identified possible participants and paged study staff, who verified eligibility and enrolled participants. Inclusion criteria were: presenting to the ED with suicide attempts and/or ideation; age 10 -18 years. Exclusion criteria were: acute psychosis/symptoms that impede consent/assessment; no parent/guardian to consent (youth <18); youth not English-speaking; parents/guardians not English or Spanish-speaking. Following baseline assessments youths were randomized to either the enhanced mental health intervention (n=89), or usual ED care (n= 92).

Baseline Assessment and Predictor Variables.

Youths and parents independently completed 20-30 minute questionnaires at the time of the ED visit (Asarnow et al., 2008). Predictor variables, selected based on prior research on cross-sectional and longitudinal predictors of SAs and current models of suicide/SAs, included measures of baseline: suicidality and self-harm behavior and ideation; mental health symptoms; stress; family stress/support; sociodemographic

variables; treatment history and treatment for the index suicidal episode. For feasibility within the ED setting, we selected brief measures.

Suicidality & Self-Harm. SA status at the ED visit was assessed using: youth self-report, and best estimate ratings of the reason for the ED visit based on all available information, including youth and parent report and clinical records (Berk & Asarnow, 2015). Prior suicidality/behavior was measured using youth response to Youth Risk Behavior Survey (YRBS) questions about past-year: serious SI; SA plans; SAs requiring medical treatment; and number of prior suicide attempts (Asarnow et al., 2008). NSSI was assessed by combining responses to two Child Behavior Checklist (CBCL) items asking about 1) deliberate self-harm, and 2) talks about killing self (Achenbach, 1991). To ensure that the NSSI item did not reflect SAs, youths were classified as having engaged in NSSI only if their parents endorsed some deliberate self-harm (a score of 1 or 2) and no talk of killing self (score of 0).

Mental Health. Depression was assessed using the *CES-D*, a 20-item self-report measure that asks about past-week depressive symptoms and is reliable and valid in adolescents (Clarke et al., 1995; Radloff, 1977). Posttraumatic stress disorder (PTSD) symptoms during the past month were assessed using the Primary Care PTSD Screen, a 4-item self-report questionnaire with good reliability, sensitivity and specificity for identifying PTSD (Prins et al., 2004). Parent report on the CBCL (Achenbach, 1991), a psychometrically strong questionnaire with procedures for determining clinical significance standardized to national norms, assessed a broader range of youth symptoms. Based on data indicating that sleep problems are associated with increased risk of suicide and suicide attempts (Goldstein, Bridge, & Brent, 2008; Wong, Brower, & Zucker, 2011; Wong & Brower, 2012), we also examined CBCL sleep items: nightmares; and insomnia. Substance use was assessed using an item (“have you been thought to have a drug or alcohol problem”) from the Service Use and Adjustment Problem Screen (SUAPS; Asarnow et al., 2008; Glynn et al., 2003).

Stress. The Life Events Scale assessed stressful events over the past 6-months including: exposure to suicide/attempted suicide; romantic break-ups; fights with romantic partners; deaths; injuries; medical illness; car accidents; assaults; arguments with friends; parent divorce/separation; parent remarriage; arguments with parents; parent criticism/disapproval; financial problems; school suspensions/expulsions; physical fights; arrested/legal problems; pregnancy/got someone pregnant, other stressors

(Asarnow et al., 2008). We examined rates of specific events and total number of stressors (range 0-19).

Family Stress/Support. Family conflict was assessed by youth-report on the 20-item Conflict Behavior Questionnaire (CBQ), a psychometrically sound measure (Robin & Weiss, 1980). Parent depression was assessed with the CES-D (Radloff, 1977). Family support was measured using the Medical Outcomes Study Social Support Scale (Sherbourne & Kamberg, 1992) which asks youths about satisfaction with their parents on three 5-point items: 1) togetherness; 2) support and understanding; 3) ability to talk things over (range 3-15).

Sociodemographic/Other Variables. We assessed youth age, gender, ED site, and sexual orientation (heterosexual vs. other).

Treatment and Service Use. We examined whether youths were randomized to the enhanced ED intervention vs. usual care and whether they were hospitalized from the ED. Treatment history in the 6-months prior to the ED visit was assessed using the SUAPS items asking about: ED visits and inpatient, residential, and medication treatment for mental health and substance use problems.

Follow-Up Assessment.

Detailed youth and parent assessments were conducted at first and second follow-up points, at roughly 2 and 7 months respectively. A third follow-up point used a brief telephone interview with parents. This third follow-up point was planned for 12 months, with the assessment window remaining open through 18 months. The follow-up assessments included the Diagnostic Interview Schedule for Children (DISC) questions regarding SAs (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). These questions ask about the occurrence of SAs ("times when the you tried to kill yourself") during: 1) the past 4 weeks; and 2) the time since ED/hospital discharge at the first follow-up, and the time between follow-ups at subsequent follow-ups. When participants did not report exact dates for SAs, the SA date was estimated. We used the date of the assessment when youths reported an SA during the follow-up interval and the past 4 weeks, and the assessment date minus 4 weeks (28 days) when youths reported an SA during the assessment interval but not during the past 4-weeks. This relatively conservative approach was selected to ensure that the SA date used in the analysis was not prior to the date of the SA.

Primary Outcome.

The primary outcome for this study was the occurrence of a SA during the follow-up period, operationalized using the DISC SA questions as described above. We used youth report unless only parent report was available.

Statistical Analysis

For descriptive purposes, we present information on the characteristics of youths who did and did not attempt suicide during the follow-up interval, as well as analyses comparing baseline characteristics of youths with and without SAs during the follow-up period. Survival analyses and Kaplan-Meier curves were used to examine the cumulative probability of survival without an SA over the follow-up interval (Cleves, Gutierrez, Gould & Marchenko, 2010). Length of follow-up for each participant was represented by either the number of days between the date of the ED evaluation and the date of the SA or the end of the follow-up period, whichever came first.

Cox proportional hazards regression modeling was used to evaluate the impact of baseline predictor variables on risk of an SA during the follow-up interval. These analyses control for censoring effects due to the differential length of follow-up or the completion of follow-up without a SA. We began by estimating unadjusted hazard ratios (HRs) and 95% CIs for each predictor. Variables that emerged from the Cox proportional hazards regression analyses were then tested with sociodemographic control variables (age, gender, site). Finally, to identify the most parsimonious set of predictors, a multivariable Cox model included the sociodemographic variables (age, gender, site), and all statistically significant baseline predictors, eliminating redundant variables.

Because this is one of the largest clinical samples of youth ED patients presenting with suicidality, we also explored patterns and predictors of SAs for males and females separately. Examination of effects within each gender group is of particular importance because while females are most likely to attempt suicide, suicide deaths are more likely in males. Given that the sample was predominantly female, analyses for the female-only sample used the same procedure used for the full sample. Because the male-only sample is smaller (N=56), with only 6 males attempting suicide during the follow-up interval, we focus on individual predictor variables within the male-only sample.

RESULTS

Preliminary Analyses

Table 1 provides descriptive information for the total sample, as well as subgroups who did and did not attempt suicide by the 18 month follow-up point. The sample was 69% female, was diverse in ethnicity, included youths from two ED sites,

and 13.1% of youths endorsed a bisexual, gay, or lesbian sexual orientation. Age ranged from 10 through 18 years inclusive, with a mean age of 14.7 years (SD 2). Most youths were ≥ 12 years of age: 10- 11 years, $n=11$, 6%; 12-13 years, $n=40$, 22%; 14-15 years, $n=60$, 33%; 16-17, $n=58$, 32%; 18 years, $n=12$, 7%. By best estimate ratings (Berk and Asarnow, 2015), 53% of youths presented at the ED due to a SA, with ED visits due to SI in remaining youths. Multiple SAs were reported by 27.1% of youths within the past year. Youths presented with a variety of mental health problems: 78.5% reported clinically significant/severe depression and 52.7% screened positive for PTSD symptoms. Clinically significant problems were reported in 72.6% of youths, with 70.1% and 57.9% falling in the clinically significant range for internalizing and externalizing problems respectively. Substance abuse problems were reported by 17.3% of youths, and clinically significant delinquent behavior was reported in 34.9% of youths. Youths reported an average of 5.5 stressors (SD 3.1) in the 6 months prior to the ED visit, and parents tended to report relatively high levels of depressive symptoms (Mean 19.4, SD 13.5).

Follow-up data were available for 94% of the sample, 170/181 youths. Time to last observation ranged from 0 (for the 11 youths not participating in follow-up) to 18 months (548 days). There were no statistically significant associations between time to last follow-up observation and the baseline predictor variables.

Previously reported analyses of the RCT results revealed that youths randomized to the enhanced mental health intervention in the ED were significantly more likely to receive mental health treatment after ED/hospital discharge (our primary outcome); with a large proportion of intervention youths successfully linked to outpatient care after ED/hospital discharge (92%), as compared to youths randomized to usual ED care (76%) (Asarnow, Baraff et al., 2011). However, when assessed at roughly 2-months post-ED/hospital discharge these intervention effects did not extend to clinical outcomes (suicide attempts, suicidal ideation/behavior, depression, overall psychopathology, Asarnow, Baraff et al., 2011). New analyses conducted in this study evaluated intervention effects on SA occurrence during the follow-up interval. Results were not statistically significant (HR=1.63, 95% CI 0.79-3.36, $p<.19$), indicating similar levels of SA risk among youths in the intervention and usual ED care conditions. Additionally, there were no statistically significant effects for hospitalization from the ED vs. discharge home (HR=1.16, 95% CI 0.50-2.66, $p<.73$). Consequently, neither intervention condition nor hospitalization were included as control variables in subsequent analyses.

SAs During the Follow-Up Interval

SAs were recorded for 31 youths, 18% of the sample. One of these repeat SAs was fatal, yielding a death rate of .006 at 5 months post-ED/hospital discharge. The one suicide death occurred in a male. Attempt methods used in the first SA included: overdose (OD, n=10; cut/stab n=12; OD and cut, n=1; choke/hang, n=3; run in traffic, n=2; jump from high place n=2; missing, n=1). Five youths made multiple SAs, four youths made two attempts, three by the same method (2 OD, 1 cut), and one youth shifted methods (Hang, OD). Another youth made 3 attempts (unknown method, OD, cut).

SAs were most common during the first six months after ED/hospital discharge. The first SA occurred at 29 days, with 8 SAs by 60 days, 23 SAs by 6 months, 30 within the first year, and 31 SAs within 18 months (522 days). As shown in Fig 1, this yielded a cumulative probability of survival (defined as the absence of an SA) of 0.85 at 6-months, 0.78 at 1-year, and 0.76 by 18 months (522 days). Conversely, the cumulative probability of failure, defined as the presence of an SA, was 0.15 at 6-months; 0.22 at 1-year; and 0.24 by 18 months. Among youths making SAs, the median time to first SA was 98 days, with a mean of 145 days, SD= 117 days.

Baseline Predictors of SA Occurrence

Table 2 presents results of Cox regression analyses. As shown in Table 2, SA as the reason for the ED visit was a significant predictor, whether defined based on youth self-report alone (HR= 4.11, 95% CI 1.58-10.73, p=.004), or using best estimate ratings that combined all available information obtained from youth, parents, and clinical records (HR= 2.62, 95% CI 1.17-5.87, p=.02). NSSI at the index ED visit was also a significant predictor (HR=2.64, 95% CI 1.16-5.98, p=.02). Not having clinically significant levels of delinquent behaviors was also a significant predictor (HR=0.35, 95% CI 0.13-0.92, p=.033).

In the most parsimonious model adjusting for site, gender, and age, and including baseline variables significant in the initial analyses, Cox regression identified SA as the reason for the ED visit (HR= 3.91, 95% CI 1.49-10.26, p<.001) and baseline NSSI (HR=2.78, 95% CI 1.22-6.33, p=.015) as significant predictors. Overall model Likelihood Ratio $X^2(5)=18.29$, p=.003. This model used best estimate ratings of reason for the ED visit rather than youth self-report alone, as this was considered a stronger indicator. Further examination of these significant predictors using Kaplan-Meier survival analysis, indicated that the cumulative probability of an SA over the follow-up

period was .30 (SE .05) for youths whose index ED visit was for an SA versus .16 (SE .06) for youths whose index ED visit was for SI; and the cumulative probability of SAs among youths with NSSI at the ED visit was .48 (SE .13) compared to .21 (SE.04) for youths with no reported NSSI.

Exploratory Analyses Stratified by Gender

Exploratory analyses examined predictors of SAs within females and males separately. Results for girls (N=125) were similar to those for the total sample.

Significant predictors were: SA as reason for ED visit by youth report (HR=4.11, 95% CI 1.41-11.97, p=.01); baseline NSSI (HR=3.10, 95% CI 1.32-7.29, p=.009); and non-clinical levels of delinquent symptoms (HR=0.30, 95% CI 0.10-0.89, p=.03). In the most parsimonious model adjusting for demographic variables (age, site) and including all significant baseline variables (Table 2), Cox regression identified SA at ED visit (HR=4.32; 95% CI 1.46-12.79, p=.008) and NSSI (HR=3.67, 95% CI 1.52-8.85, p=.004) as significant predictors. Overall model Likelihood Ratio $X^2=15.36$, p=.004.

In boys (N=56) significant predictors **were:** having made repeat SAs at baseline (HR=6.59, 95% CI 1.20-36.23, p=.03); having a more severely depressed parent (HR=1.06, 95% CI 1.01-1.11, p=.023); higher levels of internalizing/emotional symptoms (HR=1.18, 95% CI 1.03-1.34, p=.015); higher levels of withdrawn symptoms (HR=1.09, 95% CI 1.00-1.18, p=.045); and nightmares (HR=3.13, 95% CI 1.04-9.39, p=.042). Results were near identical, with no change in conclusions when these predictors were tested controlling for age and site.

DISCUSSION

Our results, with one of the largest available clinical samples of ED youth patients presenting with **suicidality**, provides strong support for the importance of prior self-harm as a predictor of future SAs. While there was some variation across genders, evidence of prior SAs was a significant **predictor**. Moreover, in both the full sample and in girls, NSSI at the time of the index ED visit was a strong predictor of future SAs, with **the cumulative probability of an SA** at one year post-discharge more than doubling when NSSI was noted at the time of the ED visit. To our knowledge, this is the first prospective study in a population of suicidal youth ED patients to demonstrate the prognostic significance of NSSI.

While NSSI in youths has generally been conceptualized as distinct from suicidal behavior and having a primary function of relieving emotional distress rather than causing death (Nock, 2009), our results add to **accumulating results indicating that NSSI**

is a strong predictor of SAs in adolescent populations. First, results from two prior studies with youths in treatment for depression and one study with youths of depressed mothers found that NSSI was a significant predictor of SAs and a stronger predictor than prior SAs (Asarnow et al., 2011; Cox et al., 2012; Wilkinson et al., 2011). Second, our data are consistent with results of a recent retrospective medical record review study of youth patients presenting with psychiatric emergencies which found that lifetime history of NSSI and SAs were independent predictors of increased risk of SAs over an 18 month follow-up period (Czyz & King, 2015). However, another study with general ED patients (versus those with psychiatric emergencies) found a nonsignificant association between lifetime NSSI history and SAs within 2 months post-discharge (King et al., 2015). This suggests that the prognostic significance of NSSI may be most evident in patients presenting with mental health problems/emergencies who are likely to have higher rates and more recent NSSI, and whose NSSI is likely to stem from their mental health problems and difficulties with emotion regulation, distress tolerance, and/or interpersonal communication. Due to the relatively low rate of SAs, a longer follow-up interval may also be needed to detect prognostic relationships.

Our results with an ED sample also add to previous research indicating that a prior SA is a strong predictor of SAs, as well as data indicating that prior self-harm defined broadly to include self-harm of any type (SAs, NSSI, and self-harm with ambiguous intent) is a robust predictor of suicide deaths in adolescents (Hawton et al., 2012).

The emerging and relatively consistent data on the predictive power of both NSSI and SAs have important theoretical and clinical implications. These data support the interpersonal psychological theory of suicide, which highlights the importance of targeting the acquired capacity to self-harm in suicide prevention (Joiner, 2005; Van Orden et al., 2010). Joiner and colleagues posit that as individuals engage in repeated suicidal or non-suicidal self-harm they develop reduced thresholds for self-harm, increased ability to tolerate physical pain, and decreased fear of self-harm, thereby increasing the risk of suicide death. The accumulating data documenting the prognostic power of NSSI underscore the critical need to understand and target mechanisms through which NSSI may contribute to SA risk.

NSSI and repetitive self-harm have been consistently included as core features of borderline personality disorder. The field is moving more generally to dimensional conceptualizations of psychopathology, and in youth populations it is particularly critical

to clarify developmental processes and seek strategies for preventing chronic disorders of personality. NSSI and repetitive self-harm may signal early development of more chronic patterns of repetitive self-harm and emotional dysregulation that precede the adult patterns characteristic of BPD. Indeed, observations of high rates of depression in our sample in conjunction with findings from depression studies indicating that NSSI is a predictor of poor treatment response (Asarnow, Porta et al., 2011), support the need for increased research attention to youths with NSSI with the goal of developing improved treatments for this subgroup. Research is also needed to clarify when NSSI represents a significant risk-indicator vs. a time-limited stress response with fewer developmental implications.

Comparison of the present results on prospective predictors of SAs with our previously reported cross-sectional analyses (Asarnow et al., 2008) underscores the likely differences between concurrent and prospective predictors. Our prospective results indicate that prior self-harm, both SAs and NSSI, is a strong predictor of earlier time to SAs. Low levels of parent-reported delinquent symptoms, and for boys higher levels of parent-reported internalizing symptoms, **withdrawn behavior, and nightmares** also predicted SA risk over 18-months of follow-up in this prospective study. However, self-reported depression was not a significant predictor. None of the stress measures were significant predictors of SA occurrence in these longitudinal analyses. In contrast, prior cross-sectional analyses of baseline correlates of suicide risk levels at the index ED visit (SI only, SAs, multiple SAs) in this sample (Asarnow et al., 2008), indicated that increased symptoms across a range of dimensions (depression, substance use, PTSD, externalizing symptoms, and internalizing symptoms), increased stress levels, and increased likelihood of specific **stressors** (romantic break-ups, getting pregnant or getting someone pregnant, exposure to suicide or SAs) were associated with higher risk levels (multiple attempters > single attempters > SI only). Considered in the context of other research showing that measures of depression and family stress predicted likelihood of a SA over a briefer 3-month follow-up interval (Spirito et al., 2003), these data suggest that the stress and psychopathology measures may be more variable and state dependent making them weaker predictors of later SAs over time, particularly in acutely ill samples, such as suicidal youth ED or inpatient samples. Although suicidal youths are known to be challenging to follow clinically, these results in conjunction with other data underscoring the potential danger associated with prolonged and recent periods of SI (Yen et al., 2013; Czyz & King, 2015; Prinstein et al., 2008), underscore the importance

of monitoring SI, stress, and psychopathology closely over time in order to catch “high-risk periods” in “high risk youths”, allowing prevention of repeat and potentially lethal SAs.

As expected, given that the sample was 61% females, results for the overall sample were consistent with those for girls in the sample. The smaller sample of boys (N=56) requires that results for boys be viewed cautiously, particularly since only 6 boys made SAs during the follow-up interval. However, in boys, a pattern of repeat SAs at baseline was associated with earlier time to an SA. It is important to note that NSSI history was not a significant predictor in the boys-only sample. While NSSI may not have been known to parents, NSSI may also be a stronger predictor in girls, and may have a different meaning and prognostic significance in boys. This is an important question for future research.

Higher levels of internalizing symptoms, particularly withdrawn symptoms and nightmares, were significant predictors of SAs in boys but not girls. Thus, boys who presented to the ED with histories of repeat SAs and whose parents were aware of high levels of internalizing symptoms, particularly withdrawn symptoms, and nightmares were at greatest risk of SAs during the follow-up interval. Future research is needed to determine whether effective interventions to reduce these symptoms in boys could reduce the risk of fatal and nonfatal SAs.

Parent depression was also a significant predictor of SAs in boys. This is consistent with other research indicating that parent depression is a significant risk factor for youth depression and other adverse outcomes (Batten et al., 2012; Gunlicks & Weissman, 2008), and highlights the need to assess and intervene effectively to treat parent depression in suicidal youths. In this context, it merits note that our recent trial of the SAFETY program, a 12-week cognitive-behavioral and family treatment designed to be incorporated within emergency services after a SA, led to significant reductions in parent depression as well as youth suicidality, hopelessness, depression, and improved social adjustment (Asarnow, Berk, Hughes, & Anderson, 2015). It is possible, therefore, that treatments for SAs in youth can lead to improvements in parent depression. Evidence-based treatments for adult depression could also impact youth SA risk through reducing parent depression.

Study limitations include: the limited observations of change over the follow-up interval, which allows us to examine predictors but limits our ability to elucidate change processes over time; the absence of a measure of NSSI at follow-up; and the lack of a

youth-report NSSI measure. Our results based on parent report are consistent with predictions based on recent research (Asarnow, Porta et al., 2011; Wilkinson et al., 2011; Cox et al., 2012). Further, results beyond 12-months need to be interpreted with caution because assessments were scheduled for the 12-month post-ED/hospital discharge point, and individuals completing their final assessments closer to the 12-month post-ED assessment point were censored at the time of these assessments. Because our overall project goal was to inform ED practice, we adopted an effectiveness perspective and used brief youth and parent questionnaires (e.g. YRBS items, CBCL) that were feasible within fast-paced ED settings. This led to good participation but less detailed and precise measures than might have been used in non-ED settings where brevity is not as important. Validation of our self-report data on dates of suicide attempts would have added strength to the study. While our sample was one of the largest ED samples in the literature and includes youths from two diverse EDs in the Los Angeles area, results may not generalize to other samples. Our sample was also too small to evaluate predictors of suicide deaths, and greater statistical power could have identified predictors with smaller effect sizes. Consistent with data indicating that suicide and SAs are rare in younger childhood, and that the onset of SAs, plans, and ideation begin to increase at age 12 to 13 and increase markedly through adolescence (Nock et al., 2013), the majority of our sample was over 12 years of age; results may not generalize to younger youths. Due to the higher rates of suicidal ideation and SAs in girls we still had relatively few boys in the sample, an important limitation given the higher rate of suicide deaths in boys. It is important to note, however, that the rate of boys in this ED sample is higher than that seen in samples recruited from clinical settings and exploratory analyses examining gender effects were possible. Larger samples and more diverse samples like that obtained through the ongoing national study of pediatric ED patients (Emergency Department Screen for Teens at Risk for Suicide; King, Grupp-Phelan, & Brent, 2016) are needed to confirm and expand upon the present findings.

From a clinical perspective, it merits note that this study involved secondary analyses in a sample participating in a randomized controlled trial evaluating an enhanced emergency mental health intervention in the ED, relative to usual ED care enhanced by provider education. The intervention was designed to improve linkage to outpatient follow-up treatment after ED/hospital discharge. This is a critical first step for receiving effective care, particularly as U.S. estimates suggest that over half of youths seen for suicidal behavior in EDs receive little to no needed mental health treatment

(Olfson, Marcus, & Bridge, 2012). While previously reported results indicate significant intervention benefits for improving rates of outpatient care (Asarnow, Baraff et al., 2011), the new analyses in this study indicate no significant intervention effects on SA risk through 18 months of follow-up. Unfortunately, these results are expected given our prior findings of no statistically significant intervention advantages on clinical outcomes (suicidality, depression, psychopathology levels) assessed at roughly 2-months post-ED/hospital discharge, and no evidence that community treatment as usual led to improved clinical outcomes (Asarnow, Baraff et al., 2011). Thus, while the emergency intervention led to nearly all youths (92%) receiving outpatient treatment after ED/hospital discharge, more effective community outpatient treatment was needed to reduce SA risk.

In conclusion, our data underscore the importance of SAs and NSSI at presentation as robust predictors of risk for subsequent SAs among youth ED patients presenting with suicidality. We now have strong replicated results from diverse samples underscoring the critical need to view both SAs and NSSI (particularly in girls) as significant risk indicators for future and potentially lethal SAs. While we still lack treatments with replicated demonstrated efficacy for preventing SAs in self-harming youths and data underscore the importance of efforts to improve community care (Brent et al., 2013; Asarnow, Baraff et al., 2011), results of a recent meta-analysis of RCTs evaluating therapeutic interventions for self-harm indicate modest improvements in self-harm outcomes with our current therapeutic interventions relative to treatment as usual, with the strongest effects on non-suicidal self-harm and for dialectical behavior therapy, integrative cognitive behavior therapy that targets both suicidality and substance abuse, and mentalization-based therapy (Ougrin, Tranah, Stahl, Moran, & Asarnow, 2015). There are also promising non-experimental trials with strong encouraging results (Asarnow et al., 2015; Brent et al., 2009; Stanley et al., 2009; for reviews, Brent et al., 2013; Daniel & Goldston, 2009), as well as effective interventions for linking youths to needed follow-up treatment after ED visits for suicidality/self-harm (Asarnow, Baraff et al., 2011; Ougrin et al., 2011). This convergence of findings has direct clinical implications underscoring 1) the need to assess and monitor self-harm regardless of suicidal intent in youths, and 2) recognize that we have a developing and promising evidence-base that can be used to develop treatment strategies for individual youths presenting with suicidal and/or non-suicidal self-harm.

References

- Achenbach, T. M. (1991). *Manual for the Child Behavior Checklist / 4-18 and 1991 profile*. Burlington, VT: Department of Psychiatry, University of Vermont.
- Asarnow, J. R., Baraff, L. J., Berk, M., Grob, C., Devich-Navarro, M., Suddath, R., ... Tang, L. (2008). Pediatric emergency department suicidal patients: Two-site evaluation of suicide ideators, single attempters, and repeat attempters. *Journal of the American Academy of Child and Adolescent Psychiatry, 47*(8), 958–66. <http://doi.org/10.1097/CHI.0b013e3181799ee8>
- Asarnow, J. R., Baraff, L. J., Berk, M., Grob, C. S., Devich-Navarro, M., Suddath, R., ... Tang, L. (2011). An emergency department intervention for linking pediatric suicidal patients to follow-up mental health treatment. *Psychiatric Services, 62*(11), 1303–1309. <http://doi.org/10.1176/appi.ps.62.11.1303>
- Asarnow, J. R., Porta, G., Spirito, A., Emslie, G., Clarke, G., Wagner, K. D., ... Brent, D. A. (2011). Suicide attempts and nonsuicidal self-injury in the treatment of resistant depression in adolescents: Findings from the TORDIA study. *Journal of the American Academy of Child and Adolescent Psychiatry, 50*(8), 772-81. doi: 10.1016/j.jaac.2011.04.003
- Asarnow, J. R., Berk, M., Hughes, J. L., & Anderson, N. L. (2015). The SAFETY Program: A treatment-development trial of a cognitive-behavioral family treatment for adolescent suicide attempters. *Journal of Clinical Child and Adolescent Psychology, 44*(1), 194–203. <http://doi.org/10.1080/15374416.2014.940624>
- Asarnow, J. R., Berk, M. S., & Baraff, L. J. (2009). Family Intervention for Suicide Prevention: A specialized emergency department intervention for suicidal youths. *Professional Psychology: Research and Practice, 40*(2), 118–125. <http://doi.org/10.1037/a0012599>
- Batten, L. A., Hernandez, M., Pilowsky, D. J., Stewart, J. W., Blier, P., Flament, M. F., ... Weissman, M. M. (2012). Children of treatment-seeking depressed mothers: A comparison with the Sequenced Treatment Alternatives to Relieve Depression (STAR*D) child study. *Journal of the American Academy of Child and Adolescent Psychiatry, 51*(11), 1185-96. doi: 10.1016/j.jaac.2012.08.020
- Berk, M. S., & Asarnow, J. R. (2015). Assessment of suicidal youth in the emergency department. *Suicide and Life-Threatening Behavior, 45*(3), 345-359.
- Brent, D. A., Greenhill, L. L., Compton, S., Emslie, G., Wells, K., Walkup, J. T., ...

- Turner, J. B. (2009). The Treatment of Adolescent Suicide Attempters study (TASA): Predictors of suicidal events in an open treatment trial. *Journal of the American Academy of Child and Adolescent Psychiatry*, 48(10), 987–996. <http://doi.org/10.1097/CHI.0b013e3181b5dbe4>
- Brent, D. A., McMakin, D. L., Kennard, B. D., Goldstein, T. R., Mayes, T. L., & Douaihy, A. B. (2013). Protecting adolescents from self-harm: A critical review of intervention studies. *Journal of the American Academy of Child and Adolescent Psychiatry*, 52(12), 1260–1271. <http://doi.org/10.1016/j.jaac.2013.09.009>
- Brent, D. A., Perper, J. A., Moritz, G., Allman, C., Friend, A., Roth, C., ... Baugher, M. (1993). Psychiatric risk factors for adolescent suicide: A case-control study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32(3), 521–9. <http://doi.org/10.1097/00004583-199305000-00006>
- Centers for Disease Control. (2015). National suicide statistics. Retrieved March 11, 2016, from <http://www.cdc.gov/violenceprevention/suicide/statistics/>
- Clarke, G. N., Hawkins, W., Murphy, M., Sheeber, L. B., Lewinsohn, P. M., & Seeley, J. R. (1995). Targeted prevention of unipolar depressive disorder in an at-risk sample of high school adolescents: A randomized trial of a group cognitive intervention. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34(3), 312–321. <http://doi.org/10.1097/00004583-199503000-00016>
- Cleves, M., Gutierrez, R. G., Gould, W., & Marchenko, Y. V. (2010). *An introduction to survival analysis using Stata* (3rd ed.). College Station, Texas: Stata Press.
- Cox, L. J., Stanley, B. H., Melhem, N. M., Oquendo, M. A., Birmaher, B., Burke, A., ... Brent, D. A. (2012). A longitudinal study of nonsuicidal self-injury in offspring at high risk for mood disorder. *Journal of Clinical Psychiatry*, 73(6), 821–8. <http://doi.org/10.4088/JCP.11m07196>
- Czyz, E. K., & King, C. A. (2015). Longitudinal trajectories of suicidal ideation and subsequent suicide attempts among adolescent inpatients. *Journal of Clinical Child and Adolescent Psychology*, 44(1), 181–193. <http://doi.org/10.1080/15374416.2013.836454>
- Daniel, S. S., & Goldston, D. B. (2009). Interventions for suicidal youth: A review of the literature and developmental considerations. *Suicide and Life-Threatening Behavior*, 39(3), 252–68. doi: 10.1521/suli.2009.39.3.252
- Finkelstein, Y., Macdonald, E. M., Hollands, S., Hutson, J. R., Sivilotti, M. L., Mamdani, M. M., ... Juurlink, D. N. (2015). Long-term outcomes following self-poisoning in

adolescents: A population-based cohort study. *The Lancet Psychiatry*, 2(6), 532–9.
[http://doi.org/10.1016/S2215-0366\(15\)00170-4](http://doi.org/10.1016/S2215-0366(15)00170-4)

- Glynn, S. M., Asarnow, J. R., Asarnow, R., Shetty, V., Elliot-Brown, K., Black, E., & Belin, T. R. (2003). The development of acute post-traumatic stress disorder after orofacial injury: A prospective study in a large urban hospital. *Journal of Oral and Maxillofacial Surgery*, 61(7), 785–792. [http://doi.org/10.1016/S0278-2391\(03\)00239-8](http://doi.org/10.1016/S0278-2391(03)00239-8)
- Goldstein, T. R., Bridge, J. A., & Brent, D. A. (2008). Sleep disturbance preceding completed suicide in adolescents. *Journal Of Consulting And Clinical Psychology*, 76(1), 84–91. <http://doi.org/10.1037/0022-006X.76.1.84>
- Goldston, D. B., Daniel, S. S., Reboussin, D. M., Reboussin, B. A., Frazier, P. H., & Kelley, A. E. (1999). Suicide attempts among formerly hospitalized adolescents: A prospective naturalistic study of risk during the first 5 years after discharge. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38(6), 660-71.
- Greenfield, B., Henry, M., Weiss, M., Tse, S. M., Guile, J. M., Dougherty, G., ... Harnden, B. (2008). Previously suicidal adolescents: Predictors of six-month outcome. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, 17(4), 197–201.
- Gunlicks, M. L., & Weissman, M. M. (2008). Change in child psychopathology with improvement in parental depression: A systematic review. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47(4), 379-89. doi: 10.1097/CHI.0b013e3181640805
- Hawton, K., Bergen, H., Cooper, J., Turnbull, P., Waters, K., Ness, J., & Kapur, N. (2015). Suicide following self-harm: Findings from the Multicentre Study of self-harm in England, 2000-2012. *Journal of Affective Disorders*, 175, 147–151. <http://doi.org/10.1016/j.jad.2014.12.062>
- Hawton, K., Bergen, H., Kapur, N., Cooper, J., Steeg, S., Ness, J., & Waters, K. (2012). Repetition of self-harm and suicide following self-harm in children and adolescents: Findings from the Multicentre Study of Self-harm in England. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 53(12), 1212–1219. <http://doi.org/10.1111/j.1469-7610.2012.02559.x>
- Horwitz, A. G., Czyz, E. K., & King, C. A. (2015). Predicting future suicide attempts among adolescent and emerging adult psychiatric emergency patients. *Journal of Clinical Child and Adolescent Psychology*, 44(5), 751–61.

<http://doi.org/10.1080/15374416.2014.910789>

- Hughes, J. L., Anderson, N. L., Wiblin, J., & Asarnow, J. R. (2016, in press). Predictors and outcomes of psychiatric hospitalization in youth presenting to the ED with suicidality. *Suicide and Life-Threatening Behavior*.
- Huth-Bocks, A. C., Kerr, D. C. R., Ivey, A. Z., Kramer, A. C., & King, C. A. (2007). Assessment of psychiatrically hospitalized suicidal adolescents: Self-report instruments as predictors of suicidal thoughts and behavior. *Journal of the American Academy of Child and Adolescent Psychiatry*, *46*(3), 387–395. <http://doi.org/10.1097/chi.0b013e31802b9535>
- Joiner, T. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.
- Kerr, D. C. R., Washburn, J. J., Feingold, A., Kramer, A. C., Ivey, A. Z., & King, C. A. (2007). Sequelae of aggression in acutely suicidal adolescents. *Journal of Abnormal Child Psychology*, *35*(5), 817–830. <http://doi.org/10.1007/s10802-007-9132-5>
- King, C. A., Berona, J., Czyz, E., Horwitz, A. G., & Gipson, P. Y. (2015). Identifying adolescents at highly elevated risk for suicidal behavior in the emergency department. *Journal of Child and Adolescent Psychopharmacology*, *25*(2), 100-108.
- King, C. A., Grupp-Phelan, J., & Brent, D. (2016). *Emergency Department Screen for Teens at Risk for Suicide (ED-STARS)*. Retrieved from https://projectreporter.nih.gov/project_info_description.cfm?aid=8910789&icde=28627448&ddparam=&ddvalue=&ddsub=&cr=3&csb=default&cs=ASC
- King, C. A., Kerr, D. C. R., Passarelli, M. N., Foster, C. E., & Merchant, C. R. (2010). One-year follow-up of suicidal adolescents: Parental history of mental health problems and time to post-hospitalization attempt. *Journal of Youth and Adolescence*, *39*(3), 219–232. <http://doi.org/10.1007/s10964-009-9480-2>
- Mars, B., Heron, J., Crane, C., Hawton, K., Kidger, J., Lewis, G., ... Gunnell, D. (2014). Differences in risk factors for self-harm with and without suicidal intent: Findings from the ALSPAC cohort. *Journal of Affective Disorders*, *168*, 407–414. <http://doi.org/10.1016/j.jad.2014.07.009>
- Nock, M. K. (2009). Why do people hurt themselves? New insights into the nature and functions of self-injury. *Current Directions in Psychological Science*, *18*(2), 78-83.
- Nock, M. K., Green, J. G., Hwang, I., McLaughlin, K. A., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2013). Prevalence, correlates, and treatment of lifetime suicidal behavior among adolescents: Results from the National Comorbidity

- Survey Replication Adolescent Supplement. *JAMA Psychiatry*, 70(3), 300-310.
<http://doi.org/10.1001/2013.jamapsychiatry.55>
- Office of Disease Prevention and Health Promotion. (2016). Mental health. Retrieved March 11, 2016, from <https://www.healthypeople.gov/2020/leading-health-indicators/2020-lhi-topics/Mental-Health/data>
- Office of the Surgeon General. (2012). *2012 National strategy for suicide prevention: Goals and objectives for action: A report of the U.S. Surgeon General and of the National Action Alliance for Suicide Prevention*. Washington, D.C: U.S. Department of Health and Human Services.
- Olfson, M., Marcus, S. C., Bridge, J. A. (2012). Emergency treatment of deliberate self-harm. *Archives of General Psychiatry*, 69(1), 80-8.
<http://doi.org/10.1001/archgenpsychiatry.2011.108>
- Ougrin, D., Tranah, T., Stahl, D., Moran, P., & Asarnow, J. R. (2015). Therapeutic interventions for suicide attempts and self-harm in adolescents: Systematic review and meta-analysis. *Journal of the American Academy of Child and Adolescent Psychiatry*, 54(2), 97–107.e2. <http://doi.org/10.1016/j.jaac.2014.10.009>
- Ougrin, D., Zundel, T., Ng, A., Banarsee, R., Bottle, A., & Taylor, E. (2011). Trial of Therapeutic Assessment in London: Randomised controlled trial of Therapeutic Assessment versus standard psychosocial assessment in adolescents presenting with self-harm. *Archives of Disease in Childhood*, 96(2), 148-53.
<http://doi.org/10.1136/adc.2010.188755>
- Prins, A., Ouimette, P., Kimerling, R., Camerond, R. P., Hugelshofer, D. S., Shaw-Hegwer, J., ... Sheikh, J. I. (2004). The primary care PTSD screen (PC-PTSD): Development and operating characteristics. *Primary Care Psychiatry*, 9(1), 9–14.
<http://doi.org/10.1185/135525703125002360>
- Prinstein, M. J., Nock, M. K., Simon, V., Aikins, J. W., Cheah, C. S., & Spirito, A. (2008). Longitudinal trajectories and predictors of adolescent suicidal ideation and attempts following inpatient hospitalization. *Journal Of Consulting And Clinical Psychology*, 76(1), 92–103. <http://doi.org/10.1037/0022-006X.76.1.92>
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385–401.
<http://doi.org/10.1177/014662167700100306>
- Reinherz, H. Z., Tanner, J. L., Berger, S. R., Beardslee, W. R., & Fitzmaurice, G. M. (2006). Adolescent suicidal ideation as predictive of psychopathology, suicidal

- behavior, and compromised functioning at age 30. *American Journal of Psychiatry*, 163(7), 1226–1232. <http://doi.org/10.1176/appi.ajp.163.7.1226>
- Robin, A., & Weiss, J. (1980). Criterion-related validity of behavioral and self-report measures of problem-solving communication skills in distressed and non-distressed parent-adolescent dyads. *Behavioral Assessment*, 2(4), 339–352.
- Shaffer, D., Fisher, P., Lucas, C. P., Dulcan, M. K., & Schwab-Stone, M. E. (2000). NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): Description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child & Adolescent Psychiatry*, 39(1), 28-38.
- Sherbourne, C., & Kamberg, C. (1992). *Family and marital functioning measures*. Durham, NC: Duke University Press.
- Spirito, A., Valeri, S., Boergers, J., & Donaldson, D. (2003). Predictors of continued suicidal behavior in adolescents following a suicide attempt. *Journal of Clinical Child and Adolescent Psychology*, 32(2), 284–9. http://doi.org/10.1207/S15374424JCCP3202_14
- Stanley, B., Brown, G., Brent, D. A., Wells, K., Poling, K., Curry, J., ... Hughes, J. (2009). Cognitive-behavioral therapy for suicide prevention (CBT-SP): Treatment model, feasibility, and acceptability. *Journal of the American Academy of Child and Adolescent Psychiatry*, 48(10), 1005–13. <http://doi.org/10.1097/CHI.0b013e3181b5dbfe>
- U.S. Department of Health and Human Services. (2001). *Mental health: Culture, race, and ethnicity—A supplement to mental health: A report of the surgeon general*. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services.
- Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E. (2010). The interpersonal theory of suicide. *Psychological Review*, 117(2), 575–600. <http://doi.org/10.1037/a0018697>
- Wilkinson, P., Kelvin, R., Roberts, C., Dubicka, B., & Goodyer, I. (2011). Clinical and psychosocial predictors of suicide attempts and nonsuicidal self-injury in the Adolescent Depression Antidepressants and Psychotherapy Trial (ADAPT). *American Journal of Psychiatry*, 168(5), 495–501. <http://doi.org/10.1176/appi.ajp.2010.10050718>
- Wong, M. M., & Brower, K. J. (2012). The prospective relationship between sleep

problems and suicidal behavior in the National Longitudinal Study of Adolescent Health. *Journal of Psychiatric Research*, 46(7), 953–959.

<http://doi.org/10.1016/j.jpsychires.2012.04.008>

Wong, M. M., Brower, K. J., & Zucker, R. A. (2011). Sleep problems, suicidal ideation, and self-harm behaviors in adolescence. *Journal of Psychiatric Research*, 45(4), 505–511. <http://doi.org/10.1016/j.jpsychires.2010.09.005>

Yen, S., Weinstock, L. M., Andover, M. S., Sheets, E. S., Selby, E. A., & Spirito, A. (2013). Prospective predictors of adolescent suicidality: 6-month post-hospitalization follow-up. *Psychological Medicine*, 43(5), 983-93. <http://doi.org/10.1017/S0033291712001912>

Author Manuscript

	Overall (N=181)	No SA Outcome Group (N=150)	SA Outcome Group (N=31)
Variables	N (%) or Mean±SD	N (%) or Mean±SD	N (%) or Mean±SD
Sociodemographic			
Gender, Female	125 (69.1%)	100 (66.7%)	25 (80.6%)
Age,	14.7±2.0	14.8±2.0	14.5±1.9
Race/Ethnicity			
Hispanic Ethnicity	82 (45.3%)	67 (44.7%)	15 (48.4%)
White (Non-Hispanic)	60 (33.1%)	52 (34.7%)	8 (25.8%)
African American	23 (12.7%)	19 (12.7%)	4 (12.9%)
Other	16 (8.8%)	12 (8.0%)	4 (12.9%)
Site, A	80 (44.2%)	65 (43.3%)	15 (48.4%)
Sexual Orientation, Endorsed Questioning/Other Than Heterosexual ^b	22 (13.3%)	19 (13.9%)	3 (10.7%)
Suicide/Self-Harm			
SA at ED Visit-BE	96 (53.0%)	73 (48.7%)	23 (74.2%)**
SA at ED Visit-Youth Report	102 (56.4%)	76 (50.7%)	26 (83.9%)***
Past Year medically treated SA	55 (30.4%)	41 (27.3%)	14 (45.2%)*
#Prior Attempts, Past Year	2.0±1.0	2.0±0.9	2.3±1.0
# Youths with Multiple Attempts, Past Year (#Attempts >1)	49 (27.1%)	38 (25.3%)	11 (35.5%)
NSSI	22 (13.1%)	14 (10.1%)	8 (26.7%)*
Psychopathology			
Depression, CES-D	33.6±11.8	33.4±11.7	34.9±12.7
Depression Severe, CES-D ≥ 24	142 (78.5%)	118 (78.7%)	24 (77.4%)

Table 1. Characteristics of Total Sample and Youths Who Did and Did Not Make Suicide Attempts During 18-Months of Follow-Up			
	Overall (N=181)	No SA Outcome Group (N=150)	SA Outcome Group (N=31)
Variables	N (%) or Mean±SD	N (%) or Mean±SD	N (%) or Mean±SD
PTSD, Positive Screen (PTSD Screen ≥ 2)	89 (52.7%)	69 (49.3%)	20 (69%) †
Substance Abuse, Probable	31 (17.3%)	28 (18.8%)	3 (10.0%)
Total Problems, Clinically Significant	119 (72.6%)	98 (72.1%)	21 (75.0%)
Externalizing, Clinically Significant	95 (57.9%)	80 (58.8%)	15 (53.6%)
Internalizing, Clinically Significant	115 (70.1%)	98 (72.1%)	17 (60.7%)
Delinquent Behavior, Clinically Significant	58 (34.9%)	53 (38.7%)	5 (17.2%)*
Stress/Environmental Context			
Total Stress	5.5±3.1	5.5±3.2	5.4±3.1
Arguments Friends	87 (48.3%)	67 (45.0%)	20 (64.5%)*
Parent Depression, CES-D	19.4±13.5	19.3±13.2	20.2±14.8
ED Treatment for Suicidal Behavior			
Hospitalization	125 (70.6%)	103 (70.5%)	22 (71.0%)
Enhanced ED Intervention	89 (49.2%)	72 (48.0%)	17 (54.8%)
<p>^aBetween group comparisons used t-tests for continuous variables and Chi Squared or Fisher's Exact Tests for categorical variables. Due to missing data N < 181 for some variables.</p> <p>^b Options were undecided/unsure, bisexual, gay, lesbian.</p> <p>† p<.10; * p<.05; **p<.01.</p>			

Table 2. Cox Proportional Hazard Models Predicting to Time to Suicide Attempt Occurrence from Each Explanatory Variable			
	Combined sexes	Females	Males
Explanatory Variable	Hazard Ratio (95% CI)^a	Hazard Ratio (95% CI)^a	Hazard Ratio (95% CI)^a
Sociodemographic Control Variables			
Gender	2.01 (0.83-4.91)		
Age	0.92 (0.77-1.10)	0.91 (0.72-1.14)	0.84 (0.58-1.22)

Table 2. Cox Proportional Hazard Models Predicting to Time to Suicide Attempt Occurrence from Each Explanatory Variable

	Combined sexes	Females	Males
Explanatory Variable	Hazard Ratio (95% CI) ^a	Hazard Ratio (95% CI) ^a	Hazard Ratio (95% CI) ^a
Site	1.12 (0.56-2.27)	1.05 (0.48-2.32)	1.75 (0.32-9.63)
Suicide/Self-Harm Variables			
Suicide Attempt Reason for ED Visit (Best Estimate)	2.62 (1.17-5.87)*	2.32 (0.97-5.58)	4.20 (0.49-36.03)
Suicide Attempt Reason for ED Visit (Youth Report)	4.11 (1.58-10.73)**	4.11 (1.41-11.97)*	3.70 (0.43-31.84)
Repeat Suicide Attempts, Past Year	1.59 (0.76-3.32)	1.11 (0.46-2.67)	6.59 (1.20-36.23)*
Non-suicidal Self-Injurious Behavior (NSSI)	2.64 (1.16-5.98)*	3.10 (1.32-7.29)**	-- ^b
Psychopathology Variables			
Delinquent Behavior, Clinically Significant	0.35 (0.13-0.92)*	0.30 (0.10-0.89)*	1.00 (0.11-9.10)
Internalizing, T Score	0.99 (0.95-1.02)	0.97 (0.93-1.01)	1.18 (1.03-1.34)*
Withdrawn, T Score	1.02 (0.99-1.06)	1.01 (0.97-1.05)	1.09 (1.00-1.18)*
Nightmares	0.92 (0.51-1.65)	0.61 (0.28-1.31)	3.13 (1.04-9.39)*
Stress/Environmental Context Variables			
Parent Depression, CES-D	1.00 (0.98-1.03)	0.98 (0.95-1.02)	1.06 (1.01-1.11)*
ED Treatment Suicidal Behavior			
Hospitalization	1.16 (0.50-2.66)	1.72 (0.64-4.59)	0.40 (0.08-1.99)
Enhanced ED Intervention	1.63 (0.79-3.36)	1.56 (0.69-3.52)	2.04 (0.37-11.27)

^a Following preliminary analyses of sociodemographic variables subsequent analyses adjusted for gender, age, and site for the full sample; and age and site for the female-only sample. Due to the small sample size for males, unadjusted results are presented. Analyses adjusted for age and site yielded near-identical results. Due to missing data N < 181 for some variables. Only sociodemographic control variables and variables with statistically significant effects listed.

^b Analysis not valid due to sample size limitations

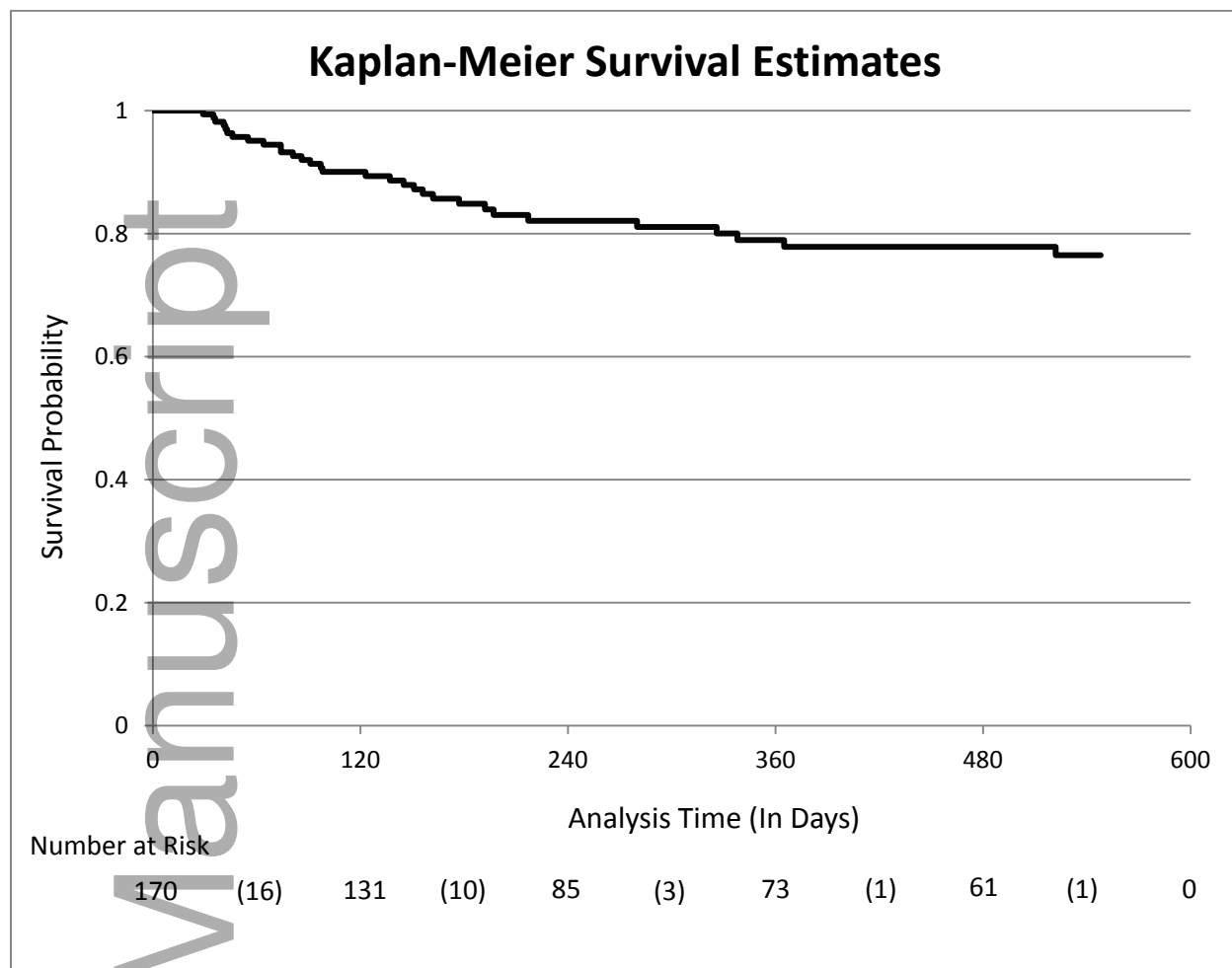


Figure 1. Kaplan-Meier survival estimates with a number-at-risk table; the number of failures are reported in parentheses.



Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Asarnow, JR; Berk, M; Zhang, L; Wang, P; Tang, L

Title:

Emergency Department Youth Patients With Suicidal Ideation or Attempts: Predicting Suicide Attempts Through 18Months of Follow-Up

Date:

2017-10-01

Citation:

Asarnow, J. R., Berk, M., Zhang, L., Wang, P. & Tang, L. (2017). Emergency Department Youth Patients With Suicidal Ideation or Attempts: Predicting Suicide Attempts Through 18Months of Follow-Up. SUICIDE AND LIFE-THREATENING BEHAVIOR, 47 (5), pp.551-566. <https://doi.org/10.1111/sltb.12309>.

Persistent Link:

<http://hdl.handle.net/11343/292111>

File Description:

Accepted version