A Longitudinal Study of Risk Factors, Correlates, Course, and Outcomes of Adults who Engage in Non-suicidal Self-injury

by

Hayley K. Chartrand

A Thesis submitted to the Faculty of Graduate Studies of

The University of Manitoba

in partial fulfillment of the requirements of the degree

DOCTORATE OF PHILOSOPHY

Department of Psychology

University of Manitoba

Winnipeg

ABSTRACT

With the release of DSM-5, the distinction between non-suicidal self-injury and suicide attempts is highlighted in the section of conditions for further study with non-suicidal self-injury and suicidal behavior disorder classified as distinct disorders. However, some have questioned the validity of distinguishing non-suicidal self-injury from suicide attempts and have instead advocated for the use of the term "self-harm" regardless of intent. The objective of this study was to examine the correlates, risk factors, course, discharge disposition, and rate of re-presentation to emergency services of adults who engaged in non-suicidal self-injury and compared them to (a) adults who engage in suicide attempts and (b) adults with no self-harm or suicidal ideation, to determine whether non-suicidal self-injury and suicide attempts should be considered distinct groups. Data came from 4,772 presentations to adult psychiatric services in the emergency departments of tertiary care hospitals in Manitoba between January 2009 and June 2012. Chart reviews were conducted for all presentations with non-suicidal self-injury (n=158), and a sample of those with suicide attempts (n=172) and no self-harm or suicidal ideation (n=173). Results showed that those who present to emergency services with self-harm regardless of intent, appear similar for the most past in terms of correlates and risk factors. The overlap between non-suicidal self-injury and suicidal behaviours demonstrates the problem with creating a separate disorder, because those who originally presented with non-suicidal self-injury that returned to hospital do not return with repeat non-suicidal self-injury, but instead the majority escalate to suicidal thoughts and behaviour. Further, those who re-presented with non-suicidal self-injury and suicide attempts are less likely to be hospitalized or receive a referral to mental health services,

and more likely to be discharged to usual care. This study highlights the need for increased intervention in emergency services among those who present with self-harm regardless of intent.

Acknowledgements

I would like to acknowledge my committee members: Dr. James Bolton (advisor), Dr. Bruce Tefft (co-advisor), Dr. Jitender Sareen (internal member), Dr. Diane Hiebert-Murphy (internal member), Dr. Laurence Katz (internal member), and Dr. David Klonsky (external member) for their invaluable assistance, guidance, and mentorship throughout this process. I would also like to thank Ms. Yunqiao Wang and Dr. Dan Chateau for their guidance with designing my data analytic strategy. I would also like to acknowledge Dr. Sara Courtis for her assistance with data collection.

I would also like to acknowledge the Canadian Institutes of Health Research (CIHR) Fredrick Banting and Charles Best Canada Graduate Scholarship – Doctoral Award and Manitoba Graduate Scholarship for funding the current research.

Table of Contents

List of Tables

List of Figures

INTRODUCTION

I. Definition and Characteristics of Non-Suicidal Self-Injury

Non-suicidal self-injury is "the direct, deliberate destruction of one's own body tissue in the absence of intent to die" (Nock, 2009). This definition of non-suicidal self-injury allows it to be distinguished from other forms of injury, including (a) unintended self-injury (e.g., drinking excessive amounts of alcohol), (b) normative behaviours (e.g., biting one's lip, picking at a wound), (c) culturally sanctioned body modification (e.g., tattooing, body piercing), and (d) suicidal behaviour (i.e., self-injury with intent to die).

Non-suicidal self-injury is included in the DSM-5 in the section of conditions for further study (American Psychiatric Association, 2013). In order to receive a diagnosis of non-suicidal self-injury, according to DSM-5 diagnostic criteria, an individual must, in the previous year, on five or more days, "…engaged in intentional self-inflicted damage to the surface of his or her body of a sort likely to induce bleeding, bruising, or pain (e.g., cutting, burning, stabbing, hitting, excessive rubbing), with the expectation that the injury will lead to only minor or moderate physical harm (i.e., there is no suicidal intent)," (American Psychiatric Association, 2013, p. 803). The criteria further specifies that the individual engages in this behaviour with one or more of the following beliefs: (a) that the self-injury will relieve them from negative feelings or cognitive state, (b) that the self-injury will resolve an interpersonal problem, or (c) that the self-injury will induce a positive feeling state. In addition, the self-injury is associated with at least one of the following: (a) interpersonal difficulties or negative feelings or thoughts (e.g., depression, anxiety, anger) that occur in the period immediately prior to the act, (b) difficulty controlling a preoccupation with engaging in self-injury prior to the act, or (c) thinking

about self-injury frequently even if it is not acted upon. The behaviour or its consequences must also cause significant distress or interference in interpersonal, academic, or other important areas. Finally, the self-injury cannot be a socially sanctioned behaviour (e.g., tattooing), or better explained by another mental disorder or medical condition (e.g., psychotic disorder, autism spectrum disorder, intellectual disability).

In the past, non-suicidal self-injury was frequently conceptualized as an associated feature of borderline personality disorder (Gardner & Cowdry, 1985; Gunderson & Singer, 1975; Schaffer, Carroll, & Abramowitz, 1982; Walsh & Rosen, 1988). This conceptualization was not surprising given that non-suicidal self-injury's only appearance in the previous versions of the DSM (i.e., DSM-IV, and DSM-III-R) was as a diagnostic criterion of borderline personality disorder (American Psychiatric Association, 1980; American Psychiatric Association, 1994). However, individuals who engage in non-suicidal self-injury do not always meet diagnostic criteria for borderline personality disorder (Herpertz, 1995; Joyce et al., 2010; Selby, Bender, Gordon, Nock, & Joiner, 2012). For instance, a study by Selby and colleagues (2012) compared individuals with non-suicidal self-injury to those with borderline personality disorder and found that most of the non-suicidal self-injury group did not exhibit even sub-threshold borderline personality disorder symptoms.

The most common method of non-suicidal self-injury is cutting or carving oneself with a sharp instrument (e.g. knife, razor) on the arms, legs, and/or stomach (Klonsky & Muehlenkamp, 2007; Nock & Prinstein, 2004; Whitlock, Muehlenkamp, & Eckenrode, 2008). Other commonly used methods are scratching the skin until it bleeds, burning the

skin, and inserting objects (e.g., safety pin) under the skin (Nock, 2010). In most cases, people report using multiple methods of non-suicidal self-injury (Nock, 2010).

The frequency and severity of non-suicidal self-injury varies depending on the population of study. In community samples, adolescents and adults who engage in non-suicidal self-injury report engaging in this behaviour infrequently (e.g., less than 10 times in their entire life) (Whitlock et al., 2008). In contrast, inpatients who engage in non-suicidal self-injury report a much higher frequency (e.g., more than 50 times in the past year) (Nock & Prinstein, 2004). However, even in community samples, the severity of tissue damage after non-suicidal self-injury has been classified as moderate to severe (Nock et al., 2007; Whitlock et al., 2008).

One of the most consistent findings across studies has been the presence of negative thoughts and affect prior to engaging in non-suicidal self-injury. This has been used as support for the hypothesis that non-suicidal self-injury is performed in order to self-sooth or as a method of help seeking (i.e., getting others to help them cope with their negative thoughts and affect) (Klonsky, 2009; Muehlenkamp et al., 2009; Nock, 2010; Nock, Prinstein, & Sterba, 2009). Furthermore, there is strong evidence to suggest that individuals who engage in non-suicidal self-injury have an elevated pain tolerance (Kirtley, O'Carroll, & O'Connor, 2016).

In summary, non-suicidal self-injury is featured in the DSM-5, although prior to this version it was only included as a symptom of borderline personality disorder. Furthermore, non-suicidal self-injury occurs in both community and clinical samples and it can be distinguished from other forms of self-injury (e.g., tattooing, suicide attempt, drinking excessively).

II. Definition and Characteristics of Suicide Attempts

A suicide attempt is "a potentially self-injurious behavior, associated with at least some intent to die, as a result of the act. Evidence that the individual intended to kill him/herself, at least to some degree, can be explicit or inferred from the behavior or circumstance. A suicide attempt may or may not result in actual injury." (Posner, Oquendo, Gould, Stanley, & Davies, 2007, p. 1037). This definition allows suicide attempts to be distinguished from non-suicidal self-injuries, based on the intent of the behavior. Nonetheless, some have questioned the validity of distinguishing non-suicidal self-injury from suicide attempts and have instead advocated for the use of the term "self-harm," to represent self-injury or self-poisoning regardless of intent (Kapur, Cooper, O'Connor, & Hawton, 2013).

The iceberg theoretical model of self-harm conceptualizes the incidence of self-harm based on three different levels: suicide (i.e., fatal self-harm), which is overt but low incident behavior (the tip of the iceberg); hospital-presenting non-fatal self-harm, which is overt but more common; and community-occurring non-fatal self-harm, which is the most common but mostly hidden (the submerged part of the iceberg) (Arensman, Corcoran, & McMahon, 2017; Geulayov et al., 2017). The iceberg theoretical model infers a dimensional relationship of increasing severity between community occurring self-harm, hospital-presenting self-harm, and suicide (Arensman, Corcoran, & McMahon, 2017; Geulayov et al., 2017). Joiner's (2005) interpersonal theory of suicide has further described the progression of suicidal ideation to attempted suicide. According to this theory, suicidal ideation arises from a combination of perceived burdensomeness and low belongingness, while the capability to act on suicidal ideation and attempt suicide

requires that an individual overcome the fear of death and pain (Klonsky, May, & Saffer, 2016). In other words, attempting suicide requires both the desire and capability for suicide. Non-suicidal self-injury has been described as both a risk factor for increased desire for suicide (suicidal ideation) and capability for suicide (Klonsky, May, & Glenn, 2013). Klonsky, May, and Glenn (2013) explain the progression from non-suicidal self-injury to suicide attempt as non-suicidal self-injury creating habituation to self-inflicted violence and pain, which then leads to increased capability for attempting suicide.

Although there is strong evidence for common risk factors that predispose individuals to both non-suicidal self-injury and suicide attempts, "…clear differences have been found in the extent and quality of these common clinical factors, which supports the hypothesis that NSSI is a distinct entity in its own right." (Butler & Malone, 2013, p. 325). For instance, adolescents who have attempted suicide have been found to have higher scores on measures of anxiety, depression, and suicidal ideation than those who engage in non-suicidal self-injury (Wilkinson, Kelvin, Roberts, Dubicka, & Goodyer, 2011).

With the release of DSM-5, the distinction between non-suicidal self-injury and suicide attempts is highlighted in the section of conditions for further study (American Psychiatric Association (APA), 2013, p. 801). Diagnostic criteria are laid out for both non-suicidal self-injury and suicidal behavior disorder as separate and distinct disorders. In order to receive a diagnosis of suicidal behavior disorder an individual must, in the previous year, have made a suicide attempt. "A suicide attempt is a self-initiated sequence of behaviors by an individual who, at the time of initiation, expected that the set of actions would lead to his or her own death…" (APA, 2013, p. 801). The act must not

meet criteria for non-suicidal self-injury and a diagnosis of suicidal behaviour disorder does not apply to suicidal ideation or preparatory acts. Additional exclusion criteria include: the act not occurring during a state of delirium or confusion, and the act not being for political or religious purposes.

In contrast, an editorial by Kapur and colleagues (2013) argued that suicidal behaviour and non-suicidal self-injury are not so distinct. They point out that many individuals who engage in non-suicidal self-injury report suicidal ideation during the episode (Klonsky, 2011) and that self-cutting has been associated with higher risk of death by suicide than self-poisoning (Cooper et al., 2005; Hawton et al., 2012). In addition, they argue that some individuals self-poison and report no suicidal intent (Kapur et al., 2006; O'Connor et al., 2007). However, according to DSM-5 criteria, this self-harm behaviour would not be classified as non-suicidal self-injury. Further, Kapur and colleagues (2013) highlight how methods of self-harm change over time (Lilley et al., 2008; Owens et al., 2015), and motivations for self-harm change over time and many different motivations may occur in the same episode (Cooper et al., 2011; Scoliers et al., 2009). In addition, Orlando and colleagues (2015) examined the latent structure of self-injurious behavior and found that it was continuous, with individuals who engage in suicidal self-injury and non-suicidal self-injury differing in dimensional variations of the same construct rather than distinct categories of self-injuries behavior. Moreover, Maciejewski and colleagues (2014) conducted a twin study in an Australian population-based sample and they indicated that there was a substantial correlation between non-suicidal self-injury and suicidal ideation, which is largely the result of overlapping genetic factors. They noted that this suggests that the two behaviours share similar

biological underpinnings. With strong arguments both for and against non-suicidal self-injury as a distinct category, both sides have advocated for more research to clarify the distinction or non-distinction between non-suicidal self-injury and suicide attempts (Kapur et al., 2013; Nock, 2010).

In brief, the DSM-5 distinguishes non-suicidal self-injury and suicide attempts. However, there are some who argue that distinguishing self-harm based on intent is unnecessary. More research is needed to clarify the distinction or non-distinction between non-suicidal self-injury and suicide attempts.

III. The Epidemiology of Non-Suicidal Self-Injury

Estimates of prevalence rates of non-suicidal self-injury have varied widely. Among adolescents, a prevalence range of 10.9%- 48.7% has been reported in nonclinical samples (Brunner et al., 2014; Garisch & Wilson, 2015; Morey, Mellon, Dailami, Verne, & Tapp, 2016; Muehlenkamp, Claes, Havertape, & Plener, 2012; Plener, Libal, Keller, Ferget, & Muehlenkamp, 2009; Swannell, Martin, Page, Hasking, & St John, 2014; Zetterqvist, Lundh, Dahlstrom, & Svedin, 2013; Zubrick et al., 2016). The prevalence of non-suicidal self-injury among adults in nonclinical samples is lower at 2.7%-18.56% among young adults (Benjet et al., 2017; Christoffersen, Mohl, DePanfilis, & Vammen, 2015; Swannell et al., 2014), and 3.1%-23% among adults (Andover, 2014; Klonsky, 2011; Maciejewski et al., 2014; Plener et al., 2016; Swannell et al., 2014). In clinical samples, not surprisingly, the prevalence of non-suicidal self-injury is higher: 20%-21.7% among adolescent outpatients (Garcia-Nieto, Carballo, Diaz de Neira Hernando, de Leon-Martinez, & Baca-Garcia, 2015; Posporelis et al., 2015) and 54.1%-82.4% among adolescent inpatients (Groschwitz et al., 2015; Nock & Prinstein, 2004). There is a

paucity of recent data on prevalence rates among clinical adult samples, with older studies reporting rates of 19-25% (Briere & Gill, 1998). A number of reasons may account for the variability in prevalence rates of non-suicidal self-injury including: studies vary in definition of non-suicidal self-injury, assessment method used, frequency of non-suicidal self-injury required to meet criteria, and characteristics of the sample (Nock, 2010).

Non-suicidal self-injury seems to begin at a young age. Age of onset of non-suicidal self-injury has been reported to begin between the ages of 12 and 14 years (Cipriano, Cella, & Cotrufo, 2017; Gandhi et al., 2018; Muehlenkamp & Gutierrez, 2007; Nock, 2010), but other studies have also reported non-suicidal self-injury occurring prior to 12 years of age (Barrocas, Hankin, Young, & Abela, 2012). Adolescence is also when suicidal thoughts and attempts begin to occur, which suggest this age group is at particularly high-risk for self-harm in general (Nock et al., 2008a; Nock et al., 2008b). Previously, it was assumed that non-suicidal self-injury occurred primarily in women and was repetitive (Skegg, 2005). However, some research has now shown that non-suicidal self-injury may be just as common in men (Briere & Gil, 1998; Gratz, 2001; Klonsky et al., 2003) and may be transient (Hawton et al., 2002; Ross & Heath, 2002). Although, a recent meta-analysis (Bresin & Schoeleber, 2015) found that female adolescents and adults were more likely to engage in non-suicidal self-injury than males and that this gender difference was larger in clinical samples. Non-suicidal self-injury is also more common in adults than was previously thought (Briere & Gil, 1998; Klonsky et al., 2003; Nada-Raja et al., 2004).

Non-suicidal self-injury occurs at an alarmingly high rate and has been increasing in recent years. Studies examining the rate of occurrence of self-harm have shown that the number of hospital presentations for self-harm (both suicidal and non-suicidal) have increased over the past 10 to 20 years (Hawton et al., 2003; Nock et al., 2008). In addition, a study examining trends in non-suicidal self-injury among three different cohorts of freshman university students over a seven-year period found that lifetime and current non-suicidal self-injury drastically increased across the three cohorts (Wester, Trepal, & King, 2017). Furthermore, Nock (2010) in his review of non-suicidal self-injury insists "obtaining accurate estimates of the rate of self-injury in community and clinical samples is essential for understanding the scope of the problem, allocating services and other resources, and for monitoring changes in this behavior over time…However, no longitudinal data are currently available on prevalence rates of non-suicidal self-injury in particular, so the trends and course of this form of self-injury remain unknown." Only a small number of studies have examined the trends and course of non-suicidal self-injury longitudinally. An Australian longitudinal study found that self-harm (including non-suicidal self-injury and suicide attempts) significantly decreased from adolescence (around 15 years old) to young adulthood (around 29 years old) (Brown & Plener, 2017; Moran et al., 2012). A systematic review of longitudinal studies of non-suicidal self-injury found that prevalence rates of non-suicidal self-injury peak around 15 to 16 years of age and then decline towards 18 years of age (Plener, Schumacher, Munz, & Groschwitz, 2015).

In brief, non-suicidal self-injury begins between 12 and 14 years of age (and sometimes younger) and it occurs in both adult men and women. In addition, hospital

presentations for non-suicidal self-injury have increased in the past 10 to 20 years and cohort studies have shown an increase in non-suicidal self-injury across time. Furthermore, some longitudinal research has shown that rates of non-suicidal self-injury decline from adolescence into adulthood, but more longitudinal data is needed to better understand the scope of the problem and to monitor changes in non-suicidal self-injury over time.

IV. Risk Factors and Correlates of Non-Suicidal Self-Injury

Non-suicidal self-injury is associated with a number of risk factors and correlates. Research has shown that non-suicidal self-injury is associated with borderline personality disorder (Jacobson et al., 2008; Sevecke, Bock, Fenzel, Gander, & Fuchs, 2017), bipolar disorder (Joyce et al., 2010; Parker et al., 2005), substance use disorders (Benjet et al., 2017; Coppersmith, Nada-Raja, & Beautrais, 2017; Garisch & Wilson, 2015; Herpertz, 1995; Nock et al., 2006; Parker et al., 2005; Sevecke et al., 2017), anxiety disorders (Benjet et al., 2017; Coppersmith et al., 2017; Garisch & Wilson, 2015), non-heterosexual orientation (Taliaferro & Muehlenkamp, 2015; Wilcox, Arria, Caldeira, Vincent, Pinchevsky, & O'Grady, 2012), multiple life stressors (Townsend et al., 2016), impulsivity (Garisch & Wilson, 2015; Hamza, Willoughby, & Heffer, 2015; Lockwood, Daley, Townsend, & Sayal, 2017), aggression (O'Donnell, House, & Waterman, 2015; Tang et al., 2013), lack of social support (Baiden, Stewart, & Fallon, 2017; Christoffersen, Mohl, DePanfilis, & Vammen, 2015), major depressive disorder (Baiden, Stewart, & Fallon, 2017; Benjet et al., 2017; Coppersmith et al., 2017; Cox et al., 2012a; Cox et al., 2012b; Garisch & Wilson, 2015; Wilcox et al., 2012), mood disorders (Benjet et al., 2017; Groschwitz et al., 2015; Joyce et al., 2010; Sevecke et al., 2017), disruptive

behavior disorder (Baiden, Stewart, & Fallon, 2017; Benjet et al., 2017), attention deficit-hyperactivity disorder (Baiden et al., 2017), childhood sexual abuse (Baiden et al., 2017; Boxer, 2010; Coppersmith et al., 2017; Gladstone et al., 2004; Liu et al., 2017; Romans et al., 1995; Serafini et al., 2017), childhood physical abuse (Baiden, Stewart, & Fallon, 2017; Boxer, 2010; Liu et al., 2017; Serafini et al., 2017), parental depression and self-harm (Wilcox et al., 2012), suicidal ideation (Coppersmith, Nada-Raja, & Beautrais, 2017; Sevecke et al., 2017), suicide attempts (Asarnow, Berk, Zhang, Wang, & Tang, 2017; Benjet et al., 2017; Chesin et al., 2017; Cuellar & Curry, 2007; Groschwitz et al., 2015; Mangnall & Yurkovich, 2008; Parker et al., 2005; Sansone et al., 2006; Sevecke et al., 2017), and death by suicide (Shah & Ganesvaran, 1997). A recent meta-analysis by Fox and colleagues (2015) examined risk factors for non-suicidal self-injury. They found that the strongest risk factors for future non-suicidal self-injury were a prior history of non-suicidal self-injury, cluster b personality traits, and hopelessness.

In an adult sample of individuals treated for depression and their families (n=621), Joyce and colleagues (2010) found that a mood disorder diagnosis and having high harm avoidance (a personality trait characterized by excessive worrying, pessimism, shyness, and being fearful, doubtful and easily fatigued) were the strongest predictors of non-suicidal self-injury. In addition, the diagnosis with the highest rate of non-suicidal self-injury was Bipolar I Disorder at 38% (Joyce et al., 2010). People who engage in non-suicidal self-injury are also more likely to have alcohol and drug use disorders compared to those who do not engage in self-harm (Herpertz, 1995; Nock et al., 2006). Childhood sexual abuse has also been frequently shown in the literature to be a risk factor for self-harm, including non-suicidal self-injury (Baiden et al., 2017; Boxer, 2010; Coppersmith

et al., 2017; Gladstone et al., 2004; Liu, Scopelliti, Pittman, Zamora et al., 2017; Romans et al., 1995).

In a sample of offspring of parents with a DSM-IV mood disorder, Cox and colleagues (2012a) found in multivariate models that a diagnosis of depression, depressive symptoms, higher levels of interview and self-reported aggression (using Structured Clinical Interview of DSM-IV), and suicidal ideation were the strongest correlates of non-suicidal self-injury. They also examined non-suicidal self-injury longitudinally; however, they did not compare non-suicidal self-injury to other forms of self-harm, including suicide attempts. In their study, that examined the correlates of non-suicidal self-injury longitudinally they found similar results. The strongest predictors of future non-suicidal self-injury were a diagnosis of current major depressive disorder, suicidal ideation, and younger age (Cox et al., 2012b). Furthermore they found that a history of non-suicidal self-injury predicted future suicide attempts and that a suicide attempt after baseline predicted future non-suicidal self-injury. In another longitudinal study, Tuisku and colleagues (2014) examined the predictors of non-suicidal self-injury and suicide attempts among a depressed adolescent sample during an 8-year follow-up. They found that non-suicidal self-injury, suicide attempt, depressive and anxiety symptoms, and alcohol use at baseline predicted a suicide attempt during the 1-year follow up. Predictors of a suicide attempt occurring between the 1-year and 8-year follow up were a suicide attempt, non-suicidal self-injury, alcohol use, and low social support from friends at the 1-year follow-up. They also reported similar risk factors for non-suicidal self-injury. They found that non-suicidal self-injury, younger age, anxiety symptoms, and alcohol use at baseline predicted non-suicidal self-injury during the 1-

year follow up. Predictors of non-suicidal self-injury between the 1-year and 8-year follow up were non-suicidal self-injury, alcohol use, and anxiety symptoms at the 1-year follow-up. Hu, Glauert, Li, and Taylor (2016) examined the predictors of repetition of self-harm (regardless of intent) seven days following initial presentation for self-harm to emergency services among a Western Australia young adult (20-29 years old) sample. They found that having a substance use disorder, depressive disorder, anxiety disorder, stressor-related disorder, and borderline personality disorder within one week before and one week after a self-harm episode was associated with increased odds of repetition of self-harm within seven days (Hu et al., 2016).

In addition, although non-suicidal self-injury is engaged in without the intent to die, individuals who frequently engage in non-suicidal self-injury are also more likely to attempt suicide (Asarnow et al., 2017; Chesin et al., 2017; Cuellar & Curry, 2007; Klonsky, May, & Glenn, 2013; Mangnall & Yurkovich, 2008; Sansone et al., 2006). Sansone and colleagues (2006) found that, among psychiatric inpatients (n=107), non-suicidal self-injury was the symptom cluster most predictive of past suicide attempt. Guan, Fox, and Prinstein (2012) examined non-suicidal self-injury among a community sample of adolescents longitudinally and found that non-suicidal self-injury was significantly and prospectively associated with suicidal ideation and suicide attempts. Furthermore, Whitlock and colleagues (2013) reported similar findings in a college sample of American adults, that a history of non-suicidal self-injury significantly predicted concurrent and future suicidal thoughts and behaviours. Similarly, Hamza and Willoughby (2016) found that non-suicidal self-injury in a sample of Canadian first-year university students predicted future suicidal ideation and suicide attempts. Furthermore,

among adults who presented to emergency services with a suicide attempt, those with a history of non-suicidal self-injury reported significantly more suicide attempts and more suicide attempts that required medical care compared to those without a history of non-suicidal self-injury (Ward-Ciesielski, Schumacher, & Bagge, 2016). Victor and Klonsky (2014) conducted a meta-analysis to determine the correlates of suicide attempts among individual who engage in non-suicidal self-injury. They found that the strongest correlate of suicide attempt history was suicidal ideation, followed by non-suicidal self-injury frequency, number of non-suicidal self-injury methods, and hopelessness. Moderate predictors of suicide attempts included borderline personality disorder, impulsivity, posttraumatic stress disorder, non-suicidal self-injury by cutting, and depression. Interestingly, they indicated that common cited risk factors for suicide attempts displayed small or negligible associations with suicide attempts among individuals who engage in non-suicidal self-injury, including history of sexual and physical abuse, anxiety, substance use, and eating disorders (Victor & Klonsky, 2014).

Moreover, non-suicidal self-injury is also associated with death by suicide (Carroll et al., 2016; Shah & Ganesvaran, 1997). Shah and Ganesvaran (1997) found that psychiatric inpatients that died by suicide were more likely to have had a history of non-suicidal self-injury than patients who did not die by suicide. Furthermore, Carroll and colleagues (2016) showed that individuals who presented to emergency services with self-cutting to areas of the body other than arm/wrist were at an increased risk of suicide compared to those who presented with self-poisoning. Death from self-harm may also be an unintended outcome of non-suicidal self-injury when injuries result in unintended death (Mangnall & Yurkovich, 2008).

Individuals who engage in non-suicidal self-injury are a heterogeneous group. A latent class analysis study by Hamza and Willoughby (2013) found that the risk for suicidal behaviour is different even among young adults who engage in non-suicidal self-injury. Hamza and Willoughby (2013) identified three subgroups of individuals: a) an infrequent non-suicidal self-injury/not high risk for suicidal behaviour, b) a frequent non-suicidal self-injury/not high risk for suicidal behaviour group, and c) a frequent non-suicidal self-injury/high risk for suicidal behaviour group. Individuals in the latter (high risk) group were characterized as having greater levels of suicidal ideation, suicide attempts, and risk for future suicidal behaviour, as well as higher levels of psychosocial impairment, compared to the other two groups. Thus, even among individuals with non-suicidal self-injury the risk for future suicidal behaviour varies.

In reviewing studies that have examined the correlates and risk factors for non-suicidal self-injury certain similarities and differences in findings emerge. Cox and colleagues (2012b) and Tuisku and colleagues (2014) both found that younger age predicted future non-suicidal self-injury. However, Cox and colleagues (2012b) and Joyce and colleagues (2010) found mood disorders were associated with non-suicidal self-injury, while Tuisku and colleagues (2014) found that non-suicidal self-injury was associated with anxiety symptoms and alcohol use. These divergent findings may be due to differences in the samples studied. Cox and colleagues' (2012b) sample consisted of adult offspring of parents with a mood disorder and Joyce and colleagues' (2010) sample consisted of treatment seeking adults with depression, whereas Tuisku and colleagues' (2014) sample was composed of depressed adolescents. A common important finding that has emerged across a number of longitudinal studies using different types of samples

(e.g., university students, adolescent community, treatment seeking) is that non-suicidal self-injury is associated with future suicide attempts (Cox et al., 2012b; Guan et al., 2012; Hamza & Willoughby, 2016; Tuisku et al., 2014; Whitlock et al., 2013). Additionally, Fox and colleagues (2015) and Tuisku and colleagues (2014) found that a history of non-suicidal self-injury predicted future non-suicidal self-injury. Despite the variety of population samples studied to date, one of the major limitations in the literature has been the lack of research that examines non-suicidal self-injury among those who present to emergency services. Most of the research on non-suicidal self-injury has been conducted on university, community, and population-based samples. Studies conducted on those with hospital presenting self-harm, for the most part, have not distinguish individuals who present with non-suicidal self-injury from those who present with suicide attempts.

Studies of adolescents have further examined the unique correlates and risk factors of non-suicidal self-injury by comparing individuals who engage in: a) non-suicidal self-injury only, b) suicide attempts only, c) non-suicidal self-injury and suicide attempts, and d) no self-harm. In multivariate analyses, borderline personality features were found to be predictive of membership in the non-suicidal self-injury only group, whereas major depression and post-traumatic stress disorder were predictive of membership in the suicide attempt only and non-suicidal self-injury and suicide attempt groups, compared to the no self-harm group (Jacobson et al., 2008). Another study, using a different psychiatric youth sample, but the same self-harm categorization, found that the non-suicidal self-injury only and non-suicidal self-injury and suicide attempt groups seemed similar on several indicators (Boxer, 2010). For example, they had significantly higher incidents of self-harm during treatment compared to the suicide attempts only and

no self-harm groups. Moreover, they were equally likely to have experienced some type of maltreatment including childhood physical and emotional abuse, and neglect (Boxer, 2010).

In a cross-sectional nationally representative American sample of adults, Nock and Kessler (2006) compared the correlates and risk factors of individuals who engaged in non-suicidal self-injury compared to suicide attempts. They found that having a major depressive episode, having drug abuse/dependence, having conduct disorder, having antisocial personality disorder, having simple phobia, having more than three psychiatric disorders, having a history of multiple incidents of sexual molestation, and a history of physical assault were more strongly associated with suicide attempts than with non-suicidal self-injury. Similarly, in a cross-sectional emergency department Manitoba sample of adults, Chartrand, Bhaskaran, Sareen, Katz, and Bolton (2015) compared the correlates and risk factors of individuals who presented to emergency services with non-suicidal self-injury to those who presented with suicide attempts. They found that having major depressive disorder, single marital status, passive suicidal ideation, having an organized plan or made a serious attempt, having previous suicide attempt or psychiatric care, experiencing an acute stressor, and lacking social support were more strongly associated with suicide attempts than with non-suicidal self-injury. Furthermore, another study using a United Kingdom population-based birth cohort sample of 16 year olds compared those who engaged in non-suicidal self-injury only to those who had ever attempted suicide (they may have also engaged in non-suicidal self-injury). Findings indicated that compared to those with non-suicidal self-injury only, those who had attempted suicide had an increased risk of major depressive disorder and anxiety

disorders (Mars et al., 2014a). Mars and colleagues (2014b) also followed this same sample longitudinally to determine whether type of self-harm (i.e., non-suicidal self-injury only versus any suicide attempt) at 16 years old predicted future self-harm, mental health problems, and substance use. Findings indicated that compared to those with non-suicidal self-injury only, those who had attempted suicide had an increased risk of future major depressive disorder, anxiety disorders, and problematic cannabis use at 18 years of age and past year self-harm at 21 years of age (Mars et al., 2014b). Mars and colleagues (2014b) concluded that individuals who self-harmed regardless of intent were at increased risk of future mental health problems, self-harm, and substance misuse, but the association was stronger for those with suicidal self-harm compared to non-suicidal self-harm. In contrast, another study using an inpatient adolescent sample compared those who engaged in non-suicidal self-injury only to those who attempted suicide only. They found that those in the non-suicidal self-injury only group endorsed earlier onset of self-injurious behaviour and suicidal ideation and higher rates of depression and anxiety compared to the suicide attempt only group (Kim et al., 2015).

In a recent study by Coppersmith, Nada-Raja, and Beautrais (2017) they compared adults with a lifetime history of non-suicidal self-injury only to those with a lifetime history of both non-suicidal self-injury and suicide attempt in a community sample. They found that the combined non-suicidal self-injury and suicide attempt group was more likely to have a history of anxiety disorder, history of substance use disorder, past year suicidal ideation, and childhood sexual abuse compared to the non-suicidal self-injury only group. Another study compared adults with past year history of non-suicidal self-injury only to those with past-year history of both non-suicidal self-injury and

suicide attempt in a college student sample (Taliaferro & Muehlenkamp, 2015). They found that the combined non-suicidal self-injury and suicide attempt group was more likely to have current depressive symptoms and to have an internalizing disorder diagnosis compared to the non-suicidal self-injury only group.

Within the literature that has compared those who engage in non-suicidal self-injury to those with suicide attempts there exists areas of agreement and divergence. A number of studies have found that depression symptoms and major depressive disorder are more strongly associated with suicide attempts than with non-suicidal self-injury (Chartrand et al., 2015; Jacobson et a., 2008; Mars et al., 2014a; Mars et al., 2014b; Nock & Kessler, 2006; Taliaferro & Muehlenkamp, 2015). Other studies have also found that anxiety symptoms and anxiety disorders are more strongly associated with suicide attempts than with non-suicidal self-injury (Coppersmith et al., 2017; Mars et al., 2014a; Mars et al., 2014b; Nock & Kessler, 2006). In contrast, Kim and colleagues (2015) found that non-suicidal self-injury was associated with higher rates of depression and anxiety compared suicide attempts. Kim and colleagues' (2015) divergent findings maybe be due to the fact that their sample consistent of inpatient adolescents, which is quite a different population than the other samples studied. Agreement among studies has also been shown for substance use and substance use disorders being more strongly associated with suicide attempts compared to non-suicidal self-injury (Coppersmith et al., 2017; Mars et al., 2014b; Nock & Kessler, 2006). Although, the association between childhood abuse and self-harm has varied by study, with some studies showing no difference between non-suicidal self-injury and suicide attempts (Chartrand et al., 2015), some showing stronger

association with suicide attempts (Coppersmith et al., 2017; Nock & Kessler, 2006) and others with non-suicidal self-injury (Boxer, 2010).

An important limitation in the literature that compares those who engage in non-suicidal self-injury to those with suicide attempts is that few studies have been conducted among adult samples. Most of the literature consists of those who have compared self-harm behaviour among adolescents (Boxer, 2010; Jacobson et a., 2008; Kim et al., 2015; Mars et al., 2014a) and young adults (Mars et al, 2014b; Taliaferro & Muehlenkamp, 2015). In addition, there is a paucity of longitudinal research comparing non-suicidal self-injury and suicide attempts. The literature in this area has been limited by small samples, community samples, samples of patients receiving treatment, or mostly cross-sectional designs (Boxer, 2010; Chartrand et al., 2015; Coppersmith et al., 2017; Jacobson et al., 2008; Kim et al., 2015; Mars et al., 2014a; Nock & Kessler, 2006; Taliaferro & Muehlenkamp, 2015). Furthermore, many studies have compared those with non-suicidal self-injury only to those with both non-suicidal self-injury and suicide attempts (Coppersmith et al., 2017; Mars et al., 2014a; Mars et al., 2014b; Taliaferro & Muehlenkamp, 2015). This makes finding the unique influence of non-suicidal self-injury and suicide attempts more challenging.

Overall, non-suicidal self-injury is associated with a variety of correlates and risk factors including borderline personality disorder (Jacobson et al., 2008; Sevecke, Bock, Fenzel, Gander, & Fuchs, 2017), bipolar disorder (Joyce et al., 2010; Parker et al., 2005), substance use disorders (Benjet et al., 2017; Coppersmith, Nada-Raja, & Beautrais, 2017; Herpertz, 1995; Nock et al., 2006; Parker et al., 2005; Sevecke et al., 2017), anxiety disorders (Benjet et al., 2017; Coppersmith et al., 2017), non-heterosexual orientation

(Wilcox, Arria, Caldeira, Vincent, Pinchevsky, & O'Grady, 2012), multiple life stressors (Townsend et al., 2016), impulsivity (Hamza, Willoughby, & Heffer, 2015; Lockwood, Daley, Townsend, & Sayal, 2017), aggression (O'Donnell, House, & Waterman, 2015; Tang et al., 2013), lack of social support (Baiden, Stewart, & Fallon, 2017), major depressive disorder (Baiden, Stewart, & Fallon, 2017; Benjet et al., 2017; Coppersmith et al., 2017; Cox et al., 2012a; Cox et al., 2012b; Wilcox et al., 2012), mood disorders (Benjet et al., 2017; Joyce et al., 2010; Sevecke et al., 2017), disruptive behavior disorder (Baiden, Stewart, & Fallon, 2017; Benjet et al., 2017), attention deficit-hyperactivity disorder (Baiden et al., 2017), childhood sexual abuse (Baiden et al., 2017; Boxer, 2010; Coppersmith et al., 2017; Gladstone et al., 2004; Liu et al., 2017; Romans et al., 1995; Serafini et al., 2017), childhood physical abuse (Baiden, Stewart, & Fallon, 2017; Boxer, 2010; Liu et al., 2017; Serafini et al., 2017), parental depression and self-harm (Wilcox et al., 2012), suicidal ideation (Coppersmith, Nada-Raja, & Beautrais, 2017; Sevecke et al., 2017), suicide attempts (Asarnow, Berk, Zhang, Wang, & Tang, 2017; Benjet et al., 2017; Chesin et al., 2017; Cuellar & Curry, 2007; Mangnall & Yurkovich, 2008; Parker et al., 2005; Sansone et al., 2006; Sevecke et al., 2017), and death by suicide (Shah & Ganesvaran, 1997). There is a paucity of research that examines non-suicidal self-injury among adults who present to emergency services; most research has been conducted on university, community, and population-based samples. Studies conducted on adults with hospital-presenting self-harm, for the most part, have not distinguish individuals who present with non-suicidal self-injury from those who present with suicide attempts. Furthermore, there is substantial literature that has demonstrated non-suicidal self-injury to be a heterogeneous group, often with co-occurring suicidal ideation or suicide

attempts, and with many shared or overlapping correlates with suicidal thoughts and behaviour.

V. The Epidemiology of Suicide Attempts

The lifetime prevalence of suicide attempts for adults in the United States ranges from 1.9% to 8.7%, whereas the adult cross-national lifetime prevalence rate (other countries besides the U.S) ranges from 0.4% to 5.1% (Nock et al., 2008b). The twelve-month prevalence of suicide attempts for adults in Canada is 0.6% (Belik, Stein, Asmundson, & Sareen, 2010), the United States is 0.2% to 2.0%, and the adult cross-national twelve-month prevalence rate ranges from 0.1% to 3.8% (Nock et al., 2008b). The lifetime prevalence of suicide attempts for adolescent Americans is higher than adults at 3.1% to 8.8%; similarly, the lifetime prevalence of suicide attempts for adolescents is also higher than adults cross-nationally at 1.5% to 12.1% (Nock et al., 2008b). The twelve-month prevalence of suicide attempts is also much higher for adolescent Americans at 7.3% to 10.6% compared to adults and the same pattern exists cross-nationally at 1.8% to 8.4% (Nock et al., 2008). The higher rates of lifetime suicide attempts in adolescents is likely due to under reporting of lifetime attempts by adults (Goldney et al., 1991; Nock et al., 2008b). The under reporting of lifetime attempts by adults may be the result of recall bias, where adults forget to report prior attempts. Another possibility is that adults are intentionally not reporting suicide attempts that occurred many years ago.

Similar to non-suicidal self-injury, the onset of suicidal behaviour begins in early adolescence. “The most consistently reported pattern is that the risk of first onset for suicidal behavior increases significantly at the start of adolescence (12 years), peaks at

age 16 years, and remains elevated into the early 20s." (Nock et al., 2008b, p. 137). As mentioned previously, adolescence and early adulthood are the periods of highest risk for onset of self-harm behaviour regardless of intent (Nock et al., 2008a; Nock et al., 2008b).

In summary, the prevalence rates of lifetime and past-year suicide attempts are higher for adolescents than adults in the United States and in other countries. This is likely due to under reporting by adults because of recall bias or intentional un-reporting of previous suicide attempts. Suicidal behaviour begins in adolescents and peaks between adolescence and early adulthood.

VI. Risk Factors and Correlates of Suicide Attempts

The common demographic risk factors for suicidal behaviour across both developed and developing nations are younger age, being unmarried, having less education, being unemployed, and being female (Nock et al., 2008b). Although the exact mechanisms through which these demographic risk factors lead to suicidal behaviour is unknown, it is thought that socioeconomic disadvantage may lead to increased risk of suicidal behaviour (Nock et al., 2008b).

The presence of a mental disorder is one of the most consistently reported risk factors for suicidal behaviour (Gould et al, 1998; Kessler, Borges, & Walters, 1999; Mann, Waternaux, Haas, & Malone, 1999; Nock et al., 2008a; Nock et al., 2008b; Petronis, Samuels, Moscicki, & Anthony, 1990; Shaffer et al, 1996; Vijayakumar & Rajkumar, 1999). Mood disorders, alcohol and substance use disorders, impulse-control disorders, psychotic disorders, and personality disorders are associated with the highest risk for suicidal behaviour (Brent et al., 2002; Hawton, Houston, Haw, Townsend, & Harriss, 2003; Kessler et al., 1999; Mann et al., 1999; Melhem et al., 2007; Nock et al.,

2008a; Nock et al., 2008b; Nock & Kessler, 2006; Shaffer et al., 1996; Yen et al., 2003). Moreover, the presence of multiple disorders further increases this risk (Hawton et al., 2003; Kessler et al., 1999; Nock et al., 2008a; Nock et al., 2008b). Futhermore, suicidal behaviour is often preceded by a stressful life event, such as family or romantic relationship conflict or legal issues (Brent, Perper, Moritz, Baugher, Roth, Balach, & Schweers, 1993; Vijayakumar & Rajkumar, 1999; Yen et al., 2005). Other correlates of suicidal behaviour include (a) experiencing childhood sexual abuse (Brent et al., 2002; Melhem et al., 2007), (b) having access to lethal means like firearms or high doses of medication (Agerbo, Gunnell, Bonde, Mortensen, & Nordentoft, 2007; Brent, Perper, Goldstein, Kolko, Allan, Allman, & Zelenak, 1988; Marzuk, Leon, Tardiff, Morgan, Stajic, & Mann, 1992), (c) having a chronic or terminal illness (Conwell, Dubertstein, & Caine, 2002), (d) non-heterosexual orientation (de Graaf, Sandfort, & ten Have, 2006; Fergusson, Horwood, & Beautrais, 1999; Herrell, Goldberg, True, Ramakrishnan, Lyons, Eisen, & Tsuang, 1999), (e) the presence of suicidal behaviour among one's peers (Gould, 1990; Gould, Wallenstein, & Kleinman, 1990; Joiner, 2003), (f) impulsivity (Alasaarela, Hakko, Riala, & Riipinen, 2017), and (g) the time of year (with higher rates in May and June) (Nakaji, Parodi, Fontana, Umeda, Suzuki, Sakamoto, Fukuda, Wada, & Sugawara, 2004; Petridou, Papadopoulos, Frangakis, Skalkidou, & Trichopoulos, 2002; Preti, Miotto, & Coppi, 2000).

Suicide attempts are more frequent than death by suicide and suicide attempts are one of the strongest risk factors for eventual death by suicide (Castellvi et al., 2017; Chan et al., 2016; Kessler et al., 1999; Jenkins et al., 2002; Suominen et al., 2004).

In brief, socioeconomic disadvantage is associated with suicidal behaviour, being young, single, female, unemployed, and less educated are associated with suicide attempts. The presence of a mental disorder is one of the strongest risk factors for suicidal behaviour. Furthermore, suicide attempts are one of the strongest risk factors for death by suicide.

VII. Emergency Department Presentations for Self-Harm

As previously noted, the number of hospital presentations for self-harm has increased over the past 10 to 20 years (Hawton et al., 2003; Nock et al., 2008). There were an estimated 594,000 presentations for self-harm to emergency departments in the United States in 2006 (Pitts et al., 2008). Furthermore, the total number of emergency department presentations for self-harm in the United States was stable between 2006 and 2013, with a population-based rate ranging from 163.1 to 173.8 per 100,000 annually (Canner, Giuliano, Selvarajah, Hammond, & Schneider, 2016). In Canada (excluding Quebec) during the 2014-2015 fiscal year, there were 13, 438 hospitalizations associated with self-inflicted injuries (Skinner et al., 2016). Among adolescents in England, the incidence of hospital-presenting self-harm was 556 per 100,000 person-years from 2011 to 2013 (Geulayov et al., 2017), while adult emergency department data for Alberta estimate there were 250 presentations for self-harm per 100,000 population from 2000 to 2001 (Colman et al., 2004). This estimate likely under-represents the number of actual cases of self-harm that present to emergency services, as many cases are misclassified as unintentional injuries. In Ontario, emergency department data from the National Ambulatory Care Reporting System from 2001-2002 put the number of presentations for self-harm at 127.3 per 100,000 population. However, when presentations of injury and

poisoning coded as "undetermined" are added into the estimates, the number of self-harm presentations increases by 60% to 203.9 per 100,000 population (Bethell & Rhodes, 2009). Bethell and Rhodes (2009) found that presentations involving cut/pierce injury or poisoning are most often mis-coded as "undetermined." This likely means that many cases of non-suicidal self-injury are misidentified because cutting and piercing the skin are common forms of non-suicidal self-injury. Furthermore, among those whose initial presentation to emergency services was coded as self-harm, the highest rate of subsequent self-harm re-presentation was if the initial presentation had involved a cut/pierce injury. Again, this may indicate that those who presented to emergency services with non-suicidal self-injury involving cutting or piercing the skin, were also those most likely to re-present to emergency services. However, this study did not classify self-harm based on intent; therefore, it is unknown if the cut/pierce injuries are non-suicidal self-injuries or other forms of self-harm.

The rate of re-presentation to emergency services with non-suicidal self-injury is unknown. Previous studies done in the United Kingdom have found that the prevalence of re-presentations with self-harm to the same general hospital within a year were between 15% and 25% (Hawton, Harriss, Hall, Simkin, Bale, & Bond, 2003; Owens, Horrocks, & House, 2002). Similarly, a meta-analysis by Carroll, Metcalfe, and Gunnell (2014) found that the prevalence of re-presentations to hospital with self-harm within a year was 17%. However, these studies did not classify the intent of the self-harm as either a suicide attempt or non-suicidal self-injury; therefore, the prevalence of re-presentations among those with non-suicidal self-injury is unknown. A recent Manitoban study by Chartrand, Bhaskaran, Sareen, Katz, and Bolton (2015) found that most people with non-

suicidal self-injury do not re-present to emergency services. Only 16.4% of people who initially presented with non-suicidal self-injury re-presented to emergency services within a two and a half-year period.

Individuals who present to emergency departments with self-harm are at increased risk of death by suicide. Cooper and colleagues (2005) found a 30-fold increase in risk of death by suicide among those who presented to emergency departments with self-harm, compared to the general population of England and Wales. Furthermore, the suicide risk was highest in the first six months after individuals engaged in self-harm. In addition, males had a higher risk of suicide compared to females at all times during the follow up period, although women had a higher risk of death by suicide than the general population (Cooper et al., 2005). Similarly, a more recent study by Beckman and colleagues (2016) found a 16-fold increase (35-fold increase in unadjusted analyses) in risk of death by suicide among those who were hospitalized for self-harm compared to the general population of Sweden. In addition, Hawton and colleagues (2015a) reported a 49 times greater risk of suicide in the first year following presentation to emergency services with self-harm compared to the general population of England and Wales. A meta-analysis by Carroll, Metcalfe, and Gunnell (2014) found that one in twenty-five individuals who present to emergency services with self-harm will die by suicide within five years.

Most patients who present to emergency departments with self-harm are discharged to the community (Olfson, Marcus, & Bridge, 2012). This American study of adult Medicaid beneficiaries found that 62.5% of individuals who presented to emergency services with self-harm regardless of intent were discharged to the community and only 47.5% received a mental health assessment in the emergency department.

Another study by these authors using an American adult Medicaid beneficiaries sample, indicated that adults who are discharged to the community are at high short-term (within 30 days) of repeat self-harm and admission to hospital; however, this risk may be attenuated by diagnosis of a mental disorder during original presentation to emergency services (Olfson, Marcus, & Bridge, 2013).

Overall, emergency department findings for self-harm suggest that a large number of individuals present with self-harm to emergency services and that this number has been growing in the past 10-20 years. Initial presentations to emergency services in Ontario with cutting/piercing injuries were associated with the highest rate of re-presentation. Previous studies in the United Kingdom have found that the prevalence of re-presentation with self-harm within a year was 15%-25% and a Manitoban study found that 16.4% of people who initially presented with non-suicidal self-injury re-presented to emergency services within a two and a half-year period. Risk for suicide is high among those who present to emergency services with self-harm, especially in the first six months. Nonetheless, these individuals are likely to be discharged from hospital without a mental health assessment.

VIII. Treatment of Non-Suicidal Self-Injury

"…There currently are no evidence-based interventions or prevention programs for self-injury… and no evidence-based pharmacological treatment of self-injury" (Nock, 2010). Moreover, non-suicidal self-injury has been described as a behaviour that is resistant to treatment efforts (Zila & Kiselica, 2001). The standard treatment of non-suicidal self-injury has been hospitalization; however, there is little evidence of its effectiveness (Muehlenkamp, 2006). Despite these important obstacles to the treatment of

non-suicidal self-injury, certain types of psychotherapeutic approaches seem promising. Cognitive behavioural theory-based psychotherapies including: cognitive behavioral therapy, problem-solving therapy (D'Zurilla & Goldfried, 1971), and dialectical behavior therapy (Linehan, 1993) focus on treating non-suicidal self-injury. These treatments emphasize immediately targeting non-suicidal self-injury and improving skill deficits (Muehlenkamp, 2006). A review by Brown and Jager-Hyman (2014) found that cognitive therapy for suicide prevention (CT-SP) (Brown et al., 2005), cognitive-behavioral therapy (CBT) (Slee, Garnefski, van der Leeden, & Arensman, 2008), dialectical behavior therapy (DBT) (Linehan et al, 2006), problem-solving therapy (PST) (Hatcher, Sharon, Parag, & Collins, 2011), mentalization-based treatment (MBT) (Bateman & Fonagy, 1999), and psychodynamic interpersonal therapy (PIT) (Guthrie et al., 2001) have all shown positive effects for preventing suicide attempts or "self-directed violence" among adults. Despite these initial findings they recommend additional research that focuses on filling in the gaps in the literature and improving the methodologic rigor of suicide-prevention psychotherapies RCTs. A recent Cochrane Review by Hawton and colleagues (2016a) examined psychosocial interventions for self-harm in adults. They found 18 trials that compared cognitive behavioural therapy, problem-solving therapy, or both, to treatment as usual and conducted a meta-analysis of these trials. This meta-analysis provided evidence that suggested a reduction in repeat self-harm at both six and twelve month's follow-up (Hawton et al., 2016a; Hawton et al., 2016b). Hawton and colleagues (2016a) also identified three trials that compared dialectical behavior therapy with treatment as usual. They found that there were no apparent overall effects on the proportion of individuals repeating self-harm at twelve and twenty-four months; however,

there was a significant effect of dialectical behavior therapy on reducing the frequency of repeat self-harm. Overall, there is some evidence to suggest that cognitive behavioural theory-based psychotherapies are effective in reducing repeat self-harm compared with treatment as usual (Hawton et al., 2016a; Hawton et al., 2016b).

Recent studies have found that individuals who present to emergency services for self-harm and receive a specialist psychosocial assessment are at a lower risk of representing to emergency services with self-harm compared to those who are not assessed (Carroll et al., 2016; Steeg et al., 2018). Thus, Steeg and colleagues (2018) argue that specialist psychosocial assessments should be provided to all individual who present to emergency services with self-harm, regardless of their perceived risk. Recent research has also shown the merits of using implicit assessment measures to predict future risk of non-suicidal self-injury (Cha et al., 2016). In addition, research is emerging showing the promise of brief contact interventions (e.g., postcards, letters, text messages, crisis cards, telephone contacts) for reducing the number of episodes of repeated self-harm following discharge from emergency services or psychiatric hospitalization (Brown & Green, 2014; Falcone et al., 2017; Milner, Carter, Pirkis, Robinson, & Spittal, 2015). However, the current literature showed mixed results and further research is needed using randomized clinical trails before brief contact interventions can be recommended for widespread clinical implementation (Brown & Green, 2014; Falcone et al., 2017; Milner et al., 2015).

There is preliminary evidence that some pharmacological treatments may be effective in reducing non-suicidal self-injury (Nock, 2010). However, one of the major limitations in pharmacological research for the treatment of non-suicidal self-injury is

that the majority of studies have been conducted with individuals with developmental disabilities, whereas the findings have been generalized to normative populations (Bloom, 2011). Research on pharmacological treatments of non-suicidal self-injury has focused on medications that target the serotonergic, dopaminergic, and opioid systems and have demonstrated some benefits (Nock, 2010; Turner, Austin, & Chapman, 2014). Studies have suggested the effectiveness of selective serotonin reuptake inhibitors (SSRIs) (Markowitz, 1992) and opioid antagonists (Roth et al., 1996; Sandman et al., 2003; Symons, Thompson, & Rodriguez, 2004) for reducing non-suicidal self-injury. The mechanism by which these pharmacological agents are thought to decrease non-suicidal self-injury, is by decreasing the high aversive arousal hypothesized to lead to self-injury, and by eliminating potential pleasurable effects of the behaviour from the release of endorphins (Nock, 2010). A study examining the effectiveness of naltrexone (an endogenous opioid) in individuals (n=69) with developmental delay found that 80% had a decrease in frequency or severity of self-injury after taking naltrexone (Symons et al., 2004). Also, fluoxetine (an SSRI) was effective at reducing the amount of self-injury in a small sample (n=21) of individuals with developmental delay (Markowitz, 1992).

A recent Cochrane Review by Hawton and colleagues (2015b) examined pharmacological interventions for self-harm in adults. They found seven non-overlapping trials of pharmacological interventions for self-harm (Battaglia et al., 1999; Hallahan et al., 2007; Hirsch, Walsh, & Draper, 1982; Lauterbach et al., 2008; Montgomery et al., 1979; Montgomery, Roy, & Montgomery, 1983; Verkes et al., 1998). There were three trials that evaluated newer generation antidepressants and they found no overall benefit or negative effect in terms of repetition of self-harm compared with placebo (Hawton et al.,

2015b). One trial evaluated the use of the depot antipsychotic medication flupenthixol and they found significant benefits compared to placebo for reducing repetition of self-harm; however, this trial has never been replicated (Hawton et al., 2015b). In another trial, two different doses of the anti psychotic fluphenazine were compared and they did not differ in their impact on repetition of self-harm (Hawton et al., 2015b). A single trial compared lithium versus placebo and they found no benefit of lithium for repetition of self-harm, depression, hopelessness, or suicidal ideation (Hawton et al., 2015b). One trial evaluated omega-3 essential fatty acids compared to placebo and they found no impact on repetition of self-harm (Hawton et al., 2015). Overall, Hawton and colleagues (2015b) concluded that there have been few trials of pharmacological interventions for self-harm and the trials were likely too small to detect significant differences in repetition of self-harm. Hawton and colleagues (2015b) recommend future research evaluate antidepressants use to treat self-harm because of the high prevalence of depression among individuals who self-harm, the strong association between depression, self-harm, and suicide, and the frequent use of antidepressant in treatment following self-harm.

In summary, there currently are no evidence-based psychotherapeutic interventions or prevention programs or evidence-based pharmacological treatments for self-injury. The standard treatment for non-suicidal self-injury has been hospitalization; however, there is little evidence of its effectiveness. Empirical support has been found for Problem-Solving Therapy and Dialectical Behavior Therapy as two types of cognitive-behavioural therapies that focus on treating non-suicidal self-injury. Both of these treatments emphasize immediately targeting non-suicidal self-injury and improving skill deficits. In terms of pharmacological treatment for self-injury, studies have suggested the

effectiveness of selective serotonin reuptake inhibitors (SSRIs) and opioid antagonists for reducing non-suicidal self-injury.

IX. Aim of Current Study and Limitations of Previous Research

The current study examined the correlates and outcomes of people who presented to psychiatric services in the emergency department with non-suicidal self-injuries and compared them to people who engage in other forms of self-harm behaviour (i.e., suicide attempts) and those without self-harm thoughts or behavior. The outcomes examined included whether people who initially presented with non-suicidal self-injuries re-presented to emergency services within a four and a half year period, their rate of re-presentation, and the reason they re-presented to emergency services (e.g., for another non-suicidal self-injury, for a suicide attempt). This study also examined which demographic, clinical, and psychiatric correlates predicted future (within a four and a half year period) re-presentation to emergency services with non-suicidal self-injury compared to suicide attempt or no self-harm or suicidal ideation. The study of non-suicidal self-injury is a vital area of research in mental health with important clinical implications. Care providers routinely encounter individuals who present to emergency services with non-suicidal self-injury, yet there is no consensus on how to manage these patients. Care providers need to make decisions about the best treatment options for these patients, whether they should be hospitalized, receive new referrals for additional treatment (e.g., day hospital psychotherapy programs), or be discharged to usual care. Their future outcome in the following months or in the next few years is virtually unknown. Specifically, clinicians need information about the longer-term outcomes of people who present with self-harm yet who claim to have no suicidal intent.

One of the major limitations in the literature has been the lack of research that examines non-suicidal self-injury among adults who present to emergency services. Most of the research on non-suicidal self-injury in adults has been conducted on university, community, and population-based samples. Studies conducted on adults with hospital presenting self-harm, for the most part, have not distinguish individuals who present with non-suicidal self-injury from those who present with suicide attempts. In the research literature, individuals who engage in non-suicidal self-injury have been classified under the umbrella term of self-harm. The term self-harm describes intentional self-injury irrespective of intent and, thus, encompasses both suicide attempts and non-suicidal self-injury (Hawton et al., 1997). This classification is problematic in that different forms of self-harm have different prevalence rates, risk factors, and degrees of persistence. Therefore, combing groups makes it difficult to isolate the unique attributes of non-suicidal self-injury (Borges et al., 2008; Butler & Malone, 2013; Nock & Kessler, 2006). "It is important that future research distinguishes the two forms of self-injury. This will provide more information on the prevalences of these behaviours, thus revealing the public health implications and treatment needs" (Wilkinson & Goodyer, 2011, p. 106). With the release of DSM-5, the distinction between non-suicidal self-injury and suicide attempts is highlighted in the section of conditions for further study (American Psychiatric Association (APA), 2013, p. 801). Diagnostic criteria are laid out for both non-suicidal self-injury and suicidal behavior disorder as separate and distinct disorders; however, if DSM-5 is proposing these diagnostic groups, further research is needed to clarify whether they are distinct groups. Furthermore, according to the iceberg theoretical model of self-harm, there is a dimensional relationship of increasing severity between

community occurring self-harm and hospital-presenting self-harm (Arensman, Corcoran, & McMahon, 2017; Geulayov et al., 2017); therefore, it is important to have studies of hospital-presenting non-suicidal self-injury among adults in addition to community samples, as hospital-presenting non-suicidal self-injury likely represents a more clinically severe population. This is of paramount importance, as women aged 15-24 years and men aged 25-34 years are at greatest risk for hospital presentations for self-harm (Schmidtke et al., 1996). In addition, older adults (65 years and older) when they do self-harm are more likely to die by suicide (Hepple & Quinton, 1997).

Furthermore, an important limitation in the literature is that few studies have examined the correlates, risk factors, and future outcomes of individuals who engage in non-suicidal self-injury compared with suicide attempts in adulthood. In addition, there is a paucity of longitudinal research on non-suicidal self-injury among adults; therefore, the trends and course of this form of self-harm remain unknown (Nock, 2010). The literature in this area has been limited by small samples, community samples, and mostly cross-sectional designs. While previous research has shown that non-suicidal self-injury is associated with affective disorders, anxiety disorders, personality disorders, substance use disorders, suicidal ideation, and suicide attempts, it is important to examine whether these correlates and risk factors are more strongly associated with non-suicidal self-injury compared to suicide attempts. Determining the stability of non-suicidal self-injury longitudinally is also vital as many dispute the value of distinguishing non-suicidal self-injury from suicide attempts. Therefore, it is also important to examine whether people who present to hospital with non-suicidal self-injury are likely to re-present with this behaviour, or engage in other types of self-harm. Previous research has found that

suicidal ideation and suicide attempts are common among people who engage in non-suicidal self-injury (Cox et al., 2012a; Cuellar & Curry, 2007; Klonsky, 2011; Mangnall and Yurkovich, 2008; Sansone, Songer, & Sellbom, 2006; Ward-Ciesielski, Schumacher, & Bagge, 2016) and that non-suicidal self-injury is associated with future suicidal ideation and suicide attempts (Cox et al., 2012b; Guan, Fox, & Prinstein, 2012; Hamza & Willoughby, 2016; Tuisku et al., 2014; Whitlock et al., 2013).

The current study addressed these limitations in the literature by being the first to compare non-suicidal self-injury, suicide attempts, and no self-harm or suicidal ideation longitudinally in an adult emergency services sample. The correlates, risk factors, course, discharge disposition (the final place or setting to which the patient is discharged on the day of discharge, e.g., discharged to usual care), and rate of re-presentation to emergency services (within the next four and a half years) of adults who engage in non-suicidal self-injury was examined and compared to (a) adults who engage in suicide attempts and (b) adults with no self-harm or suicidal ideation.

X. Research Objectives

Research Objective 1:

The first research objective was to cross-sectionally examine the risk factors and correlates for different types of self-harm in an emergency department setting. Specifically to compare individuals who engage in a) non-suicidal self-injury to those with no self-harm or suicidal ideation, b) suicide attempts to no self-harm or suicidal ideation, and c) non-suicidal self-injury to those with suicide attempts.

Research Objective 2:

The second objective was to longitudinally examine which correlates and risk factors predict future emergency department re-presentations for different types of self-harm behaviour. Specifically, to examine which baseline correlates and risk factors were associated with future presentation with a) any non-suicidal self-injury to those with no self-harm or suicidal ideation only, b) suicide attempts only to no self-harm or suicidal ideation only, and c) any non-suicidal self-injury to suicide attempts only.

Research Objective 3:

The third research objective was to explore whether discharge disposition predicted future emergency department re-presentations for different types of self-harm behaviour (i.e., non-suicidal self-injury, suicide attempt, and no self-harm or suicidal ideation).

Research Objective 4:

The fourth research objective was to examine the rate of re-presentation to emergency services for the different types of self-harm at baseline (i.e., non-suicidal self-injury, suicide attempt, and no self-harm or suicidal ideation) and the reason for re-presentation to emergency services (i.e., suicide attempt, non-suicidal self-injury).

These objectives were pursued in three separate studies. Study 1 cross-sectionally examined non-suicidal self-injury by comparing risk factors and correlates for individuals who presented to emergency services with different types of self-harm: a) non-suicidal self-injury, b) suicide attempts, and c) no self-harm or suicidal ideation. This study determined which clinical and psychiatric correlates were associated with non-suicidal self-injury and compared these to the other study groups of interest (suicide attempts and no self-harm or suicidal ideation).

Study 1 replicated and extended prior research that has examined the correlates and risk factors of non-suicidal self-injury. Specifically, this study extended previous research by Chartrand, Bhaskaran, Sareen, Katz, and Bolton (2015) by obtaining additional information through chart review including: additional and more specific sociodemographic variables (e.g., employment status), additional and more specific psychiatric disorders (e.g., alcohol abuse/dependence), personality traits/disorders, previous history of self-harm (e.g., previous non-suicidal self-injury), and an additional year of tertiary care emergency department data. Based on previous research, I hypothesized that childhood sexual/physical abuse, aggression or impulsivity, having an anxiety disorder, having major depressive disorder, having an alcohol use disorder, having a drug use disorder, having passive suicidal ideation, having active suicidal ideation, and experiencing an acute stressor would be associated with presentations to emergency services for non-suicidal self-injury in comparison to no self-harm or suicidal ideation. I also hypothesized that having a psychotic disorder would be associated with presentations with no self-harm or suicidal ideation but not non-suicidal self-injury and suicide attempts, this is because the no self-harm or suicidal ideation group, for the most part, is comprised of individuals seeking support for severe and persistent mental illness through the emergency department. Finally, I hypothesized that borderline personality traits/disorder, bipolar disorder, alcohol use disorder, and drug use disorder would be associated with non-suicidal self-injury compared to suicide attempts, whereas major depressive disorder, passive suicide ideation, active suicidal ideation, previous history of suicide attempt, experiencing an acute stressor, and lacking social support would be associated with suicide attempts.

Study 2 examined non-suicidal self-injury longitudinally in order to understand the long-term course of this behaviour. Study 2 examined whether the different groups of self-harm at baseline (i.e., non-suicidal self-injury, suicide attempt, and no self-harm or suicidal ideation) re-presented at different rates to emergency services and the reason they re-presented to emergency services (e.g., for non-suicidal self-injury, for a suicide attempt). I hypothesized that individuals who initially presented with non-suicidal self-injury and suicide attempts would re-present to emergency services at a faster rate than those who initially presented with no self-harm or suicidal ideation. Similarly, that individuals who initially presented with non-suicidal self-injury and suicide attempts would be more likely to re-present to emergency services than those who initially presented with no self-harm or suicidal ideation. This was predicted because previous research has shown that most patients who present to emergency departments with self-harm are discharged to the community and do not receive a mental health assessment (Olfson et al., 2012). In addition, I hypothesized that when individuals with non-suicidal self-injury re-present to emergency services it would be for other types of self-harm behaviour (e.g., suicide attempt) and not solely for non-suicidal self-injury.

Finally, Study 3 explored longitudinally whether type of self-harm (i.e., non-suicidal self-injury, no self-harm or suicidal ideation, and suicide attempt) at initial presentation predicted self-harm group at re-presentation to emergency services. I hypothesized that individuals would be more likely to re-present with the same type of self-harm (i.e., non-suicidal self-injury, no self-harm or suicidal ideation, and suicide attempt) as their initial presentation when they re-presented to emergency services. In addition, Study 3 examined which correlates and risk factors predicted future emergency

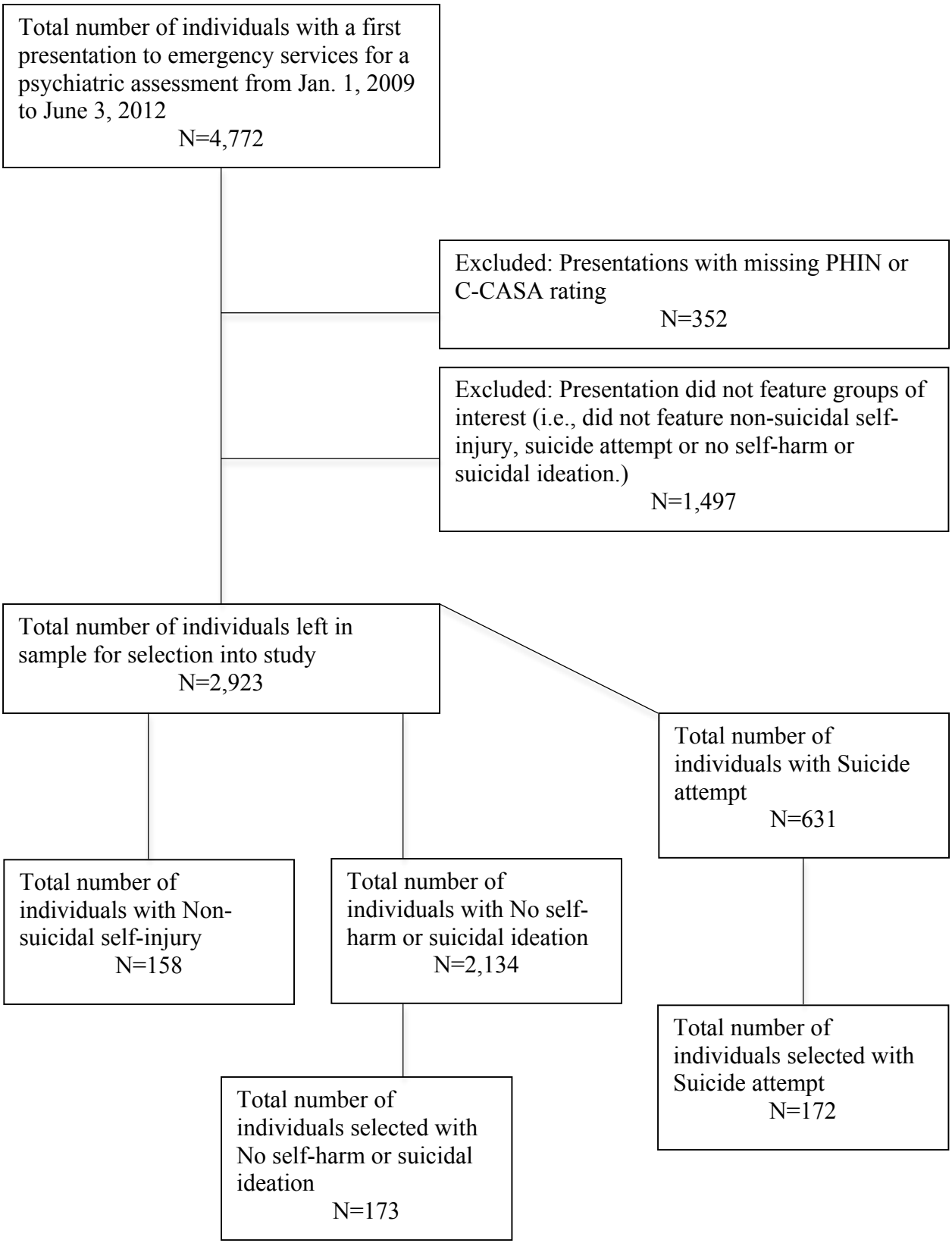
department presentations (within the next four and a half years) for the different self-harm groups (i.e., non-suicidal self-injury, suicide attempt, and no self-harm or suicidal ideation). It was expected that the same correlates that were associated with the different self-harm groups cross-sectionally would also predict the different self-harm groups longitudinally. However, it is also possible that different correlates and risk factors would be associated with multiple presentations to emergency services compared to a single presentation to emergency services. For example, suicidal ideation may be associated with non-suicidal self-injury longitudinally, but not cross-sectionally. Longitudinal analyses require that an individual present to emergency services at least twice and presenting to emergency services more than once is likely reflective of individuals having more severe problems compared to a single presentation. Study 3 also explored whether disposition at an individual's first presentation to emergency services predicted future re-presentation to emergency services with the different groups of self-harm (i.e., any non-suicidal self-injury, no self-harm or suicidal ideation only, and suicide attempt only). It was hypothesized that those who re-presented with non-suicidal self-injury or suicide attempt would be more likely to be discharged to usual care and less likely to receive a referral for mental health services or to be hospitalized at first presentation to emergency services compared to those who re-presented with no self-harm or suicidal ideation. This was predicted because previous research has shown that most patients who present to emergency departments with self-harm are discharged to the community and do not receive a mental health assessment (Olfson et al., 2012).

METHOD

I. Sample

Participants for my study were selected from the Suicide Assessment Form in Emergency Psychiatry (SAFE) database. The SAFE database is comprised of all adults (18 years and older) who are assessed by psychiatric services in the emergency departments of the two largest tertiary care hospitals in Winnipeg, Manitoba, the Health Sciences Centre and St. Boniface Hospital. In other words, this sample is comprised of those patients presenting to the emergency department that the emergency department physicians consider in need of a psychiatric consultation and consideration of admission/disposition. Data collection began on January 1, 2009 and is ongoing. Participants were selected for inclusion in my study between the dates of January 1, 2009 and June 3, 2012. These dates were selected due to the opening of the Crisis Response Centre on June 3, 2013. The Crisis Response Centre (CRC) was established as a resource for adults in Winnipeg to access twenty-four hours per day during a psychiatric emergency instead of presenting to hospital emergency departments. Due to the lower likelihood of participants re-presenting to the Health Sciences Centre and St. Boniface Hospital following the opening of the CRC, participant selection was cut off one year before the CRC opened, which allowed for at least a minimum of one year follow-up. The follow-up time for participants varied based on the date of initial presentation to emergency services over the study period (January 1, 2009 to June 3, 2012). For example, someone who presented on January 1, 2009 would have four and a half years of follow-up, while someone who presented on June 3, 2012 would have one year of follow-up. The total number of individuals with a first presentation to emergency services for a psychiatric assessment from Jan. 1, 2009 to June 3, 2012 was 4,772 individuals (see Figure 1).

Figure 1: Flowchart of sample studied.



II. Procedure

Psychiatric residents and medical students (under supervision of a psychiatrist) completed the SAFE database single-page form (see Appendix A) following patient interviews. Patients' Manitoba Personal Health Information Number (PHIN) was collected at the same time. Having PHINs ensured automatic and indefinite follow-up, as well as the ability to examine diverse outcomes by extracting additional information from the patients' charts. The information from the hard copy SAFE database forms was periodically entered into a computerized database. A research assistant was hired to complete the entry of the SAFE database forms into an SPSS file. The research assistant was blind to any identifying data except the PHIN. The hard copies of the SAFE database forms and the electronic file are housed securely in a locked office in the PsychHealth Centre at the Health Sciences Centre and the electronic file is kept on a password-protected computer.

Drs. Bolton and Kim, and Ms. Chartrand of the University of Manitoba, conducted a chart review study previously on a subsample of the overall SAFE database. This subsample consisted of all people with first-time presentation for non-suicidal self-injury over the time period January 1, 2009 to December 31, 2013 (n=219). The PHIN numbers from the SAFE form were used to identify medical charts at the Health Science Centre and St. Boniface Hospital. Members of the study team, who were blind to the information on the SAFE form, reviewed patient charts in Medical Records and extract targeted information relating to the corresponding emergency department presentation. A number of additional variables were important correlates of non-suicidal self-injury, but were not included on the SAFE database form were collected, such as age, employment

status, psychiatric diagnoses (including personality traits/disorders), previous history of self-harm, hospital admission, and substance use. Of this original chart review sample of first-time presentation non-suicidal self-injury (n=219) during the time period of January 1, 2009 to December 31, 2013, 158 individuals were selected for inclusion in my study. The 158 individuals were included in my study because they had first-time presentation for non-suicidal self-injury during the time period of January 1, 2009 to June 3, 2012 (See Figure 1).

A power analyses was conduced using the G*Power program (Faul, Erdfelder, Buchner, & Lang, 2009; Faul, Erdfelder, Lang, & Buchner, 2007) to determine the sample size required to obtain statistically significant results. Using the G*Power program, it was determined that a total sample size of 503 individuals was required. The sample already consisted of 158 individuals with non-suicidal self-injury; therefore, a total of 345 individuals were required between the no self-harm or suicidal ideation and suicide attempt groups.

Among the 2,134 individuals with first-time presentation for no self-harm or suicidal ideation during the time period of January 1, 2009 to June 3, 2012, a sample of 173 individuals were selected (see Figure 1). These 173 individuals with no self-harm or suicidal ideation were matched with the sample of 158 individuals with non-suicidal self-injury based on available sociodemographic data from the SAFE datbase which icluded: sex (male versus female), martial status (spouse versus no spouse), and age (age less than 19 years or more than 45 years versus 19 to 44 years old). It should be mentioned that the available data from the SAFE database for age was crude (i.e., age less than 19 years or more than 45 years versus 19 to 44 years old) and thus the ability to match the samples

based on age was limited.The remainder of the sample was selected from the 631 individuals with first-time presentation for suicide attempt during the time period of January 1, 2009 to June 3, 2012 ; a sample of 172 individuals were selected (see Figure 1). These 172 individuals with suicide attempt were also matched with the sample of 158 individuals with non-suicidal self-injury based on the same available sociodemographic variables as the no self-harm or suicidal ideation sample. Two additional chart reviews were conducted on the two subsamples of no self-harm or suicidal ideation (n=173) and suicide attempt (n=172) from the SAFE database. The same variables were collected from each chart (e.g., psychiatric diagnosis, hospital admission).

III. Measures

The SAFE database form includes the SAD PERSONS scale that measures potential correlates and risk factors for non-suicidal self-injury, suicide attempts, and death by suicide. It also includes the Columbia Classification Algorithm of Suicide Assessment (C-CASA), a standardized rating scale used to describe suicidal behaviour and its intent. The C-CASA allows clinicians to classify the presenting behaviour into the different self-harm groups: no self-harm or suicidal ideation, non-suicidal self-injury, or suicide attempt.

a) The SAD PERSONS

The SAD PERSONS scale is a scale originally developed in 1983 (Patterson, Dohn, Bird, & Patterson, 1983). It is a mnemonic consisting of ten risk factors for suicide based on a review of the literature (see Appendix B). However, its creators did not test this scale as to whether it could predict risk for suicide. Since its creation, the SAD PERSONS scale has been widely used as a clinical and education tool for assessing

suicide risk. It has been used worldwide including both Canada and the United States, among other countries (Chen et al., 2009; Cochrane-Brink, Lofchy, & Sakinofsky, 2000; Crawford, Turnbull, & Wessely, 1998; Herman, 2006; Hockberger & Rothstein, 1988). The scale has been used as a tool to teach medical, nursing, and counseling students suicide risk assessment (Crawford, Turnbull, & Wessely, 1998; Juhnke, & Hovestadt, 1995). The scale contains 10 items that are represented by the acronym SAD PERSONS: S- sex (male), A- age (<19 or >45), D- depression or hopelessness, P- previous attempts or psychiatric care, E- ethanol or substance abuse, R- rational thinking loss (psychosis), S- social support lacking, O- organized plan or serious attempt, N- no spouse, and S- sickness (chronic pain or physical illness). The SAD PERSONS scale has been found not to predict future suicide attempts better than chance (Bolton, Spiwak, & Sareen, 2012). Due to the non-specific nature of some of the variables in the SAD PERSONS scale (e.g., for the 'depression or hopelessness' variable it is unclear if the individual meets criteria for major depressive disorder), more precise information was extracted during the chart review (e.g., whether individual met criteria for major depressive disorder). The two variables from the SAD PERSONS scale that were included in the analyses were social support lacking (low social support) and chronic pain or physical illness.

b) Other Variables in the SAFE Database

The presence or absence of the following variables are recorded on the SAFE Database form (See Appendix C) (a) abuse: childhood sexual or physical abuse, (b) anxiety disorder, (c) acute stressor, (d) aggression or impulsivity, (e) access to firearms, (f) ambivalence about living (passive suicidal ideation), (g) active suicidal ideation. All of these variables were included in the study except for access to firearms.

c) Columbia Classification Algorithm of Suicide Assessment (C-CASA)

The C-CASA is a standardized classification system that was developed by Posner and colleagues (2007) to differentiate suicidal events from non-suicidal events, and from indeterminate or potentially suicidal events (see Appendix D). The C-CASA has been endorsed by the FDA for suicide-related event assessment, and it has been used in a number of studies (Busche & Savill, 2013; Emslie et al., 2006; Meyer et al., 2010; Redden et al., 2011; US Department of Health and Human Services, Food and Drug Administration (FDA), Center for Drug Evaluation and Research (CDER), 2012).

The C-CASA has eight mutually exclusive categories: (a) completed suicide, (b) suicide attempt, (c) preparatory acts toward imminent suicidal behavior, (d) suicidal ideation, (e) self-injurious behavior, no suicidal intent (non-suicidal self-injury), (f) other, no deliberate self-harm (no self-harm or suicidal ideation), (g) self-injurious behavior, suicidal intent unknown, and (h) not enough information (see Appendix D). For my study, the important C-CASA definitions are: other, no deliberate self-harm (no self-harm or suicidal ideation); suicide attempt; and self-injurious behavior, no suicidal intent (non-suicidal self-injury). The C-CASA defines no self-harm or suicidal ideation as, "no evidence of any suicidality or deliberate self-injurious behavior associated with the event. The event is characterized as an accidental injury, psychiatric or behavioral symptoms only, or medical symptoms or procedure only," (Posner et al., 2007). A suicide attempt, as defined by the C-CASA, is "a potentially self-injurious behavior, associated with at least some intent to die, as a result of the act. Evidence that the individual intended to kill him/herself, at least to some degree, can be explicit or inferred from the behavior or circumstance. A suicide attempt may or may not result in actual injury," (Posner et al.,

2007). Non-suicidal self-injury is "self-injurious behavior associated with no intent to die. The behavior is intended purely for other reasons, either to relieve distress (often referred to as "self-mutilation," e.g., superficial cuts or scratches, hitting/banding, or burns) or to effect change in others or the environment," (Posner et al., 2007). The other categories of the C-CASA that were included in the SAFE database: preparatory acts toward imminent suicidal behavior; suicidal ideation; self-injurious behavior, suicidal intent unknown; and not enough information were excluded from my study (see Figure 1). The reason suicidal ideation only presentations were excluded from my study was because suicidal ideation was examined as a predictor variable rather than an outcome variable (i.e., whether suicidal ideation was associated with non-suicidal self-injury, suicide attempt, or no self-harm or suicidal ideation). Preparatory acts toward imminent suicidal behavior presentations were excluded from my study as well because I wanted to focus on completed acts of self-harm where the intent of the self-harm behaviour was clear.

The C-CASA has excellent overall reliability (median ICC=0.89), demonstrated by independent ratings from nine experts using the C-CASA (Posner et al., 2007). Cohen's kappa was used to evaluate the agreement between pharmaceutical companies and C-CASA classifications. Modest agreement was found between pharmaceutical company and C-CASA raters' classification of suicide attempts (kappa=0.53) (Posner et al., 2007). Agreement between C-CASA and pharmaceutical company ratings improved when using the broader C-CASA category of definitely suicidal events (attempts, preparatory acts, and suicidal ideation) with the pharmaceutical company ratings of possibly suicidal cases (kappa=0.69). Furthermore, when comparing the broad nonspecific pooling of all categories that could possibly represent suicidality, there was

good agreement between C-CASA (suicide attempts, preparatory behaviours, suicidal ideation, self-injurious behavior with unknown intent, and not enough information) and pharmaceutical company identification of possibly suicidal events (kappa=0.77).

d) Variables Collected During Chart Reviews

Additional information regarding psychiatric diagnoses, substance abuse, sociodemographics, previous self-harm, and hospital admission were collected from the charts of individuals in my sample (n=503) who presented to the emergency department with non-suicidal self-injury (n=158), suicide attempts (n=172), and no self-harm or suicidal ideation (n=173) (see Figure 1). Appendix E contains a complete list of all the variables that were collected from patients' charts. Only current mental disorder diagnoses were collected based on the psychiatric consultation form (and discharge summary if one was present). Each variable was coded as present or absent (yes or no). For example, diagnosis of borderline personality disorder coded as either yes or no. Current sociodemographics were collected from the initial presentation to emergency services from the psychiatric consultation form (i.e., age at the time of presentation). Certain sociodemographic information was not collected from the psychiatric consultation form (e.g., race/ethnicity) because this sociodemographic information is not routinely recorded as part of a psychiatric consultation. In order to avoid bias and a large amount of missing data this sociodemographic information was not included. Ms. Chartrand and Dr. Courtis conducted the chart reviews. Cohen's kappa was used to evaluate the agreement between Ms. Chartrand and Dr. Courtis' ratings on data collected from the chart reviews for a subsample of the 503 charts (n= 55 charts). There was

substantial agreement between the two chart reviewers on collected data, $k = .759$, $p < .000$.

IV. Statistical Analyses

Data analysis was completed using IBM SPSS Statistics for Macintosh, Version 24.0. Frequencies, cross-tabulations, and means were used to derive estimates of the prevalence of each type of self-harm in adults. In Study 1, multinomial logistic regression using cross-sectional data was used to examine the relationships between the different groups of self-harm: (a) non-suicidal self-injury, (b) suicide attempt, and (c) no self-harm or suicidal ideation (reference category) and their association with sociodemographic variables (e.g., age), psychiatric disorders (e.g. major depression, borderline personality traits/disorder), and clinical correlates (e.g. any previous self-harm). The analysis that examined the association between sociodemographic variables and the different groups of self-harm was intended to verify the similarity between the groups who were matched based on available sociodemographic data from the SAFE database (sex, marital status, and age). The categories of self-harm (non-suicidal self-injury, suicide attempt, and no self-harm or suicidal ideation) were the dependent variables (outcome variables) and the sociodemographic variables, psychiatric disorders, and clinical correlates were the independent variables (predictor variables). Multinomial logistic regression was required in this study because the dependent and independent variables are categorical and there were three (multiple) dependent variables (Tabachnick & Fidell, 2013). Bivariate logistic regression using cross-sectional data was also used to examine the relationships between non-suicidal self-injury (reference category) and suicide attempts and their association with sociodemographic variables (e.g., age), psychiatric disorders (e.g. major depression,

borderline personality traits/disorder), and clinical correlates (e.g. any previous self-harm). The multinomial and bivariate logistic regression models that examined the relationship between the different self-harm groups and psychiatric disorders and clinical correlates were run both unadjusted and adjusting for statistically significant sociodemographic variables.

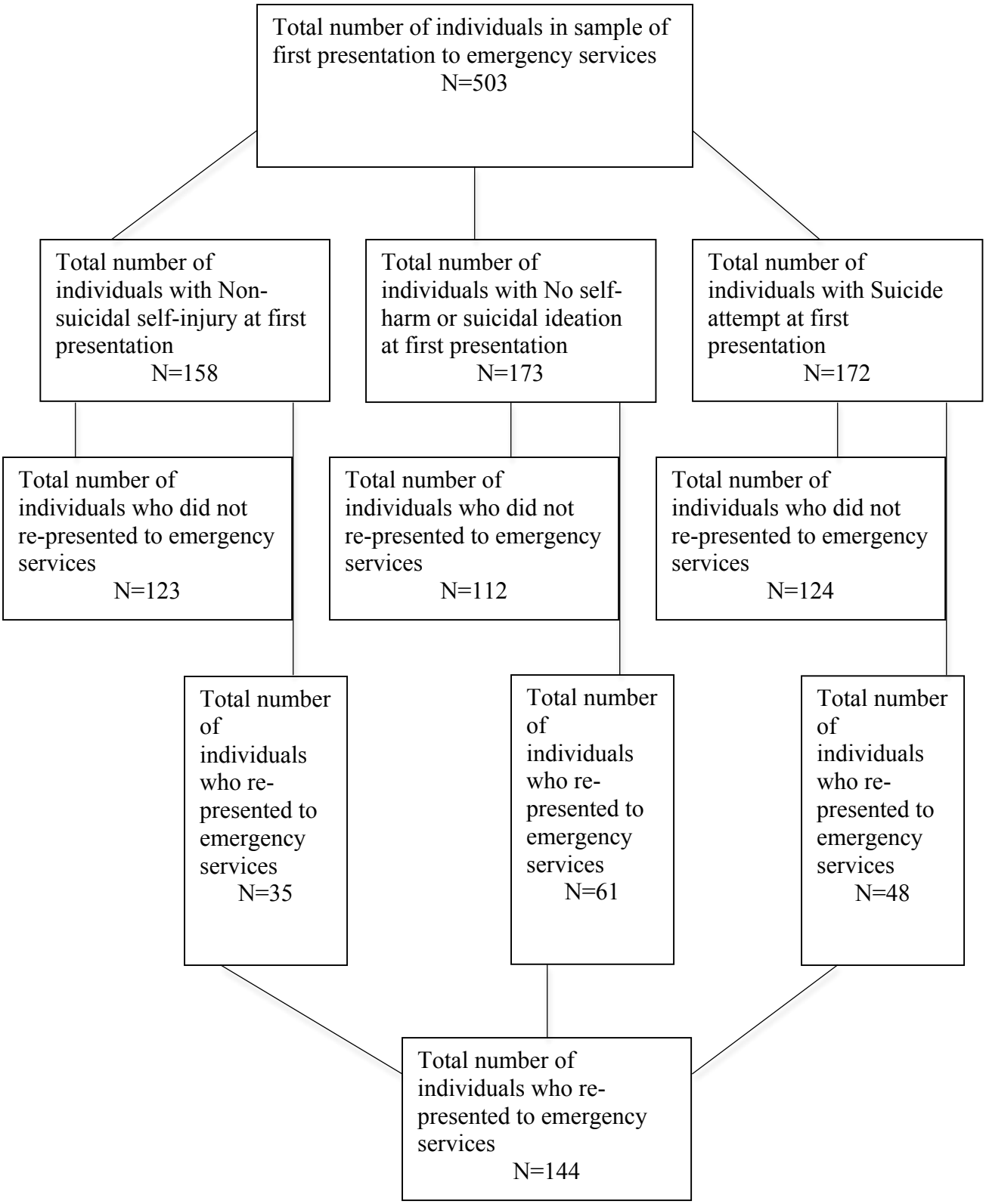
A missing values analysis was conducted to determine the pattern of missing values in my dataset. The variable with the largest percentage of missing data was education level at 63.4% missing. This variable was eliminated from future analyses due to its high percentage of missing data and it not being critical to future analyses. The next two variables with the largest percentage of missing data were childhood sexual or physical abuse at 52.1% and previous self-harm at 40.2%. These variables were considered critical to future analyses; therefore, they were retained in their original form and their findings are interpreted with caution. All other variables had less than 12% missing data and the multiple imputation method was selected to estimate missing values. Multiple imputation was selected as the method to deal with missing data in my study due to multiple imputation being "…currently considered the most respectable method of dealing with missing data," (Tabachnick & Fidell, 2013). The advantage of using multiple imputation is that it does not require data to be missing completely at random (and potentially not even missing at random) (Tabachnick & Fidell, 2013). All analyses were performed on the imputed dataset (except for those involving the childhood sexual or physical abuse and previous self-harm variables).

In Study 2, longitudinal data was used to examine the relationship between the different self-harm groups and their rate of re-presentation to emergency services (see

Figure 2). Survival analysis using the Kaplan-Meier method examined the different types of self-harm at initial presentation to emergency services (January 1, 2009 to June 3, 2012) and their rate of re-presentation to emergency services. Survival analysis was an appropriate statistical technique because it involved the modeling of time to event data; in this research, re-presentation to emergency services was considered the "event" in the survival analysis (Hosmer, Lemeshow, & May, 2008). Survival analysis was used to create graphs depicting the amount of time it took for people to re-present to emergency services (in days) and compare the rate of re-presentation among the different self-harm groups (i.e., do people who attempt suicide re-present faster than those with non-suicidal self-injury?). The follow-up time for participants varied based on the date of initial presentation to emergency services over the study period (January 1, 2009 to June 3, 2012). The amount of time it took for people to re-present to emergency services was calculated by subtracting the date of re-presentation to emergency services from the date of initial presentation to emergency services among those who re-presented to emergency services. The mean and median were calculated for the number of days until re-presentation to emergency services for the different self-harm groups. A log rank test was run to determine if there were differences in the survival distribution for the different presentations to emergency services: no self-harm or suicidal ideation, non-suicidal self-harm and suicide attempt. Multinomial logistic regression using longitudinal data was used to examine which of the different groups of self-harm: (a) non-suicidal self-injury, (b) suicide attempt, and (c) no self-harm or suicidal ideation (reference category) were more likely to re-present to emergency services. Bivariate logistic regression was also used to examine whether the non-suicidal self-injury group (reference category) or

suicide attempt group was more likely to re-present to emergency services. Descriptive statistics were used to describe the frequency of the different reasons for re-presentation (e.g., non-suicidal self-injury, suicidal ideation).

Figure 2: Flowchart of sample studied.

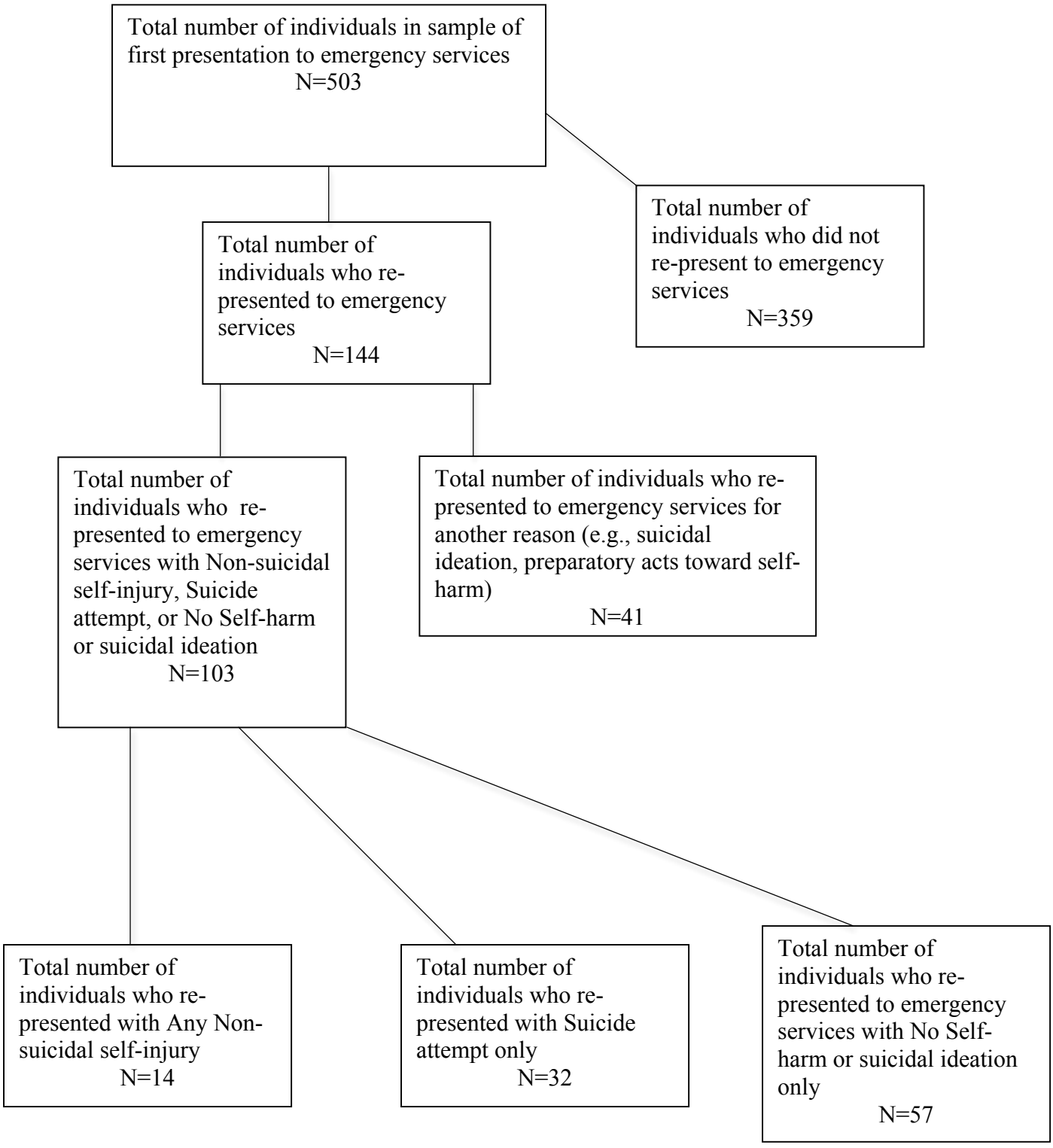


In Study 3, multinomial logistic regression using longitudinal data was used to determine whether type of self-harm at first presentation (i.e., non-suicidal self-injury, suicide attempt, or no self-harm or suicidal ideation) predicted future type of self-harm during re-presentation to emergency services (see Figure 3). Multinomial logistic regression using longitudinal data was also used to determine whether sociodemographic variables (e.g., age), psychiatric disorders (e.g. major depression, borderline personality traits/disorder), and clinical correlates (e.g. any previous self-harm) present during an individual's first presentation to emergency services predicted future re-presentation to emergency services with the different groups of self-harm: (a) any non-suicidal self-injury, (b) suicide attempt only, and (c) no self-harm or suicidal ideation only (reference category). The categories of self-harm (any non-suicidal self-injury, suicide attempt only, and no self-harm or suicidal ideation only) were the dependent variables (outcome variables) and the sociodemographic variables, psychiatric disorders, and clinical correlates were the independent variables (predictor variables). Multinomial logistic regression was required in this study because the dependent and independent variables are categorical and there were three (multiple) dependent variables (Tabachnick & Fidell, 2013). Bivariate logistic regression using longitudinal data was used to determine whether sociodemographic variables (e.g., age), psychiatric disorders (e.g. major depression, borderline personality traits/disorder), and clinical correlates (e.g. any previous self-harm) during an individual's first presentation to emergency services predicted whether they were more likely to re-present with any non-suicidal self-injury (reference category) compared to a suicide attempt only. The multinomial and bivariate logistic regression models that examined the relationship between the different self-harm

groups and psychiatric disorders and clinical correlates were run both unadjusted and adjusting for statistically significant sociodemographic variables. When the cell sizes were smaller than five, a Fisher's exact test was run instead of multinomial or bivariate logistic regression models. The Fisher's exact test is a method for computing the exact probability of the chi-square statistic that is accurate when sample sizes are small (Field, 2013; Fisher, 1922). Multinomial logistic regression using longitudinal data was also used to examine whether discharge disposition (e.g., hospital admission versus discharged to usual care) during an individual's first presentation to emergency services predicted future emergency department presentations for the different types of self-harm behaviour. Bivariate logistic regression using longitudinal data was used to determine whether discharge disposition during an individual's first presentation to emergency services predicted whether they were more likely to re-present with any non-suicidal self-injury (reference category) compared to a suicide attempt only.

All three studies did not correct for multiple comparisons; however, this approach was justified due to this research's exploratory nature. In fact, according to Bender and Lange (2001) they "…prefer that data of exploratory studies be analyzed without multiplicity adjustment," (p.344). Since my research is exploratory I did not want to miss any possible significant associations by being too conservative with my significance level. Further replication of these results is required to draw more firm conclusions. To address the concern of multiple comparisons, three levels of significance are provided ($p < .05$, $p < .01$, and $p < .001$) as noted in the footnotes of each table, so that the more conservative reader can interpret the findings with this in mind.

Figure 3. Flowchart of sample studied.



RESULTS

Of the 4,772 individuals with a first presentation to emergency services for a psychiatric assessment within a three and a half year period between January 1, 2009 and June 3, 2009, 158 (3.3%) were for non-suicidal self-injury, 2,134 (44.7%) were for no self-harm or suicidal ideation, and 631 (13.2%) were for suicide attempt (See Figure 1). Figure 1 depicts the study sample of 503 individuals, which is comprised of 158 individuals with non-suicidal self-injury, 173 individuals with no self-harm or suicidal ideation, and 172 individuals with suicide attempt.

I. Study 1

Table 1 illustrates multinomial logistic regression models using cross-sectional data to examine the relationships between the different groups of self-harm (i.e., non-suicidal self-injury, no self-harm or suicidal ideation, and suicide attempt) and their association with sociodemographic variables. The analysis presented in Table 1 was intended to verify the similarity between the groups who were matched based on available sociodemographic variables (sex, marital status, and age). Those who presented with non-suicidal self-injury (n=158), no self-harm or suicidal ideation (n=173), and suicide attempt (n=172) were similar in terms of sex, marital status, and employment status, indicating that the groups were successfully matched based on sex and marital status. The only sociodemographic variable where the groups differed was age, where people who presented with non-suicidal self-injury tended to be younger than individuals who presented with no self-harm or suicidal ideation. People who presented with non-suicidal self-injury were more likely to be in the age groups of 18 to 23 years old [Odds ratio (OR) = 7.09, 95% confidence interval (CI) 3.00-16.82, $p<.001$], 24 to 29 years old

(OR = 5.37, 95% CI 2.15-13.44, p<.001), 30 to 37 years old (OR = 5.83, 95% CI 2.33-14.61, p<.001), and 38 to 44 years old (OR = 4.61, 95% CI 1.82-11.66, p<.001) compared to the 55 years and older age group. It should be noted that the available data from the SAFE database for age was crude (i.e., age less than 19 years or more than 45 years versus 19 to 44 years old) and thus the ability to match the samples based on age was limited, which is why statistically significant differences between the groups were observed based on age. Future analyses were adjusted for age to correct for the unsuccessful matching of groups based on age.

Table 1: Multinomial Logistic Regression Examining the Association Between Type of Self-Harm and Sociodemographic Correlates.

Type of Self-Harm in SAFE Database sample N = 503						
	No Self-Harm or Suicidal Ideation N=173 ***n* (%)**	Non-Suicidal Self-Injury N=158 ***n* (%)**	Suicide Attempt N=172 ***n* (%)**	OR – No Self-Harm or Suicidal Ideation (Reference)	OR – Non-Suicidal Self-Injury	OR – Suicide Attempt
Sex						
Female	84(48.8)	81(51.6)	92(53.5)	1.00	1.00	1.00
Male	88(51.2)	76(48.4)	80(46.5)	1.00	0.90(0.58-1.39)	0.83(0.54-1.27)
Age						
18-23 years old	28(16.2)	47(29.7)	33(19.2)	1.00	7.09(3.00-16.82)***	1.54(0.77-3.10)
24-29 years old	22(12.7)	28(17.7)	30(17.4)	1.00	5.37(2.15-13.44)***	1.79(0.86-3.72)
30-37 years old	21(12.1)	29(18.4)	28(16.3)	1.00	5.83(2.33-14.61)***	1.75(0.83-3.68)
38-44 years old	22(12.7)	24(15.2)	31(18.0)	1.00	4.61(1.82-11.66)***	1.85(0.89-3.83)
45-54 years old	42(24.3)	21(13.3)	21(12.2)	1.00	2.11(0.86-5.17)	0.66(0.32-1.34)
55 years and older	38(22.0)	9(5.7)	29(16.9)	1.00	1.00	1.00
Marital Status						
Married/Common Law	56(33.3)	31(29.0)	46(27.4)	1.00	0.87(0.42-1.79)	0.64(0.34-1.21)
Single	84(50.0)	58(54.2)	85(50.6)	1.00	0.91(0.50-1.67)	0.78(0.44-1.40)
Separated/Widowed/Divorced	28(16.7)	18(16.8)	37(22.0)	1.00	1.00	1.00
Employment Status						
Employed	47(29.4)	46(35.7)	57(37.5)	1.00	1.32(0.80-2.18)	1.42(0.90-2.22)
Unemployed	113(70.6)	83(64.3)	95(62.5)	1.00	1.00	1.00

*p<.05, **p<.01, ***p<.001

Table 2 compares the sociodemographic correlates of people who presented with non-suicidal self-injury to those with suicide attempt using bivariate logistic regression models. The analysis presented in Table 2 was intended to verify the similarity between the groups who were matched based on available sociodemographic variables (sex, marital status, and age). There were no statistically significant differences between the groups on sociodemographic variables, indicating that the groups were successfully matched based on sex, age, and marital status.

Table 2: Bivariate Logistic Regression Examining the Association Between Type of Self-Harm and Sociodemographic Correlates.

Type of Self-Harm in SAFE Database sample N = 503				
	Non-Suicidal Self-Injury N=158 ***n* (%)**	Suicide Attempt N=172 ***n* (%)**	OR – Non-Suicidal Self-Injury	OR – Suicide Attempt
Sex				
Female	81(51.6)	92(53.5)	1.00	1.00
Male	76(48.4)	80(46.5)	1.00	0.95(0.67-1.37)
Age				
18-23 years old	47(29.7)	33(19.2)	1.00	0.40(0.15-1.12)
24-29 years old	28(17.7)	30(17.4)	1.00	0.51(0.20-1.31)
30-37 years old	29(18.4)	28(16.3)	1.00	0.45(0.16-1.24)
38-44 years old	24(15.2)	31(18.0)	1.00	0.60(0.16-2.26)
45-54 years old	21(13.3)	21(12.2)	1.00	0.54(0.15-1.89)
55 years and older	9(5.7)	29(16.9)	1.00	1.00
Marital Status				
Married/Common Law	31(29.0)	46(27.4)	1.00	0.73(0.38-1.40)
Single	58(54.2)	85(50.6)	1.00	0.82(0.50-1.33)
Separated/Widowed/Divorced	18(16.8)	37(22.0)	1.00	1.00
Employment Status				
Employed	46(35.7)	57(37.5)	1.00	1.00(0.63-1.60)
Unemployed	83(64.3)	95(62.5)	1.00	1.00

Table 3 displays multinomial logistic regression models using cross-sectional data to examine the relationships between the different groups of self-harm (i.e., non-suicidal self-injury, no self-harm or suicidal ideation, and suicide attempt) and their association with psychiatric and clinical correlates. Those who presented with non-suicidal self-injury, compared with no self-harm or suicidal ideation, were more likely to have the following psychiatric disorders: an adjustment disorder (OR = 6.31, 95% CI 2.84-14.03, p<.001), alcohol use disorder (OR = 3.12, 95% CI 1.71-5.69, p<.001), cluster B personality traits/disorder (OR = 5.19, 95% CI 3.02-8.90, p<.001), borderline personality traits/disorder (OR = 22.57, 95% CI 5.32-95.82, p<.001), and any personality traits/disorder (OR = 4.76, 95% CI 2.84-7.98, p<.001). People who presented with non-suicidal self-injury, compared with no self-harm or suicidal ideation, were more likely to have these psychiatric disorders even after adjusting for the effects of age [adjustment disorder (AOR = 5.05, 95% CI 2.22-11.49, p<.001), alcohol use disorder (AOR = 3.30, 95% CI 1.77-6.14, p<.001), cluster B personality traits/disorder (AOR = 4.60, 95% CI 2.65-7.98, p<.001), borderline personality traits/disorder (AOR = 20.73, 95% CI 4.84-88.88, p<.001), and any personality traits/disorder (AOR = 4.13, 95% CI 2.43-6.99, p<.001)]. People who presented with non-suicidal self-injury, compared with no self-harm or suicidal ideation, were less likely to have an anxiety disorder (AOR = 0.43, 95% CI 0.19-0.99, p<.05), bipolar affective disorder (AOR = 0.24, 95% CI 0.08-0.74, p<.05), and a psychotic disorder (AOR = 0.19, 95% CI 0.10-0.35, p<.001), after adjusting for the effects of age.

Table 3: Multinomial Logistic Regression Examining the Association Between Type of Self-Harm and Clinical Correlates.

Type of Self-Harm in SAFE Database sample N = 503								
Clinical Correlates	No Self-Harm or Suicidal Ideation N=173 ***n* (%)**	Non-Suicidal Self-Injury N=158 ***n* (%)**	Suicide Attempt N=172 ***n* (%)**	OR/AOR – No Self-Harm or Suicidal Ideation (Reference)	OR – Non-Suicidal Self-Injury	OR – Suicide Attempt	AOR – Non-Suicidal Self-Injury	AOR – Suicide Attempt
Psychiatric Disorders								
Major Depressive Disorder	18 (10.4)	15 (9.5)	54 (31.4)	1.00	0.90 (0.44-1.86)	**3.94 (2.20-7.07)*** **	1.12 (0.53-2.36)	**4.64 (2.53-8.54)*** **
Anxiety Disorder	18 (10.4)	10 (6.3)	12 (7.0)	1.00	0.58 (0.26-1.30)	0.65 (0.30-1.39)	**0.43 (0.19-0.99)***	0.52 (0.24-1.13)
Adjustment Disorder	8 (4.6)	37 (23.4)	23 (13.4)	1.00	**6.31 (2.84-14.03)*** **	**3.18 (1.38-7.33)** **	**5.05 (2.22-11.49)*** **	**2.98 (1.27-6.99)***
Alcohol Abuse/Dependence	18 (10.4)	42 (26.6)	64 (37.2)	1.00	**3.12 (1.71-5.69)*** **	**5.10 (2.86-9.09)*** **	**3.30 (1.77-6.14)*** **	**5.41 (3.00-9.76)*** **
Drug Abuse/Dependence	23 (13.3)	31 (19.6)	34 (19.8)	1.00	1.59 (0.88-2.87)	1.61 (0.90-2.86)	1.31 (0.71-2.42)	1.56 (0.86-2.83)
Bipolar Affective Disorder	20 (11.6)	4 (2.5)	8 (4.7)	1.00	**0.20 (0.07-0.60)** **	**0.37 (0.16-0.87)***	**0.24 (0.08-0.74)***	**0.41 (0.17-0.98)***
Psychotic Disorder	61 (35.3)	17 (10.8)	11 (6.4)	1.00	**0.22 (0.12-0.40)*** **	**0.13 (0.06-0.25)*** **	**0.19 (0.10-0.35)*** **	**0.12 (0.06-0.23)*** **
Personality Traits/Disorders								

Cluster B Personality Traits/Disorder	23 (13.3)	70 (44.3)	60 (34.9)	1.00	**5.19 (3.02-8.90)*** **	**3.49 (2.04-5.99)*** **	**4.60 (2.65-7.98)*** **	**3.40 (1.96-5.87)*** **
Borderline Personality Traits/Disorder	2 (1.2)	33 (20.9)	26 (15.1)	1.00	**22.57 (5.32-95.82)*** **	**15.23 (3.55-65.24)*** **	**20.73 (4.84-88.88)*** **	**14.64 (3.40-63.00)*** **
Narcissistic Personality Traits/Disorder	2 (1.2)	7 (4.4)	6 (3.5)	1.00	3.96 (0.81-19.37)	3.09 (0.62-15.53)	4.51 (0.88-23.20)	2.95 (0.58-15.06)
Antisocial Personality Traits/Disorder	4 (2.3)	7 (4.4)	6 (3.5)	1.00	1.96 (0.56-6.82)	1.53 (0.42-5.51)	1.76 (0.49-6.34)	1.51 (0.41-5.62)
Any Personality Traits/Disorder	27 (15.6)	74 (46.8)	63 (36.6)	1.00	**4.76 (2.84-7.98)*** **	**3.13 (1.87-5.23)*** **	**4.13 (2.43-6.99)*** **	**3.00 (1.78-5.07)*** **
Any Psychiatric Traits/Disorder	141 (81.5)	134 (84.8)	153 (89.0)	1.00	1.27 (0.71-2.26)	1.83 (0.99-3.37)	0.99 (0.54-1.84)	1.73 (0.92-3.25)
Previous History of Self-Harm	(n=66)	(n=105)	(n=130)					
No Previous Self-Harm	35 (53.0)	22 (21.0)	36 (27.7)	1.00	1.00	1.00	1.00	1.00
Any Previous Self-Harm	31 (47.0)	83 (79.0)	94 (72.3)	1.00	**4.26 (2.17-8.36)*** **	**2.95 (1.59-5.47)*** **	**4.31 (2.18-8.55)*** **	**2.95 (1.59-5.47)*** **
Previous Suicide Attempt	25 (37.9)	32 (30.5)	86 (66.2)	1.00	0.72 (0.38-1.37)	**3.21 (1.73-5.93)*** **	0.81 (0.42-1.56)	**3.33 (1.79-6.21)*** **
Previous NSSI	9 (13.6)	49 (46.7)	27 (20.8)	1.00	**5.54 (2.49-12.34)*** **	1.66 (0.73-3.77)	**4.76 (2.10-10.82)*** **	1.63 (0.70-3.76)
Previous Both NSSI and Suicide Attempt	4 (6.1)	8 (7.6)	19 (14.6)	1.00	1.28 (0.37-4.43)	2.65 (0.86-8.15)	1.05 (0.30-3.69)	2.61 (0.84-8.11)
Previous History of Psychiatric Care								
No Previous Psychiatric Care	55 (33.3)	51 (34.2)	44 (26.3)	1.00	1.00	1.00	1.00	1.00
Yes Previous Psychiatric Care	110 (66.7)	98 (65.8)	123 (73.7)	1.00	0.92 (0.57-1.46)	1.42 (0.88-2.29)	1.03 (0.63-1.69)	1.50 (0.92-2.46)
Other Correlates								

Childhood Sexual or Physical Abuse	(n=68) 22 (32.4)	(n=83) 37 (44.6)	(n=90) 39 (43.3)	1.00	1.68 (0.86-3.28)	1.60 (0.83-3.09)	1.74 (0.87-3.45)	1.61 (0.83-3.14)
Acute Stressor	60 (40.3)	97 (65.1)	119 (74.8)	1.00	**2.83 (1.79-4.48)*** **	**4.50 (2.79-7.25)*** **	**2.76 (1.70-4.47)*** **	**4.62 (2.84-7.53)*** **
Aggression or Impulsivity	66 (42.0)	98 (65.8)	109 (67.7)	1.00	**2.59 (1.63-4.10)*** **	**2.82 (1.78-4.48)*** **	**2.34 (1.44-3.79)*** **	**2.80 (1.73-4.51)*** **
Passive Suicidal Ideation	9 (5.8)	31 (20.8)	84 (51.9)	1.00	**4.37 (2.02-9.45)*** **	**17.02 (8.00-36.21)*** **	**5.17 (2.34-11.45)*** **	**19.12 (8.91-41.02)*** **
Active Suicidal Ideation	1 (0.6)	12 (8.1)	74 (45.4)	1.00	5.69 (0.17-191.81)	**50.83 (1.75-1480.52)***	6.45 (0.20-212.37)	**54.42 (1.86-1588.88)***
Low Social Support	46 (27.5)	53 (34.6)	68 (41.5)	1.00	1.46 (0.90-2.35)	**1.92 (1.22-3.02)** **	**2.14 (1.27-3.62)** **	**2.52 (1.54-4.11)*** **
Chronic Pain or Physical Illness	40 (23.8)	31 (20.1)	48 (28.9)	1.00	0.80 (0.48-1.35)	1.24 (0.77-2.02)	1.37 (0.77-2.45)	1.59 (0.94-2.70)

*p<.05, **p<.01, ***p<.001 AOR: Adjusted Odds Ratio: Adjusted for age.

Regarding previous self-harm, people who presented with non-suicidal self-injury, compared with no self-harm or suicidal ideation, were more likely to have a history of any previous self-harm (OR = 4.26, 95% CI 2.17-8.36, p<.001) and a history of previous non-suicidal self-injury (OR = 5.54, 95% CI 2.49-12.34, p<.001). People who presented with non-suicidal self-injury, compared with no self-harm or suicidal ideation, were more likely to have a history of any previous self-harm (AOR = 4.31, 95% CI 2.18-8.55, p<.001) and previous non-suicidal self-injury (OR = 4.76, 95% CI 2.10-10.82, p<.001) even after adjusting for the effects of age. People with non-suicidal self-injury also had a higher likelihood of having an acute stressor (AOR = 2.76, 95% CI 1.70-4.47,

p<.001), aggression or impulsivity (AOR = 2.34, 95% CI 1.44-3.79, p<.001), passive suicidal ideation (AOR = 5.17, 95% CI 2.34-11.45, p<.001), and low social support (AOR = 1.92, 95% CI 1.22-3.02, p<.01) even after adjusting for the effects of age.

When comparing those who presented with suicide attempt to those who presented with no self-harm or suicidal ideation, people with suicide attempt were more likely to have the following psychiatric disorders: major depressive disorder (OR = 3.94, 95% CI 2.20-7.07, p<.001), an adjustment disorder (OR = 3.18, 95% CI 1.38-7.33, p<.01), alcohol use disorder (OR = 5.10, 95% CI 2.86-9.09, p<.001), cluster B personality traits/disorder (OR = 3.49, 95% CI 2.04-5.99, p<.001), borderline personality traits/disorder (OR = 15.23, 95% CI 3.55-65.24, p<.001), and any personality traits/disorder (OR = 3.13, 95% CI 1.87-5.23, p<.001). People who presented with suicide attempt, compared with no self-harm or suicidal ideation, were more likely to have these psychiatric disorders even after adjusting for the effects of age [major depressive disorder (AOR = 4.64, 95% CI 2.53-8.54, p<.001), adjustment disorder (AOR = 2.98, 95% CI 1.27-6.99, p<.05), alcohol use disorder (AOR = 5.41, 95% CI 3.00-9.76, p<.001), cluster B personality traits/disorder (AOR = 3.40, 95% CI 1.96-5.87, p<.001), borderline personality traits/disorder (AOR = 14.64, 95% CI 3.40-63.00, p<.001), and any personality traits/disorder (AOR = 3.00, 95% CI 1.78-5.07, p<.001)]. People who presented with suicide attempt, compared with no self-harm or suicidal ideation, were less likely to have bipolar affective disorder (AOR = 0.41, 95% CI 0.17-0.98, p<.05) and a psychotic disorder (AOR = 0.12, 95% CI 0.06-0.23, p<.001), even after adjusting for the effects of age.

People with suicide attempt also had a higher likelihood of suicidality, compared with those who presented with no self-harm or suicidal ideation. They were more likely to passive suicidal ideation (AOR = 19.12, 95% CI 8.91-41.02, p<.001), active suicidal ideation (AOR = 54.42, 95% CI 1.86-1588.88, p<.05), have a history of any previous self-harm (AOR = 2.95, 95% CI 1.159-5.47, p<.001), and a history of previous suicide attempt (AOR = 3.33, 95% CI 1.79-6.21, p<.001), even after adjusting for the effects of age. Other correlates of suicide attempted compared to no self-harm or suicidal ideation included experiencing an acute stressor (AOR = 4.62, 95% CI 2.84-7.53, p<.001), having aggression or impulsivity (AOR = 2.80, 95% CI 1.73-4.51, p<.001), and having low social support (AOR = 2.52, 95% CI 1.54-4.11, p<.001), even after adjusting for the effects of age.

Table 4 compares the psychiatric and clinical correlates of people who presented with non-suicidal self-injury to those with suicide attempt using bivariate logistic regression models. In terms of psychiatric disorders, the only statistically significant differences between those who presented with non-suicidal self-injury and those who presented with suicide attempt are that those who presented with suicide attempt are more likely to have major depressive disorder (OR = 2.94, 95% CI 1.61-5.37, p<.01) and less likely to have an adjustment disorder (OR = 0.58, 95% CI 0.34-0.99, p<.05). Those who presented with a suicide attempt are also more likely to experience suicidality compared to those who presented with non-suicidal self-injury. Presenting with a suicide attempt, is associated with having passive suicidal ideation (OR = 3.22, 95% CI 1.82-5.70, p<.001), active suicidal ideation (OR = 6.82, 95% CI 3.08-15.09, p<.001), and a history of previous suicide attempt (AOR = 4.46, 95% CI 2.57-7.74, p<.001), compared to those

who presented with non-suicidal self-injury. Those who presented with a suicide attempt are also significantly less likely to have a history of previous non-suicidal self-injury (OR = 0.30, 95% CI 0.17-0.53, p<.001), compared to those who present with a non-suicidal self-injury.

Table 4: Bivariate Logistic Regression Examining the Association Between Type of Self-Harm and Clinical Correlates.

Type of Self-Harm in SAFE Database sample N = 503				
Clinical Correlates	Non-Suicidal Self-Injury N=158 ***n* (%)**	Suicide Attempt N=172 ***n* (%)**	OR – Non-Suicidal Self-Injury	OR – Suicide Attempt
Psychiatric Disorders				
Major Depressive Disorder	15(9.5)	54(31.4)	1.00	**2.94(1.61-5.37)****
Anxiety Disorder	10(6.3)	12(7.0)	1.00	0.89(0.32-2.50)
Adjustment Disorder	37(23.4)	23(13.4)	1.00	**0.58(0.34-0.99)***
Alcohol Abuse/Dependence	42(26.6)	64(37.2)	1.00	1.46(0.89-2.38)
Drug Abuse/Dependence	31(19.6)	34(19.8)	1.00	0.94(0.49-1.80)
Psychotic Disorder	17(10.8)	11(6.4)	1.00	0.85(0.40-1.78)
Personality Traits/Disorders				
Cluster B Personality Traits/Disorder	70(44.3)	60(34.9)	1.00	0.78(0.52-1.17)
Borderline Personality Traits/Disorder	33(20.9)	26(15.1)	1.00	0.73(0.41-1.30)
Narcissistic Personality Traits/Disorder	7(4.4)	6(3.5)	1.00	1.05(0.86-1.28)
Antisocial Personality Traits/Disorder	7(4.4)	6(3.5)	1.00	0.81(0.26-2.46)

Any Personality Traits/Disorder	74(46.8)	63(36.6)	1.00	0.76(0.50-1.17)
Any Psychiatric Traits/Disorder	134(84.8)	153(89.0)	1.00	1.16(0.69-1.94)
Previous History of Self-Harm	(n=105)	(n=130)		
No Previous Self-Harm	22(21.0)	36(27.7)	1.00	1.00
Any Previous Self-Harm	83(79.0)	94(72.3)	1.00	0.69(0.38-1.27)
Previous Suicide Attempt	32(30.5)	86(66.2)	1.00	**4.46(2.57-7.74)*** **
Previous NSSI	49(46.7)	27(20.8)	1.00	**0.30(0.17-0.53)*** **
Previous Both NSSI and Suicide Attempt	8(7.6)	19(14.6)	1.00	2.08(0.87-4.95)
Previous History of Psychiatric Care				
No Previous Psychiatric Care	51(34.2)	44(26.3)	1.00	1.00
Yes Previous Psychiatric Care	98(65.8)	123(73.7)	1.00	1.22(0.63-2.39)
Other Correlates				
Childhood Sexual or Physical Abuse	(n=83) 37(44.6)	(n=90) 39(43.3)	1.00	0.95(0.52-1.73)
Acute Stressor	97(65.1)	119(74.8)	1.00	1.18(0.76-1.84)
Aggression or Impulsivity	98(65.8)	109(67.7)	1.00	1.00(0.68-1.49)
Passive Suicidal Ideation	31(20.8)	84(51.9)	1.00	**3.22(1.82-5.70)*** **
Active Suicidal Ideation	12(8.1)	74(45.4)	1.00	**6.82(3.08-15.09)*** **
Low Social Support	53(34.6)	68(41.5)	1.00	1.23(0.81-1.93)
Chronic Pain or Physical Illness	31(20.1)	48(28.9)	1.00	1.41(0.88-2.25)

*p<.05, **p<.01, ***p<.001

II. Study 2

Among the 503 people in my study sample with a first presentation to emergency services for a psychiatric assessment between January 1, 2009 and June 3, 2009, 144

(28.6%) people re-presented to emergency services (see Figure 2). Figure 2 shows the number of individuals who re-presented to emergency services among the different self-harm groups. Of the 158 people who initially presented with non-suicidal self-injury, 35 (22.2%) re-presented to emergency services. Of the 173 people who initially presented with no self-harm or suicidal ideation, 61 (35.3%) re-presented to emergency services. Finally, of the 172 people who initially presented with suicide attempt, 48 (27.9%) re-presented to emergency services.

Figure 4 depicts the survival distributions of time to re-presentation to emergency services for the different self-harm groups among those who re-presented to emergency services. A log rank test was run to determine if there were differences in the survival distributions for the different presentations to emergency services: no self-harm or suicidal ideation, non-suicidal self-injury and suicide attempt. The survival distributions for the three presentations were statistically significantly different, $\chi^2(2) = 6.289$, $p = 0.043$ (see Table 5).

Figure 4: Survival Distributions of Time to Re-presentation to Emergency Services for Different Types of Self-Harm Among those who Re-presented to Emergency Services

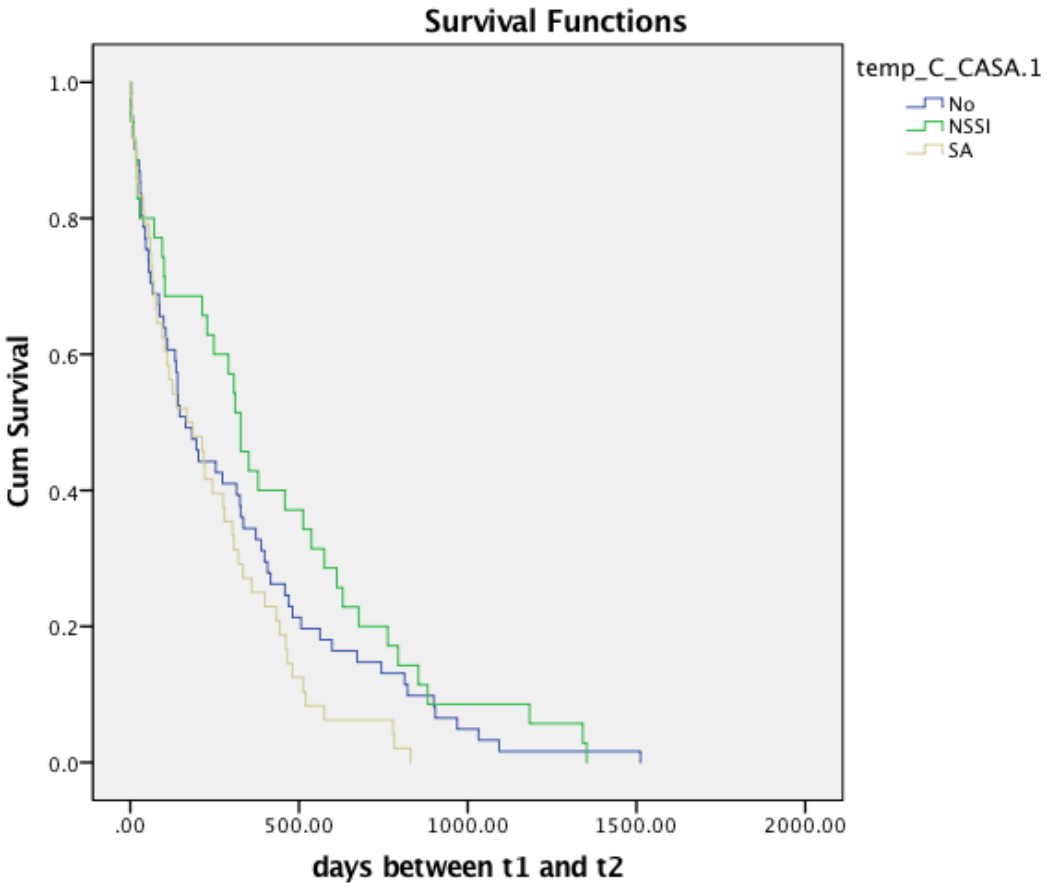


Table 5: Kaplan-Meier Survival Analyses of Type of Self-Harm at First Presentation Predicting Time to Re-presentation in SAFE Database sample

Time to Re-presentation in SAFE Database sample N = 144						
	Mean number of days until re-presentation (95% CI)	Standard Error	Median number of days until re-presentation (95% CI)	Standard Error	Chi-Square	Sig.
Re-presentation Among those who originally presented with No Self-Harm or Suicidal Ideation N=61	311.05 (226.44-395.66)	43.17	164.00 (100.86-227.14)	32.21	N/A	N/A
Re-presentation Among those who originally presented with Non-Suicidal Self-Injury N=35	417.71 (291.79-543.64)	64.25	327.00 (257.68-396.32)	35.37	N/A	N/A
Re-presentation Among those who originally presented with Suicide Attempt N=48	238.17 (175.41-300.93)	32.02	167.00 (52.71-281.29)	58.31	N/A	N/A
Overall Comparison	N/A	N/A	N/A	N/A	**6.289**	**0.043**

No Self-Harm or Suicidal Ideation versus Non-Suicidal Self-Injury	N/A	N/A	N/A	N/A	1.261	0.261
No Self-Harm or Suicidal Ideation versus Suicide Attempt	N/A	N/A	N/A	N/A	2.063	0.151
Suicide Attempt versus Non-Suicidal Self-Injury	N/A	N/A	N/A	N/A	**7.457**	**0.006**

Figure 5 displays the survival distributions of time to re-presentation to emergency services for first presentation for suicide attempt and non-suicidal self-injury among those who re-presented to emergency services. A log rank test was run to determine if there were differences in the survival distributions for non-suicidal self-injury and suicide attempt. The survival distributions for non-suicidal self-injury and suicide attempt presentations were statistically significantly different, $\chi^2(1) = 7.457$, p =0.006 (see Table 5). People with first presentation for suicide attempt who re-presented to emergency services returned a median of 167 days later (approximately five and a half months later), while those with first presentation for non-suicidal self-injury who re-presented to emergency services returned a median of 327 days later (approximately eleven months later) (see Table 5). Thus, individuals with first presentation for non-suicidal self-injury re-present less often than individual with first presentation for suicide

attempt, and if they do re-present to emergency services it is much later than those with suicide attempt Table 5 also shows that the mean number of days until re-presentation also differed with those with first presentation for suicide attempt who re-presented to emergency services returned a mean of 238.17 days later (approximately eight months later), while those with first presentation for non-suicidal self-injury who re-presented to emergency services returned a mean of 417.71 days later (approximately a year and two months later).

Figure 5: Survival Distributions of Time to Re-presentation to Emergency Services for First Presentation for Suicide Attempt and Non-Suicidal Self-Injury Among those who Re-presented to Emergency Services

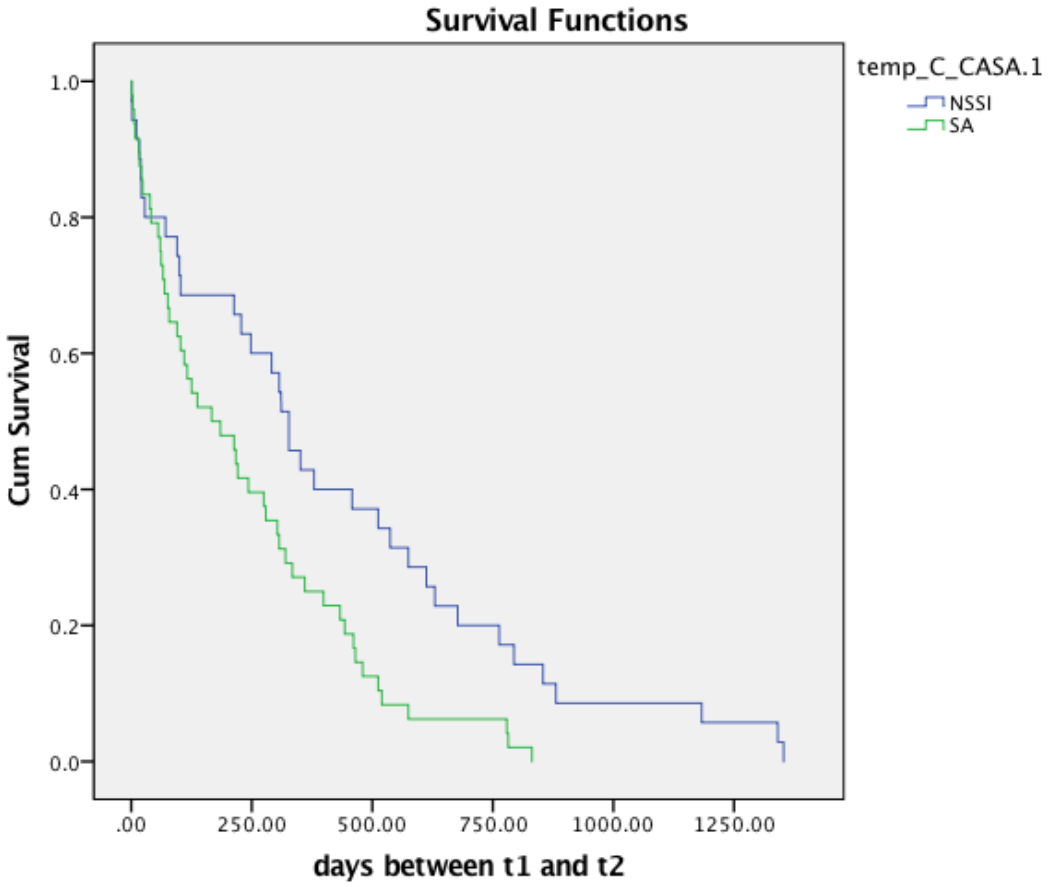


Figure 6 depicts the survival distributions of time to re-presentation to emergency services for first presentation for suicide attempt and no self-harm or suicidal ideation among those who re-presented to emergency services. A log rank test was run to determine if there were differences in the survival distributions for no self-harm or suicidal ideation and suicide attempt. The survival distributions for no self-harm or suicidal ideation and suicide attempt presentations were not statistically significantly different, $\chi^2(1) = 2.063$, $p = 0.151$ (see Table 5).

Figure 6: Survival Distributions of Time to Re-presentation to Emergency Services for First Presentation for Suicide Attempt and No Self-Harm or Suicidal Ideation Among those who Re-presented to Emergency Services

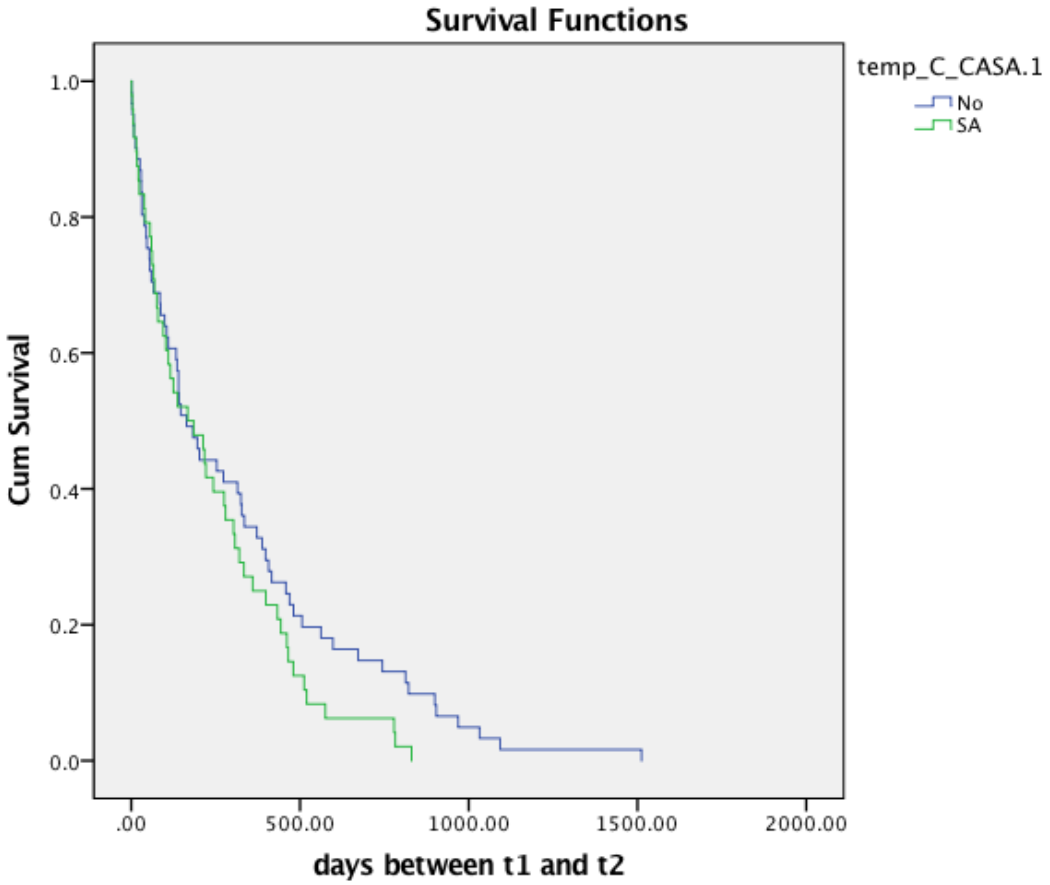


Figure 7 shows the survival distributions of time to re-presentation to emergency services for first presentation for non-suicidal self-injury and no self-harm or suicidal ideation among those who re-presented to emergency services. A log rank test was run to determine if there were differences in the survival distributions for no self-harm or suicidal ideation and non-suicidal self-injury. The survival distributions for no self-harm or suicidal ideation and non-suicidal self-injury presentations were not statistically significantly different, $\chi^2(1) = 1.261$, $p = 0.261$ (see Table 5).

Figure 7: Survival Distributions of Time to Re-presentation to Emergency Services for First Presentation for Non-Suicidal Self-Injury and No Self-Harm or Suicidal Ideation Among those who Re-presented to Emergency Services

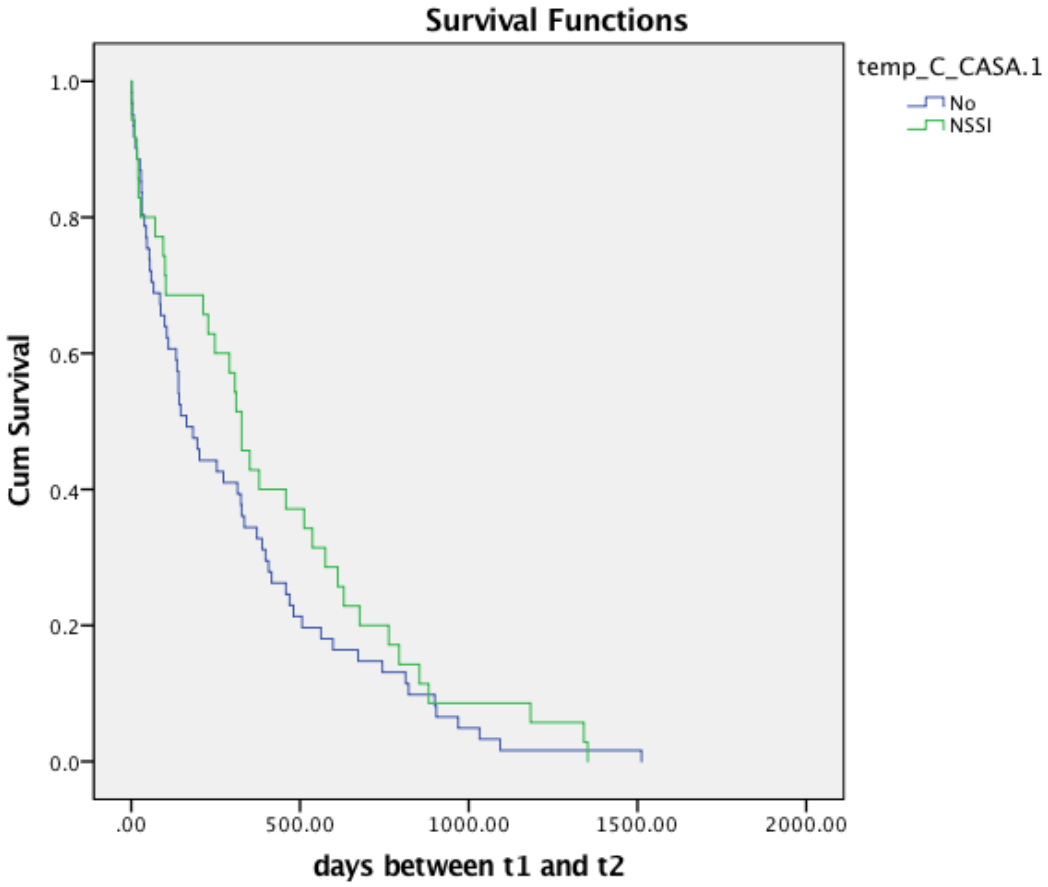


Table 6 illustrates multinomial logistic regression models using longitudinal data to predict re-presentation to emergency services based on type of self-harm (i.e., non-suicidal self-injury, no self-harm or suicidal ideation, and suicide attempt) at first presentation. Compared to those with first presentation for no self-harm or suicidal ideation, those with first presentation for non-suicidal self-injury are less likely to re-present to emergency services (OR = 0.53, 95% CI 0.32-0.86, $p<.05$). There were no statistically significant differences between likelihood of re-presentation between those with first presentation for suicide attempt and no self-harm or suicidal ideation (OR = 0.71, 95% CI 0.45-1.12, $p>.05$).

Table 6: Multinomial Logistic Regression Predicting Re-presentation to Emergency Services based on Type of Self-Harm at First Presentation.

Type of Self-Harm in SAFE Database sample N = 503			
	Does not Re-present	Re-present	OR – Re-present
First Presentation No Self-Harm or Suicidal Ideation (n=173)	112(64.7)	61(35.3)	1.00
First Presentation NSSI (n=158)	122(77.7)	35(22.3)	**0.53(0.32-0.86)***
First Presentation Suicide Attempt (n=172)	124(72.1)	48(27.9)	0.71(0.45-1.12)

*p<.05

Table 7 displays a bivariate logistic regression model using longitudinal data to predict re-presentation to emergency services based on first presentation for suicide attempt compared to non-suicidal self-injury. There were no statistically significant differences between likelihood of re-presentation between those with first presentation for suicide attempt and non-suicidal self-injury (OR = 0.74, 95% CI 0.45-1.23, p>.05).

Table 7: Bivariate Logistic Regression Predicting Re-presentation to Emergency Services based on Type of Self-Harm at First Presentation.

Type of Self-Harm in SAFE Database sample N = 503			
	Does not Re-present	Re-present	OR – Re-present
First Presentation NSSI (n=158)	122(77.7)	35(22.3)	1.00
First Presentation Suicide Attempt (n=172)	124(72.1)	48(27.9)	0.74(0.45-1.23)

Figure 8 shows the types of re-presentations to emergency services among those with first presentation for non-suicidal self-injury. Among the 158 people who initially presented with non-suicidal self-injury there was a total of 60 re-presentations by 35 people to emergency services. The majority of people with first presentation for non-suicidal self-injury do not re-present to emergency services (77.8%; n=123), only 22.3% (n=35) re-present to emergency services. Among those who re-present to emergency services, the reasons for representation differ. Only 11.7% return with repeat non-suicidal self-injury, 21.7% return with suicide attempt, 23.3% return with no self-harm or suicidal

ideation, 33.3% return with suicidal ideation, and 6.7% return with self-harm with unknown intent. Thus, the most frequent reason for re-presentation to emergency services is for suicidal ideation.

Figure 8: Pie Chart of Type of Re-presentations to Emergency Services Among Those with First Presentation for Non-Suicidal Self-Injury

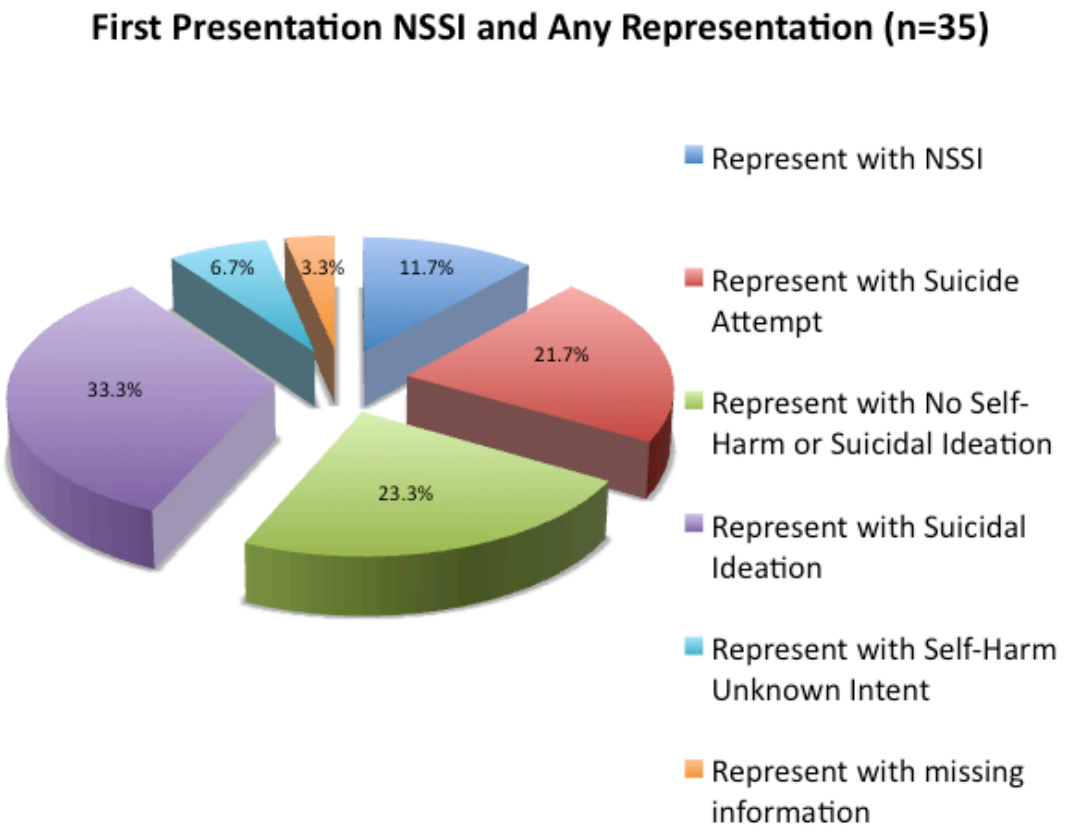


Figure 9 displays the types of re-presentations to emergency services among those with first presentation for suicide attempt. Among the 172 people who initially presented with a suicide attempt there was a total of 113 re-presentations by 48 people. The majority of people with first presentation for suicide attempt do not re-present to emergency services (72.1%; n=124), only 27.9% (n=48) re-present to emergency

services. Among those who re-present to emergency services, the reasons for re-presentation remain similar. 36.3% return with repeat suicide attempt, 39.8% return with suicidal ideation, 4.4% return with non-suicidal self-injury, 9.7% return with no self-harm or suicidal ideation, 2.7% return with self-harm with unknown intent, and 2.7% return with preparatory acts towards self-harm. Thus, the most frequent reason for re-presentation to emergency services is for suicidalility (76.1%; suicidal ideation or suicide attempt).

Figure 9: Pie Chart of Type of Re-presentation to Emergency Services Among Those with First Presentation for Suicide Attempt

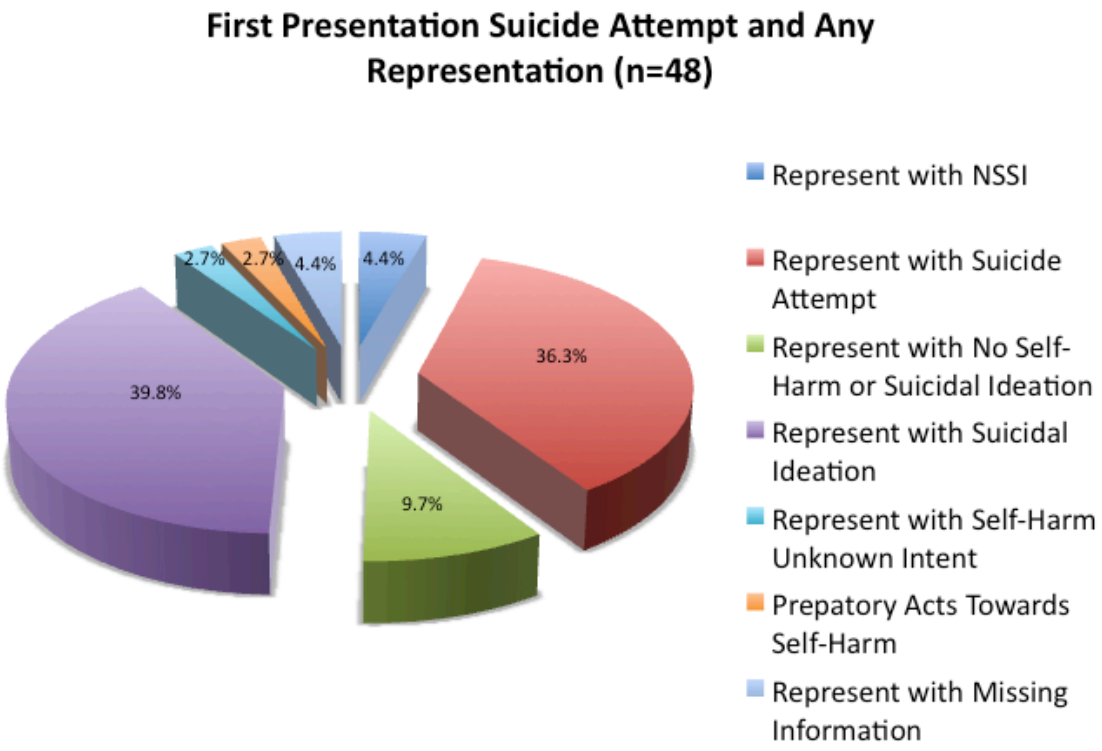
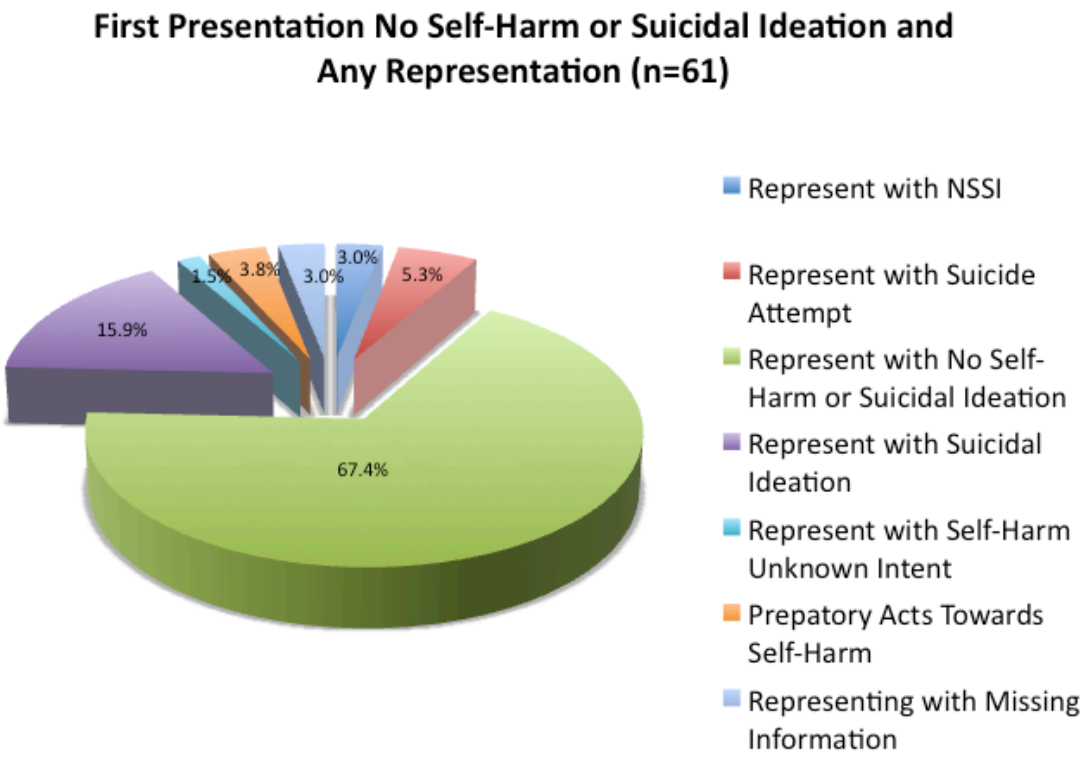


Figure 10 shows the types of re-presentations to emergency services among those with first presentation for no self-harm or suicidal ideation. Among the 173 people who initially presented with a no self-harm or suicidal ideation there was a total of 132 re-

presentations by 61 people. The majority of people with first presentation for no self-harm or suicidal ideation do not re-present to emergency services (64.7%; n=112), only 35.3% (n=61) re-present to emergency services. Among those who re-present to emergency services, the reasons for re-presentation remain similar. 67.4% return with repeat no self-harm or suicidal ideation, 15.9% return with suicidal ideation, 5.3% return with suicide attempt, 3.0% return with non-suicidal self-injury, 1.5% return with self-harm with unknown intent, and 3.8% return with preparatory acts towards self-harm. Thus, the most frequent reason for re-presentation to emergency services is for no self-harm or suicidal ideation.

Figure 10: Pie Chart of Type of Re-presentation to Emergency Services Among Those with First Presentation for No Self-Harm or Suicidal Ideation



III. Study 3

Among the 503 people in my study sample with a first presentation to emergency services for a psychiatric assessment between January 1, 2009 and June 3, 2012, 144 (28.6%) people re-presented to emergency services within a four and a half year period (between January 1, 2009 and June 3, 2013) (see Figure 3). Of the 144 people who re-presented to emergency services, 103 (71.5%) re-presented with no self-harm or suicidal ideation, non-suicidal self-injury, or suicide attempt. Figure 3 shows the number of individuals who re-presented to emergency services with the different types of self-harm (i.e., non-suicidal self-injury, no self-harm or suicidal ideation, and suicide attempt). Of the 103 people who re-presented with no self-harm or suicidal ideation, non-suicidal self-injury, or suicide attempt; 14 (13.6%) re-presented with any non-suicidal self-jury, 32 (31.1%) re-presented with suicide attempt only, and 57 (55.3%) re-presented with no self-harm or suicidal ideation only. Among the people who re-presented with no self-harm or suicidal ideation, non-suicidal self-injury, or suicide attempt; merely 8 people (7.8%) re-presented with non-suicidal self-injury only and 6 people (5.8%) re-presented with both non-suicidal self-injury and suicide attempt.

Table 8 depicts multinomial logistic regression models using longitudinal data to predict type of self-harm (i.e., any non-suicidal self-injury, no self-harm or suicidal ideation only, and suicide attempt only) at re-presentation to emergency services based on type of self-harm at first presentation. Those with first presentation for no self-harm or suicidal ideation are significantly less likely to re-present with any non-suicidal self-injury (OR = 0.12, 95% CI 0.03-0.44, $p<.01$) or suicide attempt only (OR = 0.05, 95% CI 0.02-0.17, $p<.001$), compared to re-presenting with no self-harm or suicidal ideation

only. Those with first presentation for non-suicidal self-injury had a higher likelihood of re-presenting with any non-suicidal self-injury (OR = 5.36, 95% CI 1.43-20.08, p<.05) compared to re-presenting with no self-harm or suicidal ideation only. Similarly, those with first presentation for suicide attempt were more likely to re-present with suicide attempt only (OR = 12.42, 95% CI 4.13-37.38, p<.001) compared to no self-harm or suicidal ideation only.

Table 8: Multinomial Logistic Regression Predicting Future Type of Self-Harm Based on Type of Self-Harm at First Presentation.

Type of Self-Harm Among those who Re-present in SAFE Database sample N = 103						
	No Self-Harm or Suicidal Ideation Only N=57 ***n* (%)**	Any Non-Suicidal Self-Injury N=14 ***n* (%)**	Suicide Attempt Only N=32 ***n* (%)**	OR – No Self-Harm or Suicidal Ideation Only (Reference)	OR – Any Non-Suicidal Self-Injury	OR – Suicide Attempt Only
First Presentation for No Self-Harm or Suicidal Ideation	44 (77.2)	4 (28.6)	5 (15.6)	1.00	**0.12 (0.03-0.44)****	**0.05 (0.02-0.17)*****
First Presentation for Non-Suicidal Self-Injury	7 (12.3)	6 (42.9)	8 (25.0)	1.00	**5.36 (1.43-20.08)***	2.38 (0.77-7.34)
First Presentation for Suicide Attempt	6 (10.5)	4 (28.6)	19(59.4)	1.00	3.40 (0.81-14.28)	**12.42 (4.13-37.38)*****

*p<.05, **p<.01, ***p<.001

Table 9 displays a bivariate logistic regression model and Fisher's Exact Tests using longitudinal data to predict re-presentation with suicide attempt compared to non-suicidal self-injury based on type of self-harm at first presentation. A first presentation for no self-harm or suicidal ideation, non-suicidal self-injury, or suicide attempt did not significantly predict re-presentation with a suicide attempt only compared to any non-suicidal self-injury.

Table 9: Bivariate Logistic Regression Predicting Future Type of Self-Harm Based on Type of Self-Harm at First Presentation.

Type of Self-Harm Among those who Re-present in SAFE Database sample N = 103				
	Any Non-Suicidal Self-Injury N=14 ***n* (%)**	Suicide Attempt Only N=32 ***n* (%)**	OR – Any Non-Suicidal Self-Injury	OR – Suicide Attempt Only
First Presentation for No Self-Harm or Suicidal Ideation	4(28.6)	5(15.6)	1.00	Fisher's Exact Test p=0.42
First Presentation for Non-Suicidal Self-Injury	6(42.9)	8(25.0)	1.00	0.44(0.12-1.68)
First Presentation for Suicide Attempt	4(28.6)	19(59.4)	1.00	Fisher's Exact Test p=0.11

Table 10 illustrates multinomial logistic regression models and Fisher's Exact Tests using longitudinal data to predict whether sociodemographic variables present during an individual's first presentation to emergency services predicted future re-presentation to emergency services with the different groups of self-harm (i.e., any non-

suicidal self-injury, no self-harm or suicidal ideation only, and suicide attempt only). Those who re-presented with any non-suicidal self-injury (n=14), no self-harm or suicidal ideation only (n=57), and suicide attempt only (n=32) were similar in terms of sex, marital status, and employment status. The only sociodemographic variable where the groups differed was age at first presentation, where people who re-presented with suicide attempt only tended to be younger than individuals who re-presented with no self-harm or suicidal ideation only. People who re-presented with suicide attempt only were more likely to be in the age group of 34 years old and younger at first presentation (OR = 2.63, 95% CI 1.07-6.45, $p<.05$) compared to the 35 years and older age group.

Table 10: Multinomial Logistic Regression Predicting Future Type of Self-Harm Based on Sociodemographic Correlates.

Type of Self-Harm Among those who Re-present in SAFE Database sample N = 103						
	No Self-Harm or Suicidal Ideation Only N=57 ***n* (%)**	Any Non-Suicidal Self-Injury N=14 ***n* (%)**	Suicide Attempt Only N=32 ***n* (%)**	OR – No Self-Harm or Suicidal Ideation Only (Reference)	OR – Any Non-Suicidal Self-Injury	OR – Suicide Attempt Only
Sex						
Female	24(42.1)	9(64.3)	18(58.1)	1.00	2.48(0.74-8.33)	1.81(0.75-4.39)
Male	33(57.9)	5(35.7)	13(41.9)	1.00	1.00	1.00
Age						
Older Age (35 years and older)	33(57.9)	5(35.7)	11(34.4)	1.00	1.00	1.00
Younger Age (34 years and younger)	24(42.1)	9(64.3)	21(65.6)	1.00	2.48(0.74-8.33)	**2.63(1.07-6.45)***
Marital Status						
Married/Common Law	13(25.0)	2(18.2)	4(14.3)	1.00	Fisher's Exact Test p=1.00	Fisher's Exact Test p=0.39
Not Married	39(75.0)	9(81.8)	24(85.7)	1.00	1.00	1.00
Employment Status						
Employed	12(23.1)	3(25.0)	12(41.4)	1.00	1.00	1.00
Unemployed	40(76.9)	9(75.0)	17(58.6)	1.00	Fisher's Exact Test p=1.00	0.43(0.16-1.13)

*p<.05

Table 11 shows bivariate logistic regression models and Fisher's Exact Tests using longitudinal data to predict whether sociodemographic variables present during an individual's first presentation to emergency services predicted future re-presentation to emergency services with any non-suicidal self-injury or suicide attempt only. There were no statistically significant differences between the groups on sociodemographic variables present at first presentation to emergency services.

Table 11: Bivariate Logistic Regression Predicting Future Type of Self-Harm Based on Sociodemographic Correlates.

Type of Self-Harm Among those who Re-present in SAFE Database sample N = 103				
	Any Non-Suicidal Self-Harm N=14 ***n* (%)**	Suicide Attempt Only N=32 ***n* (%)**	OR – Any Non-Suicidal Self-Harm	OR – Suicide Attempt Only
Sex				
Female	9(64.3)	18(58.1)	1.00	1.30(0.35-4.80)
Male	5(35.7)	13(41.9)	1.00	1.00
Age				
Older Age (35 years and older)	5(35.7)	11(34.4)	1.00	1.00
Younger Age (34 years and younger)	9(64.3)	21(65.6)	1.00	0.94(0.25-3.51)
Marital Status				
Married/Common Law	2(18.2)	4(14.3)	1.00	Fisher's Exact Test p=1.00
Not Married	9(81.8)	24(85.7)	1.00	1.00
Employment Status				
Employed	3(25.0)	12(41.4)	1.00	1.00
Unemployed	9(75.0)	17(58.6)	1.00	Fisher's Exact Test p=0.48

Table 12 illustrates multinomial logistic regression models and Fisher's Exact Tests using longitudinal data to predict whether psychiatric disorders and clinical correlates present during an individual's first presentation to emergency services predicted future re-presentation to emergency services with the different groups of self-harm (i.e., any non-suicidal self-injury, no self-harm or suicidal ideation only, and suicide attempt only). Those who re-presented with any non-suicidal self-injury, compared with no self-harm or suicidal ideation only, were more likely to have an anxiety disorder (Fisher's Exact Test $p = .04$) at first presentation to emergency services. Regarding other clinical correlates, people who re-presented with any non-suicidal self-injury, compared with no self-harm or suicidal ideation only, had a higher likelihood of having an acute stressor (OR = 3.91, 95% CI 1.12-13.67, $p < .05$) and active suicidal ideation (Fisher's Exact Test $p = .05$) at first presentation to emergency services. People who re-presented with any non-suicidal self-injury, compared with no self-harm or suicidal ideation only, were more likely to have an acute stressor (AOR = 4.31, 95% CI 1.19-15.65, $p < .05$) even after adjusting for the effects of age.

Table 12: Multinomial Logistic Regression Predicting Future Type of Self-Harm Based on Clinical Correlates.

Type of Self-Harm Among those who Re-present in SAFE Database sample N = 103								
Clinical Correlates	No Self-Harm or Suicidal Ideation Only N=57 ***n* (%)**	Any Non-Suicidal Self-Injury N=14 ***n* (%)**	Suicide Attempt Only N=32 ***n* (%)**	OR/AOR – No Self-Harm or Suicidal Ideation Only (Reference)	OR – Any Non-Suicidal Self-Injury	OR – Suicide Attempt Only	AOR – Any Non-Suicidal Self-Injury	AOR – Suicide Attempt Only
Psychiatric Disorders								
Major Depressive Disorder	5 (8.8)	2 (14.3)	5 (15.6)	1.00	Fisher's Exact Test p=0.62	1.93 (0.51-7.24)	N/A	2.89 (0.71-11.85)
Anxiety Disorder	4 (8.5)	4 (28.6)	3 (9.4)	1.00	**Fisher's Exact Test p=0.04***	Fisher's Exact Test p=0.70	N/A	N/A
Alcohol Abuse/Dependence	6 (10.5)	3 (21.4)	14 (43.8)	1.00	Fisher's Exact Test p=0.37	**6.61 (2.21-19.80)****	N/A	**6.12 (2.01-18.66)****
Drug Abuse/Dependence	9 (15.8)	2 (14.3)	5 (15.6)	1.00	Fisher's Exact Test p=1.00	0.99 (0.30-3.25)	N/A	0.81 (0.24-2.77)
Psychotic Disorder	33 (57.9)	4 (28.6)	5 (15.6)	1.00	Fisher's Exact Test p=0.07	**0.14 (0.05-0.40)*****	N/A	**0.12 (0.04-0.37)*****
Personality Traits/Disorders								

Cluster B Personality Traits/Disorder	11 (19.3)	5 (35.7)	13 (40.6)	1.00	2.32 (0.65-8.32)	**2.86 (1.09-7.51)***	2.07 (0.57-7.58)	2.54 (0.95-6.82)
Borderline Personality Traits/Disorder	2 (3.5)	2 (14.3)	7 (21.9)	1.00	Fisher's Exact Test p=0.17	**7.70 (1.49-39.74)***	N/A	**8.39 (1.56-45.04)***
Any Personality Traits/Disorder	11 (19.3)	5 (35.7)	13 (40.6)	1.00	2.32 (0.65-8.32)	**2.86 (1.09-7.51)***	2.07 (0.57-7.58)	2.54 (0.95-6.82)
Any Psychiatric Traits/Disorder	52 (91.2)	12 (85.7)	29 (90.6)	1.00	0.58 (0.10-3.33)	0.93 (0.21-4.17)	0.44 (0.07-2.72)	0.93 (0.21-4.17)
Previous History of Self-Harm	(n=22)	(n=5)	(n=21)					
No Previous Self-Harm	9 (40.9)	0 (0.0)	4 (19.0)	1.00	1.00	1.00	1.00	1.00
Any Previous Self-Harm	13 (59.1)	5 (100.0)	17 (81.0)	1.00	N/A	2.94 (0.74-11.71)	N/A	3.02 (0.75-12.22)
Previous Suicide Attempt	8 (36.4)	2 (40.0)	15 (71.4)	1.00	Fisher's Exact Test p=1.00	**4.38 (1.21-15.81)***	N/A	**7.38 (1.59-34.19)***
Previous NSSI	5 (22.7)	3 (60.0)	6 (28.6)	1.00	Fisher's Exact Test p=0.14	1.36 (0.34-5.38)	N/A	1.11 (0.25-4.93)
Previous History of Psychiatric Care								
No Previous Psychiatric Care	12 (21.4)	5 (38.5)	4 (12.5)	1.00	1.00	1.00	1.00	1.00
Yes Previous Psychiatric Care	44 (78.6)	8 (61.5)	28 (87.5)	1.00	0.51 (0.14-1.81)	1.99 (0.58-6.77)	0.65 (0.17-2.44)	2.76 (0.77-9.89)
Other Correlates								
Childhood Sexual or Physical Abuse	(n=19) 4 (21.1)	(n=9) 2 (22.2)	(n=18) 8 (44.4)	1.00	Fisher's Exact Test p=1.00	Fisher's Exact Test p=0.17	N/A	N/A

Acute Stressor	14 (29.8)	9 (64.3)	19 (65.5)	1.00	**3.91 (1.12-13.67)***	**4.03 (1.57-10.38)****	**4.31 (1.19-15.65)***	**4.47 (1.67-11.96)****
Aggression or Impulsivity	23 (45.1)	7 (53.8)	21 (72.4)	1.00	1.34 (0.40-4.50)	**3.00 (1.10-8.19)***	1.30 (0.38-4.45)	**2.90 (1.04-8.06)***
Passive Suicidal Ideation	5 (10.2)	4 (28.6)	14 (46.7)	1.00	Fisher's Exact Test p=0.10	**5.82 (1.82-18.60)****	N/A	**6.32 (1.90-20.99)****
Active Suicidal Ideation	4 (8.0)	4 (30.8)	10 (33.3)	1.00	**Fisher's Exact Test p=0.05***	**4.67 (1.38-15.85)***	N/A	**4.35 (1.24-15.23)***
Low Social Support	16 (30.2)	4 (28.6)	10 (32.3)	1.00	Fisher's Exact Test p=1.00	1.23 (0.47-3.19)	N/A	1.45 (0.53-3.95)
Chronic Pain or Physical Illness	12 (21.8)	3 (21.4)	4 (12.5)	1.00	Fisher's Exact Test p=1.00	Fisher's Exact Test p=0.39	N/A	N/A

*p<.05, **p<.01, ***p<.001 AOR: Adjusted Odds Ratio: Adjusted for age.

When comparing those who re-presented with suicide attempt only to those who re-presented with no self-harm or suicidal ideation only, people who re-presented with suicide attempt only were more likely to have the following psychiatric disorders at first presentation to emergency services: alcohol use disorder (OR = 6.61, 95% CI 2.21-19.80, p<.01), cluster B personality traits/disorder (OR = 2.86, 95% CI 1.09-7.51, p<.05), borderline personality traits/disorder (OR = 7.70, 95% CI 1.49-39.74, p<.05), and any personality traits/disorder (OR = 2.86, 95% CI 1.09-7.51, p<.05). People who re-presented with suicide attempt only, compared with no self-harm or suicidal ideation only, were more likely to have alcohol use disorder (AOR = 6.12, 95% CI 2.01-18.66, p<.01) and borderline personality traits/disorder (AOR = 8.39, 95% CI 1.56-45.04, p<.05)

at first presentation to emergency services, even after adjusting for the effects of age. People who re-presented with suicide attempt only, compared with no self-harm or suicidal ideation only, were less likely to have a psychotic disorder (AOR = 0.12, 95% CI 0.04-0.37, p<.001), even after adjusting for the effects of age.

People with re-presentation for suicide attempt only also had a higher likelihood of suicidality at first presentation to emergency services, compared with those who re-presented with no self-harm or suicidal ideation only. They were more likely to passive suicidal ideation (AOR = 6.32, 95% CI 1.90-20.99, p<.01), active suicidal ideation (AOR = 4.35, 95% CI 1.24-15.23, p<.05), and a history of previous suicide attempt (AOR = 7.38, 95% CI 1.59-34.19, p<.05) at first presentation to emergency services, even after adjusting for the effects of age. Other correlates of re-presentation for suicide attempt only compared to no self-harm or suicidal ideation only included experiencing an acute stressor (AOR = 4.47, 95% CI 1.67-11.96, p<.01) and having aggression or impulsivity (AOR = 2.90, 95% CI 1.04-8.06, p<.05) at first presentation to emergency services, even after adjusting for the effects of age.

Table 13 displays bivariate logistic regression models and Fisher's Exact Tests using longitudinal data to predict re-presentation to emergency services with any non-suicidal self-injury compared to suicide attempt only based on psychiatric disorders and clinical correlates at first presentation to emergency services. There were no statistically significant differences between likelihood of re-presentation to emergency services with any non-suicidal self-injury compared to suicide attempt only based on psychiatric disorders and clinical correlates at first presentation to emergency services.

Table 13: Bivariate Logistic Regression Predicting Future Type of Self-Harm Based on Clinical Correlates.

Type of Self-Harm Among those who Re-present in SAFE Database sample N = 103				
Clinical Correlates	Any Non-Suicidal Self-Harm N=14 ***n* (%)**	Suicide Attempt Only N=32 ***n* (%)**	OR – Any Non-Suicidal Self-Harm	OR – Suicide Attempt Only
Psychiatric Disorders				
Major Depression	2(14.3)	5(15.6)	1.00	Fisher's Exact Test p=1.00
Anxiety Disorder	4(28.6)	3(9.4)	1.00	Fisher's Exact Test p=0.18
Alcohol Abuse/Dependence	3(21.4)	14(43.8)	1.00	Fisher's Exact Test p=0.20
Drug Abuse/Dependence	2(14.3)	5(15.6)	1.00	Fisher's Exact Test p=1.00
Psychotic Disorder	4(28.6)	5(15.6)	1.00	Fisher's Exact Test p=0.42
Personality Disorders				
Cluster B Personality Traits/Disorder	5(35.7)	13(40.6)	1.00	0.81(0.22-2.98)
Borderline Personality Traits/Disorder	2(14.3)	7(21.9)	1.00	Fisher's Exact Test p=0.70
Any Personality Traits/Disorder	5(35.7)	13(40.6)	1.00	0.81(0.22-2.98)
Any Psychiatric Disorder	12(85.7)	29(90.6)	1.00	0.62(0.09-4.20)
Previous History of Self-Harm	(n=5)	(n=21)		
No Previous Self-Harm	0(0.0)	4(19.0)	1.00	1.00

Any Previous Self-Harm	5(100.0)	17(81.0)	1.00	N/A
Previous Suicide Attempt	2(40.0)	15(71.4)	1.00	Fisher's Exact Test p=0.30
Previous NSSI	3(60.0)	6(28.6)	1.00	Fisher's Exact Test p=0.30
Previous History of Psychiatric Care				
No Previous Psychiatric Care	5(38.5)	4(12.5)	1.00	1.00
Yes Previous Psychiatric Care	8(61.5)	28(87.5)	1.00	0.26(0.06-1.17)
Other Correlates				
Childhood Sexual or Physical Abuse	(n=9) 2(22.2)	(n=18) 8(44.4)	1.00	Fisher's Exact Test p=0.41
Acute Stressor	9(64.3)	19(65.5)	1.00	0.97(0.26-3.62)
Aggression or Impulsivity	7(53.8)	21(72.4)	1.00	0.45(0.11-1.78)
Passive Suicidal Ideation	4(28.6)	14(46.7)	1.00	Fisher's Exact Test p=0.33
Active Suicidal Ideation	4(30.8)	10(33.3)	1.00	Fisher's Exact Test p=1.00
Low Social Support	4(28.6)	10(32.3)	1.00	Fisher's Exact Test p=1.00
Chronic Pain or Physical Illness	3(21.4)	4(12.5)	1.00	Fisher's Exact Test p=0.66

Table 14 depicts multinomial logistic regression models and Fisher's Exact Tests using longitudinal data to predict whether disposition at an individual's first presentation to emergency services predicts future re-presentation to emergency services with the different groups of self-harm (i.e., any non-suicidal self-injury, no self-harm or suicidal

ideation only, and suicide attempt only). Those who re-presented with any non-suicidal self-injury, compared with no self-harm or suicidal ideation only, were less likely to have had a hospital admission to psychiatry (OR = 0.26, 95% CI 0.08-0.88, $p<.05$) or to have received a referral for any mental health services (including day treatment, crisis stabilization services, and admission to psychiatry) (OR = 0.26, 95% CI 0.07-0.88, $p<.05$) during their first presentation to emergency services. They were also more likely to be discharged to usual care (OR = 4.18, 95% CI 1.21-14.41, $p<.05$) during their first presentation to emergency services. Similarly, those who re-presented with suicide attempt only, compared with no self-harm or suicidal ideation only, were less likely to have had a hospital admission to psychiatry (OR = 0.28, 95% CI 0.11-0.69, $p<.01$) or to have received a referral of any mental health services (including day treatment, crisis stabilization services, and admission to psychiatry) (OR = 0.23, 95% CI 0.09-0.59, $p<.01$) during their first presentation to emergency services. In addition, they were also more likely to be discharged to usual care (OR = 4.74, 95% CI 1.82-12.33, $p<.01$) during their first presentation to emergency services.

Table 14: Multinomial Logistic Regression Predicting Future Type of Self-Harm Based on First Presentation Disposition.

Type of Self-Harm Among those who Re-present in SAFE Database sample N = 103						
	No Self-Harm or Suicidal Ideation Only N=57 ***n* (%)**	Any Non-Suicidal Self-Harm N=14 ***n* (%)**	Suicide Attempt Only N=32 ***n* (%)**	OR – No Self-Harm or Suicidal Ideation Only (Reference)	OR – Any Non-Suicidal Self-Harm	OR – Suicide Attempt Only
Hospital Admission to Psychiatry at First Presentation	39(68.4)	5(35.7)	12(37.5)	1.00	**0.26(0.08-0.88)***	**0.28(0.11-0.69)****
Hospital Admission to Medical Ward at First Presentation	2(3.5)	0(0.0)	0(0.0)	1.00	N/A	N/A
Referral to Mental Health Services at First Presentation	4(7.0)	2(14.3)	3(9.4)	1.00	Fisher's Exact Test p=0.34	Fisher's Exact Test p=0.70
Referral for any Mental Health Care (including admission to psychiatry) at First Presentation	43(75.4)	7(50.0)	15(46.9)	1.00	**0.26(0.07-0.88)***	**0.23(0.09-0.59)****
Discharged to Usual Care at First Presentation	11(19.3)	7(50.0)	17(53.1)	1.00	**4.18(1.21-14.41)***	**4.74(1.82-12.33)****

*p<.05, **p<.01

Table 15 illustrates bivariate logistic regression models and Fisher's Exact Tests using longitudinal data to determine whether disposition at an individual's first presentation to emergency services predicts re-presentation to emergency services with any non-suicidal self-injury compared to suicide attempt only. There were no statistically significant differences between likelihood of re-presentation to emergency services with any non-suicidal self-injury compared to suicide attempt only based on disposition at first presentation to emergency services.

Table 15: Bivariate Logistic Regression Predicting Future Type of Self-Harm Based on First Presentation Disposition.

Type of Self-Harm Among those who Re-present in SAFE Database sample N = 103				
	Any Non-Suicidal Self-Harm N=14 ***n* (%)**	Suicide Attempt Only N=32 ***n* (%)**	OR – Any Non-Suicidal Self-Harm	OR – Suicide Attempt Only
Hospital Admission to Psychiatry at First Presentation	5(35.7)	12(37.5)	1.00	0.93(0.25-3.42)
Hospital Admission to Medical Ward at First Presentation	0(0.0)	0(0.0)	1.00	N/A
Referral to Mental Health Services (Crisis Stabilization or new referral) at First Presentation	2(14.3)	3(9.4)	1.00	Fisher's Exact Test p=0.63
Referral for any Mental Health Care (including admission to psychiatry) at First Presentation	7(50.0)	15(46.9)	1.00	1.13(0.32-3.98)
Discharged to Usual Care at First Presentation	7(50.0)	17(53.1)	1.00	0.88(0.25-3.10)

DISCUSSION

I. Study 1

Five key findings emerged from my cross-sectional study 1. First, consistent with previous research, non-suicidal self-injury was associated with current life stressors and stress-related disorders, alcohol use disorders, cluster b and borderline personality traits/disorders, a previous history of non-suicidal self-injury and self-harm, passive suicidal ideation, aggression or impulsivity, and low social support. Second, interestingly, presenting to emergency services with non-suicidal self-injury or a suicide attempt was associated with being less likely to have serious persistent mental disorders (i.e., bipolar and psychotic disorders). Third, consistent with previous research, those who presented to emergency services with self-harm regardless of intent, appear similar for the most past in terms of correlates and risk factors. Fourth, although both self-harm presentations appear similar, there are some key differences with those who presented with suicide attempt being more likely to have major depressive disorder, passive and active suicidal ideation, and a previous history of suicide attempts compared to those who presented with non-suicidal self-injury. Finally, this study is the first to show that presenting to emergency services with non-suicidal self-injury is associated with a higher likelihood of having a current adjustment disorder and a previous history of non-suicidal self-injury compared to those presenting with a suicide attempt.

This is only the second study to examine the correlates and risk factors of non-suicidal self-injury, compared with suicide attempts, among adults in an emergency department sample. Study 1 replicated and extended prior research that has examined the correlates and risk factors of non-suicidal self-injury. Specifically, this study extended

previous research by Chartrand, Bhaskaran, Sareen, Katz, and Bolton (2015) by obtaining additional information through chart review including: additional and more specific psychiatric disorders (e.g., alcohol use disorders, adjustment disorders), the inclusion of personality traits/disorders, the inclusion of previous history of self-harm (e.g., previous non-suicidal self-injury), and an additional year of tertiary care emergency department data. Of the 4,772 individuals with a first presentation to emergency services for a psychiatric assessment within a three and a half year period between January 1, 2009 and June 3, 2009, 158 (3.3%) were for non-suicidal self-injury, 2,134 (44.7%) were for no self-harm or suicidal ideation, and 631 (13.2%) were for suicide attempt. To the best of this author's knowledge, there are no other studies that have reported the prevalence rate of individuals' with non-suicidal self-injury, suicide attempt, and no self-harm or suicidal ideation that are assessed by psychiatry in the emergency department. Future studies are needed to determine whether these prevalence rates are similar to other emergency department settings.

The finding that people who present to emergency services with non-suicidal self-injury are more likely to have current life stressors and stress-related disorders, alcohol use disorders, cluster b and borderline personality traits/disorders, a previous history of non-suicidal self-injury and self-harm, passive suicidal ideation, aggression or impulsivity, and low social support compared to people who present with no self-harm or suicidal ideation is in-line with prior studies. Previous research has shown that non-suicidal self-injury is associated with borderline personality disorder (Jacobson et al., 2008; Sevecke, Bock, Fenzel, Gander, & Fuchs, 2017), substance use disorders (Benjet et al., 2017; Coppersmith, Nada-Raja, & Beautrais, 2017; Garisch & Wilson, 2015;

Herpertz, 1995; Nock et al., 2006; Parker et al., 2005; Sevecke et al., 2017), impulsivity (Garisch & Wilson, 2015; Hamza, Willoughby, & Heffer, 2015; Lockwood, Daley, Townsend, & Sayal, 2017), aggression (O'Donnell, House, & Waterman, 2015; Tang et al., 2013), lack of social support (Baiden, Stewart, & Fallon, 2017; Christoffersen, Mohl, DePanfilis, & Vammen, 2015), and suicidal ideation (Coppersmith, Nada-Raja, & Beautrais, 2017; Sevecke et al., 2017). A recent meta-analysis by Fox and colleagues (2015) examined risk factors for non-suicidal self-injury. They found that the strongest risk factors for future non-suicidal self-injury were a prior history of non-suicidal self-injury, cluster b personality traits, and hopelessness. Although my study did not assess hopelessness, it also found that a prior history of non-suicidal self-injury and cluster b personality traits/disorder were associated with non-suicidal self-injury.

Furthermore, consistent with previous research, this study showed that those who presented to emergency services with self-harm regardless of intent appeared similar for the most part in terms of correlates and risk factors. People who engaged in non-suicidal self-injury and those who attempted suicide had high rates of mental disorders and other psychiatric correlates. Both groups had high prevalence rates of alcohol use disorders, cluster b personality traits/disorder, borderline personality traits/disorder, previous psychiatric care, a history of previous self-harm behaviour, and lack of serious persistent mental disorders (i.e., bipolar and psychotic disorders) and the groups did not significantly differ. Nock and Kessler (2006) also found that individuals who engaged in non-suicidal self-injury and those with suicide attempts had similar rates of alcohol use disorders and lack of serious persistent mental disorders (i.e., mania and non-affective psychosis) and that did not significantly differ. However, they did not assess for

personality pathology and previous self-harm, so it is unknown whether these rates were similar as well in a population-based American sample.

Although both self-harm presentations appear similar in Study 1, there are some key differences with those who presented with suicide attempt being more likely to have major depressive disorder, passive and active suicidal ideation, and a previous history of suicide attempts compared to those who presented with non-suicidal self-injury. Prior research that has compared the risk factors and correlates of non-suicidal self-injury and suicide attempts have also found that those who attempted suicide were more likely to have major depressive disorder compared to those with non-suicidal self-injury. Mars and colleagues (2014a) using a United Kingdom population-based birth cohort sample of 16 year olds, indicated that those who had ever attempted suicide (they may have also engaged in non-suicidal self-injury) had an increased risk of major depressive disorder. Similarly, Taliaferro and Muehlenkamp (2015) compared adults with past year history of non-suicidal self-injury only to those with past-year history of both non-suicidal self-injury and suicide attempt in a college student sample and found that the combined non-suicidal self-injury and suicide attempt group was more likely to have current depressive symptoms and to have an internalizing disorder diagnosis compared to the non-suicidal self-injury only group. In addition, Nock and Kessler (2006) found a higher likelihood of major depressive disorder among people with suicide attempts, compared with non-suicidal self-injury in a population-based American adult sample.

Previous research has also found that those with suicide attempts have a higher likelihood of passive and active suicidal ideation compared to those with non-suicidal self-injury. In a recent study by Coppersmith, Nada-Raja, and Beautrais (2017) compared

adults with a lifetime history of non-suicidal self-injury only to those with a lifetime history of both non-suicidal self-injury and suicide attempt in a community sample. They found that the combined non-suicidal self-injury and suicide attempt group was more likely to have past year suicidal ideation compared to the non-suicidal self-injury only group. In addition, other studies also have found that suicide attempts are more strongly associated with suicidal ideation and death by suicide than non-suicidal self-injury. Prior research has shown that self-harm with suicidal intent, is a stronger risk factor for future death by suicide, compared with self-harm without intent to die (Hawton, Harriss, Hall, et al., 2003; Hjelmeland, 1996; Owens, Wood, Greenwood, Hughes, & Dennis, 2005).

My Study 1 was also the first to show that presenting to emergency services with non-suicidal self-injury is associated with a higher likelihood of having a current adjustment disorder and a previous history of non-suicidal self-injury compared to those presenting with a suicide attempt. Previous research has shown that people who present to hospital with self-harm also experience multiple life stressors (Townsend et al., 2016). In fact, Townsend and colleagues (2016) indicated that 92.6% of their self-harm sample had at least one contributing life problem and life problems are an important part of the diagnostic criteria for adjustment disorders. Although, Townsend and colleagues (2016) did not differentiate non-suicidal self-harm from suicidal self-harm or assess whether individuals met criteria for an adjustment disorder, it is likely that a portion of their hospital presenting self-harm sample engaged in non-suicidal self-injury and met criteria for an adjustment disorder. To the best of my knowledge, only one other study that has compared non-suicidal self-injury to suicide attempts and has found correlates more strongly associated with non-suicidal self-injury than suicide attempts. Kim and

colleagues (2015) using an inpatient adolescent sample compared those who engaged in non-suicidal self-injury only to those who attempted suicide only. They found that those in the non-suicidal self-injury only group endorsed earlier onset of self-injurious behaviour and suicidal ideation and higher rates of depression and anxiety compared to the suicide attempt only group (Kim et al., 2015). Although, both my study and Kim and colleagues (2015) found a similar association with a previous history of self-harm behaviour, my study in contrast, found higher rates of major depressive disorder in the suicide attempt group. These divergent findings may be due to the fact that my study examined a tertiary-care emergency department adult sample, while Kim and colleagues (2015) examined an inpatient adolescent sample. Perhaps the reason that engaging in non-suicidal self-injury was more strongly associated with having an adjustment disorder than suicide attempts was due to the function that is often cited for non-suicidal self-injury. The function of non-suicidal self-injury has been regarded as a way to self-sooth or as a method of help seeking (i.e., getting others to help them cope with their negative thoughts and affect) (Klonsky, 2009; Muehlenkamp et al., 2009; Nock, 2010; Nock, Prinstein, & Sterba, 2009), perhaps non-suicidal self-injury is a method of coping with the strong negative emotions experienced due to significant life stressors, which also contribute to the development of an adjustment disorder.

In contrast to prior research that has found that non-suicidal self-injury is associated with bipolar disorder (Joyce et al., 2010; Parker et al., 2005), my study found that presenting to emergency services with non-suicidal self-injury or a suicide attempt was associated with being less likely to have a bipolar or psychotic disorder compared to those presenting to emergency services with no self-harm or suicidal ideation. This likely

reflects the characteristics of my sample, which comprised of individuals who present to emergency services and are assessed by psychiatry. It is likely that the majority of individuals who present to emergency services without self-harm thoughts and behaviour are instead seeking help with managing serious persistent mental disorders, such as bipolar and psychotic disorders.

II. Study 2

Five key findings emerged from my longitudinal study 2. First, most people present only once to emergency services no matter whether they are presenting for non-suicidal self-injury, suicide attempt, or no self-harm or suicidal ideation. Second, among those that returned to emergency services, those who originally presented with a suicide attempt re-presented significantly faster than those who presented with non-suicidal self-injury. Third, individuals who presented with non-suicidal self-injury were significantly less likely to re-present to emergency services compared to those who presented with no self-harm or suicidal ideation. However, among those who originally presented with non-suicidal self-injury that returned to hospital, they did not return with repeat non-suicidal self-injury, but instead the majority (55%) escalated to suicidal thoughts and behaviour. Finally, in contrast, those who originally presented with suicide attempts or no self-harm or suicidal ideation that returned to emergency services, the majority returned for the same reason.

The finding that most people present only once to emergency services no matter whether they are presenting for non-suicidal self-injury, suicide attempt, or no self-harm or suicidal ideation is consistent with previous research. In my study, the prevalence of re-presentation to emergency services among those who first presented with non-suicidal

self-injury was 22.3% (n=35), 27.9% (n=48) among those who first presented with suicide attempt, and 35.3% (n=61) among those who first presented with no self-harm or suicidal ideation. The prevalence of re-presentation to emergency services among those who self-harm is consistent with previous research from the United Kingdom, that has shown that between 15% and 25% of individuals who present to hospital with self-harm will re-present with self-harm within one year to the same general hospital (Hawton, Harriss, & Hall et al., 2003; Owens, Horrocks, & House, 2002). However, these studies did not differentiate non-suicidal self-injury and suicide attempts and instead examined self-harm regardless of intent.

This is the first study to compare rates of re-presentation to emergency services among those who present with non-suicidal self-injury and suicide attempts. I found that among those that return to emergency services, those who originally presented with a suicide attempt re-presented significantly faster than those who presented with non-suicidal self-injury. People with first presentation for suicide attempt who re-presented to emergency services returned a median of five and a half months later, while those with first presentation for non-suicidal self-injury who re-presented to emergency services returned a median of eleven months later. This study was also the first to show that individuals who presented with non-suicidal self-injury were significantly less likely to re-present to emergency services compared to those who presented with no self-harm or suicidal ideation. This finding could potentially be explained by the increased rates of serious persistent mental disorders (i.e., psychotic and bipolar disorders) found in Study 1 among those who presented with no self-harm or suicidal ideation compared to those with non-suicidal self-injury. This is in line with previous research that has shown that the

highest utilizers of psychiatric emergency services are those with a diagnosis of a psychotic disorder (Chaput & Lebel, 2007a; Chaput & Lebel, 2007b).

This study is consistent with previous literature that has questioned the stability of non-suicidal self-injury overtime. I found that among individuals who originally presented with suicide attempts and no self-harm or suicidal ideation that returned to emergency services, the majority returned for the same reason. In contrast, those who originally presented with non-suicidal self-injury for the most part did not return for the same reason. The fact that the majority (55%) of individuals that represent to emergency services among the original non-suicidal self-injury group escalate to suicidal thoughts and behaviour is consistent with prior research. Previous research has shown that methods of self-harm change over time (Lilley et al., 2008; Owens et al., 2015), and motivations for self-harm change overtime and many different motivations may occur in the same episode (Cooper et al., 2011; Scoliers et al., 2009). Furthermore, other longitudinal studies have found that non-suicidal self-injury predicted future suicidal thoughts and behaviour. Cox and colleagues (2012b) found that a history of non-suicidal self-injury predicted future suicide attempts and that a suicide attempt after baseline predicted future non-suicidal self-injury. Guan, Fox, and Prinstein (2012) examined non-suicidal self-injury among a community sample of adolescents longitudinally and found that non-suicidal self-injury was significantly and prospectively associated with suicidal ideation and suicide attempts. Furthermore, Whitlock and colleagues (2013) reported similar findings in a college sample of American adults, that a history of non-suicidal self-injury significantly predicted concurrent and future suicidal thoughts and behaviours. Similarly, Hamza and Willoughby (2016) found that non-suicidal self-injury in a sample

of Canadian first-year university students predicted future suicidal ideation and suicide attempts. Based on my current study and previous research, it appears as though non-suicidal self-injury is on the trajectory of behaviours toward suicide rather than a separate, distinct disorder.

III. Study 3

Four key findings emerged from my longitudinal Study 3. First, among individuals who originally presented to emergency services with non-suicidal self-injury, suicide attempt, or no self-harm or suicidal ideation that re-presented to emergency services in a four and a half-year period, I found that only a small number (13.6%) re-presented to emergency services with non-suicidal self-injury. Second, the original presentation significantly predicted the reason for re-presentation to emergency services, where those who first presented with a non-suicidal self-injury were more likely to return with a non-suicidal self-injury and those who first presented with a suicide attempt were more likely to return with a suicide attempt compared to those who first presented with no self-harm or suicidal ideation. However, there was no significant difference for non-suicidal self-injury compared to suicide attempt for reason for re-presentation. Third, in terms of longitudinal correlates that predict future non-suicidal self-injury, having an anxiety disorder, experiencing an acute stressor, and having active suicidal ideation during first presentation to emergency services had a higher likelihood of re-presenting to emergency services with any non-suicidal self-injury compared to no self-harm or suicidal ideation. Finally, I found that those who re-presented with non-suicidal self-injury and suicide attempts were less likely to be hospitalized or receive a referral to mental health services, and more likely to be discharged to usual care during their first

presentation to emergency services.

This is the first study to compare non-suicidal self-injury, suicide attempts, and no self-harm or suicidal ideation longitudinally in an adult emergency services sample. There is a paucity of research that examines non-suicidal self-injury among adults who present to emergency services, most research has been conducted on university, community, and population-based samples. Studies conducted on adults with hospital presenting self-harm, for the most part, have not distinguish individuals who present with non-suicidal self-injury from those who present with suicide attempts. I found that only a small number (13.6%) re-presented to emergency services with non-suicidal self-injury and that the original presentation significantly predicted the reason for re-presentation to emergency services, where those who first presented with a non-suicidal self-injury were more likely to return with a non-suicidal self-injury and those who first presented with a suicide attempt were more likely to return with a suicide attempt compared to those who first presented with no self-harm or suicidal ideation. This means that among those who presented to emergency services with any type of self-harm (i.e., non-suicidal self-injury or suicide attempt) when they re-present to emergency services it is for another act of self-harm and not for other psychiatric reasons (e.g., treatment for a serious persistent mental disorder). This may be due to the fact that having a psychotic disorder significantly predicted future re-presentation with no self-harm or suicidal ideation compared to re-presenting with any self-harm, meaning that those with no self-harm or suicidal ideation tend to present to hospital for treatment of a serious persistent mental disorder (i.e., psychotic disorder). This is in line with previous research showing that the

highest utilizers of psychiatric emergency services are those with a diagnosis of a psychotic disorder (Chaput & Lebel, 2007a; Chaput & Lebel, 2007b).

In Study 3, I found that having an anxiety disorder, experiencing an acute stressor, and having active suicidal ideation during first presentation to emergency services longitudinally predicted re-presenting to emergency services with any non-suicidal self-injury compared to no self-harm or suicidal ideation. Similarly, I found in Study 1 that experiencing an acute stressor was associated with non-suicidal self-injury cross-sectionally compared to no self-harm or suicidal ideation. However, Study 1 showed that having an anxiety disorder cross-sectionally was associated with a lower likelihood of non-suicidal self-injury compared to no self-harm or suicidal ideation. This may be due to the fact that acutely non-suicidal self-injury seems to relieve symptoms of anxiety in the short-term. Research has shown that automatic (intrapersonal) negative reinforcement is the most frequently cited motivation for non-suicidal self-injury (Klonsky, 2011; Nock & Prinstein, 2004). This means that non-suicidal self-injury is used to reduce negative thoughts and emotional states, such as anxiety (Chapman, Gratz, & Brown, 2006). Based on this theory, individuals would experience a reduction in anxiety in the short-term following non-suicidal self-injury, but in the long-term anxiety would lead to an increase likelihood of future non-suicidal self-injury. In addition, Study 1 did not find an association between active suicidal ideation and non-suicidal self-injury. This may also be explained by automatic (intrapersonal) negative reinforcement, where engaging in non-suicidal self-injury leads to acute relief from active suicidal ideation by reducing negative thoughts and emotions, but in the long-term the negative thoughts and emotions return.

Tuisku and colleagues (2014) found similar longitudinal predictors of non-suicidal self-injury. Tuisku and colleagues (2014) examined the predictors of non-suicidal self-injury among a depressed adolescent sample during an 8-year follow-up. They found that predictors of non-suicidal self-injury between the 1-year and 8-year follow up were non-suicidal self-injury, alcohol use, and anxiety symptoms at the 1-year follow-up. Similarly, my Study 3 also showed that those who first presented with a non-suicidal self-injury were more likely to return with a non-suicidal self-injury compared to those who first presented with no self-harm or suicidal ideation. My Study 3 also found that having an anxiety disorder predicted future non-suicidal self-injury; however, I did not find that an alcohol use disorder predicted future non-suicidal self-injury. Perhaps this is because my study examined alcohol use disorders as opposed to alcohol use; furthermore, their sample included depressed adolescents, while mine was hospital-presenting adults who may or may not be depressed.

Finally, I found that those who re-presented with non-suicidal self-injury and suicide attempts were less likely to be hospitalized or receive a referral to mental health services, and more likely to be discharged to usual care during their first presentation to emergency services. My findings are consistent with Olfson, Marcus, and Bridge (2012) study that showed that most patients who present to emergency departments with self-harm are discharged to the community. This American study of adult Medicaid beneficiaries found that 62.5% of individuals who presented to emergency services with self-harm were discharged to the community and only 47.5% received a mental health assessment in the emergency department.

IV. Limitations

The present findings should be interpreted within the context of certain limitations. The first limitation is that I was unable to draw conclusions about the risk for death by suicide among people who presented with non-suicidal self-injury, suicide attempt, or no self-harm or suicidal ideation. It is possible that some of the individuals that did not re-present to emergency services may have died by suicide. The second limitation of my study is that, although the two tertiary care hospitals in Manitoba receive the majority of emergency department presentations with self-harm, it is possible that some people may have presented to another hospital. Third, it is possible that some of the non-suicidal self-injury presentations to emergency services were missed in my study due to the individuals not being referred to psychiatry for an assessment. A fourth limitation is that my study did not directly evaluate DSM-5 definitions of non-suicidal self-injury and suicidal behaviour disorder. The fifth limitation is that of limited statistical power. The power of Study 3 was limited by the number of individuals who re-presented to emergency services with any non-suicidal self-injury (n=14). Non-significant trends for differences were observed for some examined variables, and the prevalence rates of some variables appeared different despite a lack of significance in regression analyses. Future studies that include a larger number of non-suicidal self-injury presentations would help clarify whether the lack of statistical difference in our study represented true similarity between the groups, or actually Type II error. A sixth limitation of my study is that certain sociodemographic information was not collected, such as race/ethnicity/cultural background because this sociodemographic information is not routinely recorded as part of a psychiatric consultation. Future research can increase the generalizability of findings by including information about race/ethnicity/cultural background. The seventh limitation

of my study is the difficulty in discretely distinguishing the constructs of non-suicidal self-injury and suicide attempts. For example, a non-suicidal self-injury incident for some individuals may occur after a previous suicide attempt. Consequently, participants identified as belonging to the non-suicidal self-injury categorization may not solely belong to that categorization, if one were to consider their complete history of self-injurious behaviour. An eighth limitation is that some of the variables relied on self-report such as previous self-harm history and childhood abuse and thus are limited by recall bias and potential under reporting. A final limitation is that, although physicians conducted the psychiatric assessments, the diagnoses generated were not based on standardized structured clinical interviews; rather they were based on a standard psychiatric interview conducted by psychiatric residents in emergency services.

V. Implications

This study has implications for mental health care service delivery, clinical assessment and intervention, clinical psychology training and practice, and diagnostic classification. This study found that the majority (55%) of individuals that re-presented to emergency services among the original non-suicidal self-injury group escalated to suicidal thoughts and behaviour. Joiner's (2005) interpersonal theory of suicide provides a theoretical context for these results. According to Joiner's (2005) theory, suicidal ideation arises from a combination of perceived burdensomeness and low belongingness, while the capability to act on suicidal ideation and attempt suicide requires that an individual overcome the fear of death and pain (Klonsky, May, & Saffer, 2016). In other words, attempting suicide requires both the desire and capability for suicide. Non-suicidal self-injury has been described as both a risk factor for increased desire for suicide

(suicidal ideation) and capability for suicide (Klonsky, May, & Glenn, 2013). Klonsky, May, and Glenn (2013) explain the progression from non-suicidal self-injury to suicide attempt as non-suicidal self-injury creating habituation to self-inflicted violence and pain, which then leads to increased capability for attempting suicide. Thus, the individuals in my study who originally presented to emergency services with non-suicidal self-injury and then re-presented with future suicide attempts, became more comfortable with self-inflicted pain when they engaged in non-suicidal self-injury, which combined with suicidal ideation, led them to attempt suicide. This finding highlights the importance of clinical intervention when an individual presents to emergency services with non-suicidal self-injury to help prevent the progression to future suicide attempts.

Large, Ryan, Carter, and Kapur (2017) discuss recommendations for intervention for people presenting to emergency services with self-harm behaviour. They recommend that all patients presenting with a mental health problem receive a psychosocial assessment with the aim to provide an individualized treatment plan. This is in line with recent studies that have found that individuals who present to emergency services for self-harm and receive a specialist psychosocial assessment are at a lower risk of re-presenting to emergency services with self-harm compared to those who are not assessed (Carroll et al., 2016; Steeg et al., 2018). Similarly, Steeg and colleagues (2018) argue that specialist psychosocial assessments should be provided to all individual who present to emergency services with self-harm, regardless of their perceived risk. My study was unable to examine this particular recommendation as all people included in this study received a psychosocial assessment upon presentation to emergency services; however,

these other studies highlight the importance of assessing all individuals who present to emergency services with self-harm.

Large, Ryan, Carter, and Kapur (2017) also recommend that people presenting to emergency services with self-harm thoughts or behaviours be offered evidence-based therapies for problems associated with suicide, such as substance use disorders and depression. The emergency department offers an opportunity to identify people who self-harm and refer them for treatment to help prevent future self-harm. My study found that patients who present to emergency services with non-suicidal self-injury appear on a trajectory toward suicidal behaviour and this has significant implications for clinical practice. As my study did not evaluate interventions for self-harm, I am only able to speculate about potential helpful interventions. One possible type of intervention that could be implemented for people who present with self-harm (either non-suicidal self-injury or suicide attempts) to emergency departments or after psychiatric hospitalization is brief contact interventions. Research is emerging showing the promise of brief contact interventions (e.g., postcards, letters, text messages, crisis cards, telephone contacts) for reducing the number of episodes of repeated self-harm following discharge from emergency services or psychiatric hospitalization (Falcone et al., 2017; Milner, Carter, Pirkis, Robinson, & Spittal, 2015). However, the current literature has showed mixed results and further research is needed using randomized clinical trials before brief contact interventions can be recommended for widespread clinical implementation (Falcone et al., 2017; Milner et al., 2015). An important issue with recommending treatments in the emergency department for people who present with self-harm is that "…there currently

are no evidence-based interventions or prevention programs for self-injury… and no evidence-based pharmacological treatment of self-injury" (Nock, 2010).

A recent Cochrane Review by Hawton and colleagues (2016a) examined psychosocial interventions for self-harm in adults. They found 18 trials that compared cognitive behavioural therapy, problem-solving therapy, or both, to treatment as usual and conducted a meta-analysis of these trials. This meta-analysis provided evidence that suggested a reduction in repeat self-harm at both six and twelve month's follow-up (Hawton et al., 2016a; Hawton et al., 2016b). Hawton and colleagues (2016a) also identified three trials that compared dialectical behavior therapy with treatment as usual. They found that there were no apparent overall effects on the proportion of individuals repeating self-harm at twelve and twenty-four months; however, there was a significant effect of dialectical behavior therapy on reducing the frequency of repeat self-harm. Based on these findings, it appears that the best available intervention for those presenting to emergency services with self-harm would be referring them for cognitive behavioural therapy because there is some evidence to suggest that cognitive behavioural theory-based psychotherapies (e.g., dialectical behavior therapy) are effective in reducing repeat self-harm compared with treatment as usual (Hawton et al., 2016a; Hawton et al., 2016b).

It is important to note that the emergency department is not the most therapeutic environment for those experiencing a mental health crisis. The emergency department is designed to prioritize those who are physically most in danger of death (e.g., heart attack patients, patients with stab wounds) and it can be a very chaotic, busy, high stress environment. All of these features contribute to the limitations of the emergency

department in adequately providing support and services to respond to mental health needs. My study found that most people who re-present to emergency services with either non-suicidal self-injury or suicide attempt were less likely to have received referrals for mental health services or hospital admission during prior presentation to emergency services and they were more likely to be discharged to usual care compared to those who re-presented with no self-harm or suicidal ideation. This highlights a missed opportunity for intervention to help prevent future self-harm behaviour. In an effort to better address the service needs of those experiencing a mental health crisis, the Crisis Response Centre (CRC) was opened in Winnipeg on June 3, 2013. The Crisis Response Centre (CRC) was established as a resource for adults in Winnipeg to access twenty-four hours per day, seven days per week during a psychiatric emergency as an alternative to presenting to hospital emergency departments. The CRC provides assessments, treatment, and referrals to other mental health services. My study did not examine patients' perception of seeking and receiving services in the emergency department; therefore, I am unable to comment on whether they perceived their visit as meeting their mental health needs. Future research is needed to determine whether the CRC has improved mental health care service delivery and especially the assessment and treatment of those who present with self-harm. Specifically, it would be important to examine whether referrals to other mental health services have increased for those who present with non-suicidal self-injury and suicide attempts, as my study found that these patients were more likely to be discharged to usual care.

The current study found that presenting to emergency services with non-suicidal self-injury was associated with a higher likelihood of having a current adjustment

disorder compared to those presenting with a suicide attempt. Also, in terms of longitudinal correlates that predicted future non-suicidal self-injury, having an anxiety disorder and experiencing an acute stressor during first presentation to emergency services had a higher likelihood of re-presenting to emergency services with any non-suicidal self-injury compared to no self-harm or suicidal ideation. These findings have implications for the assessment and treatment of adjustment and anxiety disorders. Given that adjustment and anxiety disorders have been shown to be associated with non-suicidal self-injury it can be speculated that providing evidence-based interventions for adjustment and anxiety disorders may help prevent future non-suicidal self-injury as the distress from the adjustment and anxiety disorder is treated. In addition, these findings suggest that it may be beneficial to screen those who seek services for an adjustment or anxiety disorder for non-suicidal self-injury as these individuals may also be engaging in non-suicidal self-injury or at risk for engaging in this behaviour.

The present study also has implications for clinical psychology training and practice. In the past, non-suicidal self-injury was frequently conceptualized as an associated feature of borderline personality disorder (Gardner & Cowdry, 1985; Gunderson & Singer, 1975; Schaffer, Carroll, & Abramowitz, 1982; Walsh & Rosen, 1988). However, this study as well previous research has shown that individuals who engage in non-suicidal self-injury do not always meet diagnostic criteria for borderline personality disorder (Herpertz, 1995; Joyce et al., 2010; Selby, Bender, Gordon, Nock, & Joiner, 2012). In fact, my study found that only 20.9% of individuals presenting to emergency services with non-suicidal self-injury had borderline personality traits or disorder. Furthermore, a common belief among the lay public is that only people with

depression self-harm. My study along with previous research has shown that a number of mental disorders are associate with non-suicidal self-injury and suicide attempts, including anxiety disorders, substance use disorders, and trauma and stress-related disorders (Benjet et al., 2017; Coppersmith, Garisch & Wilson, 2015; Herpertz, 1995; Nada-Raja, & Beautrais, 2017; Nock et al., 2006; Parker et al., 2005; Sevecke et al., 2017). Based on these findings, it is reasonable to recommend that all new clients seeking services from a clinical psychologist (or clinical psychology trainee) be assessed for current and past self-harm thoughts and behaviour as it cannot be assumed that they are not at risk for self-harm thoughts and behaviour solely based on their presenting concern (e.g., anxiety disorder, substance use disorder). In addition, although my study did not examine psychosocial interventions, there is other research that has shown that cognitive behavioural theory-based psychotherapies have the strongest evidence-base for psychosocial interventions for self-harm (Hawton et al., 2016a; Hawton et al., 2016b), as well as other common mental disorders, such as anxiety disorders, depressive disorders, and trauma and stress-related disorders (Brewin, 1996; Kaczkurkin & Foa, 2015; Rector, Man, & Lerman, 2014). Based on this research literature, it is recommended that graduate clinical psychology training programs train their students in cognitive behavioural theory-based interventions, so that students are competent to provide clients with evidence-based interventions to address their mental health needs.

My study has implications for the diagnostic classification of self-harm behaviour as well. Selby, Kranzler, Fehling, and Panza (2015) discuss the path to diagnostic validity and final obstacles for non-suicidal self-injury disorder. They argue that five obstacles prevent the validation of non-suicidal self-injury disorder including: 1) the diagnostic

delimitation obstacle; 2) the developmental course and stability considerations obstacle; 3) the suicide/self-injurious behaviour continuum obstacle; 4) the diagnostic criteria obstacle; and 5) the clinical implication obstacle. My study contributes data towards the stability consideration. I found that the majority (55%) of individuals that re-present to emergency services among the original non-suicidal self-injury group escalate to suicidal thoughts and behaviour and only 11.7% re-present with repeat non-suicidal self-injury. This provides support for the non-stability of non-suicidal self-injury because my sample of hospital presenting individuals with non-suicidal self-injury does not continue to present to hospital with non-suicidal self-injury. This conclusion is tempered by the fact that I am unable to comment on whether they continue to engage in non-suicidal self-injury in the community without seeking treatment in the emergency department. However, the fact that these individuals are presenting with future suicidal thoughts and behaviours highlights another obstacle to validating non-suicidal self-injury disorder; the suicide/self-injurious behaviour continuum obstacle. The overlap between non-suicidal self-injury and suicidal behaviours demonstrates the problem with creating a separate non-suicidal self-injury disorder.

An editorial by Kapur and colleagues (2013) has also argued that suicidal behaviour and non-suicidal self-injury are not so distinct. They point out that many individuals who engage in non-suicidal self-injury report suicidal ideation during the episode (Klonsky, 2011) and that self-cutting has been associated with higher risk of death by suicide than self-poisoning (Cooper et al., 2005; Hawton et al., 2012). In addition, they argue that some individuals self-poison and report no suicidal intent (Kapur et al., 2006; O'Connor et al., 2007). However, according to DSM-5 criteria, this self-

harm behaviour would not be classified as non-suicidal self-injury. Further, Kapur and colleagues (2013) highlight how methods of self-harm change over time (Lilley et al., 2008; Owens et al., 2015), and motivations for self-harm change overtime and many different motivations may occur in the same episode (Cooper et al., 2011; Scoliers et al., 2009). In addition, Orlando and colleagues (2015) examined the latent structure of self-injurious behavior and found that the latent structure of self-injurious behavior was continuous, with individuals who engage in suicidal self-injury and non-suicidal self-injury differing in dimensional variations of the same construct rather than distinct categories of self-injuries behavior. Moreover, Maciejewski and colleagues (2014) conducted a twin study in an Australian population-based sample and they indicated that there was a substantial correlation between non-suicidal self-injury and suicidal ideation, which is largely the result of overlapping genetic factors. They noted that this suggests that the two behaviours share similar biological underpinnings. Based on the findings from the current study and previous research, caution is warranted when distinguishing non-suicidal self-injury from suicide attempts. It appears that those who engage in non-suicidal self-injury and suicide attempts are an overlapping population and the same individuals who engaged in non-suicidal self-injury are at risk for engaging in suicide attempts in the future.

This study can also help inform future research. For instance, this study found that 3.3% of psychiatric assessments in emergency services were for non-suicidal self-injury, 44.7% were for no self-harm or suicidal ideation, and 13.2% were for suicide attempts; however, this finding needs to be replicated in future studies to determine if this is typical for most emergency department mental health presentations. This study was the first to

compare non-suicidal self-injury, suicide attempts, and no self-harm or suicidal ideation longitudinally in an adult emergency services sample. Despite this strength, this study lacked power to detect significant differences between non-suicidal self-injury and suicide attempts due to the small number of re-presentations for non-suicidal self-injury (n=14). Future studies could follow-up a larger initial sample to ensure that there was adequate power to compare these groups longitudinally. This study did not examine death by suicide. Future research could link databases like the SAFE database to population registration data such as the databases available at the Manitoba Centre for Health Policy to allow for detection of death by suicide. Another suggestion for future research is to begin following individuals during early adolescence when they first begin to engage in non-suicidal self-injury and suicide attempts and then follow them into adulthood to better measure the trajectory of self-harm behaviour over time. Future research should also continue to evaluate evidence-based interventions for self-harm behaviour, particularly those that can be implemented in the emergency department to help prevent suicide and the reoccurrence of self-harm behaviour. Finally, my study used the C-CASA to categorize and assess self-harm behaviour, future research should use more robust and psychometrically sound measures like the Self-Injurious Thoughts and Behaviors Interview (Nock et al., 2007).

VI. Conclusion

The current study, together with previous research, demonstrates how those who present to emergency services with self-harm regardless of intent, appear similar for the most past in terms of correlates and risk factors. It is important to note that non-suicidal self-injury is not a normative behaviour and is associated with a number of serious

clinical correlates including mental disorders and future suicidal thoughts and behaviour. Furthermore, the overlap between non-suicidal self-injury and suicidal behaviours demonstrates the problem with creating a separate non-suicidal self-injury disorder, because those who originally presented with non-suicidal self-injury that returned to hospital do not return with repeat non-suicidal self-injury, but instead the majority escalate to suicidal thoughts and behaviour. Further, those who re-presented with non-suicidal self-injury and suicide attempts are less likely to be hospitalized or receive a referral to mental health services, and more likely to be discharged to usual care during their first presentation to emergency services. Overall, these findings highlight the need for increased intervention in emergency services among those who present with self-harm regardless of intent.

REFERENCES

Agerbo, E., Gunnell, D., Bonde, J. P., Mortensen, P. B., & Nordentoft, M. (2007). Suicide and occupation: The impact of socio-economic, demographic and psychiatric differences. *Psychological Medicine, 37*(8), 1131-1140. http://dx.doi.org/10.1017/S0033291707000487

Alasaarela, L., Hakko, H., Riala, K., & Riipinen, P. (2017). Association of self-reported impulsivity to nonsuicidal self-injury, suicidality, and mortality in adolescent psychiatric inpatients. *Journal of Nervous and Mental Disease, 205*, 340-345. doi: 10.1097/NMD.0000000000000655

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders: DSM-III-R* (3rd ed., rev.). Washington, DC: APA.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders: DSM-IV* (4th ed.). Washington, DC: APA.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed.). Washington, DC: APA.

Andover, M. S. (2014). Non-suicidal self-injury disorder in a community sample of adults. *Psychiatry Research, 219*(2), 305-310. doi:10.1016/j.psychres.2014.06.001.

Arensman, E., Corcoran, P. , & McMahon, E. (2017). The iceberg model of self-harm: New evidence and insights. *Lancet Psychiatry* (published online ahead of print 12 December 2017). Available at: http://dx.doi.org/10.1016/S2215-0366(17)30477-7 (Accessed 26 December 2017).

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 18 moths of follow-up. *Suicide and Life-Threatening Behavior, 47*(5), 551-566. doi: 10.1111/sltb.12309

Baiden, P., Stewart, S. L., & Fallon, B. (2017). The role of adverse childhood experiences as determinants of non-suicidal self-injury among children and adolescents referred to community and inpatient mental health settings. *Child Abuse & Neglect, 69*, 163-176. http://dx.doi.org/10.1016/j.chiabu.2017.04.011

Barrocas, A. L., Hankin, B. L., Young, J. F., & Abela, J. R. Z. (2012). Rates of nonsuicidal self-injury in youth: Age, sex, and behavioral methods in a community sample. *Pediatrics, 130*(1), 39-45. doi:10.1542/peds.2011-2094

Bateman, A., & Fonagy, P. (1999). Effectiveness of partial hospitalization in the treatment of borderline personality disorder: A randomized controlled trial. *American Journal of Psychiatry, 156(10),* 1563-1569. https://doi.org/10.1176/ajp.156.10.1563

Battaglia, J., Wolff, T. K., Wagner-Jonson, D. S., Rush, A. J., Carmody, T. J., & Basco, M. R. (1999). Structured diagnostic assessment and deport fluphenazine treatment of multiple suicide attempters in the emergency department. *International Clinical Psychopharmacology, 14,* 361-372.

Beckman, K., Mittendorfer-Rutz, E., Lichtenstein, P., Larsson, H., Almqvist, C., Runeson, B., & Dahlin, M. (2016). Mental illness and suicide after self-harm among young adults: Long-term follow-up of self-harm patients, admitted to hospital care, in a national cohort. *Psychological Medicine, 46*, 3397-3405. doi:10.1017/S0033291716002282

Belik, S.-L., Stein, M.B., Asmundson, G.J.G., & Sareen, J. (2010). Are Canadian soldiers more likely to have suicidal ideation and suicide attempts than Canadian civilians? *American Journal of Epidemiology*, 172(11), 1250-1258. doi: 10.1093/aje/kwq290.

Bender, R., & Lange, S. (2001). Adjusting for multiple testing-when and how? *Journal of Clinical Epidemiology*, 54, 343-349.

Benjet, C., Gonzalez-Herrera, I., Castro-Silva, E., Mendez, E., Borges, G., Casanova, L., & Medina-Mora, M. E., (2017). Non-suicidal self-injury in Mexican young adults: Prevalence, associations with suicidal behavior and psychiatric disorders, and DSM-5 proposed diagnostic criteria. *Journal of Affective Disorders, 215*, 1-8. http://dx.doi.org/10.1016/j.jad.2017.03.025

Bethell, J., & Rhodes, A.E. (2009). Identifying deliberate self-harm in emergency department data. *Statistics Canada, Catalogue no. 82-003-XPE, Health Reports*, 20(2), 35-42.

Bloom, C. M., & Holly, S. (2011). Toward new avenues in the treatment of nonsuicidal self-injury. *Journal of Pharmacy Practice, 24*(5), 472-477. http://dx.doi.org/10.1177/0897190011422877

Bolton, J. M., Spiwak, R., & Sareen, J. (2012). Predicting suicide attempts with the SAD PERSONS scale: A longitudinal analysis. *Journal of Clinical Psychiatry, 73*(6), e735-e741.

Borges, G., Angst, J., Nock, M. K., Ruscio, A. M., & Kessler, R. C. (2008). Risk factors for the incidence and persistence of suicide-related outcomes: A 10-year follow-up study using the national comorbidity surveys. *Journal of Affective Disorders, 105*(1-3), 25-33. http://dx.doi.org/10.1016/j.jad.2007.01.036

Boxer, P. (2010). Variations in risk and treatment factors among adolescents engaging in different types of deliberate self-harm in an inpatient sample. *Journal of Clinical Child and Adolescent Psychology, 39*(4), 470-480. http://dx.doi.org/10.1080/15374416.2010.486302

Brent, D. A., Oquendo, M., Birmaher, B., Greenhill, L., Kolko, D., Stanley, B., . . . Mann, J. J. (2002). Familial pathways to early-onset suicide attempt: Risk for suicidal behavior in offspring of mood-disordered suicide attempters. *Archives of General Psychiatry, 59*(9), 801-807. http://dx.doi.org/10.1001/archpsyc.59.9.801

Brent, D. A., Perper, J. A., Goldstein, C. E., Kolko, D. J., Allan, M. J., Allman, C. J., & Zelenak, J. P. (1988). Risk factors for adolescent suicide: A comparison of adolescent suicide victims with suicidal inpatients. *Archives of General Psychiatry, 45*(6), 581-588.

Brent, D. A., Perper, J. A., Moritz, G., Baugher, M., Roth, C., Balach, L., & Schweers, J. (1993). Stressful life events, psychopathology, and adolescent suicide: A case control study. *Suicide and Life-Threatening Behavior, 23*(3), 179-187.

Bresin, K., & Schoenleber, M. (2015). Gender differences in the prevalence of nonsuicidal self-injury: A meta-analysis. *Clinical Psychology Review, 38*, 55-64. http://dx.doi.org/10.1016/j.cpr.2015.02.009

Briere, J., & Gil, E. (1998). Self-mutilation in clinical and general population samples: Prevalence, correlates, and functions. *American Journal of Orthopsychiatry, 68*(4), 609-620. http://dx.doi.org/10.1037/h0080369

Brewin, C. R. (1996). Theoretical foundations of cognitive-behavior therapy for anxiety and depression. *Annual Review of Psychology, 47,* 33-57.

Brown, G. K., & Green, K. L. (2014). A review of evidence-based follow-up care for suicide prevention. Where do we go from here? *American Journal of Preventative Medicine, 47*, S209-S215. http://dx.doi.org/10.1016/j.amepre.2014.06.006

Brown, G. K., & Jager-Hyman, S. (2014). Evidence-based psychotherapies for suicide prevention future directions. *American Journal of Preventive Medicine, 47,* S186-S194. http://dx.doi.org/10.1016/j.amepre.2014.06.008

Brown, G. K., Ten Have, T., Henriques, G. R., Xie, S. X., Hollander, J. E., & Beck, A. T. (2005). Cognitive therapy for the prevention of suicide attempts a randomized controlled trial. *Journal of the American Medical Association, 294(5),* 563-570. doi:10.1001/jama.294.5.563

Brunner, R., Kaess, M., Parzer, P., Fischer, G., Carli, V., Hoven, C. W., … Wasserman, D. (2014). Life-time prevalence and psychosocial correlates of adolescent direct self-injurious behavior: A comparative study of findings in 11 European countries. *Journal of Child Psychology and Psychiatry, 55*(4), 337-348. doi:10.1111/jcpp.12166

Bushe, C. J., & Savill, N.C. (2013). Suicide related events and attention deficit hyperactivity disorder treatments in children and adolescents: A meta-analysis of atomoxetine and methylphenidate comparator clinical trials. *Child and Adolescent Psychiatry and Mental Health*, 7, 19-25. doi:10.1186/1753-2000-7-19

Butler, A. M., & Malone, K. (2013). Attempted suicide v. non-suicidal self-injury: Behaviour, syndrome or diagnosis? *The British Journal of Psychiatry, 202*(5), 324-325. doi:10.1192/bjp.bp.112.113506

Canner, J. K., Giuliano, K., Selvarajah, S., Hammond, E. R., & Schneider, E. B. (2016). Emergency department visits for attempted suicide and self harm in the USA: 2006-2013. *Epidemiology and Psychiatric Sciences* (published online ahead of print 17 November). Available at: doi:10.1017/S2045796016000871 (accessed 6 January 2018).

Carroll, R., Metcalfe, C., & Gunnell, D. (2014). Hospital presenting self-harm and risk of fatal and non-fatal repetition: Systematic review and meta-analysis. *PLoS ONE, 9*(2), e89944. doi:10.1371/journal.pone.0089944

Carroll, R., Metcalfe, C., Steeg, S., Davies, N. M., Cooper, J., Kapur, N., & Gunnell, D. (2016). Psychosocial assessment of self-harm patients and risk of repeat presentation: An instrumental variables analysis using time of hospital presentation. *PLoS ONE, 11*(2), e0149713. doi:10.1371/journal.pone.0149713

Carroll, R., Thomas, K. H., Bramley, K., Williams, S., Griffin, L., Potokar, J., & Gunnell, D. (2016). Self-cutting and risk of subsequent suicide. *Journal of Affective Disorders, 192*, 8-10. http://dx.doi.org/10.1016/j.jad.2015.12.007

Castellvi, P., Lucas-Romero, E., Miranda-Mendizabal, A., Pares-Badell, O., Almenara, J., Alonso, I., . . . Alonso, J. (2017). Longitudinal association between self-injurious thoughts and behaviors and suicidal behaviour in adolescents and young adults: A systematic review with meta-analysis. *Journal of Affective Disorders, 215*, 37-48. http://dx.doi.org/10.1016/j.jad.2017.03.035

Cha, C. B., Augenstein, T. M., Frost, K. H., Gallagher, K., D'Angelo, E. J., & Nock, M. K. (2016). Using implicit and explicit measures to predict nonsuicidal self-injury

among adolescent inpatients. *Journal of the American Academy of Child & Adolescent Psychiatry, 55*(1), 62-68. http://dx.doi.org/10.1016/j.jaac.2015.10.008

Chan, M. K. Y., Bhatti, H., Meader, N., Stockton, S., Evans, J., O'Connor, R. C., … Kendal, T. (2016). Predicting suicide following self-harm: Systematic review of risk factors and risk scales. *The British Journal of Psychiatry, 209*, 277-283. doi: 10.1192/bjp.bp.115.170050

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy, 44*, 371-394. doi: 10.1016/j.brat.2005.03.005

Chaput, Y. J., & Lebel, M. J. (2007a). Demographic and clinical profiles of patients who make multiple visits to psychiatric emergency services. *Psychiatric Services, 58*(3), 335-341. doi:10.1176/ps.2007.58.3.335

Chaput, Y. J., & Lebel, M. J. (2007b). An examination of the temporal and geographical patterns of psychiatric emergency service use by multiple visit patients as a means for their early detection. *BMC Psychiatry, 7*, 60-66. doi:10.1186/1471-244X-7-60

Chartrand, H., Bhaskaran, J., Sareen, J., Katz, L. Y., & Bolton, J. M. (2015). Correlates of nonsuicidal self-injury and suicide attempts among tertiary care, emergency department patients. *Canadian Journal of Psychiatry, 60*(6), 276-283. doi: 10.117/070674371506000606

Chen, W., Chen, C., Ho, C., Lee, M., Chung, Y., Wang, Y., . . . Chou, F. H. (2009). The suitability of the BSRS-5 for assessing elderly who have attempted suicide and need to be referred for professional mental health consultation in a metropolitan

city, taiwan. *International Journal of Geriatric Psychiatry, 24*(10), 1151-1157. http://dx.doi.org/10.1002/gps.2239

Chesin, M. S., Galfavy, H., Sonmez, C. C., Wong, A., Oquendo, M. A., Mann, J. J. & Stanley, B. (2017). Nonsuicidal self-injury is predictive of suicide attempts among individuals with mood disorders. *Suicide and Life Threatening Behavior, 47*(5), 567-579. doi:10.1111/sltb.12331.

Christoffersen, M. N., Mohl, B., DePanfilis, D., & Vammen, K. S. (2015). Non-suicidal self-injury – Does social support make a difference? An epidemiological investigation of a Danish national sample. *Child Abuse & Neglect, 44*, 106-116. http://dx.doi.org/10.1016/j.chiabu.2014.10.023

Cipriano, A., Cella, S. , & Cotrufo, P. (2017). Nonsuicidal self-injury: A systematic review. *Frontiers in Psychology, 8*, 1946-1959. doi: 10.3389/fpsyg.2017.01946

Cochrane-Brink, K., Lofchy, J. S., & Sakinofsky, I. (2000). Clinical rating scales in suicide risk assessment. *General Hospital Psychiatry, 22*(6), 445-451.

Colman, I., Yiannakoulias, N., Schopflocher, D., Svenson, L. W., & al, e. (2004). Population-based study of medically treated self-inflicted injuries. *CJEM : Journal of the Canadian Association of Emergency Physicians, 6*(5), 313-20.

Conwell, Y., Dubertstein, P. R., & Caine, E. D. (2002). Risk factors for suicide in later life. *Biological Psychiatry, 52*(3), 193-204. http://dx.doi.org/10.1016/S0006-3223(02)01347-1

Cooper, J., Hunter, C., Owen-Smith, A., Gunnell, D., Donovan, J., Hawton, K., & Kapur, N. (2011). “Well it's like someone at the other end cares about you.” A qualitative study exploring the views of users and providers of care of contact-based

interventions following self-harm. *General Hospital Psychiatry, 33*(2), 166-176. http://dx.doi.org/10.1016/j.genhosppsych.2011.01.009

Cooper, J., Kapur, N., Webb, R., Lawlor, M., Guthrie, E., Mackway-Jone, K., & Appleby, L. (2005). Suicide after deliberate self-harm: A 4-year cohort study. *The American Journal of Psychiatry, 162*(2), 297-303. http://dx.doi.org/10.1176/appi.ajp.162.2.297

Coopersmith, D. D. L., Nada-Raja, S., & Beautrais, A. L. (2017). Non-suicidal self-injury and suicide attempts in New Zealand birth cohort. *Journal of Affective Disorders, 221*, 89-96. doi: http://dx.doi.org/10.1016/j.jad.2017.06.029

Cox , L.J., Stanley, B.H., Melhem, N.M., Oquendo, M.A., Birmaher, B., Burke, A., … Brent, D.A. (2012a). Familial and individual correlates of nonsuicidal self-injury in the offspring of mood-disordered parents. *Journal of Clinical Psychiatry*, 73(6), 813-820. doi: 10.4088/JCP.11m07196.

Cox , L.J., Stanley, B.H., Melhem, N.M., Oquendo, M.A., Birmaher, B., Burke, A., … Brent, D.A. (2012b). A longitudinal study of nonsuicidal self-injury in offspring at high risk for mood disorder. *Journal of Clinical Psychiatry*, 73(6), 821-828. doi: 10.4088/JCP.11m07250.

Crawford, M.J., Turnbull, G., & Wessely, S. (1998). Deliberate self harm assessment by accident and emergency staff – an interention study. *Journal of Accident & Emergency Medicine*, 15(1), 18-22.

Cuellar, J., & Curry, T. R. (2007). The prevalence and comorbidity between delinquency, drug abuse, suicide attempts, physical and sexual abuse, and self-mutilation among

delinquent hispanic females. *Hispanic Journal of Behavioral Sciences, 29*(1), 68-82. http://dx.doi.org/10.1177/0739986306295796

Darche, M. A. (1990). Psychological factors differentiating self-mutilating and non-self-mutilating adolescent inpatient females. *Psychiatric Hospital, 21*(1), 31-35. Retrieved from http://search.proquest.com/docview/617747575?accountid=14569

de Graaf, R., Sandfort, T. G. M., & ten Have, M. (2006). Suicidality and sexual orientation: Differences between men and women in a general population-based sample from the netherlands. *Archives of Sexual Behavior, 35*(3), 253-262. http://dx.doi.org/10.1007/s10508-006-9020-z

DiClemente, R. J., Ponton, L. E., & Hartley, D. (1991). Prevalence and correlates of cutting behavior: Risk for HIV transmission. *Journal of the American Academy of Child & Adolescent Psychiatry, 30*(5), 735-739. Retrieved from http://search.proquest.com/docview/618098871?accountid=14569

Emslie, G., Kratochvil, C., Vitiello, B., Silva, S., Mayes, T., McNulty, S., … March, J.; Comlumbia Suicidality Classification Group; TADS Team. (2006). Treatment for Adolescents with Depression Study (TADS): Safety results. *Journal of the American Academy of Child and Adolescent Psychiatry*, 45(12), 1440-1455.

D'Zurilla, T. J., & Goldfried, M. R. (1971). Problem solving and behavior modification. *Journal of Abnormal Psychology, 78*(1), 107-126. http://dx.doi.org/10.1037/h0031360

Falcone, G., Nardella, A., Lamis, D. A., Erbuto, D., Girardi, P., & Pompili, M. (2017). Taking care of suicidal patients with new technologies and reaching-out means in

the post-discharge period. *World Journal of Psychiatry, 7*(3), 163-176. doi: 10.5498/wjp.v7.i3.163

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149-1160. doi:10.3758/BRM.41.4.1149

Fergusson, D. M., Horwood, L. J., & Beautrais, A. L. (1999). Is sexual orientation related to mental health problems and suicidality in young people? *Archives of General Psychiatry, 56*(10), 876-880. http://dx.doi.org/10.1001/archpsyc.56.10.876

Field, A. (2013). Discovering statistics using IBM SPSS statistics, fourth edition. Washington, DC: SAGE Publications Ltd.

Fisher, R. A. (1922). On the interpretation of chi square from contingency tables, and the calculation of P. *Journal of the Royal Statistical Society*, 85, 87-94.

Fox, K. R., Franklin, J. C., Ribeiro, J. D., Kleiman, E. M., Bentley, K. H., & Nock, M. K. (2015). Meta-analysis of risk factors for nonsuicidal self-injury. *Clinical Psychology Review, 42*, 156-167. doi:10.1016/j.cpr.2015.09.002.

Gandhi, A., Luyckx, K., Baetens, I., Kiekens, G., Sleuwaegen, E., Berens, A., … Claes, L. (2018). Age of onset of non-suicidal self-injury in Dutch-speaking adolescents and emerging adults: An event history analysis of pooled data. *Comprehensive Psychiatry, 80*, 170-178. https://doi.org/10.1016/j.comppsych.2017.10.007

Garcia-Nieto, R., Carballo, J. J., Diaz de Neira Hernando, M., de Leon-Martinez, V., & Baca-Garcia, E. (2015). Clinical correlates of non-suicidal self-injury (NSSI) in an outpatient sample of adolescents. *Archives of Suicide Research,19(2)*, 218–230. http://dx. doi.org/10.1080/13811118.2014.957447.

Gardner, D. L., & Cowdry, R. W. (1985). Suicidal and parasuicidal behavior in borderline personality disorder. *Psychiatric Clinics of North America, 8*(2), 389-403. Retrieved from http://search.proquest.com/docview/617158753?accountid=14569

Garisch, J. A., & Wilson, M. S. (2015). Prevalence, correlates, and prospective predictors of non-suicidal self-injury among New Zealand adolescents: Cross-sectional and longitudinal survey data. *Child and Adolescent Psychiatry and Mental Health, 9*, 28-38. doi: 10.1186/s13034-015-0055-6

Geulayov, G., Casey, D., McDonald, K. C., Foster, P., Pritchard, K. Wells, C., … Hawton, K. (2017). Incidence of suicide, hospital-presenting non-fatal self-harm, and community-occurring non-fatal self-harm in adolescents in England (the iceberg model of self-harm): A retrospective study. *Lancet Psychiatry* (published online ahead of print 12 December). Available at: http://dx.doi.org/10.1016/ S2215-0366(17)30478-9 (Accessed 1 January 2018).

Gladstone, G. L., Parker, G. B., Mitchell, P. B., Malhi, G. S., Wilhelm, K., & Austin, M. (2004). Implications of childhood trauma for depressed women: An analysis of pathways from childhood sexual abuse to deliberate self-harm and revictimization. *The American Journal of Psychiatry, 161*(8), 1417-1425. http://dx.doi.org/10.1176/appi.ajp.161.8.1417

Goldney, R. D., Smith, S., Winefield, A. H., Tiggemann, M., & Winefield, H. R. (1991). Suicidal ideation: Its enduring nature and associated morbidity. *Acta Psychiatrica Scandinavica, 83*(2), 115-120.

Gould, M.S. (1990). Teenage suicide clusters. *Journal of the American Medical Association*, 263(15), 2051-2052. doi:10.1001/jama.1990.03440150055023.

Gould, M. S., King, R., Greenwald, S., Fisher, P., Schwab-Stone, M., Kramer, R., . . . Shaffer, D. (1998). Psychopathology associated with suicidal ideation and attempts among children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 37*(9), 915-923.

Gould, M.S., Wallenstein, S., & Kleinman, M. (1990). Time-space clustering of teenage suicide. *American Journal of Epidemiology*, 131(1), 71–78.

Gratz, K. L. (2001). Measurement of deliberate self-harm: Preliminary data on the deliberate self-harm inventory. *Journal of Psychopathology and Behavioral Assessment, 23*(4), 253-263. http://dx.doi.org/10.1023/A:1012779403943

Groschwitz, R. C., Kaess, M., Fischer, G., Ameis, N., Schulze, U. M. E., Brunner, R., … Plener, P. L. (2015). The association of non-suicidal self-injury and suicidal behavior according to DSM-5 in adolescent psychiatric inpatients. *Psychiatry Research, 228*, 454-461. http://dx.doi.org/10.1016/j.psychres.2015.06.019

Guan, K., Fox, K R., & Prinstein, M. J. (2012). Nonsuicidal self-injury as a time-invariant predictor of adolescent suicide ideation and attempts in a diverse community sample. *Journal of Consulting and Clinical Psychology, 80*(5), 842-849. doi:10.1037/a0029429.

Gunderson, J. G., & Singer, M. T. (1975). Defining borderline patients: An overview. *The American Journal of Psychiatry, 132*(1), 1-10. Retrieved from http://search.proquest.com/docview/615980859?accountid=14569

Guthrie, E., Kapur, N., Mackway-Jones, K., Chew-Graham, C., Moorey, J., Mendel, E., … Tomenson, B. (2001). Randomised controlled trial of brief psychological intervention after deliberate self poisoning. *British Medical Journal, 323, 135-138.*

Hallahan, B., Hibbeln, R. J., Davis, J. M. , & Garland, M.R. (2007). Omega-3 fatty acid supplementation in patients with recurrent selfharm: Single-centre double-blind randomised controlled trial. *The British Journal of Psychiatry*, *190*, 118–122. doi: 10.1192/bjp.bp.106.022707

Hamza, C. A., & Willoughby, T. (2013). Nonsuicidal self-injury and suicidal behavior: A latent class analysis among young adults. *PLoS ONE, 8*(3):e59955. doi: 10.1371/journal.pone.0059955.

Hamza, C. A., & Willoughby, T. (2016). Nonsuicidal self-injury and suicidal risk among emerging adults. *Journal of Adolescent Health, 59*, 411-415. http://dx.doi.org/10.1016/j.jadohealth.2016.05.019

Hamza, C. A., Willoughby, T., & Heffer, T. (2015). Impulsivity and nonsuicidal self-injury: A review and meta-analysis. *Clinical Psychology Review*, 38, 13-24. http://dx.doi.org/10.1016/j.cpr.2015.02.010

Hatcher, S., Sharon, C., Parag, V., & Collins, N. (2011). Problem-sovling therapy for people who present to hospital with self-harm: Zelen radomised controlled trial. *British Journal of Psychiatry, 199(4),* 310-316. https://doi.org/10.1192/bjp.bp.110.090126

Hawton, K., Bergen, H., Cooper, J., Turnbull, P., Water, K., Ness, J., & Kapur, N. (2015a). Suicide following self-harm: Findings from the Multicentre Study of self-harm in England, 2000-2012. *Journal of Affective Disorders, 175*, 147-151. http://dx.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, 53*(12), 1212-1219. http://dx.doi.org/10.1111/j.1469-7610.2012.02559.x

Hawton, K., Fagg, J., Simkin, S., Bale, E., & Bond, A. (1997). Trends in deliberate self-harm in oxford, 1985–1995: Implications for clinical services and the prevention of suicide. *The British Journal of Psychiatry, 171*, 556-560.

Hawton, K., Hall, S., Simkin, S., Bale, L., Bond, A., Codd, S., & Stewart, A. (2003). Deliberate self-harm in adolescents: A study of characteristics and trends in oxford, 1990-2000. *Journal of Child Psychology and Psychiatry, 44*(8), 1191-1198. http://dx.doi.org/10.1111/1469-7610.00200

Hawton, K., Harriss, L., Hall, S., Simkin, S., Bale, E., & Bond, A. (2003). Deliberate self-harm in oxford, 1990-2000: A time of change in patient characteristics. *Psychological Medicine, 33*(6), 987-995. http://dx.doi.org/10.1017/S0033291703007943

Hawton, K., Houston, K., Haw, C., Townsend, E., & Harriss, L. (2003). Comorbidity of axis I and axis II disorders in patients who attempted suicide. *The American*

Journal of Psychiatry, 160(8), 1494-1500. http://dx.doi.org/10.1176/appi.ajp.160.8.1494

Hawton, K., McKeown, S., Day, A., Martin, P., O'Connor, M., & Yule, J. (1987). Evaluation of out-patient counselling compared with general practitioner care following overdoses. *Psychological Medicine, 17*(3), 751-761. Retrieved from http://search.proquest.com/docview/617450031?accountid=14569

Hawton, K., Rodham, K., Evans, E., & Weatherall, R. (2002). Deliberate self harm in adolescents: Self report survey in schools in england. *BMJ: British Medical Journal, 325*(7374), 1207-1211. http://dx.doi.org/10.1136/bmj.325.7374.1207

Hawton, K., Witt, K. G., Taylor Salisbury, T. L., Arensman, E., Gunnell, D., Hazell, P., … van Heeringen, K. (2015b). Pharmacological interventions for self-harm in adults. *Cochrane Database of Systematic Reviews, 7, 1-58.* doi: 10.1002/14651858.CD011777.

Hawton, K., Witt, K. G., Taylor Salisbury, T. L., Arensman, E., Gunnell, D., Hazell, P., … van Heeringen, K. (2016a). Psychosocial interventions for self-harm in adults. *Cochrane Database of Systematic Reviews, 5*, 1-308. doi: 10.1002/14651858.CD012189.

Hawton, K., Witt, K. G., Taylor Salisbury, T. L., Arensman, E., Gunnell, D., Hazell, P., … van Heeringen, K. (2016a). Psychosocial interventions for self-harm in adults. *Lancet Psychiatry, 3*, 740-750. http://dx.doi.org/10.1016/S2215-0366(16)30070-0

Hepple, J., & Quinton, C. (1997). One hundred cases of attempted suicide in the elderly. *The British Journal of Psychiatry, 171*, 42-46. Retrieved from http://search.proquest.com/docview/619095736?accountid=14569

Herman, S. M. (2006). Is the SADPERSONS scale accurate for the veterans affairs population? *Psychological Services, 3*(2), 137-141. http://dx.doi.org/10.1037/1541-1559.3.2.137

Herpertz, S. (1995). Self-injurious behaviour: Psychopathological and nosological characteristics in subtypes of self-injurers. *Acta Psychiatrica Scandinavica, 91*(1), 57-68. Retrieved from http://search.proquest.com/docview/618706006?accountid=14569

Herrell, R., Goldberg, J., True, W. R., Ramakrishnan, V., Lyons, M., Eisen, S., & Tsuang, M. T. (1999). Sexual orientation and suicidality: A co-twin control study in adult men. *Archives of General Psychiatry, 56*(10), 867-874. http://dx.doi.org/10.1001/archpsyc.56.10.867

Hirsch, S., Walsh, C., & Draper, R. (1982). Parasuicide: A review of treatment interventions. *Journal of Affective Disorders, 4*, 299–311.

Hjelmeland, H. (1996). Verbally expressed intentions of parasuicide: II. Prediction of fatal and nonfatal repetition. *Crisis, 17*(1), 10-14.

Hockberger, R.S., & Rothstein, R.J. (1988). Assessments of suicide potential by nonpsychiatrists using the SAD PERSONS score. *Journal of Emergency Medicine*, 6(2), 99-107.

Hosmer, D.W., Lemeshow, S., & May, S. (2008). Applied survival analysis. Regression modeling of time-to-event data. Second Edition. John Wiley & Sons, Inc., Hoboken: New Jersey.

Jacobson, C. M., Muehlenkamp, J. J., Miller, A. L., & Turner, J. B. (2008). Psychiatric impairment among adolescents engaging in different types of deliberate self-harm.

Journal of Clinical Child and Adolescent Psychology, 37(2), 363-375. http://dx.doi.org/10.1080/15374410801955771

Jenkins, G. R., Hale, R., Papanastassiou, M., Crawford, M. J., & Tyrer, P. (2002). Suicide rate 22 years after parasuicide: Cohort study. *BMJ: British Medical Journal, 325*(7373), 1155. http://dx.doi.org/10.1136/bmj.325.7373.1155

Joiner, T. E., Jr. (2003). Contagion of suicidal symptoms as a function of assortative relating and shared relationship stress in college roommates. *Journal of Adolescence, 26*(4), 495-504. http://dx.doi.org/10.1016/S0140-1971(02)00133-1

Joiner, T. E. (2005). *Why people die by suicide.* Cambridge, MA: Harvard University Press.

Joyce, P. R., Light, K. J., Rowe, S. L., Cloninger, C. R., & Kennedy, M. A. (2010). Self-mutilation and suicide attempts: Relationships to bipolar disorder, borderline personality disorder, temperament and character. *Australian and New Zealand Journal of Psychiatry, 44*(3), 250-257. http://dx.doi.org/10.3109/00048670903487159

Juhnke, G. A., & Hovestadt, A. J. (1995). Using the SAD PERSONS scale to promote supervisee suicide assessment knowledge. *The Clinical Supervisor, 13*(2), 31-40.

Kaczkurkin, A. N., & Foa, E. B. (2015). Cognitive-behavioral therapy for anxiety disorders: An update on the empirical evidence. *Dialogues in Clinical Neuroscience, 17*, 337-346.

Kapur, N., Cooper, J., King-Hele, S., Webb, R., Lawlor, M., Rodway, C., & Appleby, L. (2006). The repetition of suicidal behavior: A multicenter cohort study. *Journal of Clinical Psychiatry, 67*(10), 1599-1609. http://dx.doi.org/10.4088/JCP.v67n1016

Kapur N., Cooper, J., O'Connor, R.C., & Hawton, K. (2013). Non-suicidal self-injury v. attempted suicide: New diagnosis or false dichotomy? *British Journal of Psychiatry*, 202, 326-328. doi:10.1192/bjp.bp.112.116111

Kim, K. L., Galvan, T., Puzia, M. E., Cushman, G. K., Seymour, K. E., Vanmali, R., … Dickstein, D. P. (2015). Psychiatric and self-injury profiles of adolescent suicide attempters versus adolescents engaged in nonsuicidal self-injury. *Suicide and Life-Threatening Behavior, 45*(1), 37-50. doi: 10.1111/sltb.12110

Kirtley, O. J., O'Carroll, R. E., & O'Connor, R. C. (2016). Pain and self-harm: A systematic review. *Journal of Affective Disorders, 203*, 347-363. http://dx.doi.org/10.1016/j.jad.2016.05.068

Klonsky, E. D. (2009). The functions of self-injury in young adults who cut themselves: Clarifying the evidence for affect-regulation. *Psychiatry Research, 166*(2-3), 260-268. http://dx.doi.org/10.1016/j.psychres.2008.02.008

Klonsky, E.D. (2011). Non-suicidal self-injury in United States adults: Prevalence, sociodemographics, topography and functions. *Psychological Medicine, 41*, 1981–1986. http://dx.doi.org/10.1017/S0033291710002497.

Klonsky, E. D., May, A . M. , & Glenn, C. R. (2013). The relationship between nonsuicidal self-injury and attempted suicide: Converging evidence from four samples. *Journal of Abnormal Psychology, 122*(1), 231-237. doi: 10.1037/a0030278

Klonsky, E. D., May, A . M. , & Saffer, B. Y. (2016). Suicide, suicide attempts, and suicidal ideation. *Annual Review of Clinical Psychology, 12,* 307-330. doi: 10.1146/annurev-clinpsy-021815-093204

Kessler, R. C., Berglund, P., Borges, G., Nock, M., & Wang, P. S. (2005). Trends in suicide ideation, plans, gestures, and attempts in the united states, 1990-1992 to 2001-2003. *JAMA: Journal of the American Medical Association, 293*(20), 2487-2495. http://dx.doi.org/10.1001/jama.293.20.2487

Kessler, R. C., Borges, G., & Walters, E. E. (1999). Prevalence of and risk factors for lifetime suicide attempts in the national comorbidity survey. *Archives of General Psychiatry, 56*(7), 617-626.

Klonsky, E. D. (2011). Non-suicidal self injury in United States adults: Prevalence, sociodemographics, topography and functions. *Psychological Medicine, 41*(9), 1981-1986. http://dx.doi.org/10.1017/S0033291710002497

Klonsky, E. D., & Muehlenkamp, J. J. (2007). Self-injury: A research review for the practitioner. *Journal of Clinical Psychology, 63*(11), 1045-1056. Retrieved from http://search.proquest.com/docview/621924569?accountid=14569

Klonsky, E. D., Oltmanns, T. F., & Turkheimer, E. (2003). Deliberate self-harm in a nonclinical population: Prevalence and psychological correlates. *The American Journal of Psychiatry, 160*(8), 1501-1508. http://dx.doi.org/10.1176/appi.ajp.160.8.1501

Koons, C. R., Robins, C. J., Tweed, J. L., Lynch, T. R., Gonzalez, A. M., Morse, J. Q., . . . Bastian, L. A. (2001). Efficacy of dialectical behavior therapy in women veterans with borderline personality disorder. *Behavior Therapy, 32*(2), 371-390. http://dx.doi.org/10.1016/S0005-7894(01)80009-5

Large, M. M., Ryan, C. J., Carter, G., & Kapur, N. (2017). Can we usefully stratify patients according to suicide risk? *BMJ, 359*, j4627. doi: 10.1136/bmj.j4627

Lauterbach, E., Ahrens, B., Felber, W., Muller-Oerlinghausen, B., Kilb, B., Bischof, G., ... Hohagen, F. (2005). Suicide prevention by lithium (SUPLI): Challenges of a multi-center prospective study. *Archives of Suicide Research*, *9*(1), 27–34. doi: 10.1080/13811110590512886

Lauterbach, E., Felber, W., Müller-Oerlinghausen, B., Ahrens, B., Bronisch, T., Meyer, T., … Hohagen, F. (2008). Adjunctive lithium treatment in the prevention of suicidal behaviour in depressive disorders: A randomised, placebo-controlled, 1-year trial. *Acta Psychiatrica Scandinavica, 118*(6), 469–479. doi: 10.1111/j.1600-0447.2008.01266.x.

Lerner, M. S., & Clum, G. A. (1990). Treatment of suicide ideators: A problem-solving approach. *Behavior Therapy, 21*(4), 403-411. Retrieved from http://search.proquest.com/docview/617906105?accountid=14569

Liberman, R. P., & Eckman, T. (1981). Behavior therapy vs insight-oriented therapy for repeated suicide attempters. *Archives of General Psychiatry, 38*(10), 1126-1130. Retrieved from http://search.proquest.com/docview/616597192?accountid=14569

Lilley, R., Owens, D., Horrocks, J., House, A., Noble, R., Bergen, H., . . . Kapur, N. (2008). Hospital care and repetition following self-harm: Multicentre comparison of self-poisoning and self-injury. *The British Journal of Psychiatry, 192*(6), 440-445. http://dx.doi.org/10.1192/bjp.bp.107.043380

Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York, NY, US: Guilford Press, New York, NY. Retrieved from http://search.proquest.com/docview/618396253?accountid=14569

Linehan, M. M., Armstrong, H. E., Suarez, A., & Allmon, D. (1991). Cognitive-behavioral treatment of chronically parasuicidal borderline patients. *Archives of General Psychiatry, 48*(12), 1060-1064. Retrieved from http://search.proquest.com/docview/618103986?accountid=14569

Linehan, M. M., Comtois, K. A., Murray, A. M., Brown, M. Z., Gallop, R. J., Heard, H. L., … Lindenboim, N. (2006). Two-year randomized controlled trial and follow-up of Dialectical Behavior Therapy vs therapy by experts for suicidal behaviors and borderling personality disorder. *JAMA Psychiatry, 63(7),* 757-766. doi:10.1001/archpsyc.63.7.757

Linehan, M. M., Dimeff, L. A., Reynolds, S. K., Comtois, K. A., Welch, S. S., Heagerty, P., & Kivlahan, D. R. (2002). Dialectical behavior therapy versus comprehensive validation therapy plus 12-step for the treatment of opioid dependent women meeting criteria for borderline personality disorder. *Drug and Alcohol Dependence, 67*(1), 13-26. http://dx.doi.org/10.1016/S0376-8716(02)00011-X

Liu, R. T., Scopelliti, K. M., Pittman, S. K., & Zamora, A. S. (2017). Childhood maltreatment and non-suicidal self-injury: A systematic review and meta-analysis. *Lancet Psychiatry* (published online ahead of print 28 November). Available at: http://dx.doi.org/10.1016/S2215-0366(17)30469-8 (Accessed 1 January 2018).

Lloyd-Richardson, E., Perrine, N., Dierker, L., & Kelley, M. L. (2007). Characteristic and functions on non-suicidal self-injury in a community sample of adolescents. *Psychological Medicine, 37*(8), 1183-1192. http://dx.doi.org/10.1017/S003329170700027X

Lockwood, J., Daley, D., Townsend, E., & Sayal, K. (2017). Impulsivity and self-harm in adolescence: A systematic review. *European Child & Adolescent Psychiatry, 26,* 387-402. doi: 10.1007/s00787-016-0915-5

Low, G., Jones, D., Duggan, C., Power, M., & MacLeod, A. (2001). The treatment of deliberate self-harm in borderline personality disorder using dialectical behaviour therapy: A pilot study in a high security hospital. *Behavioural and Cognitive Psychotherapy, 29*(1), 85-92. Retrieved from http://search.proquest.com/docview/619690891?accountid=14569

Maciejewski, D. F., Creemers, H. E., Lynskey, M. T., Madden, P. A. F., Heath, A. C., Statham, D. J., … Verweij, K. J. H. (2014). Overlapping genetic and environmental influences on nonsuicidal self-injury and suicidal ideation different outcomes, same etiology? *JAMA Psychiatry, 71*(6), 699-705. doi:10.1001/jamapsychiatry.2014.89

Mangnall, J., & Yurkovich, E. (2008). A literature review of deliberate self-harm. *Perspectives in Psychiatric Care, 44*(3), 175-184. http://dx.doi.org/10.1111/j.1744-6163.2008.00172.x

Mann, J. J., Waternaux, C., Haas, G. L., & Malone, K. M. (1999). Toward a clinical model of suicidal behavior in psychiatric patients. *The American Journal of Psychiatry, 156*(2), 181-189.

Markowitz, P. I. (1992). Effect of fluoxetine on self-injurious behavior in the developmentally disabled: A preliminary study. *Journal of Clinical Psychopharmacology, 12*(1), 27-31. Retrieved from http://search.proquest.com/docview/618136720?accountid=14569

Mars, B., Heron, J., Crane, C., Hawton, K., Kidger, J., Lewis, G., … Gunnell, D. (2014a). Differences in risk factors for self-harm with and without suicidal intent: Findings form the ALSPAC cohort. *Journal of Affective Disorders, 168*, 407-414. http://dx.doi.org/10.1016/j.jad.2014.07.009

Mars, B., Heron, J., Crane, C., Hawton, K., Lewis, G., Macleod, J., … Gunnell, D. (2014b). Clinical and social outcomes of adolescent self harm: Population based birth cohort study. *BMJ, 349*, g5954. doi: 10.1136/bmj.g5954

Marzuk, P. M., Leon, A. C., Tardiff, K., Morgan, E. B., Stajic, M., & Mann, J. J. (1992). The effect of access to lethal methods of injury on suicide rates. *Archives of General Psychiatry, 49*(6), 451-458.

McLeavey, B. C., Daly, R. J., Ludgate, J. W., & Murray, C. M. (1994). Interpersonal problem-solving skills training in the treatment of self-poisoning patients. *Suicide and Life-Threatening Behavior, 24*(4), 382-394. Retrieved from http://search.proquest.com/docview/618663175?accountid=14569

Melhem, N. M., Brent, D. A., Ziegler, M., Iyengar, S., Kolko, D., Oquendo, M., . . . Stanley, J. J. (2007). Familial pathways to early-onset suicidal behavior: Familial and individual antecedents of suicidal behavior. *The American Journal of Psychiatry, 164*(9), 1364-1370. http://dx.doi.org/10.1176/appi.ajp.2007.06091522

Meyer, R. E., Salzman, C., Youngstrom, E. A., Clayton, P. J., Goodwin, F. K., Mann, J. J., … Sheehan, D. A. (2010). Suicidality and risk of suicide – definition, drug safety concerns, and a necessary target for drug development: A brief report. *Journal of Clinical Psychiatry*, 71(8), 1040-1046. doi: 10.4088/JCP.10cs06070blu.

Milner, A., J., Carter, G., Pirkis, J., Robinson, J., & Spittal, J. (2015). Letters, green

cards, telephone calls and postcards: Systematic and meta-analytic review of brief contact interventions for reducing self-harm, suicide attempts and suicide. *The British Journal of Psychiatry, 206*, 184-190. doi: 10.1192/bjp.bp.114.147819

Montgomery, S., Montgomery, D., Jayanthi-Rani, S., Roy, D., Shaw, P., McAuley, R. (1979). Maintenance therapy in repeat suicidal behaviour: A placebo controlled trial. *Proceedings of the 10th International Congress for Suicide Prevention and Crisis Intervention*. Ottawa, Canada, 227–229.

Montgomery, S., Roy, D., & Montgomery, D. (1983). The prevention of recurrent suicidal acts. *British Journal of Clinical Pharmacology*, *15*, 183s–188s.

Moran, P., Coffey, C., Romaniuk, H., Olsson, C., Borschmann, R., Carlin, J. B., & Patton, G. C. (2012). The natural history of self-harm from adolescence to young adulthood: A population-based cohort study. *Lancet, 379*, 236-243. doi:10.1016/S0140-6736(11)61141-0

Morey, Y., Mellon, D., Dailami, N., Verne, J., & Tapp, A. (2016). Adolescent self-harm in the community: An update on prevalence using a self-report survey of adolescents aged 13-18 in England. *Journal of Public Health, 39*(1), 58-64. doi:10.1093/pubmed/fdw010

Muehlenkamp, J. J. (2006). Empirically supported treatments and general therapy guidelines for non-suicidal self-injury. *Journal of Mental Health Counseling, 28*(2), 166-185. Retrieved from http://search.proquest.com/docview/621180907?accountid=14569

Muehlenkamp, J. J., Claes, L., Havertape, L., & Plener, P. L. (2012). International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child & Adolescent Psychiatry & Mental Health*, 6(10), 1-9. doi: 10.1186/1753-2000-6-10.

Muehlenkamp, J. J., Engel, S. G., Wadeson, A., Crosby, R. D., Wonderlich, S. A., Simonich, H., & Mitchell, J. E. (2009). Emotional states preceding and following acts of non-suicidal self-injury in bulimia nervosa patients. *Behaviour Research and Therapy, 47*(1), 83-87. http://dx.doi.org/10.1016/j.brat.2008.10.011

Muehlenkamp, J. J., & Gutierrez, P. M. (2007). Risk for suicide attempts among adolescents who engage in non-suicidal self-injury. *Archives of Suicide Research, 11*(1), 69-82.

Nada-Raja, S., Skegg, K., Langley, J., Morrison, D., & Sowerby, P. (2004). Self-harmful behaviors in a population-based sample of young adults. *Suicide and Life-Threatening Behavior*, 34(2), 177-186. doi: 10.1521/suli.34.2.177.32781

Nakaji, S., Parodi, S., Fontana, V., Umeda, T., Suzuki, K., Sakamoto, J., Fukuda, S., Wada, S., & Sugawara, K. (2004). Seasonal changes inmortality rates from main causes of death in Japan. European Journal of Epidemiology, 19 (10), 905–913. http://dx.doi.org/10.1007/s10654-004-4695-8

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. http://dx.doi.org/10.1111/j.1467-8721.2009.01613.x

Nock, M. K. (2010). Self-injury. *Annual Review of Clinical Psychology, 6*, 339-363. http://dx.doi.org/10.1146/annurev.clinpsy.121208.131258

Nock, M. K., Borges, G., Bromet, E. J., Alonso, J., Angermeyer, M., Beautrais, A., . . . Williams, D. (2008a). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *The British Journal of Psychiatry, 192*(2), 98-105.

Nock, M.K., Borges, G., Bromet, E.J., Cha, C.B., Kessler, R.C., & Lee, S. (2008b). Suicide and suicidal behavior. *Epidemiologic Reviews*, 30(1), 133-154. doi:10.1093/epirev/mxn002

Nock, M. K., Holmberg, E. B., Photos, V. I., & Michel, B. D. (2007). Self-injurious thoughts and behaviors interview: Development, reliability, and validity in an adolescent sample. *Psychological Assessment, 19*(3), 309-317. http://dx.doi.org/10.1037/1040-3590.19.3.309

Nock, M. K., & Kessler, R. C. (2006). Prevalence of and risk factors for suicide attempts versus suicide gestures: Analysis of the national comorbidity survey. *Journal of Abnormal Psychology, 115*(3), 616-623. http://dx.doi.org/10.1037/0021-843X.115.3.616

Nock, M. K., & Prinstein, M. J. (2004). A functional approach to the assessment of self-mutilative behavior. *Journal of Consulting and Clinical Psychology, 72*(5), 885-890. http://dx.doi.org/10.1037/0022-006X.72.5.885

Nock, M. K., Prinstein, M. J., & Sterba, S. K. (2009). Revealing the form and function of self-injurious thoughts and behaviors: A real-time ecological assessment study among adolescents and young adults. *Journal of Abnormal Psychology, 118*(4), 816-827. http://dx.doi.org/10.1037/a0016948

O'Connor, R. C., Whyte, M., Fraser, L., Masterton, G., Miles, J., & MacHale, S. (2007). Predicting short-term outcome in well-being following suicidal behaviour: The

conjoint effects of social perfectionism and positive future thinking. *Behaviour Research and Therapy, 45*(7), 1543-1555. http://dx.doi.org/10.1016/j.brat.2006.11.006

O'Donnell, O., House, A., & Waterman, M. (2015). The co-occurrence of aggression and self-harm: Systematic literature review. *Journal of Affective Disorders, 175*, 325-350. http://dx.doi.org/10.1016/j.jad.2014.12.051

Olfson, M., Marcus, S. C., & Bridge, J. A. (2012). Emergency treatment of deliberate self-harm. *Archives of General Psychiatry, 69*(1), 80-88. http://dx.doi.org/10.1001/archgenpsychiatry.2011.108

Olfson, M., Marcus, S. C., & Bridge, J. A. (2013). Emergency department recognition of mental disorders and short-term outcome of deliberate self-harm. *American Journal of Psychiatry, 170*(12), 1442-1450. doi: 10.1176/appi.ajp.2013.12121506.

Orlando, C. M., Broman-Fulks, J. J., Whitlock, J. L., Curtin, L., & Michael, K. D. (2015). Nonsuicidal self-injury and suicidal self-injury: A taxometric investigation. *Behavior Therapy, 46*, 824-833. doi: 10.1016/j.beth.2015.01.002.

Owens, D., Horrocks, J., & House, A. (2002). Fatal and non-fatal repetition of self-harm: Systematic review. *The British Journal of Psychiatry, 181*(3), 193-199. http://dx.doi.org/10.1192/bjp.181.3.193

Owens, D., Kelley, R., Munyombwe, T., Bergen, H., Hawton, K, Cooper, J., … Kapur, N. (2015). Switching methods of self-harm at repeat episodes: Findings from a multicentre cohort study. *Journal of Affective Disorders, 180,* 44-51. http://dx.doi.org/10.1016/j.jad.2015.03.051

Owens, D., Wood, C., Greenwood, D. C., Hughes, T., & Dennis, M. (2005). Mortality and suicide after non-fatal self-poisoning: 16-year outcome study. *British Journal of Psychiatry, 187*, 470-475. doi: 10.1192/bjp.187.5.470

Parker, G., Malhi, G., Mitchell, P., Kotze, B., Wilhelm, K., & Parker, K. (2005). Self-harming in depressed patients: Pattern analysis. *Australian and New Zealand Journal of Psychiatry, 39*(10), 899-906. http://dx.doi.org/10.1111/j.1440-1614.2005.01662.x

Patterson, W. M., Dohn, H. H., Bird, J., & Patterson, G. A. (1983). Evaluation of suicidal patients: The SAD PERSONS scale. *Psychosomatics: Journal of Consultation and Liaison Psychiatry, 24*(4), 343-349.

Petridou, E., Papadopoulos, F. C., Frangakis, C. E., Skalkidou, A., & Trichopoulos, D. (2002). A role of sunshine in the triggering of suicide. *Epidemiology*, 13(1), 106-109.

Petronis, K. R., Samuels, J. F., Moscicki, E. K., & Anthony, J. C. (1990). An epidemiologic investigation of potential risk factors for suicide attempts. *Social Psychiatry and Psychiatric Epidemiology, 25*(4), 193-199.

Pitts, S.R., Niska, R.W., Xu, J., & Burt, C.W. (2008). National hospital ambulatory medical care survey: 2006 emergency department summary. *National Health Statistics Reports*, 7, 1-39. Retrieved from: http://www.cdc.gov/nchs/data/nhsr/nhsr007.pdf

Plener, P. L., Allroggen, M., Kapusta, N. D., Brahler, E., Fegert, J. M., & Groschwitz, R. C. (2016). The prevalence of nonsuicidal self-injury (NSSI) in a representative

sample of the German population. *BMC Psychiatry, 16*, 353-359. doi: 10.1186/s12888-016-1060-x

Plener, P. L., Libal, G., Keller, F., Fegert, J. M., & Muehlenkamp, J. J. (2009). An international comparison of adolescent non-suicidal self-injury (NSSI) and suicide attempts: Germany and the USA. *Psychological Medicine, 39*(9), 1549-1558. http://dx.doi.org/10.1017/S0033291708005114

Plener, P., Schumacher, T., Munz, L., & Groschwitz, R. (2015). The longitudinal course of non-suicidal self-injury and deliberate self-harm: a systematic review of the literature. *Borderline Personality Disorder and Emotion Dysregulation, 2*(1), 2-12. doi: 10.1186/s40479-014-0024-3

Posner, K., Oquendo, M. A., Gould, M., Stanley, B., & Davies, M. (2007). Columbia classification algorithm of suicide assessment (C-CASA): Classification of suicidal events in the FDA's pediatric suicidal risk analysis of antidepressants. *The American Journal of Psychiatry, 164*(7), 1035-1043. http://dx.doi.org/10.1176/appi.ajp.164.7.1035

Posporelis, S., Paspali, A., Takayanagi, Y., Sawa, A., Banerjea, P., & Kyriakopoulos, M. (2015). Demographic and clinical correlates of suicidality in adolescents attending a specialist community mental health service: A naturalistic study. *Journal of Mental Health, 24*(4), 225-229. doi: 10.3109/09638237.2015.1022249

Preti, A., Miotto, P., & Coppi, M. d. (2000). Season and suicide: Recent findings from italy. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 21*(2), 59-70. http://dx.doi.org/10.1027//0227-5910.21.2.59

Rector, N. A., Man, V., & Lerman, B. (2014). The expandinf cognitive-behavioural therapy treatment umbrella for the anxiety disorders: Disorder-specific and transdiagnostic approaches. *Canadian Journal of Psychiatry, 59*(6), 301-309. doi: 10.1177/070674371405900603

Redden, L., Prittchett, Y., Robieson, W., Kovacs, X., Garofalo, M., Tracy K., & Saltarelli, M. (2011). Suicidality and divalproex sodium: Analysis of controlled studies in multiple indications. *Annals of General Psychiatry*, 10(1), 1-10. doi: 10.1186/1744-859X-10-1.

Romans, S. E., Martin, J. L., Anderson, J. C., & Herbison, G. P. (1995). Sexual abuse in childhood and deliberate self-harm. *The American Journal of Psychiatry, 152*(9), 1336-1342. Retrieved from http://search.proquest.com/docview/618896948?accountid=14569

Ross, S., & Heath, N. (2002). A study of the frequency of self-mutilation in a community sample of adolescents. *Journal of Youth and Adolescence, 31*(1), 67-77. http://dx.doi.org/10.1023/A:1014089117419

Roth, A. S., Ostroff, R. B., & Hoffman, R. E. (1996). Naltrexone as a treatment for repetitive self-injurious behavior: An open-label trial. *Journal of Clinical Psychiatry, 57*(6), 233-237. Retrieved from http://search.proquest.com/docview/618856816?accountid=14569

Sandman, C. A., Touchette, P., Lenjavi, M., Marion, S., & Chicz-DeMet, A. (2003). β-Endorphin and ACTH are dissociated after self-injury in adults with developmental disabilities. *American Journal on Mental Retardation, 108*(6), 414-424. http://dx.doi.org/10.1352/0895-8017(2003)108<414:EAAADA>2.0.CO;2

Sansone, R. A., Songer, D. A., & Sellbom, M. (2006). The relationship between suicide attempts and low-lethal self-harm behavior among psychiatric inpatients. *Journal of Psychiatric Practice, 12*(3), 148-152. http://dx.doi.org/10.1097/00131746-200605000-00003

Schaffer, C. B., Carroll, J., & Abramowitz, S. I. (1982). Self-mutilation and the borderline personality. *Journal of Nervous and Mental Disease, 170*(8), 468-473. Retrieved from http://search.proquest.com/docview/616684057?accountid=14569

Schmidtke, A., Bille-Brahe, U., DeLeo, D., & Kerkhof, A. (1996). Attempted suicide in europe: Rates, trends and sociodemographic characteristics of suicide attempters during the period 1989-1992. results of the WHO/EURO multicentre study on parasuicide. *Acta Psychiatrica Scandinavica, 93*(5), 327-338.

Scoliers, G., Portzky, G., Madge, N., Hewitt, A., Hawton, K., de Wilde, E. J., . . . van Heeringen, K. (2009). Reasons for adolescent deliberate self-harm: A cry of pain and/or a cry for help? findings from the child and adolescent self-harm in europe (CASE) study. *Social Psychiatry and Psychiatric Epidemiology, 44*(8), 601-607. http://dx.doi.org/10.1007/s00127-008-0469-z

Selby, E. A., Bender, T. W., Gordon, K. H., Nock, M. K., & Joiner, T. E. (2012). Non-suicidal self-injury (NSSI) disorder: A preliminary study. *Personality Disorders: Theory, Research, and Treatment, 3*(2), 167-175. http://dx.doi.org/10.1037/a0024405

Selby, E. A., Kranzler, A., Fehling, K. B., & Panza, E. (2015). Nonsuicidal self-injury disorder: The path to diagnostic validity and final obstables. *Clinical Psychology Review, 38,* 79-91. http://dx.doi.org/10.1016/j.cpr.2015.03.003

Serafini, G., Canepa, G., Adavastro, G., Nebbia, J., Belvederi Murri, M. , Erbuto, D., … Amore, M. (2017). The relationship between childhood maltreatment and non-suicidal self-injury: A systematic review. *Frontiers in Psychiatry, 8, 149-159.* doi: 10.3389/fpsyt.2017.00149

Sevecke, K., Bock, A., Fenzel, L., Gander, M., & Fuchs, M. (2017). Nonsuicidal self-injury in a naturalistic sample of adolescents undergoing inpatient psychiatric treatment: Prevalence, gender distribution and comorbidities. *Psychiatrica Danubina, 29*(4), 522-528. https://doi.org/10.24869/psyd.2017.522

Shaffer, D., Gould, M. S., Fisher, P., Trautman, P., Moreau, D., Kleinman, M., & Flory, M. (1996). Psychiatric diagnosis in child and adolescent suicide. *Archives of General Psychiatry, 53*(4), 339-348.

Shah, A. K., & Ganesvaran, T. (1997). Inpatient suicides in an australian mental hospital. *Australian and New Zealand Journal of Psychiatry, 31*(2), 291-298. Retrieved from http://search.proquest.com/docview/619110662?accountid=14569

Shearin, E. N., & Linehan, M. M. (1994). Dialectical behavior therapy for borderline personality disorder: Theoretical and empirical foundations. *Acta Psychiatrica Scandinavica, 89*(379), 61-68. Retrieved from http://search.proquest.com/docview/618508179?accountid=14569

Skegg, K. (2005). Self-harm. *The Lancet, 366*(9495), 1471-1483. http://dx.doi.org/10.1016/S0140-6736(05)67600-3

Skinner, R., McFaull, S., Draca J., Frechette, M., Kaur, J., Pearson, C., & Thompson, W. (2016). Suicide and self-inflicted injury hospitalizations in Canada (1979 to

2014/15). *Health Promotion and Chronic Disease Prevention in Canada, 36*(11), 243-251.

Slee, N., Garnefski, N., van der Leeden, R., Arensman, E., & Spinhoven, P. (2008). Cognitive-behavioural intervention for self-harm: Randomised controlled trial. *The British Journal of Psychiatry, 192(3),* 202-211 https://doi.org/10.1192/bjp.bp.107.037564.

Steeg, S., Emsley, R., Carr, M., Cooper, J., & Kapur, N. (2018). Routine hospital management of self-harm and risk of further self-harm: Propensity score analysis using record-based cohort data. *Psychological Medicine, 48*(2), 315-326. doi: 10.1017/S0033291717001702

Suominen, K., Isometsä, E., Suokas, J., Haukka, J., Achte, K., & Lönnqvist, J. (2004). Completed suicide after a suicide attempt: A 37-year follow-up study. *The American Journal of Psychiatry, 161*(3), 563-564. http://dx.doi.org/10.1176/appi.ajp.161.3.562

Swannell, S.V., Martin, G. E., Page, A., Hasking, P. H., & St John, N. J. (2014). Prevalence of nonsuicidal self-injury in nonclinical samples: Systematic review, meta-analysis and meta-regression. *Suicide and Life-Threatening Behavior*, 44(3), 273-303. doi: 10.1111/sltb.12070

Symons, F. J., Thompson, A., & Rodriguez, M. C. (2004). Self-injurious behavior and the efficacy of naltrexone treatment: A quantitative synthesis. *Mental Retardation and Developmental Disabilities Research Reviews, 10*(3), 193-200. http://dx.doi.org/10.1002/mrdd.20031

Tabachnick, B.G., & Fidel, L.S. (2013). Using Multivariate Statistics. Sixth Edition. Boston: Pearson.

Taliaferro, L. A., & Muehlenkamp, J. J. (2015). Risk factors associated with self-injurious behavior among a national sample of undergraduate college students. *Journal of American College Health, 63*(1), 40-48. doi: 10.1080/07448481.2014.953166

Tang, J., Ma, Y., Guo, Y., Ahmed, N. I., Yu, Y., & Wang, J. (2013). Association of aggression and non-suicidal self-injury: A school-based sample of adolescents. *PLoS ONE, 8*(10), e78149. doi:10.1371/journal.pone.0078149

Townsend E., Ness, J., Waters, K., Kapur, N., Turnbull, P., Cooper, J., …Hawton, K. (2016). Self-harm and life problems: Findings from the Multicentre Study of Self-Harm in England. *Social Psychiatry and Psychiatric Epidemiology, 51,* 183-192. doi: 10.1007/s00127-015-1136-9

Tuisku, V., Kiviruusu, O., Pelkonen, M., Karlsson, L., Strandholm T., & Marttunen, M. (2014). Depressed adolescents as young adults – Predictors of suicide attempt and non-suicidal self-injury during an 8-year follow-up. *Jounrnal of Affective Disorders, 152-154*, 313-319. http://dx.doi.org/10.1016/j.jad.2013.09.031

Turner, R. M. (2000). Naturalistic evaluation of dialectical behavior therapy-oriented treatment for borderline personality disorder. *Cognitive and Behavioral Practice, 7*(4), 413-419. http://dx.doi.org/10.1016/S1077-7229(00)80052-8

Turner, B., J., Austin, S. B., & Chapman, A. L. (2014). Treating nonsuicidal self-injury: A systematic review of psychological and pharmacological interventions. *Canadian Journal of Psychiatry, 59*(11), 576-585. doi: 10.1177/070674371405901103

US Department of Health and Human Services, Food and Drug Administration (FDA), Center for Drug Evaluation and Research (CDER), Guidance for industry, 2012. Retrieved November 19, 2017, from http://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM225130.pdf.

Verheul, R., van, d. B., Koeter, M. W. J., de Ridder, Maria A. J., Stijnen, T., & van, d. B. (2003). Dialectical behaviour therapy for women with borderline personality disorder: 12-month, randomised clinical trial in the netherlands. *The British Journal of Psychiatry, 182*(2), 135-140. http://dx.doi.org/10.1192/bjp.182.2.135

Verkes, R. J., van der Mast, R. C., Hengeveld, M. W., Tuyl, J. P., Zwinderman, A. H., van Kempen, G. M. J. (1998). Reduction by paroxetine of suicidal behavior in patients with repeated suicide attempts but not major depression. *American Journal of Psychiatry, 155*, 543–547.

Victor, S. E., & Klonsky, E. D. (2014). Correlates of suicide attempts among self-injurers: A meta-analysis. *Clinical Psychology Review, 34*, 282-297. http://dx.doi.org/10.1016/j.cpr.2014.03.005

Vijayakumar, L., & Rajkumar, S. (1999). Are risk factors for suicide universal? A case-control study in india. *Acta Psychiatrica Scandinavica, 99*(6), 407-411.

Walsh, B. W., & Rosen, P. M. (1988). *Self-mutilation: Theory, research, and treatment*. New York, NY, US: Guilford Press, New York, NY. Retrieved from http://search.proquest.com/docview/617672106?accountid=14569

Ward-Ciesielski, E. F., Schumacher, J. A., & Bagge, C. L. (2016). Relations between nonsuicidal self-injury and suicide attempt characteristics in a sample of recent suicide attempters. *Crisis, 37*(4), 310-313. doi: 10.1027/0227-5910/a000400

Wester, K., Trepal, H., & King, K. (2017). Nonsuicidal self-injury: Increased prevalence in engagement. *Suicide and Life-Threatening Behavior* (published online ahead of print 28 August). Available at: doi: 10.1111/sltb.12389 (Accessed 6 January 2018).

Whitlock, J., Muehlenkamp, J., & Eckenrode, J. (2008). Variation in nonsuicidal self-injury: Identification and features of latent classes in a college population of emerging adults. *Journal of Clinical Child and Adolescent Psychology, 37*(4), 725-735. http://dx.doi.org/10.1080/15374410802359734

Whitlock, J., Muehlenkamp, J., Eckenrode, J., Purington, A., Abrams, G. B., Barreira, P., & Kress, V. (2013). Nonsuicidal self-injury as a gateway to suicide in young adults. *Journal of Adolescent Health, 52*, 486-492. http://dx.doi.org/10.1016/j.jadohealth.2012.09.010

Wilcox, H. C., Arria, A. M., Caldeira, K. M., Vincent, K. B., Pinchevsky, G. M., & O'Grady, K. E. (2012). Longitudinal predictors of past-year non-suicidal self-injury and motives among college students. *Psychological Medicine, 42*(4), 717-726. http://dx.doi.org/10.1017/S0033291711001814

Wilkinson, P., & Goodyer, I. (2011). Non-suicidal self-injury. *European Child & Adolescent Psychiatry, 20*(2), 103-108. http://dx.doi.org/10.1007/s00787-010-0156-y

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). *The American Journal of Psychiatry, 168*(5), 495-501. http://dx.doi.org/10.1176/appi.ajp.2010.10050718

World Health Organization (WHO), 2014. Suicide prevention (SUPRE). Retrieved April 3, 2014, from http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/.

Yen, S., Pagano, M. E., Shea, M. T., Grilo, C. M., Gunderson, J. G., Skodol, A. E., . . . Zanarini, M. C. (2005). Recent life events preceding suicide attempts in a personality disorder sample: Findings from the collaborative longitudinal personality disorders study. *Journal of Consulting and Clinical Psychology, 73*(1), 99-105. http://dx.doi.org/10.1037/0022-006X.73.1.99

Yen, S., Shea, T., Pagano, M., Sanislow, C. A., Grilo, C. M., McGlashan, T. H., . . . Morey, L. C. (2003). Axis I and axis II disorders as predictors of prospective suicide attempts: Findings from the collaborative longitudinal personality disorders study. *Journal of Abnormal Psychology, 112*(3), 375-381. http://dx.doi.org/10.1037/0021-843X.112.3.375

Zetterqvist, M., Lundh, L.-G., Dahlstrom, O., & Svedin, C.G. (2013). Prevalence and function of non-suicidal self-injury (NSSI) in a community sample of adolescents, using suggested DSM-5 criteria for a potential NSSI disorder. *Journal of Abnormal Child Psychology*, 41, 759–773. http://dx.doi.org/10.1007/s10802-013-9712-5.

Zila, L. M., & Kiselica, M. S. (2001). Understanding and counseling self-mutilation in female adolescents and young adults. *Journal of Counseling & Development, 79*(1), 46-52. http://dx.doi.org/10.1002/j.1556-6676.2001.tb01942.x

Zubrick, S. R., Hafekost, J., Johnson, S. E., Lawrence, D., Saw, S., Sawyer, M., … Buckingham, W. J. (2016). Self-harm: Prevalence estimates from the second Autralian Child and Adolescent Survey of Mental Health and Wellbeing. *Australian & New Zealand Journal of Psychiatry, 50*(9), 911-921. doi: 10.1177/0004867415617837

Appendix A
The SAFE Database Form

SAFE **DATABASE**
Version 1.3 (Feb 7, 2011)

Day Month Year
DATE:

Your Level of Training (circle):
Med Student Psych Resident (and circle year: 1 2 3 4 5) Off-service Resident Staff Psychiatrist

PHIN ***MUST be filled out***

GENDER (please circle) **M** **F**

7A SCALE

	Present (please circle)	Absent (please ☑)	Unknown (please ☑)
Abuse: Childhood Sexual or Physical Abuse	1		
Anxiety Disorder	1		
Acute Stressor	1		
Aggression or Impulsivity	1		
Access to Firearms	1		
Ambivalence about Living	1		
Active Suicidal Ideation	1		

Total Point Score: ___

SAD PERSONS

	Present (please circle)	Absent (please ☑)	Unknown (please ☑)
S- Sex (Male)	1		
A- Age (<19 or >45)	1		
D- Depression or Hopelessness	1		
P- Previous Attempts or Psychiatric Care	1		
E- Ethanol or Substance Abuse	1		
R- Rational Thinking Loss (Psychosis)	1		
S- Social Support Lacking	1		
O- Organized Plan or Serious Attempt	1		
N- No Spouse	1		
S- Sickness (Chronic Pain or Physical Illness)	1		

Total Point Score: ___

C-CASA
(Please check the one that BEST applies to the current presentation):

1. ____ Suicide attempt
2. ____ Preparatory acts towards imminent suicidal behavior
3. ____ Suicidal ideation
4. ____ Self-injurious behavior; No suicidal intent
5. ____ Self-injurious behavior, intent unknown
6. ____ Not enough information
7. ____ Presentation did not feature suicidality or self-injurious behavior

Was person intoxicated during above behavior?
Please circle: Yes No

If item 1 is checked on the C-CASA, please fill out the following 2 sections:

METHOD OF ATTEMPT
(Check all that apply)

____ Carbon monoxide or other gas poisoning
____ OTC or prescription medication overdose
____ Alcohol or illicit drug overdose
____ Laceration or stabbing
____ Firearm
____ Hanging
____ Jumping
____ Drowning
____ Other (please describe)_____

REACTION TO SURVIVAL
(Check MOST appropriate)

____ Glad to be alive
____ Ambivalent
____ Wished they were dead

Clinician prediction for likelihood of **each** of the following outcomes in the next 6 months (please circle):

Suicide Attempt:	0	1	2	3	4	5	6	7	8	9	10
Non-lethal SIB:	0	1	2	3	4	5	6	7	8	9	10
Suicide:	0	1	2	3	4	5	6	7	8	9	10
	NO LIKELIHOOD										VERY HIGH LIKELIHOOD

Appendix B
The SAD PERSONS Scale

	Present (please circle)	**Absent** (please ☑)	**Unknown** (please ☑)
S- Sex (Male)	1		
A- Age (<19 or >45)	1		
D- Depression or Hopelessness	1		
P- Previous Attempts or Psychiatric Care	1		
E- Ethanol or Substance Abuse	1		
R- Rational Thinking Loss (Psychosis)	1		
S- Social Support Lacking	1		
O- Organized Plan or Serious Attempt	1		
N- No Spouse	1		
S- Sickness (Chronic Pain or Physical Illness)	1		

Appendix C
Other Variables in the SAFE Database

	Present (please circle)	**Absent** (please ☑)	**Unknown** (please ☑)
Abuse: Childhood Sexual or Physical Abuse	1		
Anxiety Disorder	1		
Acute Stressor	1		
Aggression or Impulsivity	1		
Access to Firearms	1		
Ambivalence about Living	1		
Active Suicidal Ideation	1		

Appendix D
Columbia Classification Algorithm of Suicide Assessment (C-CASA)

Classification/Category	Definition
Suicidal events	
Completed suicide	A self-injurious behavior that resulted in fatality and was associated with at least some intent to die as a result of the act.
Suicide attempt	A potentially self-injurious behavior, associated with at least some intent to die, as a result of the act. Evidence that the individual intended to kill him/herself, at least to some degree, can be explicit or inferred from the behavior or circumstance. A suicide attempt may or may not result in actual injury.
Preparatory acts toward imminent suicidal behavior	The individual takes steps to injure him- or herself, but is stopped by self or others from starting the self-injurious act before the potential harm has begun.
Suicidal ideation	Passive thoughts about wanting to be dead or active thoughts about killing oneself, not accompanied by preparatory behavior.
Nonsuicidal events	
Self-injurious behavior, no suicidal intent	Self-injurious behavior associated with no intent to die. The behavior is intended purely for other reasons, either to relieve distress (often referred to as "self-mutilation," e.g., superficial cuts or scratches, hitting/banding, or burns) or to effect change in others or the environment.
Other, no deliberate self-harm	No evidence of any suicidality or deliberate self-injurious behavior associated with the event. The event is characterized as an accidental injury, psychiatric or behavioral symptoms only, or medical symptoms or procedure only.
Indeterminate or potentially suicidal events	
Self-injurious behavior, suicidal intent unknown	Self-injurious behavior where associated intent to die is unknown and cannot be inferred. The injury or potential for injury is clear, but why the individual engaged in that behavior is unclear.

Not enough information	Insufficient information to determine whether the event involved deliberate suicidal behavior or ideation. There is reason to suspect the possibility of suicidality but not enough to be confident that the event was not something other, such as an accident or psychiatric symptom. An injury sustained on a place on the body consistent with deliberate self-harm or suicidal behavior (e.g., writs), without any information as to how the injury was received, would warrant placement in this category.

Appendix E
Chart Review Data Capture Sheet

Date of Birth	
Marital Status	Married/Common Law
	Single
	Widowed
	Separated/Divorced
Employment Status	Employed
	Unemployed
Highest Education Level Achieved	Less than High School
	High School Graduation
	Some Post-secondary Education
	University Degree or College Diploma

Axis I Diagnoses at Presentation					
Axis II Diagnoses at Presentation					
Current Smoker	No	Yes	NK	Years smoked:	Age at First Use:
	Number of cigarettes smoked daily (circle one): (A) 1-9 (B) 10-20 (half-pack per day) (C) >20 (pack per day) (D) Not specified				
Alcohol Use History	Current Alcohol Use (Y/N/NK): If not, Past Use (Y/N/NK):				
	Current Alcohol Abuse (Y/N/NK):				
	Current Dependence (Y/N/NK):				
Drug Use History	Drug Types Used Currently:				
	Drug Types Used in Past:				
	Drugs Meeting Current Abuse:				
	Drugs Meeting Current Dependence:				
Prior Psychiatric History	Previous SH (Y/N/NK): If Yes: (A) SA (B) NSSI (C) NK				
	Previous Axis II Dx:				
	Previous Psychiatric Care (Y/N/NK):				

Disposition (Circle one)	(A) Admitted to Psychiatry (B) Sent to Crisis Stabilization Unit (C) Discharged with new referral (i.e. Brief Treatment program) (D) Discharged to usual care (E) NK
Admitted to Psych Hospital Following ER Presentation	Admitted to: (A) HSC (B) St. Boniface (C) Other (D) NK
	Length of admission (days):
	Discharge Diagnoses: Axis I: Axis II:
	Post-Discharge Follow-Up Plan: (A) Day Hospital (i.e. STAT) (B) GP (C) Private Psychiatrist (D) Outpatient Psych Program (E) Other

NK = Not Known, SH = Self-Harm, NSSI = Non-Suicidal Self-Injury, SA = Suicide Attempt.

*Diagnostic information from admission note